The Product Knowledge Notebook

A complete guide to nonstick coated housewares products:

- **Basic market segments**
- **Different metals used**
- **Types of nonstick coatings**
- **Making a recommendation**

Introduction

The Product Knowledge Notebook has been produced by Whitford, makers of the largest, most complete line of nonstick coatings in the world.

Its objective is to provide the reader with the basics of the nonstick housewares markets.

Whitford brands of nonstick coatings include Eclipse,® Eterna,® Excalibur,® Fusion,® HALO,® QuanTanium,® Quantum2,™ Quantum350, Skandia,® Xylan,® Xylac,® and other brands.

For more information on PKN, the Product Knowledge Notebook, contact Whitford at: sales at whitfordww.com or visit the web at: productknowledge.com

Background

Nonstick housewares is a dynamic and often confusing category — not only for the consumer, but also for those who sell the merchandise.

Choices range from low-end, lightweight, inexpensive frypans to heavy-duty, high-quality sets that offer lifetime guarantees on the cookware and the nonstick coating. Not to mention similar choices with bakeware and small electrics. Adding to the confusion, new items appear frequently. Advertising claims escalate.

How is one to know what to recommend?

Many shoppers don't really know what they are looking for. And that's where the retail Sales Associate comes in. A basic knowledge of the various types of nonstick cookware, bakeware and small electrics can mean the difference between a lost sale and a healthy trade-up to higher-margin items.

This brief guide is intended to provide sufficient background for the retail salesperson so that he or she can respond to customers' questions confidently and lead customers to the nonstick houseware products most suited to their needs.

The market

First, a quick look at how the nonstick houseware market breaks down.

There are essentially three basic segments. Each segment will dictate the type of metal used, the kind of handle and the quality level of nonstick selected.

1. Opening Price Point (mass market): This is a highly price-sensitive segment, where quality is often compromised in favor of a small saving per piece (which, given high volumes, makes a significant difference to the manufacturer and the marketer). In terms of units sold, this is the largest of the segments.

2. Moderate (middle market): This covers a broad price range and a broad quality range, but, in general, offers products of higher quality with better nonstick coatings. Guarantees on both product and nonstick coatings are common.

3. Gourmet (high-end market): In this segment, the product is heavier, longer-lasting, almost always guaranteed and, of course, pricey. The highest-quality nonsticks are used, and most of them carry guarantees, some for the life of the cookware (product) itself.

The types of metal used

The kind and the thickness (gauge) of metal used for housewares are a direct reflection of the market segments into which the finished product will be sold.

Pots and pans are produced in two basic ways:

a. Cut from a sheet or coil of metal and pressed into shape in a die, or...

b. Formed by pouring molten metal into a die or mold, where it forms into the shape desired.

1. Steel (non-stainless): This can range from low-cost, thin-gauge metal for the low-end market to heavy gauge with porcelain enamel exteriors for the middle- and high-end markets.

Steel has a disadvantage compared with other metals: it is not as good a distributor of heat. The thinner the gauge, the more likely the cookware is to produce "hot spots" (caused by the hob or flame underneath the pan). These hot spots tend to burn food and, if extreme, can damage the nonstick coating.

The thicker the gauge, the less likely that hot spots will appear, but even in thick gauges steel remains a poor distributor of heat.

At the upper end, some manufacturers incorporate a "sandwich" bottom, adding a sheet of aluminum to the metal base (to improve heat distribution across the bottom of the pan).

Another problem with steel: it rusts. So the exteriors of nonstick steel pans are generally coated to avoid the problem.

2. Aluminum: Aluminum also runs the gamut from thin, low-end products to heavy-gauge cookware and bakeware sold in expensive boutiques. With the exception of copper, aluminum distributes heat better and more evenly than all other metals used in cookware, which is why it is so widely used.

Aluminum has another advantage over steel in that it is *lighter*, making it cheaper to ship and easier to use in the kitchen.

Just as steel rusts, aluminum will oxidize (discoloring, or developing "hazing"), especially if exposed to standard detergents in a dishwasher. So, like steel, it is generally coated on the exterior.

A more expensive kind of aluminum is "hard-coat anodized". This is the result of an electro-chemical process used to harden the surface of the aluminum and prevent oxidation. It produces a gun-metal-grey color, and is very popular in the upper-middle segment of the nonstick cookware market.

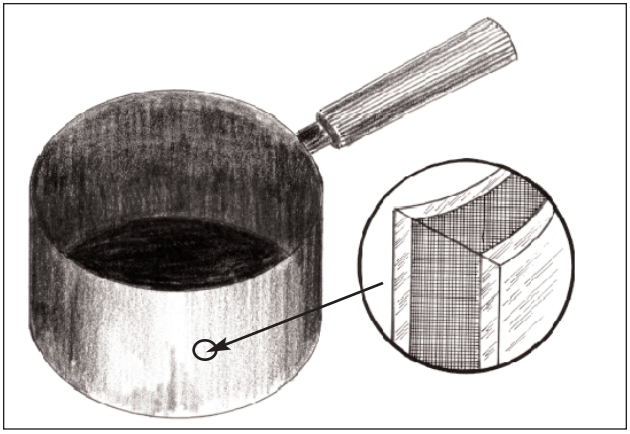
3. Stainless steel: This kind of steel is "stainless" because the steel is mixed with a variety of expensive alloys, which add to its cost. So cookware made from it tends toward the upper end of the market.

Stainless steel suffers from the same problem as ordinary steel: it is a poor distributor of heat. Manufacturers resolve the problem by adding a plate of more conductive aluminum or copper to the bottom. In the more expensive lines, a "sandwich" is created, encapsulating the heat-conducting metal in stainless steel.

Stainless can range from "bi-ply" (stainless/aluminum) to "tri-ply" (stainless/aluminum/stainless) to 5 or more plies.

One distinct advantage of stainless steel is its eye-catching gleam at point-of-sale (easily maintained by the user).

Given the reputation of stainless for long life (and the early reputation of nonsticks



Cross section of "tri-ply", with stainless on the two outsides, and aluminum in the middle.

for poor resistance to wear), it was the metal that most resisted adopting nonsticks. It wasn't until the development of Excalibur,® the externally reinforced nonstick known as "the world's toughest, longest-lasting, most durable nonstick", that nonstick coatings were accepted at the top of the market and proved their ability to stand up to tough treatment.

4. Cast products: Products made from the metals mentioned above are all "pressed" into final shape from sheets of metal, whether they be aluminum, steel or stainless steel.

Another method of forming pots and pans exists: casting.

In the casting process, the metal is melted, then poured into a mold which has the shape of the final cookware or small electric. The metal cools and solidifies, and the cast shape is removed for finishing. Metals most commonly used for casting are iron and aluminum.

Some nonsticks are engineered to give great release on cast aluminum small electrics.

Cast aluminum products are generally much thicker than the pressed equivalent, since it is difficult to cast a thin-walled piece. Another reason is that thicker metal provides better heat distribution and minimizes overheating and "hot spots". Cast iron in particular holds its heat for a long time, making it ideal for use as a serving piece and for high-temperature cooking (such as blackened fish).

What you should know about nonstick coatings

Here are the basics on this important and fast-growing housewares category:

Brief history

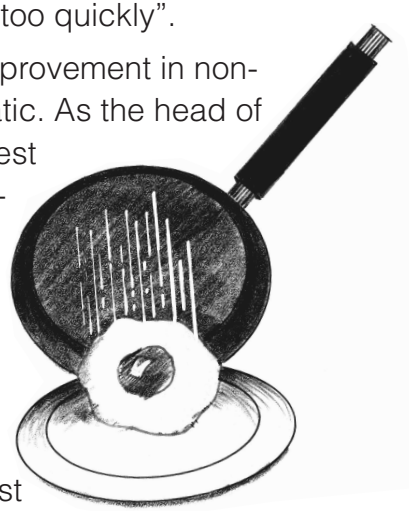
Nonstick coatings did not reach the consumer in any important way until the early 1960s.

The first nonsticks were made primarily of polytetrafluoroethylene, or PTFE, the material that has the lowest coefficient of friction of any known solid. Unfortunately, PTFE is also very soft and, if unprotected, subject to wear.

While the early nonsticks had good release (and were therefore easy to clean), they were soft and wear was obviously a problem. So they were not used on more expensive cookware.

The result, at first, was a reputation of nonsticks associated with "throwaway" cookware.

Over the years, a few reputable manufacturers of nonstick coatings invested considerable funds in research and development to help overcome the customer's most frequent complaint about nonsticks: "They wear off too quickly".



Today, the improvement in nonsticks is dramatic. As the head of one of the largest nonstick manufacturers recently said, "Our worst nonsticks of today are considerably better than our best nonsticks of only a few years ago".

Today, three out of every four pieces of cookware, bakeware and small electrics come with a nonstick coating. Perhaps more important, the better, longer-lasting nonsticks have proved so superior that they are now used on high-end cookware, and carry guarantees for as long as the life of the cookware itself.

Nonsticks are here to stay — and are adding value to cookware, bakeware and appliances at every price level.

Proof of that showed up in a recent study conducted among cookware purchasers: 87% said that they were “very” or “fairly” satisfied with nonstick coatings.

What makes a “nonstick” nonstick?

The ingredient most commonly used in nonstick coatings is PTFE, which has the lowest coefficient of friction of any known solid. This means that other materials, such as foodstuffs, do not adhere to it easily. It is inherently slippery, soft, inert and completely harmless.

What makes a soft nonstick durable?

Substances such as hardeners, pigments and resins are added to reinforce the PTFE, increasing its ability to resist wear.

How are nonsticks applied?

The application process is important, because it has an effect not only on the price of the nonstick, but also on its appearance and even its performance.

Without getting into all the variations, there are four basic methods:

1. Spray: Probably the most common method used. The nonstick, in liquid form, is fed through a spray gun which atomizes the coating and sprays it onto the pan. After curing (drying at high temperatures), it provides a smooth, even, attractive appearance. Its main disadvantage is “overspray”, the spray that misses the pan and is wasted (at a cost). This waste must also be disposed of, which can cause environmental problems (and additional costs).

2. Coil coating: Not unlike a printing press, huge coils of metal are run at high speeds through applicators which apply the coating to the metal before it is formed into its ultimate shape. Once cured, the flat metal is punched out in the form of the item to be made, then bent into the shape of a pot, muffin tin, etc. This can cause some “stretch marks” in the item where the bends occur, which affect the aesthetics. Another disadvantage: the metal that is left over after the circles or squares are pressed out is waste, and must be discarded. Coil coating is the method commonly used for bakeware.

3. Roller coating: Flat, unformed pieces of metal are run on a conveyor belt through two rollers, which apply the coating. The chief problem is both aesthetic and practical, since the rollers leave striations, or tiny ridges, in the coating. Aside from looking bad, these ridges abrade off easily in use, reducing the life of the nonstick.

4. Curtain coating: This is the fastest, most efficient, least expensive way to coat flat, unformed metal. A belt carries the metal (later to be formed into a pan) over a trough and through a “curtain” of liquid coating onto another belt. What coating does not fall on the surface of the metal falls back into the trough to be recirculated, virtually eliminating waste. The aesthetics of the finished product are as good as with spray coating, although there can be “stretch marks” where the metal is bent.

How does a nonstick stick to the pan?

One good question with two good answers: it sticks *chemically* and *mechanically*.

Chemically, because nonsticks have low surface energy (where the release comes from), so, when applied to the pan, they spread out quickly over the surface, achieving an intimate bond. In addition, elements called “binders” are added to coatings to promote chemical adhesion.

Mechanically, because the surface of the pan is generally roughened in one of several ways. This not only increases the surface area of the pan (more surface to stick to), but also creates “tooth” for the coating to grab hold of.

Sticking on one side and not sticking on the other is no mean feat. But today’s nonsticks do it very well.

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 product. 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 product, the longer and better the performance of the nonstick will be.

The differences among nonsticks

The proliferation of nonsticks makes it difficult for the retailer, since it is important for you who sell the products to be able to explain the differences to the consumer, especially if you hope to get the consumer to trade up to higher-margin product.

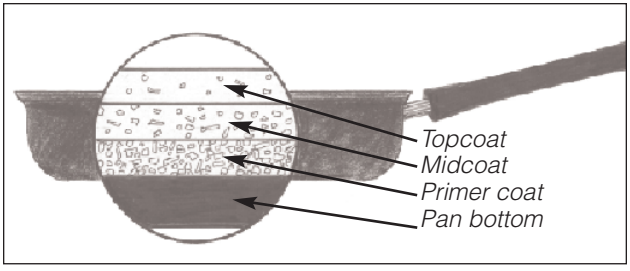
There are five basic quality levels of nonstick coating on the market today, ranging from the least expensive (with the lowest performance) to the most expensive (with the highest performance and longest life).

Following are the basic differences among the five levels.

1. One-coat nonsticks. These are used on inexpensive, opening-price-point cookware, bakeware and small electrics because they add only a little to the cost of the finished product. They perform, but have a limited life.

2. Two-coat nonsticks. These provide the coatings for most of the lower-moderate range of cookware, bakeware and small electrics.They have better adhesion 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.

3. Three-coat nonsticks. These are generally used on more expensive housewares, and, due to the formulating of each coat to provide specific benefits, take the advantages of a two-coat and extend them.



A three-coat nonstick with internal reinforcement to increase wear and abrasion resistance.

4. Three-coat nonsticks that are *internally reinforced.* These use microscopic hard reinforcing elements mixed in with the coating to increase the wear and abrasion resistance, and are used on more expensive cookware, mostly upper-moderate to gourmet-level products.

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 coatings are applied.

The peaks lock the nonstick into place, protecting it from wear and abrasion. If, for example, a fork is scraped across the surface, it will bounce off the peaks, leaving the nonsticks in the valleys virtually untouched.

These are used mostly on gourmet-level products. The classic example is "Excalibur", the brand previously mentioned that has been responsible for taking nonsticks to the high end of the market.

Health: an important advantage

Convenience/ease of cleaning is key to selling nonsticks, but health has become an increasingly important factor. Before nonsticks, one had to use a lot of oil or butter in a pan to provide release, keeping the foodstuff from sticking. This added a lot of oil to the consumer's diet.

With nonsticks, the consumer can use little or no oil when cooking — of great importance to anyone concerned about his or her diet.

The same study mentioned above

showed that 69% of purchasers list "can use less oil/fat" or "makes for healthier cooking" as a reason for the purchase of nonstick products.

This benefit provides a logical and compelling argument for the consumer to trade up to housewares with a nonstick coating.

A frequently overlooked advantage of nonsticks: they require little or no oil.

Helping your customer

Some gentle probing will tell you a lot about your customer and what kind of nonstick cookware, bakeware or small electrics would likely be best for him or her. It will also help avoid the perception of any pressure to sell too highly priced an item. A few good questions to ask are:

1. Do you enjoy cooking? How frequently do you cook?

2. What kind of cookware do you prefer (aluminum, stainless steel, etc.)? Is appearance of major importance?

3. Have you used nonstick products before? If so, what has your experience been?

4. Have you tried any of the newer, longer-lasting (and often guaranteed) nonstick cookware?

5. What kinds of foods will you cook in any nonstick product you buy?

Remember: A student will probably want a different grade of nonstick cookware from a working housewife with children. And a gourmet cook will want something different from both of them.

A little guidance from you will complete a sale, frequently lead to a higher-margin trade-up, and turn a questioning consumer into a loyal, repeat customer.

Answering the customer's questions

Here are typical questions customers ask when shopping for nonstick products:

1. Since most nonsticks look the same, aren't they really pretty much the same?

Not at all. Several coats are better than one coat. Reinforced nonsticks last longer than unreinforced. (For more details, please see pages 12-13.)

2. Do I have to season nonstick cookware? If so, how?

Yes, before your first use. First, clean the pan with soapy water. Then wipe a little oil on the cooking surface and wipe it clean with a paper towel. You should repeat this if you wash nonstick cookware in the dishwasher.

3. Should I use butter or oil when I cook?

Any type of butter or shortening may be used (especially for flavor value), but with most foodstuffs little or no oil is needed,

letting the diet-conscious reduce significantly their intake of fats by cooking more healthfully.

4. What happens if I put nonstick products in my dishwasher?

The nonstick will be fine, although you should re-season it. But be careful of the handles (some, like wood, don't like dishwashers). Note: Do not put anodized-aluminum cookware in the dishwasher, since dishwashing detergents can cause pitting and staining on the exterior.

5. If the coating chips around the edge of the pan, should I be concerned?

No. The pan is safe to use and its performance will not have been altered.

6. If the nonstick product is cut or scratched, should I replace it?

No. A simple cut or scratch may mar the appearance, but the nonstick will still perform.

7. Can the nonstick contaminate what I cook on it?

No. Nonsticks made by reputable manufacturers are completely safe for use with all kinds of food.

8. What would happen if I were to scrape off a bit of nonstick and somebody swallowed it?

Absolutely nothing. Nonsticks are totally inert and safe, and were any to scrape off, it would pass through the body harmlessly.

9. How do I clean a nonstick pan if

something really gets burned into it?

Put some dishwashing detergent in warm water and soak the pan. After an hour or so, gently nudge the hardened foodstuff with a sponge.

10. Is it all right to use metal utensils on nonsticks?

Some manufacturers of higher-end nonstick cookware say you can use metal utensils. But remember that all nonsticks will perform better and last longer if they are cared for. It's better to use wooden or plastic utensils, which are far less likely to scratch.

11. How long will a nonstick last?

That depends on two factors: the quality of the nonstick on the product (higher quality lasts longer) and the care you take while using it. You should be able to get many years of service out of the better nonsticks — if you don't go out of your way to abuse them.

12. Why are some nonsticks rougher-looking than others?

Some nonsticks appear rough because the nonsticks are applied over sturdy reinforcing elements that lock the nonstick into place. This is true of Excalibur, for example, known as "the toughest, longest-lasting, most durable nonstick in the world". But don't worry: roughness has little to do with the release a nonstick provides.

13. Which is better, rough or smooth?

It's really a matter of aesthetics, although a smoother nonstick is slightly easier to wipe clean.

14. What happens if I overheat a nonstick pan?

If a nonstick pan is accidentally left on the highest heat setting (well above temperatures normally used for cooking and baking), the nonstick may discolor and lose some of its nonstick properties.

15. I've heard that overheating nonsticks can kill pet birds. True or false?

True, but that's not the whole story. Pet birds tend to have unusually sensitive lungs, which is why they have been kept in mines and submarines. If the air goes bad, they die — warning those around them. Similarly, if an organic substance (such as a nonstick) is heated to such an extreme temperature that it vaporizes, creating fumes, it could kill such a bird. But this is as true of foodstuffs such as butter and bacon fat as it is of the coating itself. In fact, such foodstuffs vaporize at a lower temperature than a nonstick coating.

16. I'm real handy around the house. Can I buy some nonstick coating directly from the manufacturer and refurbish my old cookware?

Unfortunately, no. Nonstick coatings are processed at very high temperatures (750˚ to 825˚F/400˚ to 440˚C). Coating must be done by those equipped to do it professionally.

Caring for nonstick coatings

Nonstick cookware, bakeware and small electrics will last for years if one takes reasonable care of it. Here is what should be done:

1. Before using any nonstick product for the first time, wash it in hot, soapy water, then season it by lightly rubbing cooking oil onto the nonstick surface and heating the cookware over medium heat for two or three minutes. When it cools, sponge it with a mild detergent in warm water and rinse clean.

2. Always use low or medium heat when cooking food. This helps preserve the nutrients in food (many of which are fragile, and easily damaged when heated to extremes). It also helps preserve the nonstick surface.

3. While the newer nonsticks are designed to stand up to rough treatment, all nonsticks will last longer if one does not stab the surface with a sharp point or cut foods with a knife while in the cookware.

4. Do not overheat empty cookware. Always be sure that oil, water or food materials are in the cookware prior to heating it.

5. Do not use cookware as a food storage container, which could encourage staining. It's better to keep cookware clean when not in use.

6. Always allow cookware or bakeware to cool before immersing in water.

7. New cookware or bakeware is perfectly safe to put into the dishwasher, but the nonstick surface is so easy to clean that a quick handwash does the trick.

8. If, through misuse, burned grease or food residue collects on the surface, it can usually be removed with warm water and a mild detergent. In an extreme case, such residue can be removed by a thorough cleaning with this solution: 3 tablespoons bleach, 1 tablespoon liquid dish detergent and 1 cup of water. Apply to the cooking surface with a sponge or plastic scrubbing pad. After cleaning, recondition the surface with a light wipe of cooking oil.

Who is Whitford?

Whitford, a manufacturer of nonstick coatings, was founded in 1969. Today Whitford manufactures and maintains offices in many countries worldwide and sells in more than 100 countries.

Whitford manufactures the largest, most complete line of nonstick coatings in the world. Here are some of them used on the housewares described in this booklet:

• **Eclipse®:** Engineered to outlast other coatings by a factor of ten. Internally reinforced, Eclipse is the perfect choice for high-end aluminum cookware and bakeware.

• **Eterna®:** The world's longest-lasting nonstick. Engineered with unique technology that creates significant improvements in long-life release.

• **Excalibur®:** Whitford's high-end cookware coating system consisting of a matrix of arc-sprayed stainless steel as external reinforcement. Three coats of nonstick are applied into and over the stainless-steel basecoat.

• **Fusion®:** Made without PTFE or PFOA, it is our waterborne ceramic nonstick that withstands heat up to 850°F/455°C.

• **HALO®:** Engineered for top-end cookware with a unique formula of special additives that absorb heat from the stovetop more quickly and distribute it across the surface of the pan more evenly.

• **QuanTanium®:** The brand name for Whitford's multi-layer nonstick internally reinforced with titanium to stand up to almost anything.

• **Quantum2™:** Whitford's internally reinforced multicoat system used in many higher-quality lines of cookware and bakeware. Quantum2 is so tough it makes all conventional nonsticks obsolete.

• **Quantum350®:** The low-cure, one-coat nonstick that helps avoid casting blisters in small electrics, yet gives the release of a two-coat.

• **Skandia®:** The trademark that identifies our superior nonstick coatings for roller application.

• **Xylac®:** This trademark identifies Whitford's high-temperature decorative materials most often used as colorful exterior coatings for houseware products.

Whatever your coating problem, Whitford probably has the right product to solve it. If not, we will work closely with you to develop the coating that will.

How to contact Whitford:

Whitford manufactures and maintains sales offices in many countries around the world. For more information, please contact your Whitford representative or the nearest Whitford office (see our website: whitfordww.com) or Email: sales@whitfordww.com.

Retailers, go to: productknowledge.com

Whitford

Manufacturers of the world's largest, most complete line of fluoropolymer coatings