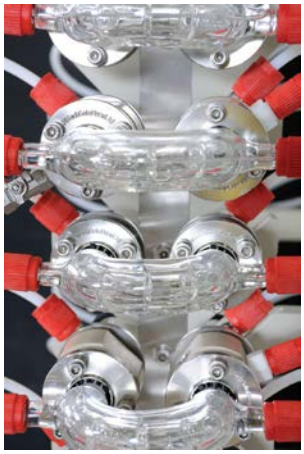
... enabling distributed manufacturing

DN15 RANGE

Dr Cameron Brown demonstrates the key features of the exciting new DN15 technology



So you've purchased or are thinking of purchasing a continuous NiTech unit, and you are wondering how to make the most of the unit as well as setting it up. Over the next few minutes I will demonstrate a simple crystallisation, which will cover the main components, start-up procedure, adding a secondary inlet, proper sampling technique, shutdown procedure and trouble-shooting.

To begin with, let me start with the main components. Firstly we have the glassware, which consists of both straight and u-bend sections. Each section is rated for 2 bar pressure and is fully jacketed. The jackets can be connected in both a counter and co-current manner. We have the piston driven by a linear activator giving us full control of both frequency and amplitude. Following this we have the inlet collar, to allow connection to the upstream process. We also have additional collars which can be fitted for secondary inlets, thermocouples or any other process analytical tools, and sampling.

This unit in particular has also been fitted with optional thermocouple data logger and integrated peristaltic pumps. Both of these are fully controllable through the touch-screen interface along with the piston. Towards the end of the unit we also have the outlet collar which can be adapted to connect to any downstream process.

Now that you're familiar with the main components, let me take you through a typical start-up procedure. First of all, ensure that your outlet is unrestricted or if a valve is fitted, that it is open. Following this, the main feed pump can now be started to fill the rig. For this demonstration we will be using water at a high flow-rate.

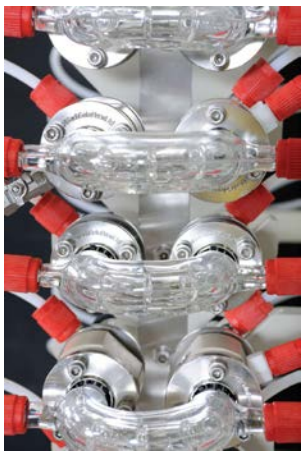
Once the unit has started to fill, the oscillation can be switched on to enhance air removal. Conditions of 3 hertz and 40 millilitres are usual at this stage. The system can now be left until all the air has been removed. With all the air now removed, the oscillation and pumps can be switched off and the unit will remain in its filled state.

CHOOSE CONTINUOUS – CHOOSE NITECH

Email: sales@nitechsolutions.co.uk Website: www.nitechsolutions.co.uk

... enabling distributed manufacturing

DN15 RANGE



To demonstrate the crystallisation process, the water used for filling has been replaced with a saturated solution and the frequency and amplitude are now set to the operating levels. For this demonstration, two hertz and twenty millilitres will be used. Depending on your chemistry, you might require a secondary inlet.

In this demonstration I'll be adding a slurry of seed crystals to initiate crystallisation. Here we have one of the additional collars connected to a second peristaltic pump. Switching on the pump starts the transfer of the saturated slurry. A proper sampling technique is necessary to prevent ingress of air into the unit.

Non-return valves can be fitted, however when dealing with solids these valves tend to block. An alternative is to fit a syringe to a valve. Pulling on the syringe to create a partial vacuum and opening the valve allows the syringe to fill. Once filled, the valve can be closed, and the syringe removed. The sample can now be used for any offline measurements.

Before shutting down the unit, it is advisable to flush the unit to remove any un-reacted reagents as well as solids. In this case, the feed pump has been connected to a freshwater supply to purge the saturated solution. It is advisable to run with fresh water for two to three residence times to ensure complete flushing. Once flushing is complete both the pump and oscillation can now be switched off.

In this final portion, I'll cover some common issues encountered when running for the first time. When dealing with chemistries which are sensitive to sudden temperature drops, it is important to measure the temperature difference between the process and jacket. For measuring the jacket temperature, thermocouples can be fitted to the exterior of the jacket or in the jacket connection between sections.

Depending on your upstream arrangement, there can be a significant temperature drop into the unit. This can be a problem in crystallisation processes as unwanted nucleation can occur. In this case, elevating the upstream process temperature or heated feed lines can be employed to minimise the risk. This concludes our short demonstration. If you have any further questions or queries, you can find us at nitechsolutions.co.uk.

CHOOSE CONTINUOUS – CHOOSE NITECH

Email: sales@nitechsolutions.co.uk Website: www.nitechsolutions.co.uk