NiTech® Solutions is a leading authority on continuous processing. Its unique patented reactors and crystallisers can transform the manufacture of chemicals, pharmaceuticals, food and drink, and biotechnology.

- Formed in 2004; Operational HQ in Edinburgh, UK
- Experienced team with relevant chemical industry experience
- Provides continuous process technology solutions
- Operates partnerships with CRO's for application feasibility studies and our engineering partner AWL

For our customers....NiTech® provides patented simple, yet highly innovative, continuous flow process technology to meet today’s need for safer, greener, faster and cheaper manufacturing processes.
NiTech® Solutions – Technology

Continuous flow technology for chemical, specialty, pharma manufacturing and other applications

- Unique, patented, continuous flow reactors and crystallisers
- Technical support/advice based on extensive knowhow and broad application experience
- Core Technology - COBC/COBR/TBR - continuous oscillatory/tubular baffled reactors/crystallisers
- Lab-scale, pilot-scale and manufacturing-scale units available
- Excellence in mixing and therefore heat/mass transfer
- Suitable for processes containing liquids, solids and gases

Safer, Greener, Faster and Cheaper

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Benefits of NiTech® Continuous Reactors and Crystalliser

- The potential for eliminating mass/heat transfer constraints allows much faster reaction times.
- Scale-up is linear, meaning conversion from lab-scale results to full production is easier.
- Throughput rates can be readily varied.
- Processes involving solid/liquid/gas are all possible.
- Footprint is significantly reduced versus batch processes.
- Better use of time and space.

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NiTech® Solutions – Company Overview

Manufactured in glass, stainless steel, Hastelloy or other materials to meet specific requirements of temperature, pressure and anti-corrosion, as well as to ATEX standards.

Sectors

- Biofuels
- Commodity Chemicals
- Consumer Products
- Dyes, Paints and Pigments
- Fine and Specialty Chemicals
- Food and Drink
- Paints and Coatings
- Personal Care
- Pharmaceuticals
- Polymers

Processes

- Biocatalysis
- Catalysis
- Emulsions and Dispersions
- Hydrogenations
- Mixing
- Organic Chemistry
- Polymerisation
- Solvent Extraction
- Crystallisations

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RESEARCH INSTITUTE OF SWEDEN (RISE)
RISE can carry out feasibility studies on chemical synthesis and crystallisation processes and provide a proof of concept for a continuous process. The institute is equipped with a NiTech® Evaluator and a NiTech® DN15 Plus unit.

LA MAISON EUROPÉENNE DES PROCÉDÉS INNOVANTS (MEPI)
MEPI has successfully developed a significant number of chemical reactions, precipitations, particle size engineering, nanoparticle and grafting generations, using NiTech’s® continuous oscillatory baffled reactor (COBR).

CENTRE FOR PROCESS INNOVATION (CPI)
CPI is a technology innovation centre that works with universities, small- and medium-sized enterprises (SMEs) and multi-national businesses to help them overcome innovation challenges and bring new products and processes to market.

SAS PIVERT develops processes and proprietary products from biorefining. PIVERT is using a high-pressure ATEX-compliant DN15 crystalliser/reactor to support its bio-chemistry research and development work.

PURDUE UNIVERSITY is researching process systems, engineering approaches and tools for product design and optimal operation. Purdue is currently using a NiTech unit in its research and can provide contract research activities.

NALAS Engineering has engineers, scientists and analysts that are highly experienced in developing manufacturing processes for energetic materials, pharmaceuticals, and fine and specialty chemicals, including the manufacture of cGMP product.

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ALCONBURY WESTON LTD is a leading designer, manufacturer and supplier of continuous processing systems, including reactors/crystallisers, filters and dryers. AWL’s products can be used independently or linked together to create a complete system at laboratory-, pilot- or production-scale.

The AWL filter range is based around a laboratory-scale continuous filter (CFC15) capable of filtering 2 litres of slurry per hour and producing solids with moisture contents around 10% and a pilot-scale continuous filter drier (CFD20) which can filter 6 litres of slurry per hour and is capable of controlled washing and drying giving cleaner, drier solids with moisture contents below 2%.
Crystallisation is traditionally carried out in batch vessels or via a series of tanks. These make it problematic in controlling mixing and temperature simultaneously, leading to wide size distribution, prolonged filtration time and increased impurity.

The NiTech crystalliser has the unique capability of providing excellent mixing and better temperature control simultaneously, delivering consistent crystal properties that cannot otherwise be achieved in traditional batch operation. Development programmes have also documented major cost savings via increased throughput and step-reduction in crystallisation time.

The NiTech crystalliser operates on a ‘plug-and-play’ basis with existing manufacturing processes.
NiTech® units are Safer, Greener, Faster and Cheaper
...than traditional stirred tank reactors

NiTech Reactor/Crystalliser

Small stand-alone units, typically:
>70% plant footprint reduction
>40% capex reduction

Energy efficient
Local manufacturing/distributed manufacturing, typically:
>30% operating-cost reduction

Standardised modular equipment
“Plug & Play” flexibility, typically:
>10% yield improvement

Cleaning very simple
High re-use ability

Traditional Units

Major use of steel, glass lining
Significant infrastructure need
Large buildings required

Energy-intensive processes
Specialist large industrial sites

Very inflexible
Extensive supply chains

Cleaning costly, time-consuming
Downtime

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Scalability of NiTech® Units

Lab → Pilot → Full

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NiTech® Technology - Process Chemistry Applications

- Continuous cooling crystallisation
- Handle extreme reaction exotherm; Hydrogenation
- Seed generator for crystallisation
- Agrochemicals
- Cosmetic products
- Dynamic separation of one phase from another during reaction; Antisolvent crystallisation, continuous crystallisation of melts
- Food and beauty products
- Biomethane
- Organic and inorganic synthesis
- Synthesis of an API involving gas, liquid and solid; Continuous cooling crystallisation of APIs
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300 m³ STR is replaced by a 2 m³ NiTech Reactor

Three-phase reaction in the production of Renagel by Genzyme, now Sanofi

1st reactor was in operation in April 2007 at a rate of 60 l/min

2nd reactor was installed in Aug 2016 at a rate of 115 l/min
Transesterification with dynamic separation (10-15 L/min)

Oil additive with multi inputs of viscous materials (2 L/min)

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DN15 Lite (40 mL/min, Vol = 1.25 L, 30 mins)

NiTech evaluator (100 or 300 mL)

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Pilot-scale

(5-10 L/min, Vol = 24 L)
Full-scale: Zeolite (DN43, 10-25 L/min, Vol = 40 L)
NiTech® Leadership Team

William Davies, CEO
- 30 years’ experience in the international chemical and oil & gas industries
- a PhD in polymer physics
- MBA from University of Edinburgh Business School

Paul Hodges, Chairman
- Chairman of International eChem (IeC)
- 17 years’ experience in Imperial Chemical Industries (ICI) - Executive Director of a $1 billion ICI business

Prof Xiongwei Ni, FIChemE, FRSC, CSO
- Pioneered and developed the NiTech crystalliser and reactor
- Over 20 years’ experience in the science and technological applications of OBR

Neil Todd, Non-Executive Director
- Extensive business knowledge from a wide range of business sectors
- Considerable experience in funding business expansion and strategic planning/change management

Dr Will Barton OBE
- Roles up to VP Manufacturing & Technology in Chemical industry
- Was Co-founder / COO of Oxford Catalysts (now Velocys) and is Co-founder / Chairman of Oxford Biotrans

Dr Sandy Dobbie, Non-Executive Director
- Over 25 years experience leading speciality chemical companies
- Founding Director and Co-owner of Cogency Chemical Consultants Ltd.

Andy Gibbins, Engineering Director
- Extensive experience in manufacturing within the chemical and process industries
- a chemical engineer, and a chartered member of the Institution of Chemical Engineers

Christopher Hall, Director
- Extensive experience in telecommunications, technology, finance and law spanning more than 30 years
- a solicitor of the Senior Courts of England and Wales and is a member of the New York Bar

George Butcher, Business Development Director
- Extensive experience in the chemical and pharmaceutical industries has ranged from agrochemicals through oral solid dose and topical drug formulation development

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