



non-stick coatings

## **Position Paper #1, April 2010**

### **QUALITY TESTING FOR NONSTICK COATINGS...REAL WORLD OR NOT?**

#### **Nonstick = category juggernaut**

Nonstick coatings were first used on aluminum cookware in Europe starting in 1954 when French engineer Marc Gregoire created the first TEFAL (Teflon+Aluminum) frypan. America had to wait seven more years until 1961 when Missouri resident Marion Trozzolo marketed the “Happy Pan” which also combined a low-friction coating on a simple skillet.

The rest is history, as people around the world quickly realized how much easier their culinary lives would be if they did not have to messily scrape eggs or omelets off of their cookware. By the late 1980’s the percentage of nonstick coated cookware within the total category tipped over 50%, and has never stopped growing—in 2010 almost 70% of all cookware is coated with a release coating. Experts cite the “healthier eating” trend of the recent two decades as an explanation for the meteoric rise of nonstick and the seemingly insatiable desire to be able to cook without oil or butter.

Clearly, coated cookware is here to stay.

#### **Slippery Business**

For nonstick coatings manufacturers, however, designing cookware coatings has always been a slippery business for more reasons than one may expect. On one hand, consumers want one thing—quality. All that matters is that food doesn’t stick, and no one cares how it happens (single coat, two coat, three coat, ten coats...) The average homemaker is refreshingly binary in their judgment, either the food sticks...or it doesn’t.

On the other hand, cookware manufacturers want quality as well, but perhaps even more importantly *they want to be better than their competitors*. After all, the cookware industry has always been highly competitive and many high-flying companies go bankrupt every year. Cookware and bakeware manufacturers have to convince their target audience (read: Wal-Mart) that they have the better mousetrap, and of course the coating has always been a big part of that story. Beginning in the 1980’s, both cookware manufacturers and coatings suppliers started to invent various machines that were

designed to show off how good their coatings were. These machines involved rubbing metal spatulas, wooden spoons, scotch brite pads, steel wool, and other devices onto the surface of the coating to see how long the nonstick properties would last. One company even invented a medieval sounding device called the “Tiger Paw” that supposedly was the most “realistic.” Outlandish as it seems, all of these machines are still in use today.

Interestingly, the nonstick technology of 20 years ago was very sensitive to minor differences in resins and additives in the formulation. Therefore, the slightest difference in two otherwise similar coatings could actually make one tremendously outperform the other on (for example) the scotch brite abrasion test. However, that winner on the scotch brite test may actually be the worst performer on the fearsome Tiger Paw. A third coating might have been the best performer under the steel wool test, but would perform terribly anywhere else. Bear in mind—all of these coatings were supposed to be used in an actual kitchen, where actual food was prepared; it soon became easy to lose sight of that with all of the contraptions we invented.

But this delta between various coatings on various differing quality tests did serve a very important purpose—it set off a feeding frenzy for coating suppliers to convince their cookware manufacturing clients of the superiority of their technology. The first question raised by a nonstick salesman would be “what tests do you guys do?” Depending on the answer, you just picked the coating that looked better on that type of test and you were off and running. Of course, this “dog and pony show” would then be repeated by cookware companies to their retailer clients. Marketing machines went into overdrive, colorful packaging was created, committees deliberated catchy slogans, and suddenly the average shopper was beset with a dazzling array of choices when buying a simple frypan.

Perhaps not surprisingly, regardless of which pan was actually purchased, most of the nonstick coatings pretty much performed the same (after two or three years, you had to toss the pan into the trash and buy a new one.) Score: marketing one, coating machines nil.

### **Be careful what you wish for**

However, from 2000-2010, the quality of nonstick products and resulting technology has truly skyrocketed. There are many reasons for this quality increase, such as improvements in PTFE technology, better resins, better science, and “internally” reinforcing the coatings with small diamond-like particles. This has led to a very different result than 20 years ago—today, most coatings look great on *every* test you subject them to. And the industry has taken note. Over the past decade, the warranties offered by high end cookware companies have gone from 5 years to 10 years to 20 years to “forever.” It’s a great time to be a consumer, as no matter what you do to the pan, or the coating, it will be replaced. We hear funny stories from clients who describe getting pans back that were melted, impaled, and in one case even welded with an acetylene torch. Again, no questions from the warranty department. The pan is replaced. Luckily these companies are not being deluged with high numbers of returns, and we coating suppliers breath a heavy sigh of relief at that fact.

In any case, today this surge in nonstick quality sets up an interesting paradox for coatings manufacturers. It is obviously crucial to show our clients that we are still continuously innovating, but we have arrived at an odd moment where the data is beginning to defy logic. For example, 15 years ago a coating was considered “pretty good” if it could withstand 5,000 scrapes with a scotch brite pad under a 10 pound pressure. Truthfully, clients back then were afraid that 5,000 scrapes was too severe and unrepresentative of the “real world”. Today, we have coatings that easily pass 500,000 cycles. Is it meaningful for us to continue using these metrics? Of course, this is an existential question—if our clients ask for it, you can bet we will diligently develop a system that goes 2 million cycles. We have a whole team of egghead chemists working 24/7 and they love this stuff, and are very good at it indeed. This is the nature of capitalism and marketing, and we make no claims to be above it.

But in the back of our minds, we also know that the reason for inventing all of these machines was to ensure that the average consumer was getting a pretty good nonstick product, and by any reasonable measure this threshold has long been passed. Thus, the purpose of this paper is to at least raise a simple question: How good is good enough? And what tests really are “real world”?

### **The next step**

Our research shows that there are 2 areas that may represent the next step forward in nonstick technology. The first is in the area of “true metal safe” coatings. Despite being able to withstand hundreds of thousands of cycles of a scotch brite rubbing, no coating today can withstand one firm stab from a serrated knife. Coatings are, after all, just engineered plastics. Plastics are much softer than sharp blades. Thus, “true metal safe” technology may be a few years and a few technical breakthroughs away. But we’re working on it, so stay tuned.

The other area that is relevant in terms of future breakthroughs is in high heat resistance. Some consumers like to overheat their cookware and need nonstick coatings temperature resistances in excess of 900 degrees F. We find this request a bit interesting, particularly since the melting point of Aluminum is 1220 degrees F. Again, we love doing this and will take the request.

One might reasonably ask why we don’t push back more, and tell our clients that the testing standards have turned into a wild fiasco that has lost all base in reality. One might wonder why we don’t just threaten their marketing personnel with our hundreds of grave Tiger Paw devices. But we won’t ever do that...because if we want to find the true party to blame we just have to look in the mirror.

Respectfully,

**GMM NONSTICK COATINGS RESEARCH TEAM**