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INDUSTRIAL FILTRATION EDITION

EUROPLASMA

INNOVATIVE NANO-COATING FOR A SAFER, GREENER WORLD

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Managing Director &
CEO

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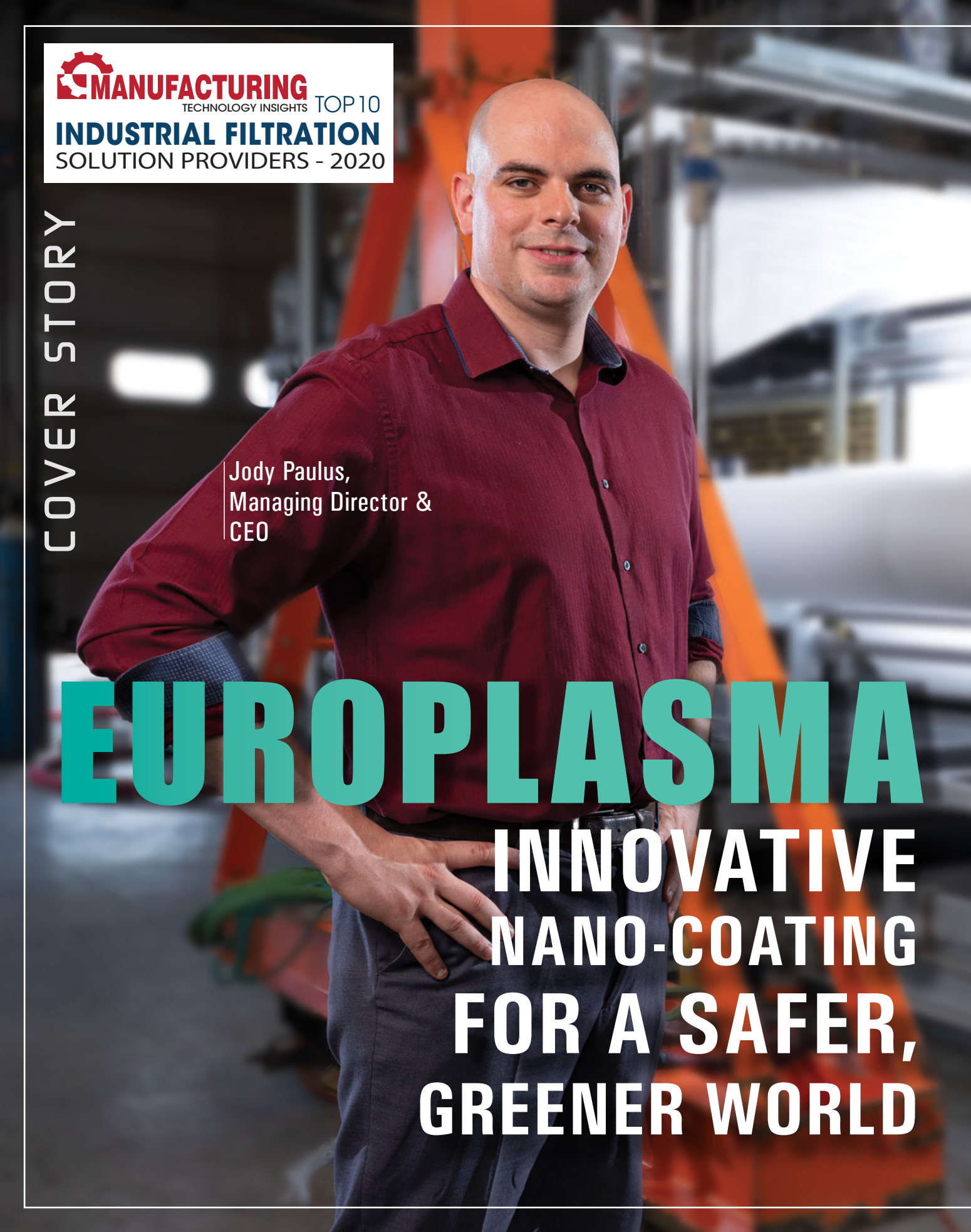
MANUFACTURING TECHNOLOGY INSIGHTS TOP 10
INDUSTRIAL FILTRATION SOLUTION PROVIDERS - 2020

COVER STORY



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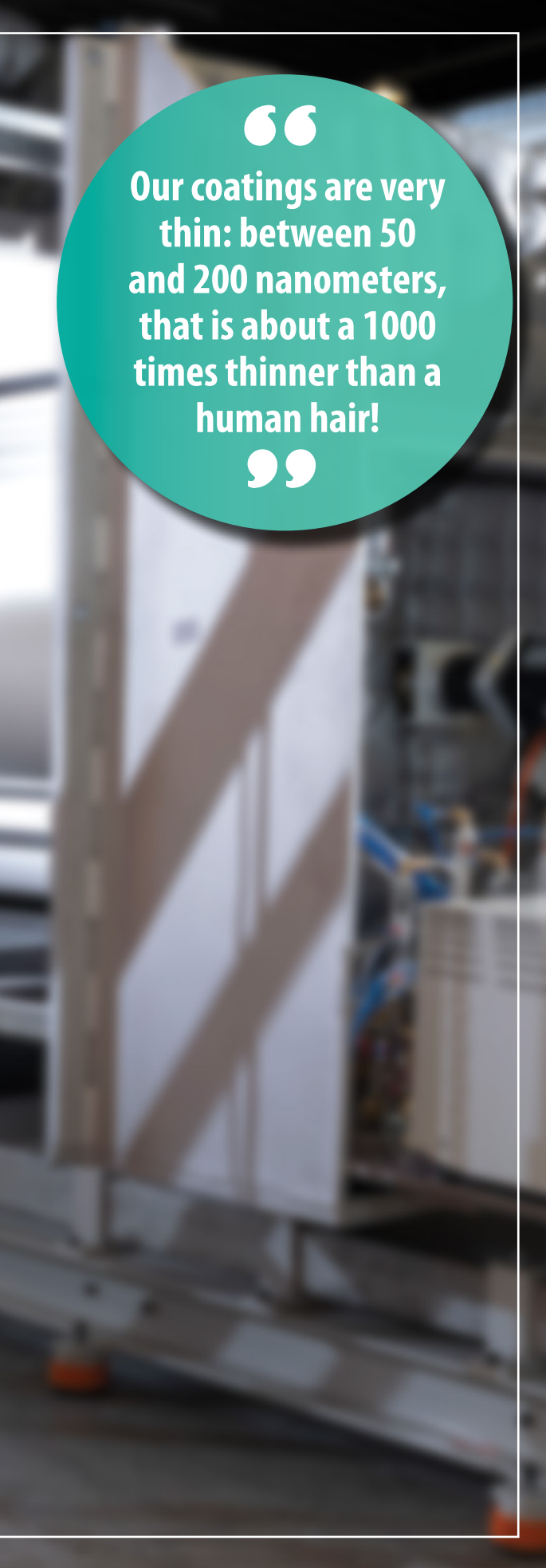


By Laura Davis

The novel coronavirus (COVID-19) outbreak has, in a manner of speaking, brought the entire world to a standstill. However, no amount of panic alarms—sounded off by governments and healthcare institutions—are enough to keep people indoors at all times. Civilians still need to visit possibly crowded spaces such as supermarkets, town centers, and airports, albeit while taking a number of precautionary measures to counter airborne and surface-borne threats.

In these tough times, overcome with a ton of uncertainty and unknowns, there is one universal truth that is unanimously agreed upon: technology will play a crucial role in the protection, mitigation, and prevention of viruses and influenzas.

One of those technologies—that may be unbeknownst to most—is nano-coating. If there is one organization that truly warrants credit for the advancement of nano-coating technology, it is Europlasma. Having pioneered the roll-to-roll plasma machine in 1994 and a nano-coating machine in 1996, Europlasma has, since its inception, been a silent player behind the success of a plethora of renowned brands in various filtration markets including the medical industry.

Technology Equipped to Battle COVID-19

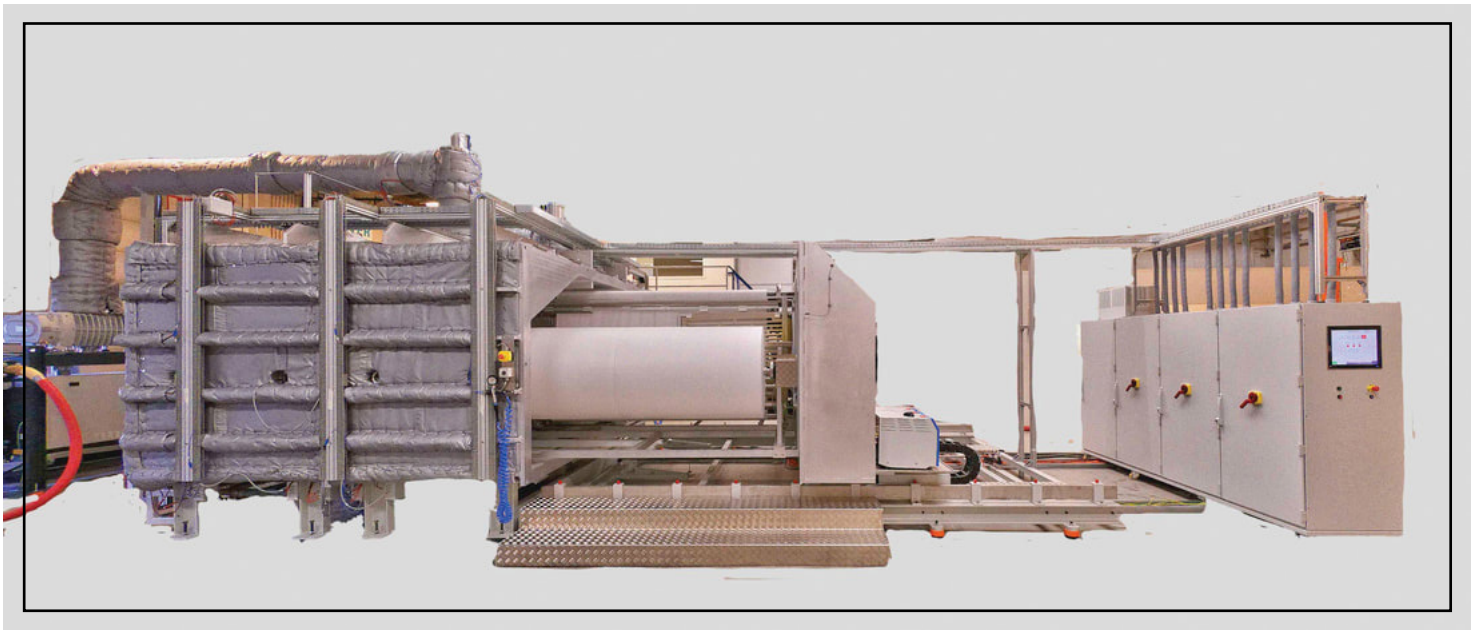
So, how exactly does Europlasma's patented line of thin, flexible, invisible, and environmentally-friendly nano-coatings serve as a key component in combating the novel coronavirus?

Its ubiquitous solutions are all around us.

While Europlasma's oleophobic coatings can be found in facemasks and other protective non-woven textiles, its coatings are also used in the air filtration systems of hospitals, clean rooms, or cruise ships—places that are vulnerable to COVID-19. "Our ultra-thin coating ensures the pores in the fabric of the facemask don't get clogged, allowing the user to breathe freely," says Jody Paulus, managing director and CEO of Europlasma, which has the rare capability to treat both rolls of textile as well as finished products made with the textile. Importantly, the coating repels moisture, saliva, blood, and other external droplets, and the facemask does not require a ventilation unit, unlike masks made with traditional coating. "While dust repellency is one aspect, advanced masks are made to resist chemicals too. Our facemasks are built to withstand everything, making them ideal for COVID-19," adds Paulus.

Furthermore, Europlasma's hydrophobic coatings—with proven antibacterial and antiviral properties—are applied in medical electronic devices and surgical gloves due to their water-repelling and anticorrosion effects. Meanwhile, Europlasma's hydrophilic coatings are being utilized on various types of culture plates and other laboratory equipment used during COVID-19 detection tests, not to mention other medical equipment for bonding, gluing, and printing.

These are a myriad ways in which Europlasma is contributing to the medical community's battle against the global pandemic. Across every application, Europlasma drives the highest-possible filter efficiency needed to capture the smallest particles, including viruses such as COVID-19.



Solutions Built to Lower Pressure Drop

To do so, Europlasma banks on its unique coating process that helps in capturing even the smallest pollutants during air filtration without creating any pressure drop. Since nano-coating is considerably thinner than chemical coating, Europlasma's technology can penetrate the core of complex shaped materials or products such as PCBs, electronic devices, filtration membranes, or technical textiles (such as facemasks). This patented process, in which the oil- and water-repellent coatings are deposited, allows a client to achieve outstanding functional performance. Paulus informs, "Our coatings are very thin: between 50 and 200 nanometers, that is about a 1000 times thinner than a human hair!"

This capability to help clients "achieve the highest filtration efficiency with the lowest pressure drop" has remained Europlasma's ultimate value proposition for nearly 20 years.

As with any filtration application, the more efficient the filter, the lower the pressure drop, which, in turn, determines the power/energy consumption and CO2 emissions. For example, the filter efficiency of a car engine is directly related to its fuel consumption. "To our clients, the success of an application hinges on the pressure drop," says Paulus.

To achieve minimal to zero pressure drop, Europlasma abides by its patented process based on low-pressure plasma technology, enabling customers to achieve a triple win—high filtration efficiency, massive environmental footprint reduction (it is a totally dry process), and lower capital investment.

Unlike traditional wet coating solutions, Europlasma's nano-coating technology brings forth the advantage of less chemicals, no water use, and reduced energy usage due to the elimination of drying and cleaning steps. "Our dry process can reduce the carbon emission by more than 50 to 80 percent," states Paulus. It also helps in adding the desired repellency, such as oleophobic, hydrophobic, or hydrophilic properties to the filtration media, and can be applied to rolls of textiles or on finished elements.

Panel: How the Technology Works

Europlasma's dry coating process is carried out using chemical vapor deposition, which is a low-pressure plasma-enhanced application. At the outset, the substrate to be coated is brought into a tight and extremely low-pressure vacuum chamber. Next, the monomer to be deposited is converted into vapor and introduced into the chamber where power is applied to create plasma and used to deposit coatings on the substrate. During the course of the deposition, the monomer properties are changed to achieve the desired repellency. The process can be done by roll-to-roll coaters with a width of up to 2.5 meters.

The Evolution: One-Stop Shop for Clients

This wherewithal to build roll-to-roll coaters as wide as 10 feet is a byproduct of years of R&D.

Europlasma has always pushed the limits of innovation. At the very onset of the company, the core engineers relied on commonly-used chemicals to make filtration machines until they saw the need for better chemicals from a liquid precursor. "The idea was to coat at higher speeds," recalls Paulus. Soon, Europlasma reached higher oil repellency levels before mastering different chemistries, a newfound ability to tailor customized solutions. Paulus elaborates, "We started with oil repellency levels of one, gradually reached six, and finally reached eight. In the process, we achieved a two-fold evolution: capability to run our machines at varying speeds, using different chemicals and attaining various levels of oleophobicity."

Today, its evolution is holding Europlasma in good stead. Europlasma is the only filtration vendor in the world that can design a roll-to-roll machine in a vacuum plasma for up to 2.5 meters (or 10-foot walls). "While others can design such

a machine in the lab, we are the first ones doing it industrially," says a proud Paulus.

Also, due to its vast history of working with various chemistries and coatings, Europlasma is able to guide clients during the entire journey of a filtration application. Typically, one filtration vendor delivers the chemistry, and another focuses on design, R&D, and so on. In contrast, Europlasma, which manufactures the machine in its entirety, delivers an all-in-one package to clients. "We collaborate with clients and push the limits of innovation for them," adds Paulus.

Green Technology at the Core

Besides building customized filtration solutions—at desired oil repellency levels, speeds, and chemistries—Europlasma has always taken pride in delivering green technology.

The green movement has impacted every sector, and the air filtration segment is also toeing the line. The demand for indoor air quality, combined with the fear of airborne viruses, has propelled the air filtration sector to improve its performance while becoming green and sustainable. One of the main aspects of producing filtration media is the functional coating prior to charging. Unfortunately, this process is traditionally hazardous for the environment, involving the use of a large amount of water, chemicals, and solvents.

Today, when green is the name of the game, Europlasma is bringing to the table a suite of environmentally-friendly solutions that comprises process chemicals and plasma-enhanced roll-to-roll machines designed to work together optimally. "We provide hands down the most environmental-friendly way of applying coating—be it oleophobic, hydrophobic or hydrophilic—for the filtration industry," emphasizes Paulus. By eliminating the traditional drying and cleaning steps from the filtration process, Europlasma's technology is helping clients reduce their CO2 emissions by a whopping 50 percent, not to mention an 80 percent reduction in coated chemicals, through a clean and green filtration system.

> **"Since we are helping clients achieve high levels of filtration efficiency and environmental benefits, they do not want to alert their competition about our solutions"**

Subsequently, a number of large corporations have incorporated Europlasma-driven results into their sustainability reporting, another instance of Europlasma serving as "the silent player."

As a matter of fact, Europlasma is often in a catch-22 situation with regard to ramping up its marketing efforts. Paulus explains, "Since we are helping clients achieve high levels of filtration efficiency and environmental benefits, they do not want to alert their competition about our solutions. This is why we are a secret component of a client's technology."

Next Target: "The Holy Grail" in Water Repellency

An exciting future awaits Europlasma, which is presently taking on a challenge that most industry experts deem impossible to accomplish. Besides disrupting the air filtration segment, Europlasma plans to build the world's first oleophobic halogen-free solution for various applications. Europlasma is presently partnering with the world's leading chemistry companies to eliminate the environmentally-hazardous PTFE, the synthetic fluoropolymer used in non-stick cookware and raincoats. "Through nano-coating, we have already reduced the need for fluoropolymer. However, we have yet to totally eliminate the chemical while attaining an oleophobic effect. This is the Holy Grail in water repellency, and extremely hard to do outside of a lab," says Paulus, before adding that several Europlasma applications have eliminated fluoropolymer but without achieving the needed oil repellency.

While a steep mountain to scale, Europlasma's history gives rise to a lot of optimism. This is the same company that reached new levels of oleophobicity—for roll-to-roll machines—when most filtration applications operated at predetermined speeds and chemistries. Europlasma is also the pioneer that enabled a client to apply hydrophilic coating to a fragile nanofiber membrane when traditional coating failed. "No other technology in the market can apply coatings to nanofibers without destroying the fragile membranes," stresses Paulus.

Simply put, pushing the envelope is a part of Europlasma's DNA. As it continues to innovate, Europlasma is working to increase the throughput of its machines. "Our clients want to go faster, and so do we," says Paulus. Within the next 12-18 months, Europlasma will apply coatings to roll-to-roll applications at a considerably higher speed.

On a closing note, Paulus underlines Europlasma's global presence, "Unless someone wants to build a machine in Antarctica, we will continue to go everywhere for our clients."

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The annual listing of 10 companies that are at the forefront of providing industrial filtration solutions and transforming businesses