Fluorinated Chemicals

Fluorinated chemicals are essential to numerous products and industries, providing such benefits as improved safety, strength, resilience and durability. FluoroTechnology is the use of fluorine chemistry to create fluorinated products such as fluoropolymers, fluorinated polymers and surfactants, which provide these benefits to products that are critical to modern life.

Fluoropolymers are used in wire and cable insulation for computer and cell phone circuits to enable high-speed data transfer; high reliability hoses for aircraft and cars to reduce emissions; and sterile equipment used in the manufacture of pharmaceuticals, food products and chemicals. Fluorinated polymers provide enhanced surface properties, such as water, oil and stain resistance for medical garments, food packaging, apparel and carpeting. Fluorinated surfactants are used in firefighting foams for extinguishing aircraft and oilfield fires and processing chemicals used in the manufacture of semiconductors.

Uses & Benefits

Fluorinated chemicals, including per- and polyfluorinated chemicals (PFCs), have a long history of delivering outstanding performance in a wide variety of challenging applications. When fluorine atoms join together with carbon atoms, they create a powerful, stable chemical bond. The use of this bond is what gives FluoroTechnology distinct properties, providing strength, resilience and durability to a variety of products.

Textiles, Apparel and Outdoor Equipment

Outdoor performance apparel and gear enhanced with fluorinated polymers are water- and oil-repellent and stain- and abrasion-resistant, to help people stay warm and dry. In extreme weather conditions, high-performance outerwear and gear can even be life-saving. Many textiles, such as carpeting and fabrics, are treated for stain-resistance with fluorinated polymers, making it easier to clean spills and extending the life of carpets and clothing.

Public Safety and Emergency Response

Fluorinated polymers are used to create strong, durable, high-impact ballistic body armor for law enforcement officers and soldiers. It’s used to make protective clothing for firefighters and first responders to shield them against hazardous liquids, materials and flames. FluoroTechnology used in firefighting foam enables on-the-ground aircraft fires to be extinguished quickly, helping to save lives and protect firefighters and property.

Electronics

FluoroTechnology makes high-tech electronics and circuit boards more durable. Fluorinated chemical coatings protect circuit boards from failure due to moisture and keep fingerprints off touchscreens. Fiber optic cables, used for high-speed internet data communication, use fluoropolymers for their flexibility and excellent optical properties, which allow for a higher volume of information to flow through the cables to create a clearer picture. FluoroTechnology also is used in aircraft wiring and cable because it is light-weight and withstands extreme temperatures and environmental conditions, allowing for safe and fuel-efficient operations.

Building and Construction

Fluorinated surfactants are used in adhesives, sealants and caulks to strengthen the bond between surfaces in building and construction materials. It helps prevent infrastructure failures caused by corrosion and weather, lowering the cost of building maintenance and improving safety for construction workers and occupants. In addition, fluoropolymers used in paint coatings provide unmatched durability.
Fluorinated Chemicals

Healthcare
In hospital gowns, drapes and divider curtains, certain fluorinated polymers create a barrier that provides life-saving protection against infections and transmission of diseases in hospitals.

Nonstick Cookware
Fluoropolymers are used to make traditional nonstick cookware coatings that facilitate healthy cooking.

Automotive
FluoroTechnology improves fuel-delivery systems and prevents gasoline vapor seepage, leading to lower fuel consumption and reducing vehicle emissions. It also helps make certain wiring and components more heat and fluid resistant, increasing the reliability, safety and service life of automobiles.

Safety Information
FluoroTechnology is a highly innovative field. Members of the FluoroCouncil, the global industry group representing FluoroTechnology manufacturers, are continually enhancing their products to meet the needs of their customers while safeguarding the environment and public health. The FluoroTechnology products currently on the market have been rigorously evaluated by the companies that make them and assessed by regulators.

One of the FluoroCouncil’s primary goals is to support a global transition from traditional “long-chain” fluorinated chemicals toward alternatives such as “short-chain” chemistries with improved environmental and biological profiles, while offering similar application properties and benefits, like the examples highlighted in the “Uses & Benefits” section.

FluoroCouncil members are voluntarily working with the U.S. Environmental Protection Agency (EPA) to reduce human and environmental exposure to long-chain products by working toward eliminating those chemicals from facility emissions and product content by the end of 2015.

- A significant volume of data evaluated by EPA, other regulators and industry supports the conclusion that short-chain chemistries offer equivalent performance with improved environmental and human health profiles.
- The Organisation for Economic Co-operation and Development’s (OECD) Perfluorinated Chemical web portal includes links to studies that demonstrate the improved environmental and biological profiles of short chain chemistries.

As part of their strong, ongoing commitment to product stewardship, FluoroCouncil members are also continually developing additional data on short-chain products.
Fluorinated Chemicals

Answering Questions about Fluorinated Chemicals

Q Why is FluoroTechnology used?
A FluoroTechnology provides a wide range of societal benefits, including improved safety, durability and fuel-efficiency in applications like cars and airplanes, buildings and electronics. Certain types of advanced semiconductors, tubing, piping and fuel-delivery systems used in the manufacturing, pharmaceutical, automotive and aerospace industries are made with FluoroTechnology.

Fluorinated performance products are used to give products enhanced surface properties, such as water, oil and stain resistance. Many textiles, such as carpeting and fabrics, are treated for stain-resistance with FluoroTechnology, making it easier to clean spills and extending the life of carpets and clothing.

Q How is FluoroTechnology different from other chemistries and products?
A Fluorine chemistries have unique properties and attributes that make them substantially different from other chemistries. The stability of carbon-fluorine bonds makes FluoroTechnology a powerful tool for providing strength, resilience and durability to a variety of products for industry, manufacturers and consumers. The qualities enable products and technologies that benefit individuals, businesses and society at large.

Q What is PFOA; what is its relationship to FluoroTechnology?
A PFOA is used as a processing aid in the manufacture of certain fluoropolymers. FluoroCouncil member companies are phasing out the use of PFOA by the end of 2015 and have developed alternative processing aids that do not contain or use PFOA.

Long-chain fluorinated polymer products can also contain PFOA as an impurity or degradation product. FluoroCouncil member companies have developed alternatives: short-chain fluorinated polymer products. Short-chain chemicals do not break down to PFOA.

Q What is the safety profile of fluorinated chemicals?
A As noted in the “Safety Information” section one of the FluoroCouncil’s goals is to support a global transition from traditional “long-chain” FluoroTechnology products toward alternatives such as “short-chain” chemistries with improved environmental and biological profiles, while offering similar application properties and benefits. A primary consideration in identifying alternatives to long-chain FluoroTechnology products is whether data indicate that the alternatives offer reduced bio-persistence and a reduced environmental footprint. Alternative materials are evaluated for these human health and environmental considerations and safety in use and are being approved for use by regulators around the world. For the newer alternatives such as short-chain fluorinated polymers, supporting data have been submitted for detailed regulatory reviews to obtain necessary approvals. These approvals generally require detailed data sets to robustly define hazard and exposure profiles.

More Information
FluoroCouncil
www.FluoroCouncil.org