



Comments on PFAS ECHA consultation.

Strasbourg (France), 21 September 2023 -

The markets for Compute Servers and Datacenters are undergoing a revolution due to the growth in usage, but more importantly, the massive influx of Artificial Intelligence applications is making cooling complications exponential. Infrastructures are operating hotter and denser, exacerbating equipment heating. In this context, innovations in computer infrastructure cooling technology are absolutely crucial !

The use of biphasic fluids for cooling computer servers represents a significant advancement in the pursuit of energy efficiency and sustainability in data centers. This approach offers several crucial advantages that deserve to be highlighted.

First and foremost, biphasic heat transfer fluids, based on hydrofluoroolefins (HFOs), enable a dramatic reduction in energy consumption for cooling. Unlike traditional air cooling methods, immersion or direct liquid cooling with biphasic fluids provides much more efficient heat dissipation, with over an 80% reduction in energy consumption compared to air. This results in a significant decrease in energy costs, which is both economically advantageous and environmentally responsible. For example, it means less nuclear energy usage in France and reduced coal consumption in Germany.

Furthermore, the use of biphasic fluids allows for the operation of high Thermal Design Power (TDP) computer components. High-performance servers equipped with powerful processors (such as Intel 8458 or AMD EPYC 9754) and energy-intensive graphics cards (GPUs, such as Nvidia H100) can operate optimally without the risk of overheating. This paves the way for more powerful and eco-friendly computer systems that meet the growing demands of businesses and resource-intensive applications like High Performance Computing (HPC) or Artificial Intelligence (AI).

Finally, this biphasic cooling technology offers three major technical advantages that are not available together in other technologies :

- It enables a record-breaking server density, allowing the equivalent of a 1000m² area of compute or AI servers to be stored in just 90m², an absolute record ;
- Components benefit from a 25% longer lifespan because they are cooled more consistently and powerfully. Immersion cooling technology based on electronic fluorinated liquid eliminates failure factors for electronic equipment, such as humidity, vibrations, and dust, which are common in traditional air-cooled data centers. This approach significantly reduces the failure rate ;
- Systems can operate without air conditioning, dry coolers, pumps, and without consuming a single liter of water, unlike the millions of servers currently cooled. Storage technologies are clearly moving toward Edge Computing (computing and storage close to users) to provide data to AI, autonomous vehicles, 5G, and future 6G technologies. Only biphasic technology can ensure the deployment of these new technologies, which are at the core of European innovations.

Another crucial advantage is the ability to reuse the thermal energy generated by the servers. Biphasic fluids efficiently capture heat, making it possible to recover it for other purposes, such as building heating or hot water production. This approach significantly contributes to reducing the carbon footprint of data centers by maximizing energy utilization. Many European companies, especially in France, are currently developing programs to provide the necessary heat to residents.

Regarding costs, while the initial adoption of this technology may involve additional investment, it is essential to consider the long-term savings. The reduction in energy costs, the extension of the lifespan of computer components due to more efficient cooling, and the benefits of heat recovery quickly offset these initial investments.

In the end, the use of biphasic fluids in computer server cooling promotes the creation of more eco-efficient and sustainable data centers. It reduces water waste compared to single-phase immersion cooling methods using dry coolers. This technology significantly improves the Power Usage Effectiveness (PUE) of data centers, which is crucial for achieving sustainability and carbon emission reduction goals set by the European Union in our industry.

The current average accepted PUE (Power Usage Effectiveness) in Europe is around 1.57 (1.57MW of energy input to produce 1MW of IT computation). With biphasic cooling, this PUE drops to 1.03 or even 1.01. In the current energy context, it would be unreasonable to forgo such gains for an industry like servers, which consumes 8 to 13% of electricity production in France, for example.

In our view, abandoning a cooling solution in Europe with so many technological advantages and eco-friendly consequences would have the following consequences:

- It would lead to a delay in the deployment of AI, 5G, and future 6G technologies across the entire European continent.
- It would encourage the emergence of tech unicorns in the aforementioned fields on other continents.
- It would compel European research centers, universities, and companies to host their data and computations in the USA, India, or China, potentially leading to the end of European sovereignty in the field of computing.

These three points also have an unfortunate societal outcome, as they imply the closure of numerous data center-focused companies across the European continent and the elimination of tens of thousands of jobs associated with these activities.

In conclusion, the use of biphasic fluids, based on hydrofluoroolefins (HFOs), for cooling computer servers represents a major step towards greener, more efficient, and cost-effective computing. This approach reduces energy consumption, allows the safe use of high TDP components, enables the reuse of thermal energy, and makes data centers more eco-efficient. It is essential for addressing current environmental and economic challenges while ensuring high-performance computing, and as of September 20, 2023, there is no equally effective replacement solution available.

About 2CRSi

Founded in Strasbourg in 2005, the 2CRSi Group designs, manufactures, and markets customized high-performance and eco-friendly computer servers. 2CRSi has been listed on the regulated market of Euronext in Paris since June 2018 (ISIN Code: FR0013341781), and its shares were transferred to Euronext Growth in November 2022.

For further information: www.2crsi.com