



High tech suture material for the medical industry in Korea and Japan

Advances in AC drive technology have helped Fibre Extrusion Ltd win a valuable order for a machine for a customer in Korea and subsequently Japan. FET Ltd manufactured two machines to produce a high tech suture material for the medical industry.

Synthetic absorbable PGA sutures biodegrade within the human body, whereas traditional synthetic sutures were based on monofilament nylon and were not dissolvable, making them unsuitable for internal stitching. Following the BSE (Bovine Spongiform Encephalopathy or "Mad cow disease) crisis, absorbable natural sutures or gut carried a small risk to the patient as BSE prions do not respond to established sterilisation methods, and threaten viral transmission. PGA also offers tensile strength, pliability, knot strength and a smooth finish. Critically, synthetic suture

material must also have a consistent diameter (denier). Control of denier during manufacture is FET's speciality.

The manufacture of PGA is a melt spinning process and was originally developed for the manufacture of polypropylene, used for high strength straps such as seatbelts, lifting straps, cordage, etc. Following polymerisation of the raw material, it is extruded through highly specialised heated dies. The melt pumps must be very accurately speed controlled to ensure constant denier of the fiber. Whereas in the original evolution of the

machines, synchronous or synchronous reluctance motors were driven by standard inverters, the more accurate vector control of modern drives enables standard 1.5kW induction motors fitted with encoder feedback to be adopted.

High speed accuracy and stability are critical

Passing from the die, the fibre is air quenched to solidify and stabilise it before it passes to a series of 4 pairs of heated draw rolls, each pair of rolls driven by a single inverter drive. Here again high speed accuracy and stability are critical, as the accuracy of draw ratio between roll pairs imparts molecular orientation and governs the material denier. There is a final relaxation to condition the yarn before it passes to a wind-up section where the fibre is 'laid on' to a bobbin in

an accurately controlled pattern to ensure a stable pack.

In this application there were a total of nine VLT® AutomationDrives on each machine.

3 x 7.5 kw, 2 x 5.5 kw, 2 x 2.2 kw and 2 at 0.37 kw. These were connected to a Danfoss Ethernet master module, which enables the machine to communicate remotely. The ability to offer high performance closed loop speed control, and an Ethernet solution was fundamental in securing the business. Global support played an important part in the decision process due to the location of the customer.

According to Managing Director Richard Slack "We selected the new Danfoss VLT® AutomationDrive for a number of reasons. In addition to the accurate vector

control, there are a number of features on the AutomationDrive that simplified their adoption and gave us confidence to meet the demands. Not least of these is the ability to connect the drives on an Ethernet network, which enables us to interrogate the machine set-up remotely.

Well represented worldwide

Danfoss is also well represented worldwide so service considerations for Korea and Japan were fully met. Mr. Slacvk says: "From the first evolution of these machines almost 20 years ago, we've always relied upon our drive suppliers not only to supply first class products but also to provide a high level of consultancy during the development process. Danfoss again met that need in every regard."