

COATING WORLD[®]

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SPECIAL REPORT ON NONSTICK COATINGS AND HOUSEWARES FOR RETAILERS

Understanding Nonstick Coatings: What The Differences Are And Why Some Are Better Than Others

Nonstick coatings are a dynamic and often confusing category — as much for the consumer as for those who source and buy the merchandise.

This issue of *CoatingWorld* provides the basic information needed to manage this category. It focuses on *interior coatings* (external and decorative coatings will be discussed in a future issue).

A brief history

Nonstick coatings began reaching the consumer on fry pans in the early 1960s. The first nonsticks were made primarily of polytetrafluoroethylene (PTFE). PTFE has the lowest coefficient of friction of any known solid. In simple terms, this means that materials do not stick to it (PTFE's low coefficient of friction "releases" the food-stuffs, making it easy to separate them from the coating). Therefore, on nonstick pans, most substances are easily removed from the surface.

Unfortunately, PTFE is also very soft and, if unprotected, wears quickly. While early nonsticks had good release, they were soft and wore out after little use. The result: cookware with nonstick coating earned a reputation of being "disposable".

R&D pays off

Over the years, a few manufacturers of nonstick coatings have invested considerably in research and development — and the results have been dra-

matic. Today 3 out of every 4 pieces of cookware and bakeware sold come with a nonstick coating.

That's right: *3 out of 4*.

Nonstick coatings also are used on gadgets and various kitchen utensils as well as key components of small electrics.



Nesco's new Roaster featured on QVC uses titanium-reinforced QuanTanium.

The better, longer-lasting nonstick coatings have proved so superior that they are now used on high-end products. Manufacturers are offering guarantees on the coatings for as long as the life of the product itself.

Nonstick coatings are here to stay. They provide additional features and benefits to a product line as well as enhancing its perceived value.

How to answer important questions

The explosion in the world of nonstick coatings has made it even more difficult for the retailer. There are so

many coatings being offered, all claiming various advantages, that it has become overwhelming. How do you make your selection? How do you know which coating is right for your product? Even if you are not the one who selects the coating, how do you know that you are getting what you are paying for?

In the sections that follow, *CoatingWorld* provides you with the basic information needed to help you address these questions.

The differences among nonsticks

There are two major types of nonstick coatings, which are differentiated primarily by the ingredient used to provide the nonstick characteristic:

1. Fluoropolymer: Any of a number of fluoropolymer resin compounds (principally PTFE) that are solid, non-toxic plastic polymers having inherent nonstick properties.

2. Silicones: These are non-toxic synthetic resins that can be applied to specially prepared metal sur-



Whitford has many different types and levels of nonstick coatings designed for use on bakeware, including new Quantum2.



Cuisinart's line of stainless-steel cookware features Excalibur, the toughest, longest-lasting, most durable nonstick on the market.

faces and bonded to the metal by baking. They are most commonly used on bakeware.

Silicone coatings are cheaper, but they tend to lose their nonstick characteristic sooner than fluoropolymer coatings, and they do not withstand wear very well.

Fluoropolymer coatings retain the nonstick quality far longer and, with advances in coating technology, they are far more resistant to wear.

Anatomy of a coating

There are five basic elements that make up a coating before it is applied:

1. The binder (or resin), which adheres to the surface of the pan. It acts as the “glue”, providing adhesion and cohesion. It also determines the fundamental properties of the coating.

2. The pigment, which provides the color.

3. The nonstick (PTFE, silicone), which provides the release.

4. The reinforcing agents, which strengthen the coating and resist wear.

5. The carrier (water or solvent), in which the other materials are suspended, and which evaporates when the coating is cured.

Now let's take a look at a typical three-coat nonstick to see the differences among the coats, or layers.

1. The primer: It is principally binder, since its primary function is to promote adhesion to the substrate (and provide a foundation for the midcoat and topcoat).

2. The midcoat: This tends to contain more fillers and pigment, which provide excellent hiding power (masking the substrate) and build up the thickness of the coating.

3. The topcoat: This is rich in fluoropolymers, since its primary role is release.

It is generally safe to say that the more coats of nonstick that are applied to a pan, the longer and better the performance will be.

Quality levels

There are five basic quality levels of nonstick coatings on the market today, ranging from the least expensive (with the lowest performance) to the most expensive (with the highest performance and longest life):

1. **One-coat nonsticks:** These are used on inexpensive, opening price-point housewares because they add only a little to the cost of the finished product. They perform adequately, but don't last as long. (Examples: Teflon® and Xylan®.)

2. **Two-coat nonsticks:** This category represents most of the lower-moderate housewares. They have good adhesion to the item, because the first, or primer, coat is formulated for adhesion. They also offer better release (the “nonstick” feature), because the second, or topcoat, usually has a higher percentage of PTFE. (Examples: Teflon II and Xylan Plus.)

3. **Three-coat nonsticks:** These are generally used on upper-moderate housewares, and, due to the formulating of each coat to provide specific benefits, take the advantages of a two-coat nonstick and extend them. (Examples: SilverStone® and Xylan Eterna.)

4. **Three-coat nonsticks that are internally reinforced:** These use microscopic, hard reinforcing elements mixed into the coating to increase the wear and abrasion resistance, and are used on better housewares goods, mostly upper-moderate to gourmet-level products. (Examples: SilverStone Professional, ScratchGuard® [“Platinum” in Europe], Quantum2 and QuanTanium®.)

5. **Three-coat nonsticks that are externally reinforced:** These employ a step in which a reinforcing agent (such as stainless steel) is first sprayed onto the surface of the cookware, forming a series of tiny “peaks” and “valleys” into and over which the nonstick coating is applied. The peaks lock the nonstick into place, protecting it from wear and abrasion. For example, if a metal spatula is used on the surface, it will come in contact primarily with the peaks, leaving the nonstick in the valleys virtually untouched. Used mostly on gourmet-level housewares products. (Exam-

ples: Autograph® and Excalibur®.)

Benefits of nonstick coatings

Obviously, convenience and ease of cleaning are the key enhancements that housewares products with nonstick coatings bring to the consumer.

But there's also the related benefit of *saving time* in the kitchen for the consumer, meaningful in this age of households with two breadwinners.

The health factor is even more important. Before nonsticks, the consumer had to use a lot of oil in a pan to keep food from sticking. With nonsticks, one can use little or no oil — of great importance to anyone concerned about diet.

With all the improvements made to nonstick coatings in recent years, the addition of nonstick to any product can elevate its performance, thus increasing the perceived value.

Selecting the right coating

Below is a basic guide to help you select the coating that is best suited for the product and target market you wish to achieve.

This information is a guide at best. Whitford would be happy to help you in your decision-making process. Please feel free to contact us (see

WHITFORD BRAND	DU PONT EQUIVALENT BRAND
	
	
	
	
	
	

address at the end of page 4).

Whitford's coatings

Whitford offers a variety of coatings. In fact, Whitford manufactures the largest, most complete line of fluoropolymer coatings in the world. We market these nonstick coatings under several brand names.

Xylan, Xylan Plus and Xylan

Eterna form our broad, economical range of one-, two- and three-coat nonstick finishes for cookware, bakeware and small appliances.

Quantum2 is the name for our multi-layer nonsticks doubly reinforced internally to outlast all conventional nonsticks.

QuanTanium is the brand name for our new, multi-layer nonstick internally reinforced with titanium to stand up to almost anything.

Excalibur is our flagship brand, the multi-layer nonstick reinforced externally with stainless steel: the toughest, longest-lasting, most durable nonstick in the world.

“Is my nonstick acceptable to the FDA?”

The previous issue of Coating-World reviewed the issues and con-

HOW TO SELECT THE RIGHT COATING

Product range	Basic specifications	Nonstick suggested
Opening price point/ promotional	Lightweight substrate, price is driving selling point (convenient and economical)	One- or two-coat system (generic or non-branded)
Moderate	Medium-weight substrate, features and benefits are of some importance, but price is still the focus (performance and value)	Three-coat nonstick
Upper moderate/ gourmet	Heavyweight substrate, features and benefits are as important as price (quality, performance and value)	Three-coat systems that are internally and/or externally reinforced

cerns regarding FDA-compliant materials, along with other international regulations.

When buying, developing or sourcing your products, make sure the supplier is able to provide you with a letter or other documentation proving the nonstick complies with the FDA and any other regulations that may apply. In addition, since many brands of nonstick can have several different formulas or series, make sure to confirm the exact one that will be used on your product.

“How do I make sure I’m getting what I paid for?”

In the world of housewares, where many products are on a re-order basis, and with numerous suppliers and manufacturers to deal with, it is not always easy to be sure that you are getting exactly what you ordered.

In many cases this task is difficult: You can measure the thickness of a pan or its diameter, but how do you

make sure the nonstick coating is the one you selected when so many look alike?

Whitford can help.

If you have specified a Whitford coating on your product, we offer free testing to verify that your product comes with that specific coating (and not an adulterated or cheaper version). We also verify whether it has been applied properly.

Whitford does this through our Quality Cooperative Program (QCP). Membership is completely voluntary on the part of the retailer, and is absolutely free.

Simply send us samples of your product, and we will conduct tests to confirm proper application, correct film thickness and vendor compliance on application specifications. (Watch for complete details of our QCP in the next issue of Coating World.)

For re-order products, this is a

valuable service and is one way we are providing support to the retailers.

Who uses Whitford coatings?

Our coatings are used in many countries on a variety of housewares products from cookware to bakeware to gadgets and small electrics. A list of some customers includes:

- Alluflon • Alva • Amana • Ballarini • Benjamin & Medwin • Black & Decker • Brabantia • Bradshaw • Caloric • Chantal • Cheflin • Corning • Cristel • Cuisinart • EKCO • Federated/Macy’s • G&S • Hamilton Beach • HSN • Imusa • Innova Group • Jenn-Air • Joyce Chen • Landers • Larien • Lifetime Hoan • Magefesa • Magic Chef • Maspion • Maytag • Metal Ware • Metro Marketing • Paton Calvert • Penedo • Prestige • Proctor Silex • QVC • Revere • Salton • Sitram • Toastmaster • Tramontina • TVS • Vitrex • West Bend • Williams Sonoma • Windmere.

Frequently Asked Questions

“FAQs” are a regular feature of Coating World.

If you have questions regarding nonsticks or any related subject, please send them to us (see address at end).

Question: “If a nonstick doesn’t stick, then how does it stick to the surface of a fry pan?”

Answer: “One good question with two good answers: chemically and mechanically. But first a word on fluoropolymers (the nonstick ingredient in most coatings).

“Fluoropolymers have very low surface energy, which means other solids and liquids tend to bead up on them rather than spread out over the surface of the nonstick coating. A drop of cold water, for example, beads up on a nonstick because the

drop has higher surface energy. Hot water has lower surface energy, and soapy water even less, which is why it gets underneath foodstuffs and helps remove them from dishes. This low surface energy provides release.

“In scientific measurement (Dynes per cm^2), cold water has a surface tension of 72. Hot water is 56. Soapy water is 40. And PTFE, the nonstick ingredient, has a surface tension of only 21.

“Now the chemical reason: low surface energy helps the nonstick coating (with special adhesive additives) spread out over the surface of the pan, achieving an intimate bond when the coating is cured.

“Mechanically, adhesion is im-

proved by roughening the surface, which creates more area for adhesion as well as little peaks (called “tooth”) for the coating to grab hold of when cured.”

Send questions with your name, address (or email) to: Fran Attilio, Whitford Corp., Box 2347, West Chester, PA 19355-0110, or email: fattilio@whitfordww.com.

Coming in future issues:

- The Quality Cooperative Program: assuring the integrity of your nonstick products.
- Testing coatings for quality.

CoatingWorld is published by Whitford Worldwide, Box 2347, West Chester, PA 19380-0110. Email: sales@whitfordww.com
Web: www.whitfordww.com