

# Xylan

## Fluoropolymer Coatings



### **A comprehensive introduction to the 1000 Series (tough industrial applications) and the 8100 Series (safe for food contact)**

Whitford Corporation was organized in 1969 to develop, manufacture and market fluoropolymer and other high-performance coatings.

Whitford's first product was Xylan 1010, a coating which enjoyed immediate acceptance as an engineering material. Today, Xylan 1010 is still the most versatile, most dependable, most successful industrial fluoropolymer coating in the world.

#### **Xylan coatings have unique properties**

Xylan coatings differ from traditional fluoropolymer coatings in one very important aspect — they are composite materials. Lubricants with the lowest known coefficient of friction are combined in a matrix with the newest high-temperature organic polymers. United, these polymers form "plastic alloys" with highly beneficial properties:

1. Low friction: as low as 0.02.
2. Wear resistance: even under extreme pressures.
3. Corrosion and chemical resistance: in most environments.
4. Weather resistance: against sunlight, saltwater, road chemicals, many hostile environments.
5. Wide range of operating temperatures: from  $-420^{\circ}$  to  $+550^{\circ}\text{F}$  ( $-250^{\circ}$  to  $+285^{\circ}\text{C}$ ).
6. Flexible curing schedule: ambient to  $750^{\circ}\text{F}$  ( $400^{\circ}\text{C}$ ).
7. Wide color range: color-code your product.
8. Pliability: Xylan coatings will bend freely and repeatedly without breaking.
9. Machinability: apply multiple coats of Xylan coating (most formulations) and mill to specification.
10. Excellent adhesion: to most metals, plastics, ceramics, wood, even to itself (most formulations).

## How to apply Xylan coatings

The long-term service life of any coating depends to a great degree upon how well it is applied. Ideal application procedures are detailed in the following paragraphs.

### Substrate preparation

Xylan coatings provide excellent adhesion to a variety of substrates, yet require a minimum of surface preparation. Final product quality, however, demands careful surface preparation. The part must be free of all contaminants (oil, grease, detergent, blast media, buffing compound, etc.). Contaminated substrates will cause poor adhesion of the coating material to the substrate or defects in the dry film.

Most applications require only a solvent wipe or vapor degreasing of the substrate to remove surface contaminants. Some applications may require additional surface preparation in order to enhance adhesion (such as grit blasting with aluminum oxide).

### Material preparation

Mix the coating by shaking the container or stirring the contents until any settling has been eliminated. It is imperative that the coating material be adequately dispersed.

The viscosity of Xylan coatings is generally suitable for application as supplied. However, some viscosity adjustment may be necessary depending upon the type of equipment employed. Refer to the Product Data Sheet for the recommended "thinning" solvent.

## Method of application

Xylan coatings are applied by conventional air spray techniques. Any spray gun apparatus associated with the application of fluoropolymer coatings will provide a uniform film without difficulty. Other methods of application, which have been successfully utilized, include airless, HVLP and electrostatic units (air and disk).

### Curing procedure

Coated parts may be cured immediately or be accumulated for a batch oven.

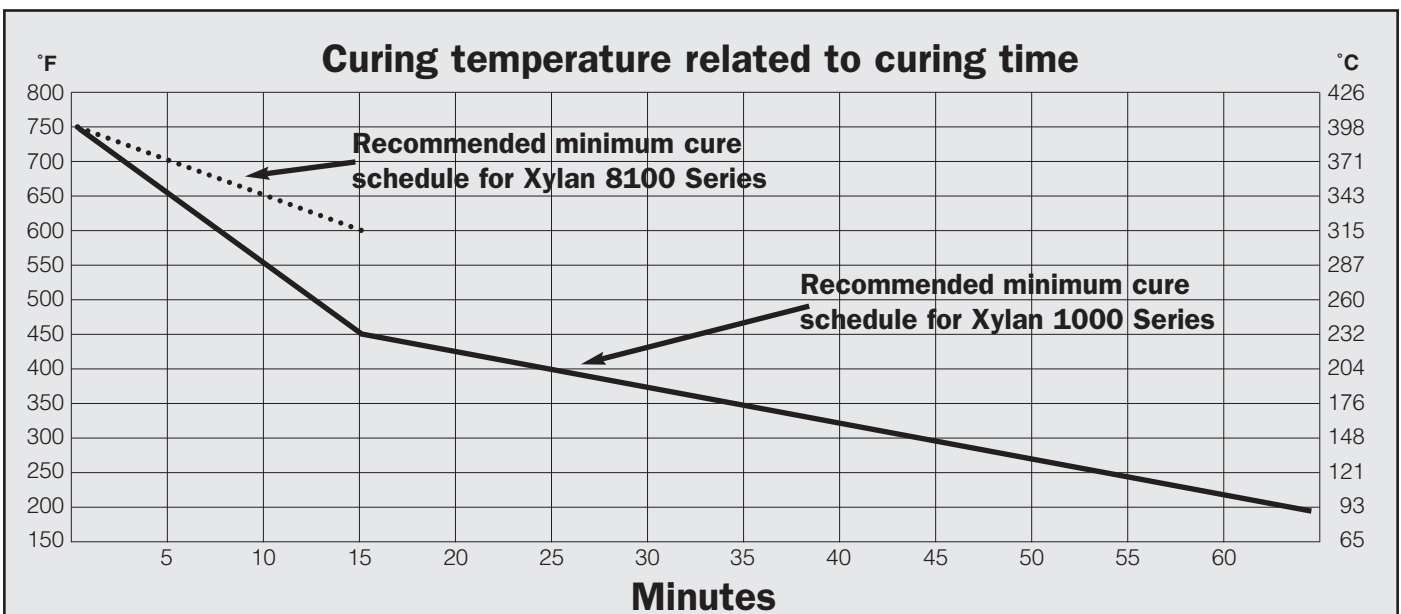
Whitford recommends a cure of 10 minutes at 450°F (230°C) for Xylan 1000 Series coatings or 15 minutes at 600°F (315°C) for the 8100 Series coatings. Other time/temperature relationships may be used (see graph). Optimum dry film characteristics are obtained when the coating is cured per our recommendations. Temperature means part metal temperature (PMT), not oven temperature.

### Safety

As with any paint or coating, proper handling is important for safety. Request and read the Material Safety Data Sheet (MSDS) for each coating before use.

### Substrate information

Xylan 1000 Series coatings demonstrate excellent adhesion to a variety of materials. Simple test procedures will determine if Xylan coatings will bond to a new or untried substrate material.



## Physical properties

Property	Units	Value
Tensile strength	psi	2,000 to 4,000
Elongation	%	35 to 50
Water absorption	%	0.03
Service temperature		
Continuous	°F/°C	500/260
Intermittent	°F/°C	550/285
Pencil hardness		H to 6H
Dielectric strength	v mil	1,200 to 2,000
Coefficient of friction		0.02 to 0.10
Wear resistance (K-factor)	$\frac{\text{cu. in.} \cdot \text{min.} \times 10^{10}}{1 \text{ lb.} \cdot \text{ft.} \cdot \text{hr.}}$	6 to 8

## Corrosion resistance

The data presented below are intended to be used only as a guide. Your choice of Xylan coating must be subjected to your test procedures prior to its use in any chemical environment.

All tests were conducted at room temperature except as noted. All test results assume a pinhole-free coating film.

Chemical	Concentration %	Hours	Effect
Water:			
Deionized - boiling	100	1000	None
Salt (immersed)	30	4000	None
Salt (spray)	5	1000	None
Tap 250°F/120°C @10,000 psi	100	24	None
Acids:			
Hydrochloric	36	24	None
Hydrochloric	15	150	Slight
Hydrochloric	2 pH	300	None
Hydrochloric (125°F/50°C)	2 pH	300	None
Sulfuric	25	1500	None
Nitric	35	24	None
Picric	Saturated solution	120	None
Base:			
Caustic	2	24	None
Caustic	100	336	Slight
Caustic	12.5 pH	150	Slight
Caustic	9.5 pH	300	None
Caustic (125°F/50°C)	9.5 pH	300	Slight
Solvents:			
Acetone	100	1500	None
Benzene	100	1500	None
DMAC	100	1500	None
Ethanol	100	1500	None
Fluorocarbons (12, 22, 113)	100	1500	None
M.E.K.	100	120	None
Methanol	100	1500	None
Methylene Chloride	100	1500	None
Perchloroethylene	100	1500	None
Phenol	5	120	None
Toluene	100	120	None
Xylene	100	1500	None
Other fluids:			
Skydrol (hydraulic fluid)	100	1500	None
JP-4 (jet fuel)	100	1500	None
Brake fluid (auto)	100	1500	None
H <sub>2</sub> O + gas at 250°F/ 120°C @2000 psi	79% CH <sub>4</sub> , 6% CO <sub>2</sub> , 15% H <sub>2</sub> S	24	None

## Coefficient of Friction

C<sub>f</sub> is a term much misunderstood and depends upon many factors including pres-

sure, speed and temperature. The friction of Xylan coatings is relatively constant over a range of increasing pressure from 0.2 psi to 400,000 psi and from liquid hydrogen temperatures of -420° to +550°F (-250° to 285°C). As speed increases, the C<sub>f</sub> increases but remains well below (better than) the values of other dry-film lubricants.

Because of the film transfer of PTFE from coating to mating part, frictional values are similar for all mating materials as long as the surface finish is 50rms or better (smoother).

Frictional oscillation (stick-slip, chatter) is virtually nonexistent. It is this ability to perform uniformly over a wide range of conditions that distinguishes these coatings from other dry-film lubricants.

## Xylan 1000 Series and 8100 Series coatings

The Xylan 1000 Series, with a variety of color choices, is ideal for industrial and mechanical applications. The 8100 Series is ideal for food-contact applications. Low-VOC versions of both Xylan 1000 and 8100 Series coatings are available.

Whitford has water-reducible systems comparable to the highly successful coatings described below.

**Note:** Every version of the 1000 and 8100 Series is DMF-free.

**Xylan 1006 and 8106** contain the highest percentage of PTFE lubricant of the Series.

**Xylan 1010 and 8110** provide the optimum combination of low friction, wear resistance and high-temperature release.

**Xylan 1014 and 8114** alter the ratio of PTFE lubricant to bonding polymers to achieve a harder, more abrasion-resistant coating with the least sacrifice in frictional values.

**Xylan 1052** contains a number of high pressure (EP) lubricating solids selected to increase the load-bearing capability and life of the basic coating while maintaining an extremely low coefficient of friction. There is no equivalent in the 8100 Series.

**Xylan 1070** excels in applications requiring a dry-film lubricant effective against a broad spectrum of chemicals and corrosives. There is no equivalent in the 8100 Series.

**Whitford manufactures the  
world's largest, most complete line  
of fluoropolymer coatings.  
This includes Dykor<sup>®</sup>, Eclipse<sup>®</sup>,  
Excalibur<sup>®</sup>, Quantum2, QuanTanium<sup>®</sup>,  
Superglide<sup>®</sup>, Ultralon<sup>®</sup>, Xylac<sup>®</sup>,  
Xylan<sup>®</sup> and Xylar<sup>®</sup>.**

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