

"It's nano!"

"It's green!"

"It's pfoa-free!"

"It's PTFE-free"

"It's ceramic!"

"It's what?"

**If today's coating buzzwords  
confuse you, you are not alone!**

*But there is help. Just turn the page...*

*A little help from your friends at*

**Whitford**

*Makers of the world's largest, most complete line of nonstick coatings*

**H**eadlines have recently been filled with the “hot” buzzwords of the new century. Among the most visible are “global warming” and “alternative energy”, both of which have created tidal waves of controversy that have led to knee-jerk reactions that may well cost the average consumer a fortune in misspent tax dollars, commodity shortages and misguided (however well intentioned) legislation.

The coating industry has not escaped these movements. In fact, a number of “new” (or at least supposedly new) coatings have been offered in the general marketplace. Not all the buzzwords (and the concepts they are assumed to represent) are clearly understood.

So what follows is a summary of the buzzwords, the materials and a brief comparison of their properties.

### **PTFE (fluoropolymer-based) materials**

“Traditional” coatings: These are the products currently available (and that have been available for nearly 50 years). Dramatic improvements have been made in these coatings, and they are arguably still the best available today, but they are still an outgrowth of an earlier technology.

### **PFOA**

A processing aid called perfluorooctanoic acid, or PFOA, is used in the manufacture of the nonstick ingredient (polytetrafluoroethylene, or PTFE, commonly, but unfairly, referred to as “Teflon®”, which is a DuPont registered trademark). The PTFE is then used in the manufacture of these liquid coatings that come to us in the form of a liquid dispersion.

PFOA has been accused of many ills, but has never been proved harmful to humans. More important, PFOA is destroyed in the process of applying and curing the coating on the substrate. No test conducted under normal cooking conditions has ever found any PFOA present in cookware on retail shelves. In addition, PTFE

manufacturers have agreed to reduce the amount of PFOA in their products by 95% (compared to 2000) by 2010, and to eliminate it by 2015. The industry has already met the 2010 schedule, and is well on the way to achieve the elimination of PFOA by 2015.

### **PFOA-free**

**PFOA-free Type 1:** This means that the coatings have been formulated with new materials recently made available from one of the major PTFE producers who manufacture the fluoropolymer *without* using PFOA as the processing aid. This is a development so recent that production quantities of these resins only became available as of the 2nd Quarter of 2008.

These new systems have the same level of properties and performance as the “traditional” materials mentioned above. However, they are currently priced at a premium (based on the increased prices of the PFOA-free PTFE as communicated to Whitford).

**PFOA-free Type 2:** There is another way to achieve coatings that are “PFOA-free”. Engineering resins that contain no fluoropolymers may be used as binder materials and combined with PTFE micropowders (which, as powders, do not use PFOA in the manufacturing process).

Since the amount of PTFE micropowders that can be incorporated into the resin is limited to about 30%, the resulting combination is not nearly so durable as either the traditional or PFOA-free type 1 materials mentioned above. Another sacrifice: The release is not as good (due to the limited amounts of fluoropolymer available).

These softer, less abrasion-resistant products have been used very successfully for many years on bakeware, but they do not have the durability consumers have come to expect of cookware, especially with the newer, reinforced coatings.

### **PTFE-free**

These products have been available for many

years as low-cost, low-performance materials originally produced for steel woks. They have been specified more to keep the woks from rusting than to provide much in the way of release. The release required to cook with little or no sticking of foodstuffs was provided by the oils used in stir frying. These coatings are economical, and can legitimately make the same “green” claims made by other products coming on the market. However, they will not equal the performance of the Type 1 or Type 2 nonsticks, particularly in terms of release and abrasion resistance.

### **Ceramics**

The most recent example of ceramics is the “Green Pan”, introduced first on HSN in 2007 and then at Ambiente in 2008, which uses a sol-gel (ceramic) binder. The advantage: the coating is very temperature-resistant (the manufacturer claims up to 850°F/455°C). The disadvantages: the surface is brittle, has limited resistance to abrasion and it loses what release it has after a few cycles of use, especially if put into the dishwasher (see the coating comparison chart on the next page).

Other problems: the coating is solvent-borne and difficult to apply because of its multiple components which have a very short pot life once the components are mixed together. If the components “kick over” during the process, they must be disposed of, which results in the loss of that material and the cost of disposal. Substantial additional information is available on the claims and truths associated with the “Green Pan”. Contact Whitford for a brochure on the subject (see next page for address).

### **Silicone hybrids**

These are generally a combination of organic and inorganic materials without PTFE. They offer hardness and come in a variety of colors. While not as durable as coatings containing PTFE, they are nevertheless several times more durable than the ceramics (Green Pan), with release properties that last far longer than ceramics. They are

also much easier to apply than the ceramic coatings, using conventional spray application methods without having to mix several components and worry about the pot-life of the mixture.

### **Nano**

One of today's hotter buzzwords, the agreed definition of “nano” is a particle that is less than 100 nanometers (nm) in length. One nanometer is a billionth of a meter. Nano-sized materials have existed forever. Smoke particles are less than 100 nanometers. In recent years much has been claimed for their benefits and the properties they impart to coatings. Some of it is true, most of it is bunk. By definition, nano coatings do not exist, although coatings containing nano particles do exist. Some coatings are better for the addition of nano-sized particles, but the majority are not really changed.

### **Carbon footprint**

Any manufacturing process, from farming to making widgets, releases carbon dioxide into the atmosphere (as does your breathing). Reducing the carbon footprint of a product means that you have done something in the process to reduce the amount of carbon dioxide released. Examples: A hybrid car which burns less fuel than a conventional car. Or recycled paper for packaging which eliminates the step of having to process a tree into paper.

### **Bio, Eco, Green**

These are marketing words and have nothing to do with technology. “Bio” suggests “biology”, and “eco” “ecology”. “Green” is one of the most abused terms, generally used to suggest something which reduces the carbon footprint of the article, making it more environmentally friendly. There are many outlandish green claims being made these days. A similar situation took place with the term “organic”. There were so many misleading organic claims that the Federal Government had to step in and regulate what could be claimed as organic. Something very similar is apt to happen with green.

# Guide to coatings and their characteristics

Type	Appearance	Flexibility	Wear	Release	Ease of application
Traditional	Excellent	Excellent	Excellent	Excellent	Simple
PFOA-free Type 1 Type 2	Excellent Very good	Excellent Very good	Excellent Good	Excellent Good	Simple Simple
PTFE-free	Excellent	Poor	Poor	Good initial	Simple
Ceramics (Green Pan)	Excellent	Poor	Fair	Short-term	Complex
Silicone Hybrid	Excellent	Fair	Good	Good	Simple
ITJ (D8605)	Very good	Poor	Under test	Under test	Simple

## More information?

As marketers have been told for years, “Sell the sizzle, not the steak!” Yet, in the end, what you eat is the steak. So it’s important not to be misled by the marketing “sizzle” rampant today in the promotion of coatings sold under one or more of the buzzwords covered in this report.

Whitford manufactures the largest, most complete line of fluoropolymer coatings in the world. So, if you would like more information on any of the

various coatings discussed here (or indeed any other coatings), please contact your Whitford representative or Whitford directly.

*You can email us at [sales@whitfordww.com](mailto:sales@whitfordww.com) or visit our website ([whitfordww.com](http://whitfordww.com)) and contact the office nearest you. Just go to the home page, click on “Contact Whitford” and select the location most convenient for you.*

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