

NEW TECHNOLOGY CUTS NITROGEN COSTS

Puresep's new membrane technology will help cut the cost of nitrogen generation.

Ledbury, United Kingdom, February 2009. Nitrogen is used throughout industry to eliminate the problems of oxidisation, in modified atmosphere food packaging, laser cutting, wave soldering and gas injection moulding, and for purging and blanketing chemical storage vessels to prevent explosion.

Typically, around 95% of all applications use nitrogen supplied via bottles, Dewars or liquid storage tanks. Although these systems generally provide an efficient supply of gas, they can often be expensive to maintain and operate, with installation, equipment rental, shipment costs and environmental charges leading to a relatively high cost for each cubic metre of gas used.

The alternative to bulk storage is to use on-site nitrogen generation systems that use specialised technology to separate nitrogen and oxygen from compressed air streams. Although these systems have been available for some time they typically require high inlet pressures and sometimes a heater to increase the air temperature.

Now, however, advances in hollow fibre membrane technology, made by Parker and exclusively distributed by Puresep, are allowing a new range of nitrogen generation systems to be introduced that have a far lower cost of ownership, compared with both competing generators and bulk storage facilities. Importantly, they allow gas to be produced quickly and simply on-site at a low cost per cubic metre.

The new technology is based on asymmetric hollow fibres, cut, bundled and formed into separation modules. Each fibre is constructed from a thin tube of a special polymer which is a modified standard engineering plastic. This acts as the support medium for a specially developed separation layer.

The permeable coating is just 40Nm in thickness and works in such a way that oxygen and water molecules from a pressurised air feed passing along the inside of the fibre are drawn through the layer as a result of the lower external pressure. Molecules of nitrogen therefore remain within the fibre and form the product stream.

These new hollow fibre membranes are up to 100 times more permeable than competing membranes enabling them to offer a number of important benefits. In particular, the pressure and feed temperature of the compressed air stream can be lowered significantly, from the level of around 14 bar and 45°C

used in earlier systems, to just 6 bar and 20°C; this has the effect of reducing energy consumption, cutting capital cost, as no air heater is required, and extending the operating life.

Additionally, the dramatically increased efficiency of each fibre allows the overall size of the filter modules to be reduced; combined with lower operating temperatures and pressures, making the system suitable for use in a far wider range of applications, including the aviation and offshore oil and gas sectors.

The hollow fibres are very robust and do not suffer from the effect of ageing, whereas other hollow fibres typically take between two to three years to age while in service, during which time efficiency gradually declines by as much as 25%.

The latest hollow fibre membrane filters are being incorporated in a new range of compact and cost effective nitrogen generation systems. These are supplied as fully integrated units, complete with compressor and all connections, enabling end users simply to plug-in and start producing a low cost nitrogen stream almost immediately.

Although the potential cost savings for those companies already using a nitrogen supply can be considerable, typically between 25% and 50% depending on current gas prices, there is also the added advantage of being able to generate nitrogen on-demand and, in many applications, at the point of use.

What is also worth considering is that the new generation systems also produce an oxygen stream that can be used in a variety of processes, typically improving the efficiency of oil or gas burners, providing many industrial users with the double benefit of low cost nitrogen and free oxygen.

As a final point, Puresep also offer system service support, tailored to suit individual site requirements; giving regional client support and process and equipment service, resulting in long term reliability and optimal system performance.

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Puresep Technologies headquarters are in Ledbury, Herefordshire. Founded in 2002, Puresep now boasts over 500 customers across market sectors that include: Food and Beverage, Pharmaceuticals, Paper and Chemicals. With the current staff levels at 15, and turnover at near £4m, Puresep has high hopes for the future and is setting aggressive targets for growth. Puresep Technologies has two divisions, Puresep Water based in Lincolnshire and Puresep Filtration based in Herefordshire.