A few days ago I cross posted an article that Prepared in TN did about Pyrex Dishes that would shatter due to extreme temperatures. Please visit this article:

Not The Pyrex of Old

To her credit she did reference a link at ConsumerAffairs.com and Consumer Affairs did do independent research. Please read the article:

Three Years Later: Pyrex Dishes Still Go Boom

In my comments StrivingSimply had made a dispute to the claim regarding this exploding glass. Anyway, I put out the call that for whoever could do the best research and get to the bottom of this story, would win a free disaster book from Bill and Janet Liebesh. I did this for a couple reasons; 1) there is only so much time in a day and since these are member and reader contributed blogs, we rely on you to help validate information, and 2) Pyrex dishes just simply are not my forte.

Well, StrivingSimply was the only one who answered the call, and I got to tell you that her article would have been very hard to beat anyway. She did her homework. So I'll let you, our readers be the judge and decide. You can read the information that ConsumerAffairs did and go off of that, or you can follow the research that StrivingSimply did and make up your own mind. Great article by the way.

Exploding Glassware: How Often It Occurs, Why It Occurs, and What We Can Do About It

According to the manufacturer of Pyrex (World Kitchens), 80% of American households use Pyrex bakeware.(1) Assuming this to be true, and knowing that according to Census data there are 105,480,101 households in America,(2) there are more than 84 million households who are in imminent danger of harm from Pyrex products. Warnings of Pyrex explosions have made their way through the internet and into our inboxes. Even snopes.com reports on this phenomenon:


Where is the data? The U.S. Consumer Product Safety Commission is tasked with tracking product safety issues. According to their manual, "all consumer product-related emergency visits to your hospital, including emergency department cases, hospital admissions, trauma center and burn center cases, and cases transferred to other hospitals" must be reported by the care provider.(3) In their records, for all types of "other cookware" that include but are not limited to the Pyrex brand, there were 27 injuries in year 2008, 32 injuries in year 2007, 45 injuries in year 2006, and 24 injuries in year 2005.(4) While there are obviously a number of people who did not seek care for injuries sustained from glassware, there are far fewer serious injuries reported than one would expect.

For the record, the US CPSC has been called into question on their recall procedures. Senator Dick Durbin from Illinois has pushed and is pushing for reform on this matter. He has even gotten involved in the Pyrex question as it comes to product labeling and instructions.(5) No action appears to have been taken since his initial concern.

Why does glassware break? In the 1960s and 1970s, a scientist named Sheldon Weiderhorn studied the formation and progression of cracks in different types of glass. Dr. Weiderhorn "established unequivocally that glass fails from surface flaws and that the strength of glass is determined by the density and severity of such flaws."(6) When glassware has been mishandled and "dinged up," the strength of the glass is compromised, leaving
Cracks progress at different velocities, which can either cause "spidering" or explosion. "For soda-lime silicate and borosilicate glasses, the crack velocity depends exponentially on the stress intensity factor for velocities greater than $10^{-7}$ and $10^{-8}$ m/s, respectively. At slower velocities, the crack velocity decreases at greater than an exponential rate, suggesting a threshold stress intensity below which crack motion does not occur. This threshold is known as the static fatigue limit."(7) This static fatigue limit is the limit at which the stress on a glass object will cause the progression of cracks. Essentially, as is expected, one has to hit the glass object hard enough to cause cracks to progress at a rapid pace. It was also established that relative humidity (i.e. the amount of water around and within the glass) dramatically increases the speed of crack progression.(8) Weiderhorn also found that the resistance to stress corrosion "… seems to be related to the sodium content of the glasses; those which contain large amounts of sodium behave poorly under stress corrosion conditions."(9) Borosilicate tended to outperform soda-lime silicate, as the soda-lime silicate had lower activation energy, though neither performed as well as silica or aluminosilicate. It seems neither version of Pyrex (new or old) is the best option for dealing with food preparation. Most importantly, Weiderhorn determined that "as the temperature is increased, the resistance of all the glasses to stress corrosion decreases."(10) All glasses were more prone to breakage when hot than cold. These temperature shifts, especially when rapidly cooling the glassware, causes any type of glass to shatter. What do we do about it? All glassware is prone to breaking if not properly handled. A few simple rules can be implemented to reduce the risk of breakage.

1. Glassware should not be nested. Often, as we pull our glassware in and out of cabinets, pieces bump into each other causing that iconic Pyrex ring. Repeated stress on the glassware can cause micro-cracks to form.

2. Large temperature shifts should be avoided. Glass is more likely to break when taken from a high temperature environment to a low temperature environment. Avoiding this can be as simple as putting a dry pot holder onto a surface before setting down the glassware. Never put a hot dish into the refrigerator. If possible, leave the pan in the oven after serving rather than on a counter.

3. Glassware should not be scraped or scoured. Repeated scraping and scouring of glassware breaks down the surface and may expose existing cracks that expand when exposed to water or temperature.

4. Be mindful of the age of your glassware. While we all like to get the greatest use of our purchases, be mindful of the wear and tear on your glassware. One must be realistic about the demands on our cooking utensils. When it needs replacing, find other uses for it – planters, centerpieces, serving trays – be creative!

The Bottom Line – All glass breaks! Be careful with its use. Weigh the benefits of its use with its dangers.

References