

# COATING WORLD

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SPECIAL REPORT ON THE USE OF FLUOROPOLYMER COATINGS IN THE INDUSTRIAL WORLD

## Whitford Revamps Xylan® 1000 Series: New 1420s Offer Low VOCs, Improved Performance

The R&D laboratory at Whitford Plastics in Runcorn, UK, has been working with Whitford Corp (USA) on a new series of coatings with all of the performance of the 1000 series but *without* the restrictions of VOCs.

The result: the Xylan 1420s, VOC-compliant, resin-bonded, thermally cured, single-film dry lubricants. Xylan 1420s can be applied to many types of substrates such as aluminum, brass, high-alloy steels, carbon steel, stainless steel, titanium and zinc plating. The series includes Xylan 1420, 1421, 1424, 1425 and 1427.

The Xylan 1420s are not only as good as the 1000 series, they are better in many ways. For example:

- The 1420s provide improved corrosion resistance in both ASTM B-117 and Kesternich DIN 50018.
- The 1420s have a wider range of resistance to chemicals (including caustics/bases).



Why settle for this...



...when you can have this?

- The 1420s are impervious to all of the new hydraulic fluids used in aggressive environments offshore.
- The 1420s are available in similar colors to the 1000 series.
- The 1420s have a lower final cure for temperature-sensitive substrates.
- Every version of the 1420 series is well below Federal limits for VOCs and is environmentally acceptable.

### One drawback

The 1420s do not (yet) offer as wide a range of operating temperatures as the 1000 series. They perform best in the -40°C/-40°F to

190°C/375°F range and up to 204°C/400°F intermittently.

### Corrosion resistance

Xylan 1420 coatings applied at 1 mil (25 microns) dry-film thickness over zinc-phosphated steel panels exceed 1500 hours of ASTM B-117 salt fog testing. With the same pretreatment, they reach 30 cycles DIN 50018 (2.0 liters SO<sub>2</sub>) Kesternich Test — both with less than 15% red rust.

The new Xylan 1420 coatings will provide even better corrosion protection if used over a sacrificial primer such as Xylan P-5211, Xylar® 1 and Xylar P-51, or over Xylan P-501.

### Physical properties

- Pencil hardness: 2-3 H.
- Dielectric strength: 500 V/mil.
- Coefficient of friction: 0.03.
- VOC Content/Series Avg.: 3 lbs/gal (360 gms/l).

### Chemical resistance

The Xylan 1420 series of coatings will withstand most solvents, waters, automotive fluids and fuels up to 93°C/200°F.

For more information, send for our brochure, "Fastener-Class Coatings" (shown on page four) or contact any of the Whitford offices (see addresses on back).

### How Xylan 1420 stands up to chemical environments

Chemical Environment	Changes after 24 hours
HCl (concentrated) @room temp. ....	No change
HCl (pH 2) @room temp. ....	No change
HCl (pH 2) @52°C/125°F ....	No change
NaOH (50%) @room temp. ....	No change
NaOH (12.5%) @room temp. ....	No change
NaOH (pH 9.5) @52°C/125°F ....	Slight mark
MEK @room temp. ....	Slight mark
Toluene @room temp. ....	Slight mark
Castrol hydraulic fluid @93°C/200°F ....	Gloss decrease: 25.6 to 24.1. No loss in coating integrity.
Oceanic hydraulic fluid @93°C/200°F ....	Gloss decrease: 29.9 to 10.3. Color lightened slightly. No loss in coating integrity.

Test Method: ASTM D1308-79



The newly renovated R&D facility at Whitford Worldwide's headquarters in the USA: Good news for Whitford customers everywhere.

## 6 New Laboratories, New Equipment, Help Drive Research And Development At Whitford

Whitford has just made a significant investment to improve its USA laboratory facility.

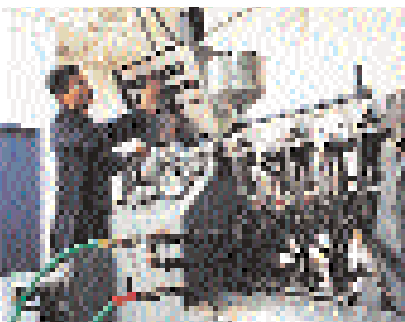
The laboratory has been moved next to manufacturing and has been expanded into six individual labs:

1. Development: new products.
2. Technical services: product modification and customer support.
3. Applications: production-line simulation, process improvement.
4. Powder coatings: product development, small-scale production.
5. Analytical: quality control, testing and coating analysis.
6. Environmental: corrosion and weathering testing.

### Breadth of testing equipment

Whitford's new lab now has the following equipment:

- Infrared spectroscopy.
- Elemental analysis by Atomic Absorption spectroscopy.



The capacity to extrude in-house speeds up the development of products.

- Measurement of coefficient of friction by several methods.

- Two extruders.
- Kesternich cabinets.
- Salt-spray cabinets.
- Accelerated weathering tester.
- Melt indexer.
- Continuously operating dishwasher.
- Continuous, automatic stainless-steel washer for etching substrates.
- Laser particle-size analyser.
- Karl Fischer Titrimeter for moisture analysis.
- Reciprocating abrasion tester.
- Mechanical scratch tester (a Whitford development).
- Knife and Spatula scratch tester (another Whitford development).
- Tensile strength tester.
- Roller coater.
- Two curtain coaters.
- Digital recording of test results with central computer files accessible by tech service and sales.
- Coming: surface-tension measurement technology.

### Double the space

The previous laboratory occupied 3,000 square feet. The new labs occupy a total of 6,000 square feet.

There are new common areas:

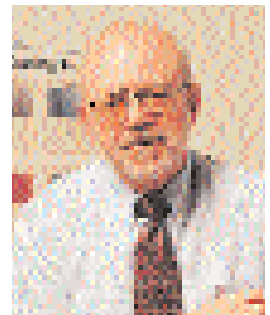
- Larger oven room with im-

proved ventilation.

- Large spray room with an isolation area for operations requiring a clean room.
- Powder-coating room.

All these areas are centralized for easy access from any of the surrounding labs.

Says Mike Miller, worldwide technical manager, "We're just beginning to do what we want to do. But our objectives are clear:



Mike Miller, worldwide technical manager and lord of the new lab.

1. Greater and faster sharing of information.
2. Uniformity in documentation and reporting.
3. Emphasis on Centers of Excellence.
4. Improve training/knowledge of technical staff.
5. Emphasis on new product development.
6. Make products easier to use, more environmentally friendly.
7. Develop a base of intellectual property to carry Whitford into the future."

Sounds like a busy time for the R&D team at Whitford.



Brian Willis

## Go Ahead: Ask Brian Willis

**E**ditor's note: A standard feature of this and future issues of *CoatingWorld* is a "Help" column hosted by Brian Willis of Whitford Corporation. Brian is our in-house expert on the use of high-performance fluoropolymer coatings in all kinds of industrial applications.

If you have any pressing questions you'd like answered, send them to Brian or to any of the Whitford offices at the addresses on the next page.

### Question:

"Should Xylan coatings be applied to anodized aluminum?"

### Brian's answer:

"There is no reason not to — provided it is hard-anodized aluminum. In fact, hard anodizing is an excellent pretreatment for Xylan coatings.

"The hard-anodizing process creates a deep, jagged profile with a high peak density. This creates "tooth", something for the coating to hang on to. And that means much better adhesion.

"Anodizing" (not "hard anodizing") is different in that it is a chemical process. It is much gentler, and does little more than alter

(darken) the color of the aluminum. It does not improve the surface for coating.

"Hard anodizing is an electrochemical process, which is why it has so significant an effect on the surface.

"One additional benefit of hard anodizing is that it increases the surface hardness of the aluminum. This, in turn, helps reinforce the coating, making it more durable.

"There is one problem, however. The last step in the anodizing process is a rinse to seal the surface. This rinse is usually water, or a solution of water and FEP.

"Either way, it will interfere with the adhesion of fluoropolymer coatings. So if you want to coat over anodized aluminum, you must eliminate the sealer step.

"Incidentally, freshly anodized aluminum tries to seal itself, using the moisture in the atmosphere. This, too, interferes with proper adhesion.

"The best way to process hard-anodized aluminum is (1) to coat the aluminum unsealed and (2) coat within two hours of the anodizing, before the tendency to self-seal can get underway."

## Two New Devices For Lab

Whitford's U.S. laboratory has purchased two new pieces of technical equipment to help in the analysis of materials and the improvement of the production process.

The first is a Differential Scanning Calorimeter. A DSC measures the melting points and glass transition temperatures of polymers (the temperature at which a polymer ceases to be brittle and begins to be flexible). It also provides estimates of molecular weight. The DSC can determine whether a fluoropolymer



coating contains PTFE, PFA or FEP and the relative amounts of each.

The second is a mini-Netzsch, a small-media, high-energy mill for dispersing pigments and polymers. It allows the lab to prepare pigment pastes and resin bases for samples, evaluate new materials rapidly and accurately, and provides scale-up information for the production-size Netzsch mills in the factory.



## New Industrial Bakeware Coatings Save Energy, Last Longer, Withstand Sugar (And Abuse) Better

Whitford Plastics Ltd. offers 3 new Dykor® powder coatings for the industrial bakeware market. Sales have been primarily to UK coaters, although many coated pieces have been supplied to bakeries across Europe.



### 1. Dykor 810

This is a PFA-based powder applied “dry-on-wet” over Xylan Coal Black primer 4060/F2726. It has superb resistance to wear and to

hot, steamy environments.

The coating also offers excellent nonstick/release properties and passes Whitford’s TM 171K with no loss of adhesion (test procedure available on request).

### 2. Dykor 850

This FEP-based coating system has been developed to compete against dispersion-based coatings currently used in the Industrial bakeware market where foodstuffs high in sugar content are prepared. It is applied “dry-on-wet” over Xylan Green primer 4060/F8105.

Dykor 850 is easy to apply compared to typical multicoat liquid-FEP systems. With good electrostatic spray properties, it provides speedy application and accurate control of

film thickness. And energy costs are reduced significantly, given that traditional 3-coat dispersion systems require three flash-off/cure stages.

### 3. Dykor 870

Based on a new fluoropolymer, this coating competes against PFA systems currently used in the industrial bakeware market. It is applied “dry-on-wet” over Xylan Black primer 4060/F9791. The resultant coating film provides a high-gloss finish and improved nonstick characteristics as it flows out to a smoother, more slippery film than PFA-based systems

All three coatings are engineered to be tough, capable of withstanding the abuse that straps, trays and molds encounter in normal use.



## Three New Brochures From Whitford (Yours For The Asking)

Three Whitford publications are now available to all who would like to take advantage of the information they offer.

The first, “Fastener-Class Coatings from Whitford”, provides a detailed explanation of the various coating options available for fasteners, including the new Xylan 1420s Series featured on page 1 of this issue of “CoatingWorld”.

It explains the coatings, pretreatments and primers. It includes a chemical resistance chart that shows

how each coating stands up to 14 common chemical environments.

The second, “Do you suffer from these 9 dangerous misconceptions about Xylan coatings?”, attacks some of the wrong assumptions that are made about what these coatings can and cannot do.

The third, “Getting started with Xylan”, explains the basics of using fluoropolymer coatings.

For free copies, please contact Whitford (any office) at the addresses listed on this page.

For more information, please contact Whitford

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