V-JET FUTURA – THE NEW SPUNLACE GENERATION

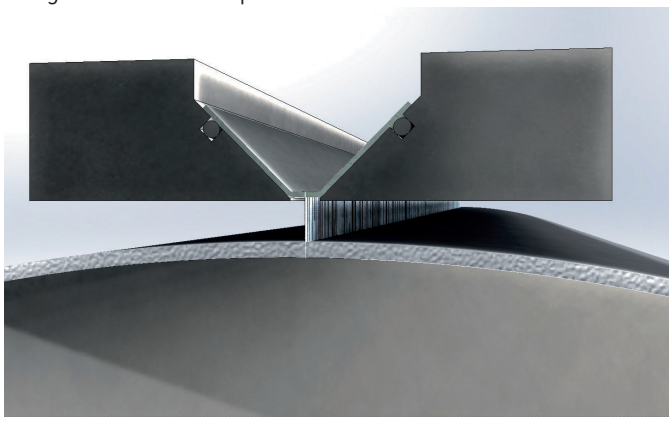
In June 2021, AUTEFA Solutions introduced the latest generation of spunlace technology, V-Jet Futura via webinar. Our editor Marcel Hofmann has researched the topic in depth, and his interview with Christoph Machill (Head of the Spunlace Business Unit) reveals the special characteristics of the new technology.

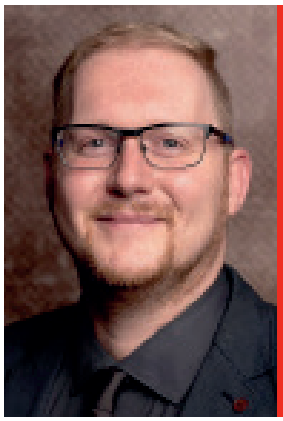
According to current EDANA figures, spunlace technology (hydroentanglement) represents the most important type of bonding in the nonwovens sector, both in terms of weight and area (quantity), with annual growth rates of approx. 5%. Water jet technology is essential in the application areas hygiene, medicine and filtration, and particularly for toilet and cosmetics wipes. Despite this wide range of products and the growth of the market segment, in recent years hardly any innovations have been seen introduced into the field of spunlace machine construction. – However, this has changed with the introduction of V-Jet technology at ITMA 2019 in Barcelona. While at that time it was only possible to see the new machine with an AUTEFA employee in the AUTEFA booth, the new technology was presented in detail at the recently held webinar.

New design

With the patented V-Jet, AUTEFA Solutions has introduced a pioneering new development in energy transfer as compared to other systems on the market.

Fig. 1: Sectional view of the V-Jet nozzle bar with integrated nozzle strip





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The new geometry of the nozzle bar and the nozzle strips in the V-jet and the distance between the nozzle strip and the underside of the nozzle bar is reduced from 25-40 mm to 10 mm (Fig. 1).
The reduction in distance between the nozzle outlet and the nonwoven surface means that negative influences such as energy losses due to air friction, air turbulence and jet expansion over the free jet length can be reduced to a minimum. This facilitates increased nonwoven bonding at the same water pressure or energy savings through reduced pressure with the same strength of the spunlaced nonwoven fabric.

What the new V-Jet promises

According to AUTEFA, the V-jet achieves up to 30% lower energy consumption due to the reduced distance from the nozzle outlet to the nonwoven, which leads to considerable cost savings. Of course, the possible reduction depends on the desired products and the desired surface effect (smooth, perforated or structured). At the same time, the reduction in required water pressure with the same nozzle diameter and distance leads to a reduced water

quantity in the process, which incorporates the concept of sustainable use of resources.

To evidence the V-Jet's innovations, AUTEFA presented studies on the ratio of specific tensile strength to bonding pressure. Selected examples with grammages of 50 and 75 g/m2 showed that savings effects are clearly apparent when compared to conventional spunlace technology, due to the reduced nozzle spacing. The "V-Jet effect", as named by Autefa, has a range of advantages:

- The same strength is achieved with a reduced energy input
- Increased strengths in the final product can be achieved with the same pressure settings
- The amount of raw material used can be reduced by approx. 7%, yet yield the same strength at the same pressure settings

With a system width of 3.6 m and 7880 productive hours, the calculations presented show possible annual cost savings in energy consumption of approx. €77,000 for hydroentanglement. The SQ-V dryer was also presented, whose cost saving in energy consumption amount to around €165,000.

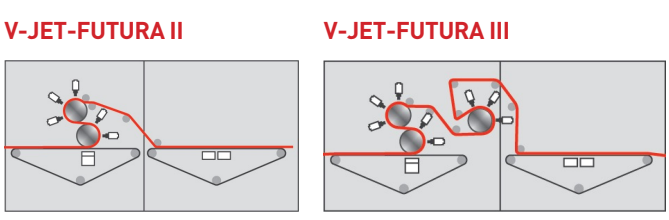
New system or conversion

Two basic machine configurations are initially planned for new customers. The V-Jet-FUTURA II is equipped with 2 sieve drums and up to 5 V-Jet nozzle bars. By contrast, the V-Jet FUTURA III, with its 3 sieve drums and up to 8 V-Jet nozzle bars, provides additional perforation and/or structuring options (Fig. 2).

Photo evidence also showed the positive influence of the reduced nozzle distance on the form of the perforation/structuring in the nonwovens (Fig. 3).

The two machine configurations are designed as standard for water pressures of up to 300 bar at a production speed of up to 400 m/min.

Fig. 2: Basic configurations available



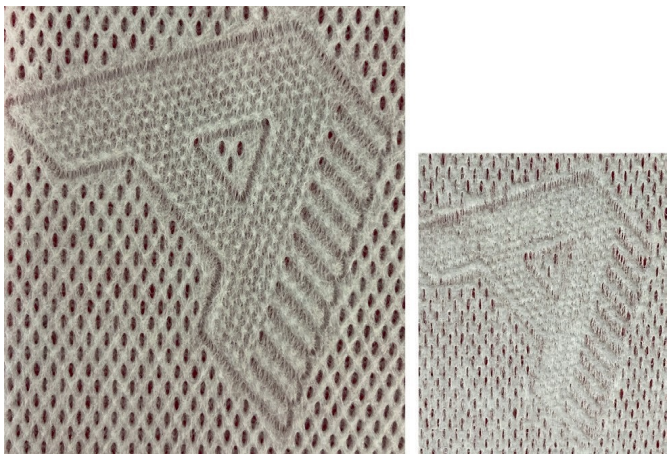


Fig. 3: Better perforation from the V-Jet nozzle bar in comparison to a conventional nozzle bar

In addition to the possibility of a new purchase, Autefa is also focusing on the topic of retrofitting, which is currently important in many companies. In the process, existing spunlace systems are being modernized with V-Jet injectors replacing older injectors and thus bringing older lines up to date with the latest technology. Manufacturers can replace older nozzle bars with the new V-Jet nozzle bars.

Conclusion

The innovations presented by Autefa and the associated potential present a favorable indication that a new impetus is gaining momentum in the area of spunlace machine construction, which has been stagnating for many years (Fig. 4). This will certainly also encourage other competitors to optimize their concepts and thus provide new impetus for the nonwovens industry.

I talked to Christoph Machill, Head of the Spunlace Business Unit, about Autefa's intention to embrace this technology and their plans for the future:

Fig. 4: V-Jet FUTURA spunlace machine

Christoph Machill – Head of the Spunlace business unit

Hello Mr Machill, attentive market competitors will be familiar with you, but please introduce yourself briefly.

Hello Mr Machill, attentive market competitors will be familiar with you, but please introduce yourself briefly. After more than 30 years in various positions in international textile machine construction, with the last 20 years focused on spunlace and drying technology, I took over the management of the Spunlace business unit at AUTEFA Solutions in November 2020. The aim is to actively establish this outstanding technology in the existing hydroentanglement market.

With the V-Jet Futura, AUTEFA is challenging the established manufacturers of spunlace equipment. Please tell us the story of how it came to life. What were their motivations and obstacles?

For many years, AUTEFA Solutions has been particularly successful in supplying machines, such as our injection card for formation of nonwovens and our CL 4006 cross-lapper, which is a component in spunlace systems. In order to be able to meet the increasing market demand for complete AUTEFA spunlace systems, it was necessary to expand the machine portfolio in order to optimize this spunlace technology and a dryer tailored to the special requirements of the products manufactured with this technology. Since hydroentanglement, with all of its advantages for the product, such as a pleasant feel and attractive appearance, to name a few, is a very energy-intensive technology, it was clear that new developments in this area had to bring significant energy savings. In this way, retrofitting is worthwhile for existing spunlace technology users and opens the market for further fields of application and nonwoven products, which were previously manufactured with other bonding methods due to the high proportion of energy costs in the total product costs.

In the meantime, you have been able to gain initial experience in the field with customers. How is the feedback and where do you see the potential for the future?

Fortunately, we have already been able to install our technology in the most important markets for spunlace systems, i.e. in America, Central Europe and Asia. The customers are enthusiastic and confirm both the energy savings and the improvements in the product, such as tensile strengths and visual and haptic improvements. Some products such as synthetic leather based on recycled leather fibres can now also be manufactured, which had not been possible with the existing technologies available on the market or could not be produced in this quality. Accordingly, we are convinced that we will be successful in the existing market and that we will also be available as a mechanical engineering partner to customers who wish to venture into new markets for spunlace products.

To see the technology for oneself, where is the best place to meet you?

We are happy to demonstrate our new technology at our Nonwovens Technology Center in Linz. Here, we have installed our V-Jet Futura behind our Injection Card and in front of our SQ-V Square Drum Dryer. The system is available for application-related tests. In addition to products manufactured in-line by carding, cross-layered nonwovens or multi-layer products can also be bonded and dried using water jet technology. Of course, the system is also equipped with the latest sensor technology, to make the advantages of the technology immediately apparent. Some well-known customers have already been impressed with this and now use the system for their product development. Of course, AUTEFA Solutions is also represented at all important trade fairs in our industry worldwide – according to current plans, for example in autumn 2021 at INDEX in Geneva. I am looking forward to interesting discussions and professional exchanges. ■