COATINGWORLD®
SPECIAL REPORT ON NONSTICK COATINGS AND HOUSEWARES FOR RETAILERS

Beware Nonstick Test Procedures: The Wrong Test Can Be More Costly Than No Test At All

Would you cook pasta sauce on a nonstick cookie sheet? Or bake a layer cake in a large nonstick stock pot? Not likely.

That's because nonstick cookware, in general, is designed to do one thing, and nonstick bakeware is designed to do something very different.

But when it comes to testing the coatings used on cookware and bakeware, some of us tend to forget the distinction — and that can lead to many mistakes.

Subjecting products to the wrong test can lead to misleading or useless results. And that can lead to lost time and money when trying to get the final product to the selling floor.

For example: If bakeware you're sourcing undergoes a cookware test and fails, you could decide to alter the product and move to a more expensive coating — both of which are probably unnecessary. The result: higher costs and lost margin points.

The wrong tests can do damage in another way by failing to identify a legitimate problem, allowing marginal goods to make it to the floor with the potential for increased markdowns, customer returns and warranty issues.

Test your testing procedures

The first step is to create a list of tests that are valid for both categories (some, in fact, are). Then a separate list of tests should be assembled for specific characteristics of specific products.

Much more is demanded of cookware than bakeware. Cookware is subjected to stirring, mixing, turning of foodstuffs — all of which mechanically abuse the coating. There is chemical attack on nonstick cookware from acidic foods, salt water, starch (something bakeware never confronts).

Nonstick bakeware, on the other hand, has an easier time of it. Most baked goods include shortening, butter or other forms of fat that act as natural release agents when baking is done.

Yet baked goods often contain sugar, which requires greater release than porous rolls, buns, etc. In fact, for maximum release, sugar requires a special type of fluoropolymer.

We can help

For both cookware and bakeware, the first priority is to confirm that the nonstick coating has been properly applied (improper application is by far the greatest cause of problems). Whitford can perform these tests for you — for free — if you are a member of the Quality Cooperative Program (see "CoatingWorld" Vol. III or contact Whitford for information).

We'll perform these tests (via the QCP) or, if you're conducting them, you'll need to have the lab confirm:

1. Adhesion (Whitford Test Methods 132C, 132D) to assure good adhesion of the coating.

2. Dry-Film Thickness (WTM 114A) to assure proper performance of the coating.

3. Completeness of Cure (WTM 115A) to assure good adhesion and performance.

There are additional tests for both categories designed to replicate how the products will perform under conditions of actual use (including abrasion and scratch resistance). For example:

1. Abrasion Resistance (WTM 135C) to measure the useful coating life to items subjected to scouring and similar forms of cleaning.

2. Detergent Resistance (WTM 150A) to measure long-term resistance to common dishwashing detergents.

Cookware and bakeware are both made of metal, are both used in the preparation of food. But when it comes to testing, they are dramatically different. Using the same testing procedures can get you into trouble (as the article here explains).

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3. Scratch Resistance)WTM 137D) to measure how well a coating resists metal utensils.

These are the only tests valid for both cookware and bakeware.

Wear resistance

With cookware, shallow vessels such as fry pans, sauté pans, sauteuses, crepe pans, fajita pans, grill pans and griddles are exposed to more spatulas, spoons, forks and the like.

With deeper vessels, such as sauce pans and stock pots, cooking time tends to be longer, which means increased exposure to stirring and mixing that can wear a coating.

Therefore, it is important to specify abuse tests such as:

1. Wear-Resistance (WTM 137B) to measure the durability of a coating and its resistance to gouging.

2. Gyrograph/Mechanical Scratch (WTM 137C) to determine intercoat adhesion and resistance to cutting or fraying.

These tests are entirely for cookware and should not be used on bakeware.

The best test for abrasion resistance of bakeware is the Knife Scratch Adhesion (WTM 132A), which measures a coating's ability to resist the abuse of a knife cutting baked goods while still in the pan.

Release

The chief benefit of nonstick on bakeware is release, which allows the baked goods to lift easily off the surface (leaving no residue and not pulling apart), to be set elsewhere for further preparation or cutting. Here are the best tests for release.

For cake pans and items with tall sides, use a yellow cake mix and repeat the cycle several times, evaluating at the end of each cycle. Pay close attention to two characteristics: (a) how easily the cake is released, and (b) how evenly the cake browns on the bottom.

For cookie sheets and other flat items, bake cookies and repeat the cycle several times, evaluating how easily the cookies lift off the surface and whether (and how much) residue is left behind. Note: Avoid sugar cookies and home-made recipes, since these variations can confuse results.

Use store-bought cake mixes and ready-to-bake cookie dough for the most reproducible results. Further tests can be conducted for different items, e.g., muffin mix for muffin pans, bread mix for loaf pans, etc. What's important is to select a particular mix and always use that same mix in your testing.

To evaluate the release properties of cookware, Whitford technicians suggest these tests:

1. Cooking (WTM 199A) to simulate conditions a typical fry pan encounters and evaluate how the coating releases and resists staining.

2. Dry Egg Release (WTM 199B) to see how easily an egg (with no oils) cooks, then slides out of a pan.

Resistance to acidic, salty and starchy foods

With deep cooking vessels such as sauce pans and stock pots that are exposed to the acid, salt and starch of such foods as tomato sauce, soups, stews and pasta, there are several tests:

1. Salt-Water Immersion (WTM 165A) to evaluate the susceptibility to attack by salty, corrosive foods.

2. Acidic Corrosion (WTM 165B) to evaluate the susceptibility to attack by acidic, corrosive foods.

3. Boiling Salt Water (WTM 165C) to determine the resistance to long-term exposure to boiling salt water and steam.

4. Salt Water and Starch Corrosion (WTM 165D) to measure the corrosion resistance in salt water and the release of starch.

While you can subject lasagna pans and other roasting pans that may come into contact with salty, acidic or starchy foods to these tests, they are not recommended for bakeware.

Adhesion

To confirm coating adhesion for cookware, Crosshatch and Boil (WTM 132D) is recommended. For bakeware, which is not subjected to boiling water, only Crosshatch (WTM 132C) should be used. These tests score the coating in tiny squares and attempt to remove it with special packaging tape. The Boil Test exposes the cross-hatched area to boiling water.

Others

Whitford has tests for virtually every type of cookware and bakeware, including woks, which employ the Accelerated Cooking (WTM 199C) to evaluate the coating.

Whitford is here to help

Testing is an important part of product development. Just as important is taking the time to make sure that the appropriate tests are used. This helps avoid wasting time and money, which are the top two commodities in the development cycle.

Whether you're a member of the QCP, want to join or just have a question on a specific testing situation, please contact us at (see below or find the office nearest you at our website, www.whitfordww.com). We also invite you to visit our manufacturing plants (there are 7 in the world) to view our testing laboratories in action.

(For a free booklet entitled "Whitford Test Methods and Procedures" in hard copy or on a CD, please contact us.)

Coming in future issues:

- Making the most of test results.
- Opening price point/promotional goods

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