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## Medical: Meltblown product aims at pathogens transmitted on blood pressure cuffs

Nonwoven fabrics are moving into a new arena in the war against healthcare acquired infections (HAIs), with a Boothbay, Maine-based company introducing a product that incorporates antimicrobial and antifungal agents directly in the meltblown material to turn it into a barrier that also actively fights infections.

The BioArmour Blood Pressure Cuff Shield is fitted over a blood pressure cuff worn on a patient's arm in facilities such as hospitals and medical offices. The new shield product can be kept in place on the cuff while the device is used to measure blood pressure in multiple patients over an extended period of time, supplanting an existing system where a blood pressure cuff must be wiped down with antimicrobial and antifungal agents after each patient.

**Europe, Canada and all non-US markets.** According to the company, "contaminant pathogens – including MRSA, VRE, *c. difficile* and others – are mitigated by the blood pressure cuff shield, allowing for multi-patient use over a 24-hour period. In lab testing, the BioArmour BPCS has been shown to kill up to 99.99% of tested microorganisms."

Biovation explained that "The BPCS has been designed, tested and validated over a two-year cycle, and is now available in European, Canadian and all non-US markets. BioArmour is the first in a suite of infection and pathogen control products from Biovation."

Chief Executive Officer Kerem Durdag told *Nonwovens Markets* that the present system of wiping down a cuff after each patient raises the possibility that busy healthcare practitioners will forget or will simply not have time to disinfect the surface from time to time, potentially spreading pathogens to later patients.

**Operates own meltblown line.** By contrast, the beneficial actives included in the nonwoven material are mixed in with the polymer before the meltblowing stage, leaving them evenly distributed within the fabric and putting them in touch with the blood pressure cuff at all times. The actives don't lose their efficacy over the product lifecycle because they are enabled on-demand in a controlled-release as the pathogens contact the material surface, and Durdag noted that they would actually still function much longer than the time for which the shield is approved to remain in place.

Durdag's company operates its own meltblowing line, which his team assembled from components from Biax and other vendors. Rolls coming off the machine have an average width of 18 inches. He praised Biax as a supplier with a lot of experience at working with PLA, and Natureworks the PLA resin supplier, adding that both have "supported us a lot – we love those guys".

**Meltblown is the natural platform.** He considers meltblowing to be the natural platform to use for these applications, noting that it is very economical with few manufacturing steps and that "Given the barrier properties, fiber diameters needed, loft, void spaces and porosities, meltblown is the right choice."

Embedding the anti-pathogen agents in the fabric allows them to be evenly distributed within the barrier, while dispensing with the coating step that would otherwise be used – making for a more economical manufacturing process, "while at the same time having the agents be of a more optimized and lower concentration tuned for the application at hand," according to Durdag. He also noted that "Additionally, the meltblown material is soft and drapable, allowing for gentle skin contact surface and a positive patient experience."

In the BioArmour product, the meltblown layer is laminated with a polylactic acid (PLA) film layer to provide robust support for multi-patient use. The product does not need sterilization.

**Seeking out niche markets.** PLA offers sustainability as well as appropriate functional attributes, but at a cost – Durdag noted that it would be difficult to compete head-to-head on a cost basis with polypropylene products. He seeks out niche markets where value-added products can generate an appropriate price, adding "we aren't likely to be making currently available commoditized drapes or gowns using PLA" for economic reasons "leaving open the possibility of perhaps having unique and differentiated product offering for that particular application at the appropriate time." BioArmour includes a mixture of ingredients, with the PLA making up 74% of the total.

In the course of talking with medical practitioners, Durdag began to suspect that the blood pressure cuff was a potential vector for disease transmission. He worked with a major hospital group to understand the problem and how blood pressure cuffs are used in practice. The research provided answers to the question of how Biovation's technology could mitigate the spread of pathogens by providing a barrier between the patient's skin and the cuff – a barrier that, itself, also fights pathogens. It also told Biovation how to design the product so it would stand up to the abuse it might encounter in real-world usage in addition to being very easy and quick to use and dispose of.

**Model from food industry.** Durdag argues that no one response to HAIs will suffice. He refers to a model that he says has been used in the food industry to increase safety: raising multiple hurdles to the development and transmission of pathogens. What Biovation has done with its cuff shield is in line with that system: "this product is a hurdle". He adds that "we are proactively adding to the tool belt for infection control."

Durdag also notes that healthcare providers can increase their government reimbursements in many jurisdictions if they can show they are proactively moving against the spread of disease, with additional incentives applying if they can show better results from their work. For Durdag, "it is important the product contribute to patient health and safety at cost-effective price points."

To make sure the BioArmour cuff shield actually gets changed on a regular basis, the system that Biovation developed with nurses in its field trials was that the nurse or aid writes the time and date when the shield was applied, plus their initials, to show them or a subsequent work shift how long the shield has been in place.

**Hope for FDA approval in summer.** Since development, the BioArmour product has been approved for clinical use in various jurisdictions, and Durdag is hopeful it will be approved for use in the United States by sometime this summer. It also has plans to use the same product material for other infection control barrier applications, providing healthcare providers with additional options.

Biovation describes itself as "a technology design and manufacturing company that produces advanced, non-woven fiber products with integrated antimicrobial properties for packaging, healthcare, specialty niche roll goods and wipes products and other specialty advanced material end products." Durdag says the company has another product coming up for review by the US Food and Drug Administration, in the advanced wound care area, which he isn't quite ready to discuss in public yet. But it can safely be assumed that even beyond that product, Durdag and his company will be looking to push the limits of what meltblown nonwovens can do to help the health care industry fight the spread of disease and contribute to the innovation eco-system in the nonwoven industry.