



WORLD WIDE WEAVE

A strong solution for thermal bonding of thick insulation material

Innovative GKD oven belts render processes more stable and easier to clean

As a key product for soundproofing, insulation, protection, stabilisation and forming, nonwovens are a driver for practically unlimited innovation. One of the leading German producers of technical nonwovens made of staple fibres is J.H. Ziegler GmbH, which is headquartered in Achern, Schwarzwald, and is celebrating its 150th anniversary this year. In 2006, the company opened a Hungarian subsidiary in Bábolna, about 100 kilometres west of Budapest, with state-of-the-art equipment and processes. Around 3,500 tons of fibres are processed there annually into high-quality products, including nonwovens with grammages of up to 4,400 grams per square metre. Such weights, combined with thermal binders, pose enormous challenges for capital equipment and key components like process belts. When a new oven was put into operation in the Hungarian factory, serious problems arose with the thermal bonding process. Neither the oven itself nor the process belts being used could cope with the increased requirements that were placed on them. After intensive efforts in collaboration with the oven manufacturer to get to the root of the problem, J.H. Ziegler Magyarország Kft. finally found a solutions partner in GKD – GEBR. KUFFERATH AG, thanks to whose expertise in innovative belt construction and design the required process reliability and efficiency of the thermal bonding process could be achieved.



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The demands on modern nonwovens and their production process are growing constantly. To meet the required increases in production rates and to cope with increasingly demanding products, maximum process efficiency is absolutely crucial. One specialist in the development of innovative nonwovens and processes for furnishing the products with new functionalities is the J.H. Ziegler Group. The parent company in Achern and the two subsidiaries in Lambrecht and Bábolna are all equally involved in the ongoing advancement of corporate growth. In 2013, the 260 employees at the three locations achieved a turnover of about 45 million euro. The target customers of the group are the furniture and construction industries, capital equipment manufacturers requiring filter and insulation materials, and, as its core business, the automotive industry. The latter accounts for about two thirds of the total turnover of the group. Thanks to the outstanding innovative strength and the speed with which Ziegler develops customer requirements into marketable products, the company is the preferred supplier to all the premium manufacturers in the automotive sector. In 2006, the Achern factory reached the limits of its capacity. In order to continue being able to deliver just-in-time at the same level of quality and profitability, Ziegler followed its existing customers from the automotive and furniture industries to Bábolna. There, on an 18,000-square-metre plot of land, Ziegler built production halls with two nonwovens plants and further equipment for finishing. A local administration structure was also established there with its own departments for purchasing, sales, logistics, development and quality assurance. Today, about 90 employees work at the Bábolna factory. Production at Ziegler runs all year round in four-shift operation. In contrast to the statistics of the group as a whole, the percentage of products for the automotive sector in Bábolna only amounts to about 50 percent of the factory's output.



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Serious problems with overweight

Key factors for the quality and performance of nonwovens are the fibre mixtures and recipes, which are precisely customised to individual product requirements. Further process parameters like plant operation speed, oven temperature and the proportions and composition of the fibres are part of the closely-guarded know-how in Ziegler's production. Fine fibre opening and web formation in ultra-modern crosslapping machines is followed by a mechanical needlefelting stage. In the subsequent bonding process, the nonwoven is thermally bonded in an oven at temperatures up to 190°C to give the product its ultimate stability.

In 2011, Ziegler put a new, 14-metre-long double-belt oven for thermal bonding into operation. The oven is equipped with an upper and a lower belt, each four metres wide. Its four heating zones can be regulated separately to meet the respective individual product and process requirements, meaning that the hot air can be made to flow through the product from above or below, as required. About 2,500 tons of nonwovens are bonded in the oven per year. Depending on the particular product, the plant operates at speeds varying between two and 15 metres per minute. After commissioning, it soon became clear that the oven and the belts could not deal with the nonwoven grammages of up to 4,400 grams per square meter. In the case of products with grammages of 1,600 grams per square meter and more, recurrent problems occurred involving deformation or even tearing of the belts. In the end, Uwe Rudolph, Technical Director of the Ziegler Group and also responsible for production in Bábolna, contacted GKD directly in search of a way to get production of the thick insulation material up and running trouble-free. He and GKD's business unit manager Frank Esser collaborated intensively to research the possibilities for a solution. Together, and in close coordination with the oven manufacturer, they succeeded in developing belts



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that were precisely tailored to the special requirements of the thick insulation products.

Perfect detachment

The solution GKD and Ziegler finally came up with included a coated lower belt and a magnetic upper belt. The directional weft wire with its unusually large diameter ensured the required high degree of cross-stability and robustness in both the lower and the upper belt. An innovative coating on the lower belt proved to be particularly efficient, not only in terms of trouble-free detachment of the product, but also because it significantly eased the cleaning of the belt, something which had previously involved a lot of time and effort. "We used to need six people working intensively for several hours to clean the belt," Uwe Rudolph recalls. The new belt prevents adhesion of the extremely sticky product and thus only gets slightly soiled. The occasional bits of residual adhesive burst of their own accord or can be removed with a soft brush as easily as small fibres. "We're extremely satisfied with the cleanability of the belt," agrees factory manager Krisztian Pauschka, praising the new mesh construction and coating of the lower belt.

Strong hold

The solution for the upper belt is a blended mesh construction of PPS and steel. This mesh type, called Duofil, with reinforced steel weft, was custom developed by GKD for the process at the Ziegler factory. One of its special features is the thick weft wire, which is dimensioned precisely to secure reliable adhesion to the magnetic strips and thus to ensure exact calibration even with the thick insulation sheets. In the running direction, a particularly strong weave pattern increases resistance to the enormous forces that occur during the process, thus ensuring that the belt retains its dimensional stability. "The decisive quality criteria of the GKD belts are their extremely



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high degrees of cross-stability and load-bearing capacity," says Uwe Rudolph, summing up his evaluation. "This makes them ideal for coping with our demanding products at weights of up to 80 kilograms." The belts are non-marking and easy to close with a pin seam. The new prototypes were installed in August 2013, and have been running trouble-free ever since. Uwe Rudolph's summary of the collaboration with GKD is extremely positive, and not just because of the process reliability and efficiency achieved. "The trouble we originally had because of the non-functioning belts has given rise to an extremely trustworthy partnership. That's really a wonderful thing!" In his view, in addition its high level of competence in consulting and problem-solving, it was GKD's enthusiasm and dedication that was the key factor in this development. "Our experience was so positive that I would contact GKD again anytime I needed help with a technical problem."

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GKD – GEBR. KUFFERATH AG

The owner-run technical weaver GKD – GEBR. KUFFERATH AG is the global market leader for metal and plastic woven solutions. Under the umbrella of GKD – WORLD WIDE WEAVE the company combines four independent business units: SOLID WEAVE (industrial meshes), WEAVE IN MOTION (process belt meshes), CREATIVE WEAVE (architectural meshes) and COMPACT FILTRATION (compact filter systems). With its seven plants – including the headquarters in Germany and other facilities in the US, Great Britain, South Africa, China, India and Chile – as well as its branches in France, Spain, Dubai, Qatar and worldwide representatives, GKD is never far from its customers.



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Photo 1: Fibre bales in the Hungarian raw materials store at J.H. Ziegler Magyarorszag Kft.



Photo 2: About 3,500 tons of fibre per year are processed at Ziegler in Hungary.



Photo 3: Rough fibre opening



Photo 4: Fine fibre opening

Photos 1-15 © GKD/Ziegler

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Photo 5: Crosslapping machine



Photo 6: Cross lapper



Photo 7-8: Made-to-measure dryer belt from GKD meets the special requirements of the thick insulation products.



Photos 1-15 © GKD/Ziegler

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Photo 9: 14-metre-long double-belt oven



Photo 10: Optical quality control



Photo 11-12: View of the finished goods warehouse: Finished rolls from a bale of raw material



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Photo 13: Stamped acoustic product



Photo 14: Uwe Rudolph, Technical Director of the Ziegler Group.

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Photo 15: Factory Manager Krisztian Pauschka in Bábolna.

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