

Industrial

'Tunable' fiber properties touted as key benefit of Eastman Cyphrex range

Wetlaid operators manufacture a lot of filter media. The market dynamics in the filtration business point toward more growth opportunities for these producers, if they can figure out how to trap smaller particles, design media that need less frequent replacement, and do the whole thing in a smaller package.

That, according to Tim Dell, vice president of innovation, Eastman Chemical, is exactly what Eastman Cyphrex™ microfibers aim to do. In a conversation with *Nonwovens Markets* at EDANA's recent INDEX 2014 exhibition in Geneva, Dell spoke about giving wetlaid operators the ability to fine-tune their end-product through the very fine and consistent fiber sizes and precisely controlled lengths of the Cyphrex materials, which have a consistency that is not possible with traditional technologies. As a result, the ability to precisely engineer the porosity and durability of filter media should be greatly increased.

Size, shape and material. In launching Cyphrex, Eastman has said that "These microfibers offer tunable fiber properties of size, shape and material that provide the wetlaid nonwoven producers with competitive advantages that aren't currently available."

Glass microfibers look attractive for many applications, but regulatory changes in the European Union can require that synthetic or cellulosic material be arrayed around the glass to keep it enclosed, increasing the cost and complexity of the system.

According to Dell, "Cyphrex microfibers don't shred or break." The technology developed by Eastman allows the user to choose a specific balance between porosity and efficiency. It becomes possible to use a smaller housing for a filter or extend the filter's service life within the same size housing.

'Islands in the sea.' In the size range targeted by Eastman for new filtration ideas, under five microns, it isn't economically feasible to do direct spinning to create the fibers. Cyphrex microfibers are manufactured when the raw material is spun using an "islands in the sea" model, in which a large number of very fine fibers are spun out, surrounded by a protective polymer layer.

Then the fibers are cut to length and the protective polymer is washed away using hot water, leaving the desired fibers in sizes as small as 2.5-micron and 4.5-micron, in what Eastman calls a "Cyphrex microfiber pulp". Because the soluble polymer coating is removed with water, the fibers are not degraded by the process, according to Dell.

Disperses uniformly in forming section. Dell explained that another division of the company that makes water dispersible polymers was wondering if there would be any application for their technology in other parts of the company. The nonwoven market group understood the possibilities, and over time, Cyphrex was born.

Dell added that synthetic fiber producers make short-cut fibers, but nothing in size range offered by Cyphrex. Such fine fibers allow for much smaller pore sizes in a filter medium. Plus, the ability of Cyphrex microfibers to be manufactured to a high degree of consistency in terms of size means the user can design products with very demanding specifications, with a high degree of assurance. Cyphrex microfibers also disperse very uniformly in the forming section, which avoids challenges associated with the use of synthetic fibers.

Cyphrex microfibers can be used either by themselves, or in a blend with other synthetic fibers, cellulose or even glass. "We have done production pilot lab work using different combinations of fiber types. We are consulting with customers to help them use this on their lines," Dell noted.

Liquid or air, or battery separator. Most of Eastman's initial exploration of Cyphrex in terms of potential applications has related to liquid filtration, but the company believes it would work with air and other gases since, as Dell commented, "there are similar problems to be overcome in those areas." He also said Eastman thinks it would be a natural for a battery separator application.

So far, Cyphrex has been made from polyethylene terephthalate (PET), but Dell says many polymer types can be used.

Ahlstrom's Captimax. Eastman is in "advanced market testing" for various applications right now. The product is being used by Ahlstrom in its Captimax fuel medium, which can be used in cars, trucks and off-road applications. Ahlstrom noted that "By using Eastman's Cyphrex microfibers, Ahlstrom has created media for a filter that allows manufacturers to obtain optimum micron efficiency ratings and dust holding capacity without making compromises."

Gary Blevins, Ahlstrom's vice president, marketing and commercial for transportation filtration, has said that "Ahlstrom Captimax can offer both high efficiency and high capacity. We've given our customers the ability to make filters to the specifications they need, allowing them to develop products outside the standard constraints from the media."

More products on the way. It is this ability to fine-tune the size, shape and material used to make filter media that Eastman emphasizes when it talks about Cyphrex. Dell says that Eastman felt a need to extend the Cyphrex product line, so it added a commercially available 4.5-micron product and is working to demonstrate the ability to change the fiber shape and the polymer material. With the ability to fine-tune the end product by varying size, shape and material, Dell says it becomes possible for the customer to achieve a wide variety of different end-results.

Dell notes that Eastman continues to provide the innovative microfibers its customers are looking for, and additional announcements about Cyphrex will be made later this year. It is still a very young product line, considering how long the product development process can take to unfold with such sophisticated technologies. Cyphrex was only introduced to the market a little over a year ago, at INDA's IDEA 2013 show in Miami Beach.

Dell feels the "tunability" of Cyphrex microfibers will allow customers to shorten their own product development timeframes. To support the Eastman Cyphrex microfibers, at its Kingsport, Tenn., headquarters, Eastman has a sophisticated synthetic fibers developmental spinning line as well as a nonwoven and specialty paper research lab.

Eager to tell his product line's story, Dell adds that "For more information about Eastman Cyphrex™ microfibers, visit <http://www.eastmancyphrex.com>"