



CALGAVIN hiVISC

CALGAVIN, a heat transfer and fluid flow specialist, has developed a device that will save on hardware and operation costs and help the process industries reduce their carbon footprint.

Unless you happen to work in the sector, you could probably live your entire life without once thinking about the process industries. Yet without these industries that produce chemicals, petrochemicals, cement and processed food, life is hard to imagine. There'd be no antibiotics, no motorways, no plastic for vital medical equipment like syringes and intravenous drips.

Processing industries are an essential part of modern life and demand for their products is [growing](#). This is a problem. These are energy-intensive industries predicted to burn more fuel and produce more emissions to meet demand, potentially slowing the world's progress towards net zero.

But an Innovate UK-funded project has developed a solution. CALGAVIN, the company that led the research, calls it the hiVISC, a device that improves the efficiency of heat exchangers that process high-viscosity fluids (liquids that have the consistency of honey or thicker). For the processing to work manufacturers have to maintain critical viscosities and rates at which fluids pass through tubes. A device called a heat exchanger is used to heat and cool the fluids along large surface areas. This requires a lot of energy, which means high cost to the manufacturer and a cost to the environment in the form of carbon emissions.

The hiVISC gets around this by sitting inside the tube, where it directs fluid back and forth from the wall to the centre of the tube as it flows. This maintains the optimal temperature for a fraction of the energy: it improves heat transfer by up to six times over a tube without inserts and higher than products on the market currently. CALGAVIN

estimates that plants that adopt hiVISC could save up to 28,000 tons of CO2 per year. That's the equivalent to the CO2 produced annually from [heating 12,000 homes in the UK](#).

Hamzah Sheikh, CALGAVIN's Technology Development Engineer, said: "We figured out that new heat exchangers that use hiVISC could be quarter the size of standard units. That could mean a saving of up to £50,000 per heat exchanger, on top of the savings made from using less energy for heat transfer. Retrofitting existing exchangers could also boost performance by increasing the throughput of products in factories."

An Innovate UK grant of £349,685 helped CALGAVIN set up a test facility where prototypes could be made and tested using 3D modelling and printing. As well as the standard stainless-steel hiVISC the company is developing an insert made of PTFE for use with fluids that are corrosive to metal. The inserts will be manufactured in the UK and are expected to create 10 new jobs at CALGAVIN and 14 indirect jobs over the next four years.

“We figured out that new heat exchangers that use hiVISC could be quarter the size of standard units.”

Hamzah Sheikh,
CALGAVIN's Technology Development Engineer