



Firefighting and Your Health

Perfluorinated Chemicals (PFCs)

What Are Perfluorinated Chemicals?

Perfluorinated chemicals (PFCs) are used to make materials stain and water resistant, slippery, and long lasting. PFCs are commonly used to waterproof and stain proof fabric, outdoor clothing and carpet, and to “leak proof” such food packaging as doughnut bags and fast food containers. PFCs are used in some stick-free cookware, plumber’s ‘teflon’ tape and windshield washer fluid.

PFCs are also used in some fire fighting foam, especially the kind of foam used to fight petroleum fires. This kind of foam is called AFFF or “aqueous film forming foam” and is considered Class B foam.

PFCs are extremely stable and can build up over time in the environment and the human body, where they may concentrate in blood and the liver. There is a growing body of scientific evidence that PFCs may be toxic to humans and to ecosystems.

Some PFCs (PFOS and PFOA) are being phased out because of concerns about their safety. Many companies list only “proprietary fluorosurfactant mixtures” as ingredients in fire fighting foams. As a consequence, little information is available about the kinds of PFCs being used as substitutes for their more toxic cousins.

It is likely that the chemicals used to replace older PFCs will share some of their characteristics, such as toxicity, persistence, and the ability to build up in people over time. Less toxic PFCs may change into more toxic or more persistent versions of PFCs once they enter the environment or living tissue. For example, some less toxic PFCs are transformed into PFOA once inside liver cells. Both laboratory and human studies indicate that PFOA is one of the PFCs more likely to threaten human health.

Toxic Exposure:

People are exposed to PFCs every day in food, water and even household dust.^{i,ii,iii} Most people in the U.S. carry PFCs in their body because of these exposures, according to the US Centers for Disease Control. Very little research has been done about occupational exposure to PFCs among firefighters. It is possible that fire fighters are exposed to PFCs through fire fighting foam and to PFCs used to make fire fighting gear water and stain resistant.

Health Effects

While little is known about the health effects of occupational exposure to PFCs specifically in firefighters, studies show that exposure to

these chemicals can cause several health problems.

Some highly exposed workers in PFC manufacturing facilities have elevated thyroid hormone levels in their blood.^{iv} Workers exposed to PFOA also have higher rates of prostate cancer.^v There is also an association between high concentrations of PFOA in the blood and higher levels of bad cholesterol, although more research is needed.^{vi,vii}

Reproductive problems have also been linked to exposure to PFCs. Men with high levels of PFOA and PFOS in their bodies were more likely to have greater numbers of abnormal sperm, at levels similar to those in the US population.^{viii} PFOA and PFOS exposure has been linked to reductions in birth weight in newborns.^{ix,x} Low birth weight increases infant mortality, developmental problems and poor health in adulthood. Higher concentrations of PFOA in the bodies of women have also been linked to difficulty conceiving a child.^{xi} PFOS and PFOA have also been linked to early menopause.^{xii}

What can be done?

Because of the growing evidence that PFCs are hazardous to people's health, exposures need to be limited. Therefore, we must institute policies and practices to replace PFCs in firefighting foams and other materials with safer alternatives. For example, fire fighter training should consider using non-PFCs foams and limit the use of Class B foam when possible while safer substitutes for PFCs are being developed.

References

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