WORLD WIDE WEAVE

A cutting-edge matter

MAXFLOW belt filter as central system at splitting and skiving machine manufacturer

The industrial processing of leather is a tough business, requiring alignment of frequent model changes and increasingly shorter production times with quality and profitability. Maximum precision and efficiency of processing methods are prerequisites to succeed on the market. The requirements on process reliability and performance of the machines used for this are correspondingly high. With its' splitting and skiving machines, Fortuna Spezialmaschinen GmbH, located in Weil der Stadt near Stuttgart, is among the leading manufacturers of leather processing systems. Due to their high quality and precision, the systems are also used in a number of other areas, such as medical science, layer analysis or in the food and printing industries. Fortuna ensures the necessary flexibility with a high level of vertical integration of the continuously developed product families. To further strengthen this leading position, the company constantly optimises its products and processes. An impressive example for this is the commissioning of a new central system for cooling lubricant filtration. The choice fell on a Maxflow belt filter from GKD – Gebr. Kufferath AG. The result of the conversion is defined by significantly increased filtrate purity and considerable savings in the consumption of water, cooling lubricants and energy.

Swabian specialist

Since its formation in 1903, skiving machines for leather processing and the applied bell knives are some of the most successful products of

Fortuna, a company with a long-standing tradition. In 1965 a new plant was built in Weil der Stadt; today, a variety of machines and systems for the industrial processing of leather, plastic, paper, rubber and technical textiles are developed and built to customer specifications in two-shift operation at this location. Whether splitting or skiving machines, packaging systems for the beverage industry, gluing machines or bell and band knives: The worldwide demand for standard and customised Fortuna cutting systems is high, the export share accounts for 90 percent.

Precision layer separation

According to reports by the UN Food and Agriculture Organisation (FAO), roughly 1.8 billion square metres of leather are produced worldwide per year. More than half that number is processed by the global shoe industry, which produces 14 billion leather shoes annually. However, the automotive, clothing, furniture, sporting goods and engineering industries also rely largely on the natural raw material. The hides can be up to 10 mm thick and therefore require splitting prior to processing and skiving over the full cutting length on the edges. The outer layer, the so-called top-grain, is dense, smooth and thus particularly durable. It is used as upper leather for bags, shoes, furniture or in car interiors. The inner coarse layer, also referred to as flesh side, is processed into suede leather. Standard leather thicknesses for processing range from 0.8 to 1.2 millimetres. For large-scale applications, like in the automotive or furniture industry, the requirements on even leather thickness are especially high. The interior equipment of high-quality cars requires leather that is split precisely to uniform thickness via computer control to ensure wrinkle-free application on dashboards, steering wheels or gear lever knobs in conformity with ISO. In the upholstery industry, up to seven perfectly matched leather hides are required for a normal size sofa. The leather thickness of sofas with a strong

top grain can be up to 5 millimetres. Thus, the features demanded from the respective splitting machines are utmost precision, maximum service life and simultaneous system flexibility. A high-speed, permanently sharpened band knife splits the entire leather area mechanically to the specified thickness, thus levelling it for trouble-free downstream processing. Precision bandknife splitting machines from Fortuna are available in working widths from 380 to 750 millimetres and, depending on system, can produce thicknesses up to 0.1 millimetre. However, this splitting to minimum layer thickness is not applied in leather processing, but has proven particularly useful in layer analysis for quality tests in the paper, tyre, carpet or cable production, or for transplantations in the medical field. Fortuna splitting machines are also increasingly applied in recycling. The environmentally friendly and cost-saving separation of composite materials like aluminium and rubber, for instance on seals, allows complete recycling of both materials.

Diversified skiving technology

The special know-how of Fortuna is also needed in the additional steps of leather processing. In the shoe, furniture or automotive industry, the edges of the model-dependent leather elements are skived after splitting and computer-controlled cutting. This mechanical flattening allows a perfect joint or bulge-free folding during downstream processing. During skiving, each individual piece is placed on the skiving knife; in case of complicated shapes, such as shoe caps or steering wheel covers, the process may be repeated several times. With a single skiving machine from Fortuna, an experienced employee can handle up to 600 pieces during an eight-hour shift, depending on size and number of different cuts. A much higher output is achieved when using a programmable multiple skiving machine with automatic calculation of the skiving angle. The core of each skiving

machine is the foot with the bell knife. Each application has a special foot as rotating segment with guide roll, allowing the precise creation of the product-specific bevel shape. The integrated bell knife is driven by a shaft and rotates at very high speed with concentricity in the µm range. The exact composition of the applied tool steel is as much a guarded company secret as are the details of knife production. Bell knives are wear items whose dimensional accuracy and synchronism have a decisive influence on the product quality of the processors. The required precision is ensured by end-to-end, reported quality control of the multi-level production process of deep-drawing, forming, turning, hardening and grinding. Fortuna produces the high-quality knives in three application-specific types – thin for paper, medium for leather and thick for rubber. For the paper industry, the bell knives undergo additional process-specific finishing. At a leading beverage carton manufacturer, it replaces the previous edge milling and the related disadvantages, such as dust emission and loss of time. On transfer lines, bell knives flatten the glued joints of cartons that fly by the knives at speeds up to 800 metres/minute. The thus skived edges are folded inward to ensure a food-safe joint.

Cooling lubricant filtration without filter aid

In addition to precise process design, the quality of the cooling lubricant is of vital importance to ensure the required minimum tolerances during knife production. Until now, Fortuna used a magnetic separator and a cyclone separator for the cleaning of cooling lubricant. Both systems came from a previous subsidiary and in many respects no longer met the current requirements. Motor failures made the systems prone to malfunctions. The oil-water emulsion used as cooling lubricant was contaminated, water supply and water return functioned unreliably and the grinding sludge had to be emptied manually on occasion. Thus, the systems required daily two hours of maintenance by an employee. Added to this was a high energy

consumption, since the systems were over-dimensioned for today's applications. When searching for an alternative, General Manager Alfred Bauer decided against a belt filter with paper fleece from the previous manufacturer. Decisive for this were the required enormous procurement and disposal costs in the five-digit range. On the Internet, Alfred Bauer became aware of the MAXFLOW compact filter and contacted GKD – Gebr. Kufferath AG in Düren. During the first discussion it was already obvious that the FS 1000 belt filter of the MAXFLOW system family was an optimal match for the specific requirements of a central system at Fortuna. It is equipped with a stainless steel endless belt from GKD and a customer-specific additional tank with a volume of 2,800 litres. Its filtration performance of 400 litres/minute cleans the cooling lubricant from two surface grinding machines, three CNC cylindrical grinding machines and ten special cylindrical grinding machines in a two-shift operation. Due to the endless filter belt made of stainless steel, the otherwise required operating costs for procurement and disposal of consumables, such as paper or fleece, are eliminated. This also significantly reduces the carryover of cooling lubricant, which becomes apparent in the lower consumption. Water consumption is also reduced, since water change is less frequently required. When looking into the tank, Alfred Bauer was clearly impressed: "The water is clear to the bottom of the tank, even though the system has been running for four weeks“. The self-cleaning stainless steel belt reliably protects against milling waste. A cleaning unit installed under the belt, consisting of nozzles with pump and scraper, performs the automatic belt cleaning. Trouble-free system operation and significantly improved filtrate quality ensure the required process reliability and consistently high product quality. The significantly lower emission of noise and dirt is also a noticeable improvement. The old system produced an oil/water mist that was deposited over all the walls, systems and work places. After a

thorough cleaning parallel to commissioning of the MAXFLOW central system, there are no longer any traces of that in the production hall. The enormous energy savings of 72 percent ensure quick payback. The conversion took only seven months, from the initial Internet research to commissioning. Alfred Bauer praised the open and pleasant cooperation with the GKD team: "GKD always responded to our wishes quickly and individually“. Thus, his conclusion on the conversion of the central cooling lubricant filtration to MAXFLOW FS 1000 belt filter is respectively positive: "This was absolutely the right decision!“

10,337 characters incl. spaces

GKD – GEBR. KUFFERATH AG

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

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