

COATINGWORLD®

© by Whitford Worldwide Volume XVIII/09

Special HOMEWORLD Section On Nonstick Coatings

Dramatic Breakthrough In Nonstick Technology Sets New High In Nonstick performance!

The holy grail in the world of nonstick coatings — outstanding nonstick (release) that lasts — has finally been achieved with new Eterna™ from Whitford.

The past few years have led to remarkable advances in the durability of nonstick coatings. The use of sophisticated reinforcing elements resulted in marked differences in resistance to wear — by a factor of 50 (and more) in some tests.

The coatings appear to last longer, since there is still coating visible after use. But the nonstick part of the coating (almost entirely the top layer) does not last longer. All or most of the nonstick ingredient (usually PTFE) is in the topcoat, which wears off first, and is the least wear-resistant of all three coats.

So while a nonstick pan after some use may appear to be “nonstick” because there is still coating on the pan, the nonstick quality is always diminished, sometimes significantly (as many cooks can attest).

Since nonstick is the entire reason for using such a coating, it follows that its ability to continue releasing over an extended period of time is key. And that has been the single greatest weakness of nonstick coatings, in spite of the greater durability of the overall coating that has been achieved with improved reinforcing technology.

Understanding “nonstick”

The technical term for “nonstick” is “release”. Release is the inability of a substance to adhere to a given surface, such as a metal frypan

coated with a nonstick coating.

The introduction of such coatings many years ago was a breakthrough for those who spend a lot of time in the kitchen, since it meant dramatically simplified cleanup after

Enter “Eterna”

Whitford R&D set out to engineer what seemed unattainable: nonstick coatings that would not only last longer but also maintain their nonstick for much more time. The



A brand new logo for a brand new nonstick system that sets a record for long-lasting nonstick performance.

cooking. But easy cleanup is not the only advantage to such coatings.

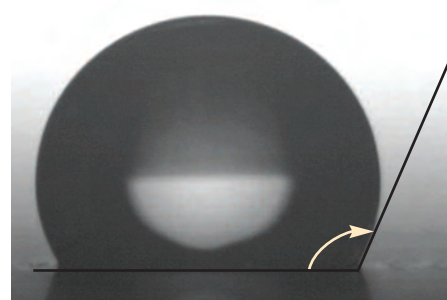
For many health-conscious consumers, the most important aspect of a nonstick coating is the ability to cook with far less fat and oil. Not only does this reduce the intake of unwanted cholesterol, but makes a significant contribution to the reduction of calories.

The American Heart Association has this to say on the healthful aspects of nonsticks: “A pan made with nonstick metal or coated with a nonstick surface is a terrific investment, because it lets you use little or no oil without having food stick.”

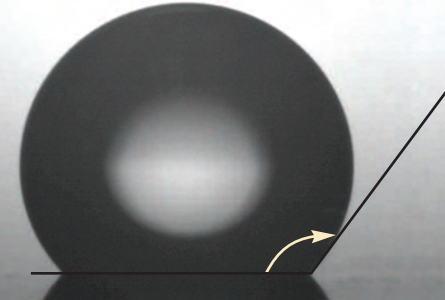
result is a totally new coating system called “Eterna”.

While the creative process that led to this technology is proprietary, we are happy to share the evidence

Conventional: contact angle of 110°



New Eterna: contact angle of 132°



A conventional nonstick-coated surface shows fair “beading” (height) of the water at 110°. The Eterna surface shows an increase in beading of 20 percent (132°).

that it outperforms every other type of coating we have tested.

Contact Angle test

Release is a function of surface energy that is measured by the angle of contact between the surface and a drop of liquid. If the liquid is strongly attracted to the surface (hydrophilic), the droplet will spread or “wet out” on the surface and the contact angle will be close to 0°. If the surface is hydrophobic, the contact angle will be greater than 90°. In such cases, a drop of water simply rests on the surface without wetting to any significant extent.

The contact angle thus provides information on the difference in energy between the surface and the liquid. So the greater the contact angle, the lower the surface energy, and the greater release a coating provides.

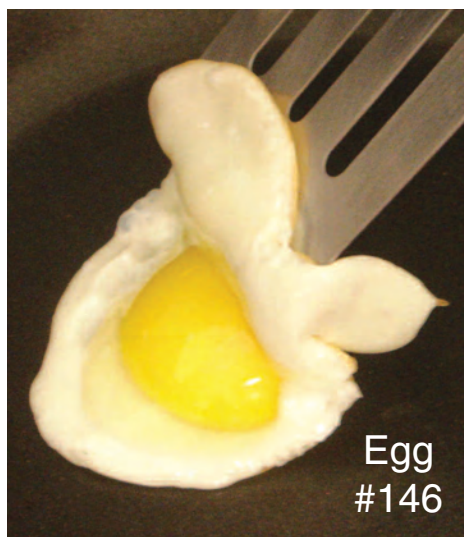
The Dry-Egg test

The most widely used test for release is cooking a series of eggs, one by one, in a nonstick pan with no butter, grease

or oil of any sort: just “dry” as the fry pan comes out of the box. It’s the kind of test anyone can run, it involves no specialized equipment and, when done under controlled

COATINGWORLD

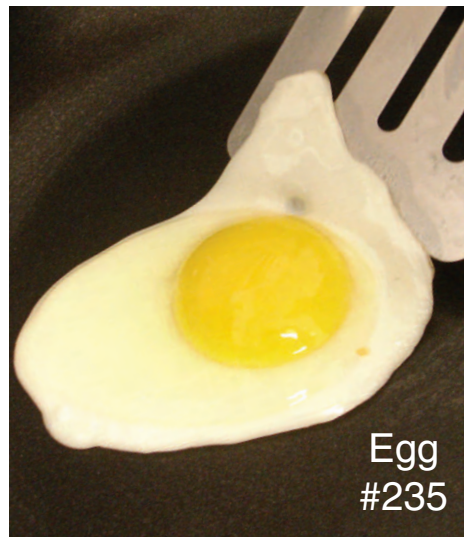
NEWS



Egg #146



Egg #173



Egg #235



Egg #350

The Dry-Egg test under way on the new Eterna coating at Whitford's laboratory. All these eggs continued to lift easily off the dry surface of the pan, qualifying as a "5".

conditions, provides reliable, repeatable results.

Here's how it works. A raw fresh egg is carefully broken into the center of a nonstick pan preheated to 350°F/175°C, and cooked for 2.5 minutes. Then a spatula is inserted gently under one edge of the egg. The effort to lift the egg is rated on a scale of 5-1 (5 = easy to remove, 1 = sticks to the pan).



What egg failure looks like in the Dry-Egg Test (egg #34 on Nonstick "C").

The test is repeated until the eggs no longer lift off with ease, at which point the nonstick is considered to have begun to wear off (but by no

means destroyed, since the pan's coating continues to perform, although at a diminishing level of nonstick quality).

The ability to achieve 5 "easy" egg removals in a row is generally considered to mean the nonstick is acceptable, and the test is stopped.

The surprising results of the test

In order to test the scope of Eterna's nonstick qualities, Whitford's laboratory returned to this classic test and ran it until the failure mode was reached for a variety of nonstick products. Pans from three major manufacturers using the latest, best nonstick coatings were used, as was a similar pan coated with new Eterna.

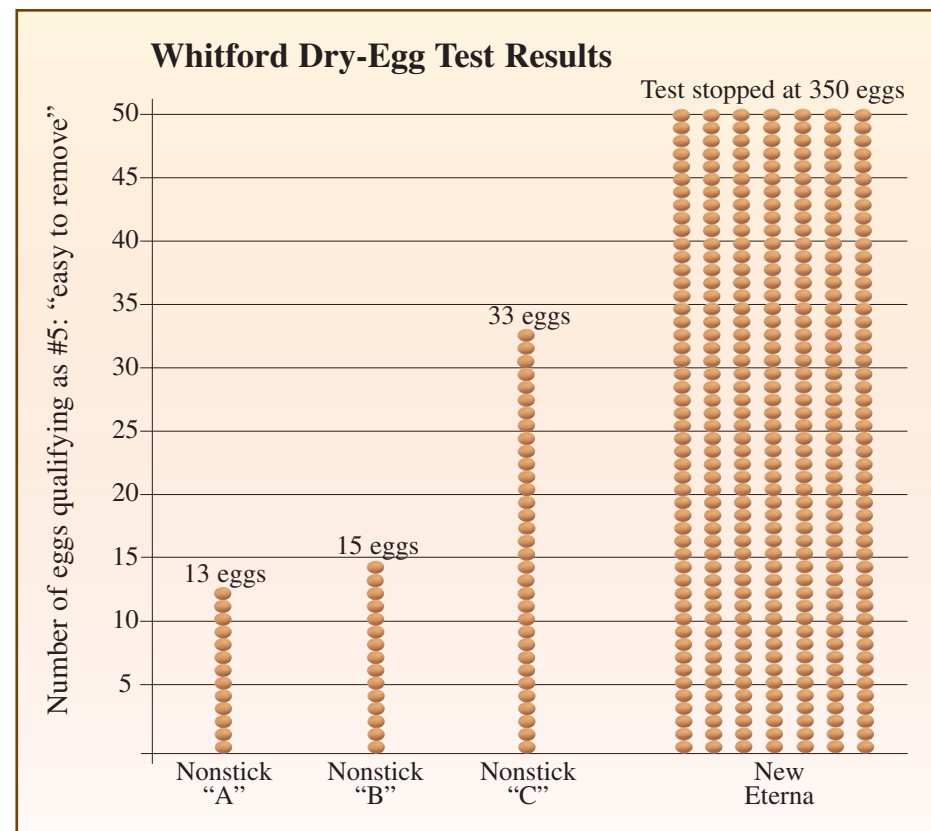
The results of this practical test confirm the more technical evidence shown by the differences in contact angle. Nonstick "A" lasted for 13 fried eggs. Nonstick "B" went to 15 fried eggs. Nonstick "C" went to 33. New Eterna went for an unheard of 350 fried eggs — at which time the test was stopped due to some pressing deadlines for publishing preliminary information on the new product (including this publication).

That's more than 26 times better than one of today's best-known, most popular nonsticks, and more than 10 times better than the nearest top-end competitive nonstick system.

Never in Whit-



Whitford's lab technician fried more than a year's worth of eggs in 5 days (and vowed she'd never eat another egg).



No one at Whitford would have predicted such dramatic results in this practical test.

ford's history have such phenomenal results been achieved over so long a period of actual cooking. Even the lab technicians who worked on the development of the technology were astounded.

That's not all...

Another advantage of the new Eterna system and its unique technology is that the coating has an extremely smooth, reflective finish, which gives it a higher gloss than other nonstick coatings, which is attractive to potential customers at point-of-sale.

Yet another: Eterna is a two-coat system and is extremely user-friendly. To the cookware manufacturer this means, compared to the usual high-

end three-coat systems, simpler application and less inventory to manage.

There's more. Whitford laboratories subjected Eterna to other tests to confirm the longer-lasting release life. In the "Tiger Paw" test, for example, Eterna outperformed all other coatings tested. In the LGA Shaker test (popular in Europe), it outperformed all others tested and, in fact, still provided excellent release after the test. No other nonstick that survived the LGA test had release approaching that of new Eterna.

For more information on new Eterna, contact your Whitford representative or Whitford directly at sales@whitfordww.com.