How Fluorochemistries Power Artificial Intelligence (AI)

AI tools have quickly become part of our everyday lives, from summarizing Internet search results, to helping families plan vacations, to helping corporations drive greater productivity and innovation. Economically, AI could contribute **up to $15.7 trillion** to the global economy by 2030, more than the current economic output of China and India combined.

While a lot is written about the potential of AI, you may not know that AI is made possible thanks to the power of fluorochemistries, some of which can be categorized as PFAS (per- and polyfluoroalkyl substances). PFAS are a broad and diverse class of chemistry that, depending on the definition, includes many compounds with significantly varying forms, including solids, liquids, and gases. In the same way crude oil and olive oil are very different in their uses and chemical composition, PFAS uses and composition vary greatly, which affects their potential risks to the environment and human health. The fluorochemistries that drive AI and countless other industries and applications have been reviewed by regulators before introduction and are supported by a robust body of health and safety data. These essential chemistries enable products with strength, durability, stability, and resilience that we rely on daily.

When we access AI tools on our personal computers and devices, we rely on technologies that incorporate fluorochemistries. These compounds are integral to the reliability, durability, and high performance of wires and data transmission cables. At this time, semiconductors, crucial for the massive amount of processing capacity that underpins AI technology, cannot be produced without this critical chemistry.

By contrast, the cold aisles rely on other fluorochemistries, which are critical for managing the immense cooling needs of data centers. Fluorochemistries are also critical for helping to increase energy efficiency by reducing the energy used for cooling. They can also help to reduce or even eliminate the use of water for data center cooling.

Data centers are energy-intensive facilities, consuming **10 to 50 times** the energy per square foot of floor space than a typical commercial office building. Berkley National Laboratory estimates data centers will account for 12% of U.S. power demand by 2028. Fluorochemistries are also vital in energy development, contributing to advancements in power plants, solar power, wind turbines, and lithium-ion batteries.

AI technology relies on complex data centers that support the computing power and storage needs that underpin AI technology. The infrastructure and operation of these centers heavily rely on fluorochemistries. To conserve energy, data centers use alternating hot and cold aisles, with hot aisles heated by the data processing activity of semiconductors that currently are not produced or do not function reliably without fluorochemistries.

Today's AI would not be possible without fluorochemistries, which are critical to innovation across many sectors of our economy. Fluorochemistries—which are often broadly categorized as PFAS—in commerce today have been reviewed by regulators before introduction to the market and are supported by a robust body of health and safety data. They are critical for the reliability, safety, and performance of thousands of products we use every day.

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