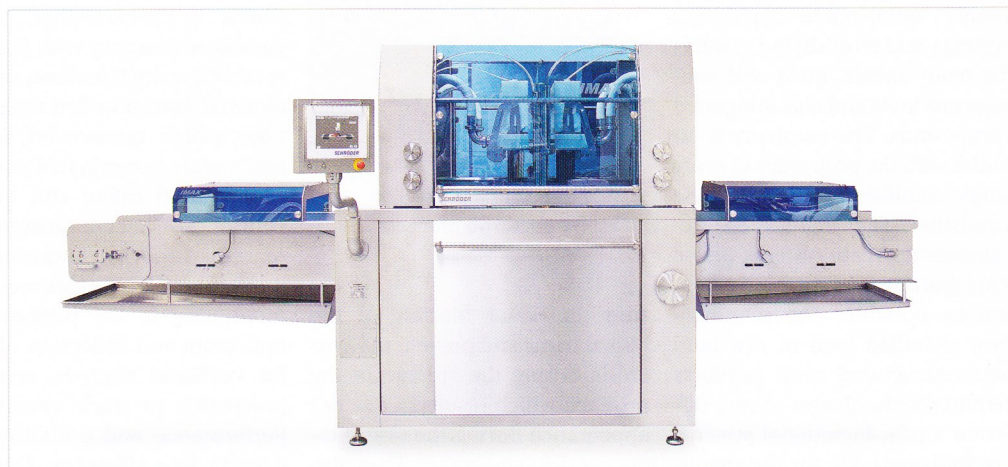


Reliable systems guarantee higher quality

One of the tasks of drum motors is to ensure hygienic plant operation

Drives for conveyor systems have to endure extreme stress, not just during processing but also at the end of each shift when they have to withstand the onslaught of intensive and aggressive cleaning measures. This is why for around five years now the firm Schröder Maschinenbau in Werther, Germany, has been equipping the belt conveyors linking the individual machines in its meat and fish processing plants with drum motors from the Dutch company Van der Graaf GmbH.

By Eberhard Schütz



The Imax-IT injector automatically regulates and controls the amount of brine to be injected.

For three years now GV drum motors have also been used as drives for brine injectors in fish and poultry processing. As in all produc-

tion processes, a number of different factors determine the cost-efficiency of a method. This applies in meat or fish processing too. Here, for example, the

reliability and precision of transport and positioning processes influence both the cost-efficiency of plant operation and the accessible product quality.

Founded 35 years ago, Schröder Maschinenbau KG is based in the direct vicinity of the stronghold region for Germany's meat production, extending from Westphalia to Oldenburg in the north. The company develops, designs and manufactures machinery for automated curing and marinating of fish, pork and poultry meat. They export over 50% of their production.

The prime concern in automated curing and marinating is to achieve the highest possible productivity whilst ensuring high product quality. In traditional craft curing, the brine only diffuses into the meat at a rate of around one centimetre per day, whereas skilfully installed needle injectors can distribute the seasoned brine optimally throughout the meat or fish in seconds.

Brief outline of the technology

Slaughterhouses deliver meat to the processing plants in 600 l containers where it is tipped into stainless steel transport containers. Z-conveyors transfer individual pieces of meat onto the

in-feed belt of the injector. Discharge belts convey the meat onward from the injector for further mechanical processing, including procedures such as tenderising, slicing and pressing. The meat is then sucked into massaging systems for further treatment. The massaging process promotes the breakdown of protein within the muscle, while ensuring uniform distribution of the injected brine. This is followed by stations for stuffing artificial sausage casings, cooking and packaging, linked by diverse conveyors. For the manufacturer, this machinery is a necessary and important element in the overall injection concept. The individual components are not simply thrown in together; instead the mixing of the ingredients is steered and monitored electronically.

Drum motors for the linking processes

Around five years ago, Peter Danwerth, Managing Director of Schröder, and Development Manager, Christoph Umbach talked to Eberhard Schütz, Managing Director of Van der Graaf Deutschland, about using Van der Graaf drum motors. Their experience of these drum motors in their previous work had been positive and in a first step they wanted to find out whether

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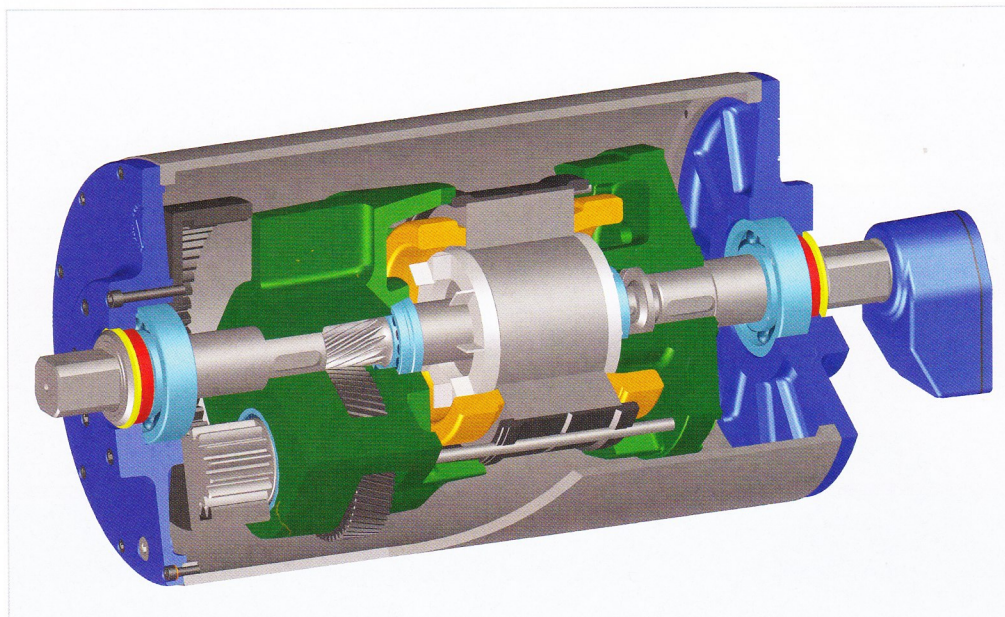
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these motors could bring increased benefits for users of z-conveyors. The initial tests immediately confirmed their previous positive experience.

GV drum motors fitted with sprockets are used to drive the plastic modular belts in the z-conveyors, as well as for all other modular conveyors. Van der Graaf machines grooves into the motor shell for this purpose. Sprockets are then pressed on to the shell and fixed in position with headless screws. The belts of the conveyors upstream of the Max 3 massagers have cleats on their lower surface so that they can move precisely thanks to the form-fitting design. Depending on the application, the sprockets fitted to the shell can also be made of stainless steel. In this way, GV drum motors ensure reliable and precise belt transport.

In the processing operation, raw meat or fish is conveyed directly onto the food-quality-plastic modular belts and through the installations. According to statutory hygiene regulations, the installations, including the conveyor machinery and equipment, have to be cleaned and disinfected after each shift. This means that all installations are cleaned with aggressive lye solutions – some of which contain chlorine. Even the water from steam jet and

high pressure cleaning equipment may not be allowed to infiltrate into the motors. The conveyor belts downstream of the injectors as well as the following processing installations also have to withstand the corrosive action of the brine. Using conventional geared motors to drive the conveyor belts would necessitate high outlay to protect all the drive components. Particularly in such cases, high quality drum motors demonstrate their technical and economic superiority compared with conventional drive solutions.



View inside a GV drum motor – the internal components are protected.

Advantages of GV drum motors

The stable operation of the drum motors is the result of over 50 years of experience in developing, designing and manufacturing drum motors with a high level of in-house production. Design begins with sound dimensioning, and continues with the choice of high quality assemblies, issuing very precise instructions for quality fabrication. The manufacturer uses high quality materials to produce the individual parts with

consistently high precision on automated machine-tools. The teeth of the gears are honed with high accuracy. The result of this complex procedure is smooth running – generally a reliable indicator of a long service life.

GV stainless steel drum motors are equipped with particularly effective chloroprene rubber (CR) seals to ensure ultra-secure protection of the internal components, as well as for protection against leakage from within the unit. This sealing system acting at several different levels consists of an external baf-



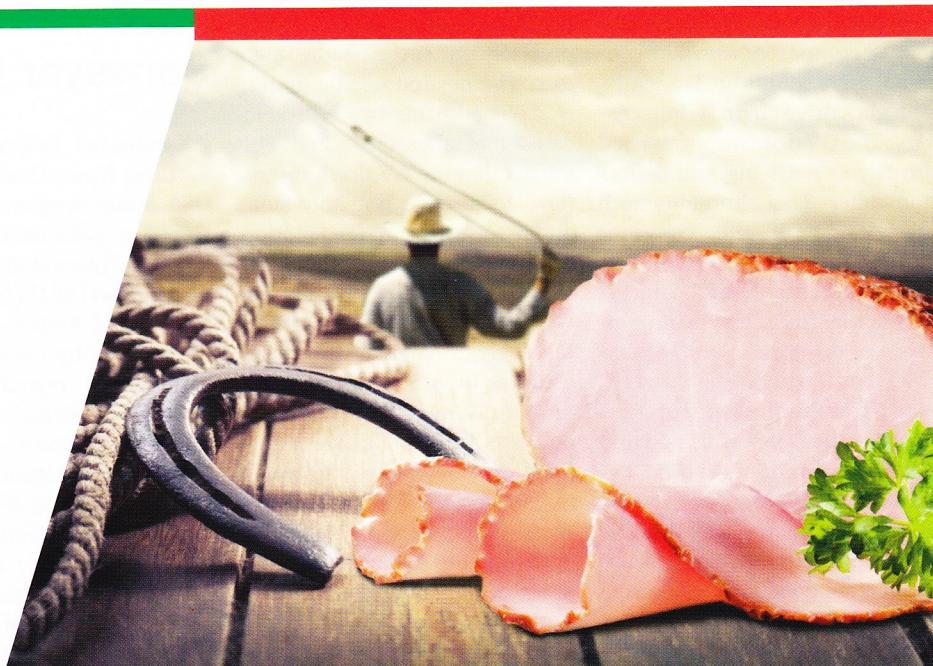
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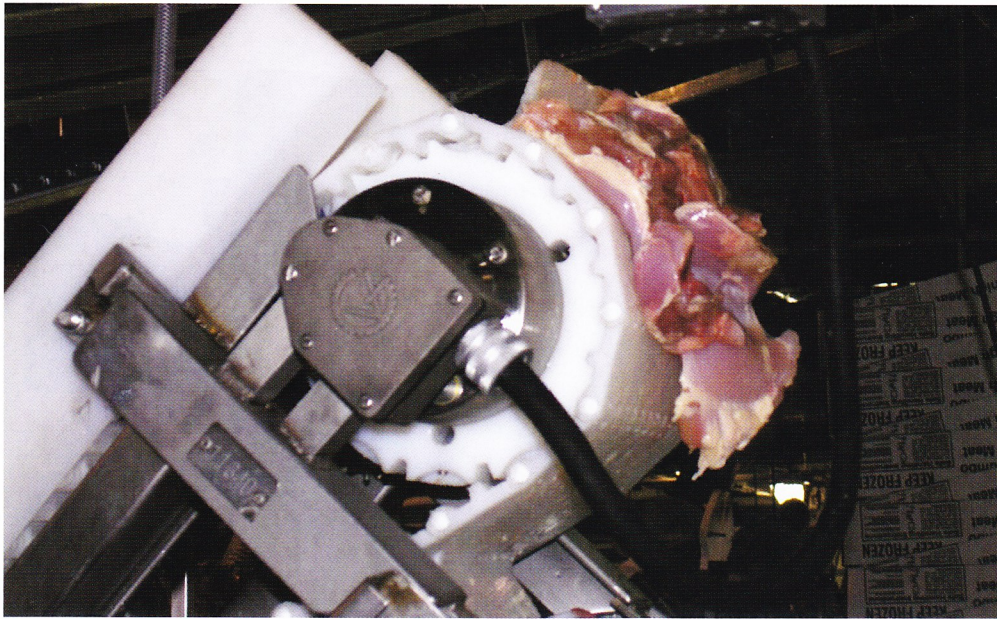
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GV drum motors are fitted with sprockets to allow continuous transportation.

file plate over a multi-labyrinth sealing system with a Teflon contact seal and an NBR rubber simmer ring on a hardened and ground stainless steel bushing. Not only does this design help to prolong service life, it also effectively prevents any oil leakage. For this reason the GV stainless steel drum motors are particularly suitable for practically all areas of the food industry. To comply with food production regulations, the drum motors in meat processing installations operate with suitably approved oils. An oil change is only necessary after 50,000 working hours.

There are fewer drive elements compared with conventional drive solutions. Transmission via a drive chain is unnecessary. The GV drum motor is used directly as a driving and deflection roller. This simplifies both the design of the conveyor equipment and the installation and repair, should this be necessary at any time. The drum motors are equipped with square shaft ends which enable zero-play fixture to the belt-supporting structure, ensuring safe and reliable operation. This is because the square shafts can be installed in such a way that the gears of the Van der Graaf drum motors are constantly bathed in oil during operation. Nevertheless, the possibility of servicing has been provided for. Thanks to

the end caps screwed into the drum shell, the motors are easy to dismantle.

GV drum motors in poultry injectors

After around three years of positive experience using GV drum motors in conveyor machinery, GV drum motors were also installed in the injectors for processing poultry and fish. The manufacturer uses tried-and-tested rake conveyors to transport larger pieces of meat into the curing injectors. The initial task was to test in detail whether incrementally controlled GV drum motors could position the poultry pieces precisely under the needle injectors. The desired needle pattern is achieved using two arrays, located one after the other. This means that the GV drum motors have to provide not only small and precise forward feed motion, but also high switching frequency over a long period of time. The GV drum motors mastered both these requirements with flying colours. In practical operation, the drum motors position the poultry pieces on a five-meter-long stretch within a tolerance range of one millimetre. The switching frequency is 3600 switches per hour. The drum motors did not even need to be modified for this. The TM 100 and TM 127 drum motors used are standard motors, whose

performance capability was exploited for the first time here.

IT injectors with intelligent control systems

In view of the precision of the forward feed, a 5 m belt injector belonging to the Imax-IT series was developed, which automatically controls and regulates the amount of brine injected. The amount to be injected is monitored and controlled via two weighing stations. The first load cell determines the weight of the poultry pieces introduced before they are injected

with brine. Another load cell determines the weight after injection. These cells are installed beneath the conveyor belt and operate continuously. The control system automatically regulates the amount injected according to the weight measured. The second load cell monitors the amount of brine added and re-adjusts the pump pressure if required. With 45 cycles per minute, two to eight tonnes of poultry can be marinated per hour, depending on the injector type. The Imax-IT injector was an innovation at Anuga Food-Tec 2012 and won an award there as the result of meticulous research, high quality development work and a modern, user-friendly design.



Eberhard Schütz

holds an MBA from the University of Düsseldorf. He has been Managing Director at Van der Graaf Antriebstechnik GmbH for 13 years.

Author's address

Eberhard Schütz, Managing Director, Van der Graaf Antriebstechnik GmbH, Rheiner Strasse 24b, 48432 Rheine-Mesum, Germany

Cambridge

Conveyor belt is Halal-ready

Cambridge Engineered Solutions from, Cambridge, MD, USA, announced that all its metal conveyor belts have been certified Halal (permissible by Islamic dietary laws) by US based Islamic Services of America (ISA). The designation by the independent certification organisation provides food processors – and ultimately consumers – assurance that nothing haram (forbidden) was used during food preparation, cooking, cooling or packaging. For the more than 1.5 bn. Muslims around the world, halal certification tells consumers that the meat, poultry, baked goods and other foods they eat were

prepared according to Islamic dietary guidelines. Cambridge uses 100% synthetic products in belt manufacturing. Other belt manufacturers traditionally use animal byproduct lubricants, most commonly pork fat, for their belt production and therefore they are not permissible. The company voluntarily sought Halal certification to guarantee its food industry customers that their conveyor belts were compliant with Islamic dietary law. Islam is the world's second largest and fastest growing religion and many companies look to serve this growing market.

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