Axium Process

Customised systems drive expansion

Increased demand for hygienic stainless steel membrane systems is driving growth and moves into new application areas for Axium Process. Filtration+Separation finds out about the company's current expansion plans and the potential for membrane technology.

UK-based hygienic stainless steel fabricator of customised membrane and filtration systems for the process industries Axium Process has trebled the size of its manufacturing facility to meet increased demand. The company supplies fully automatic filtration systems, stainless steel frameworks, heat exchangers, tanks and pressure vessels through to component customisation, pipework fabrication, tees, bends and manifolds for a wide range of industries ranging from nuclear, pharmaceutical, food, beverage and dairy.

Stainless steel fabrication at Axium Process is now all under one roof.

"We operate across many industries," says Dave Houldsworth, managing director. "We supply membrane and filtration systems, but fabricating customised stainless steel systems for hygienic applications is our real specialism. However, although many of the industries we serve are diverse, there is a common theme and similarities between them. Most of the applications require membrane systems manufactured to hygienic standards, which means that they need to be produced to the highest quality and be easily cleaned and maintained."

Under one roof

The new 30,000 square foot manufacturing facility means that Axium Process can now take on much bigger projects altogether. "We were running out of space where we were," explains Dave Houldsworth. "Our projects now often involve putting together a number of stages at the same time under one roof. However, we are also becoming more integrated. We now have our own machine shop and have better control over deliveries as a result. We have to ensure a quick turnaround because if we have to wait three weeks for a section to be machined – we lose the job. The new facilities provide us with much greater control, with all the processes being under one roof offering much greater traceability."

The new facilities now include CAD drawing office facilities, a CNC equipped machine shop, MIG, TIG, automatic orbital welding and metal fabrication departments, a high specification metal polishing and surface

Containerised systems are used as mobile leachate systems for landfill sites.

finishing department as well as bead blasting and an electro-polishing operation. The company has also invested in inspection facilities and testing procedures for demanding applications. Axium's new facility also includes a dedicated wet test area and laboratory services for pilot plant trials and evaluating membrane filtration for any liquid process separation requirements.

Membrane optimisation

However, while Axium Process is aiming to keep all its manufacturing in one place, the company is not looking to move into membrane production. "There are so many variables," Houldsworth explains. "We feel that it is right to buy from the best source because there are so many different membrane types. We choose the ones that meet our application requirements. This is our niche.

Many companies can supply membrane systems – particularly for water filtration. However, there are very few that can handle the hot viscous, high suspended solids area in which we specialise. We do not supply off-the-shelf systems – everything is always designed to customer requirements. Our jobs often involve lots of suspended materials, sugars, fats or proteins, for example, which the water orientated companies do not want and cannot really deal with."

Axium's membrane housings can be manufactured for a wide range of operating pressures, typically 6-64 bar, which cover all aspects of microfiltration, ultrafiltration, nanofiltration and reverse osmosis. In addition to producing standard and customised membrane housings, Axium Process is able to supply a full range of membranes from various membrane manufacturers as well as anti-telescoping devices (ATDs), membrane couplers and interconnectors, permeate blanking plugs, lip seals, O-rings and permeate hoses in a range of sizes and materials.

Customer trials

While Axium Process also manufactures a range of conventional filters, custom-built systems for specific applications is the company's main business. "The way we like to work is to undertake trials for customers," adds Dave Houldsworth. "We like to prove that we can get the separation that they need for their particular feed material. Ideally, we will conduct trials using one of our pilot plants in our test facility, followed by a site trial. Although sometimes time constraints mean going straight into a trial at the client's site. We are often asked for quotes without having to do a trial, but we prefer not to go there. You can do that with water, but not with the products that we deal with, because every product is different. Even in the same industries, you will find that different sites have different filtration requirements. In addition, we have not yet found an industry that does not have a membrane application. From automotive paint to antibiotics in pharmaceuticals, there are applications for membranes. However, you need to know what you are doing and select the right membrane for the job, which means to get it right you have to do the trials."

Axium Process says that pilot plant separation studies help determine at an early stage process feasibility, plant design and an evaluation of likely operating costs. Using a range of mobile membrane filtration pilot plants, trials can be carried out on fresh feed supplied by the customer at Axium's laboratory and testing area or at the customer's premises. Each customer

Plant refurbishment and customisation.

is supplied with a test protocol prior to the trials and a sample analysis together with a detailed report is provided upon completion. The company adds that a range of different membranes can be used throughout the trials because it is independent of any membrane manufacturer ensuring that the optimum membrane can be selected for a given application.

Axium Process had its origins over 30 years ago, in a membrane technology company called Memtech (UK) Ltd. The organisation grew to employ around 65 people and in 1999 was purchased by a subsidiary of Thames Water. After three years the founders re-formed the business as Axium Process and many of the original workforce are now back with the organisation. The company is now back up to around 50 people and involved in the same business that the original company had been.

Good business in effluent

Pharmaceuticals had been a mainstay of the company's business at the outset, but a lot of this activity had gone overseas to China and India, for example. However, Axium Process says that it is now seeing some of this business coming back. "While a lot of this activity went overseas for reasons of costs, the disparity now is not so high and there are issues of quality control," adds Dave Houldsworth. "Other current changes in the business include effluent charges. The cost of water and treating it worldwide is on the rise and the case for membrane systems continues to get stronger. Five or ten years ago people were saying that they would not invest in such systems, but they are now looking at it again. Although we have been in the membrane business for 30-40 years, we are still coming across companies that are not aware of membrane capabilities. So we are still very much involved in an education process as well about what membranes can achieve."

Increasingly, the membrane systems that Axium Process supplies for customers are also creating revenue streams from by-products, which can help fund the project. "We had a couple of approaches from egg producers recently," Dave Houldsworth explains. "When you are making liquid egg, you have a lot of egg shells as by-product and there is a lot of protein and albumen on the inside of the eggs. If you can get enough of it and purify it, then it can be used for pet products, animal feed or even supplied back into the human food chain. Membranes can be used to concentrate these by-products. There may be 6-8 different proteins in the eggs that might be of interest – you just have to separate them in a pure form. If you can do this, then they can have a high value. This is where membranes really come into their own."

The farming industry is increasingly providing new applications for membranes. For example, milk concentration for cheese. Axium Process has also looked at the concentration of cow and pig manure for reducing disposal costs and for use in anaerobic digesters and other potential fuel sources. The recovery of valuable phosphorus and nitrogen from such effluent streams is also of interest.

Making the most of effluent streams is an area where membranes can excel. "We are seeing a lot of interest in the Middle East because of water restrictions," adds Dave Houldsworth. "When water gets more expensive than oil, then people start to think about membranes. For example, we have been involved with a laundry waste project in Abu Dhabi. The laundry is in the middle of the desert and water at one time needed to be brought in by tankers from desalination plants on the coast. However, we have put membrane systems in place that can recover and reuse 90% of the water employed."

Another application that Axium Process has been involved with is mobile leachate systems for landfill sites, where a containerised system can be moved from one location to another. Other applications include the clarification of fruit juices, as well as separating colours and salts in the textile industry. The company has also been involved with a carpet manufacturer, putting hot dye liquors through a membrane system to recover 85% of the water used.

Sweet production, which produces large volumes of sugary water in concentrations of 0.5-1%, is another application where membrane systems from Axium Process can concentrate the solution for use in animal feed, for example. The process saves water and offers a by-product, as well as reducing effluent costs.

The most recent project is a large scale commercial ice cream factory employing membrane technology to process around 1.5 million litres per day of effluent. The recovered water is used for washing down and cooling towers, while enabling the manufacturer to increase production having been eased of discharge consent limitations. ●

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