Non-Stick Cookware Safety

Prepared by the Nonstick Coating Manufacturers Group of the Fluoropolymer Division of The Society of the Plastics Industry, Inc. (SPI)

The United States Food and Drug Administration (FDA) is responsible for regulating materials that are used in contact with food in the U.S. In evaluating materials proposed for use in food contact applications, FDA conducts its own safety evaluation. The FDA first reviewed the safety of nonstick coatings used on cookware in the early 1960s. Following their review, the FDA issued a regulation stating that nonstick coatings are cleared (may be used) for this purpose. As with all materials regulated by the FDA, the Agency continually monitors the scientific literature to assure that FDA scientists consider carefully any new data that may affect consumer safety.

The FDA is fully aware of the U.S. Environmental Protection Agency’s (EPA) recent initiatives related to the safety of PFOA, a polymerization aid used in the manufacture of perfluorocarbon (nonstick) resins. Having considered the most recent scientific information available, the FDA reaffirmed[1] in November 2005 that “at this time, we have no reason to change our position that the use of … perfluorocarbon resin … [nonstick] coatings[2] are safe for use in contact with food as described in the applicable regulations or notifications.”

In addition to the FDA’s statement, recent studies by China’s General Administration for Quality Supervision, Inspection and Quarantine and the Danish Technology Institute found no exposure to PFOA from the use of nonstick cookware. Also, in June, 2005, the European Food Safety Agency, the European Union counterpart to the U.S. FDA, stated that PFOA is permitted in producing repeated-use articles (e.g., nonstick cookware) that are sintered (baked) at high temperatures because consumer exposure to PFOA from nonstick cookware is negligible.

In sum, nonstick cookware has been used in millions of households around the world for over 40 years, and authoritative agencies around the world have confirmed its safety when used as intended.

Background on Statement

PFOA (also known as C-8) is an essential chemical needed to manufacture fluoropolymer resins.[3] Fluoropolymer resins, in turn, are used in whole or as formulated components to produce thousands of products. Many of these fluoropolymer-based products, like medical devices and aerospace components, are critical to the functioning of our technologically-based society. Others, like nonstick cookware, save consumers time and effort and contribute to healthier lifestyles.[4]

The U.S. Environmental Protection Agency (EPA) is reviewing available information on PFOA and is investigating sources of human exposure. PFOA has been in the news because 1) it has been found and is persistent in the environment – even in remote locations, 2) it has been found in the blood of 95% of the U.S. population, albeit at extremely low levels (~5ppb), and 3) it has caused health effects in highly-dosed laboratory animals. Since these findings were first published, several carefully controlled studies have been conducted of human populations exposed to PFOA from both occupational and residential exposures, without finding any adverse effects. Such studies continue on both workers and the general population. In his most recent public statement, EPA Administrator Stephen L. Johnson stated that “… to date EPA is not aware of any studies specifically relating current levels of PFOA
exposure to human health effects.”[5]

The EPA’s goal, shared by the fluoropolymer industry, is to identify the sources of PFOA in the environment and of human exposure to PFOA and to reduce or eliminate those sources. The fluoropolymers industry, including fluoropolymer manufacturers and nonstick coating manufacturers and processors, have cooperated fully with the EPA. EPA announced on March 2, 2006, that all companies asked to participate in a program to reduce emissions and product content by 95% by 2010, and “to work towards elimination of these sources of new exposure to PFOA by the year 2015”[6] have agreed to do so.

There have been a large number of reports in print and broadcast media implying that the use of nonstick cookware can expose consumers to PFOA and, therefore, may somehow be harmful to one’s health. However, government agencies responsible for public health and food safety in the U.S., the European Union, and China namely, the U.S. FDA, the European Food Safety Authority (EFSA), and the General Administration for Quality Supervision, Inspection and Quarantine of the People’s Republic of China, have all concluded there is negligible, or minimal, potential for human exposure to PFOA from nonstick cookware.

PFOA is not used to make nonstick cookware, but is used to make the fluoropolymers that give the cookware its nonstick properties. The fluoropolymer coating is applied as a liquid dispersion. Then the metal cookware is heated, per manufacturer specification, to over 800°F. After high-temperature processing in the factory, PFOA is not detectable using conventional analytical techniques. This was demonstrated in a recent study by FDA scientists. Using a novel, highly aggressive method, they removed the coating from cookware, and analyzed for any remaining, or residual, PFOA.[7] Only by destroying the cookware were the FDA scientists able to detect an extremely small quantity of PFOA. These levels were so inconsequential that the FDA scientists concluded, “[i]n particular, the coated [nonstick] cookware tested here do not appear to be a significant source of PFOA which will migrate [to food] due to [nonstick] cookware’s low . . . [parts per billion] initial residual level of PFOA.” A part per billion is equivalent to one second in 31.7 years.

Commenting on the FDA research, Paul Honigfort, Ph.D., Consumer Safety Officer for FDA stated[8] that “[a]t this time, we have no reason to change our position that the use of … perfluorocarbon resin … [nonstick coatings] are safe for use in contact with food as described in the applicable regulations or notifications.” Based on its own analytical research, FDA concluded that “the potential for PFOA migration from perfluorocarbon resins used on cookware is negligible.”

In June, 2005, based on a comprehensive review of the toxicity of PFOA, the EFSA concluded that the use of PFOA in food contact applications should only be permitted in consumer uses that result in negligible exposure. The Agency further concluded that use of PFOA to produce repeated-use articles (e.g., nonstick cookware products) that are sintered at high temperatures prior to use would meet this standard. EFSA based this conclusion on its review of the worst-case potential migration that could be predicted from available data.

In a press release dated October 14, 2004, China’s General Administration for Quality Supervision, Inspection and Quarantine (GAQSIQ) concluded that “no PFOA was detected” (at the analytical detection limit of 1 microgram PFOA per kilogram coating, or one part per billion by weight) in nonstick woks that represented 90% of the total market for this product in China. This result demonstrates that the amount of PFOA present in nonstick coatings, if any, was less than the analytical detection limit. An expert group of scientists within the GAQSIQ reviewed the study and concluded that the “testing methodology met high international standards” and “the test result is reliable.”

On March 3, 2006, the General Administration of Quality Supervision, Inspection, and Quarantine of
the Peoples’ Republic of China (GAQSIQ) announced that nonstick cookware that meets the Chinese national mandatory standards may be used without concern. A spokesman reminded consumers that, when using nonstick cookware, they should not heat empty cookware to temperatures exceeding 250°C (482º F).

EPA has stated: “EPA does not believe that there is any reason for consumers to stop using any consumer or industrial-related products [made from or containing fluoropolymers].”[9] On January 31, 2006, Susan Hazen, EPA’s Acting Assistant Administrator for the Office of Pollution Prevention and Toxins, stated “The information that we have available doesn’t indicate that the routine use of household products poses a concern.” And on March 2, 2006, Ms. Hazen reiterated, “The use of PFOA in the manufacturing process does not, however, mean that people using these products will be exposed to PFOA. The agency does not believe that consumers need to stop using their cookware, clothing, or other stick resistant, stain-resistant products.”

In sum, nonstick cookware has been used in millions of households around the world for over 40 years, and authoritative agencies around the world have confirmed its safety when used as intended.

1. Letter dated November 22, 2005, from Paul Honigfort, Ph.D., Consumer Safety Officer, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration to George G. Misko, Keller and Heckman, LLP, Washington, DC. Keller and Heckman serves as counsel to the Society of the Plastics Industry, Inc. (SPI), the trade association that represents nonstick coating manufacturers.

2. “Perfluorocarbon resins” is FDA’s term for certain polymers that impart nonstick properties to coatings.

3. The ammonium salt of PFOA, also known as APFO, is the substance that is actually used commercially. In water, APFO disassociates into ammonium ion and PFOA, like ordinary table salt disassociates into sodium and chlorine ions in solution.


5. EPA Administrator Stephen L. Johnson stated on January 25, 2006: “Although our risk assessment activities are not yet completed and new data may change the current picture, to date EPA is not aware of any studies specifically relating current levels of PFOA exposure to human health effects.”

6. Transcript of EPA dial-in press conference on EPA’s PFOA global stewardship program Thursday, March 2, 2006 2:00 p.m., with Susan Hazen, Acting Assistant Administrator, Office of Prevention, Pesticides And Toxic Substances.

