



flow technology™

Biopharma Capabilities – Short Overview

2024

Who we are:



90+ Staff



2,200m²
Workshop in
Cork



44 Years in
Business



1000+ Projects
completed



Who we work with:

8/10

World's Largest
Bio Pharma
Companies

Top 2

World's Largest
Soft Drinks
Companies

3/4

World's Top
Alcoholic Beverage
Producers

No.1

Largest Irish
Whiskey
Distillery



flow technology™



Trusted by:
8 of World's Top 10
Biotech Companies.

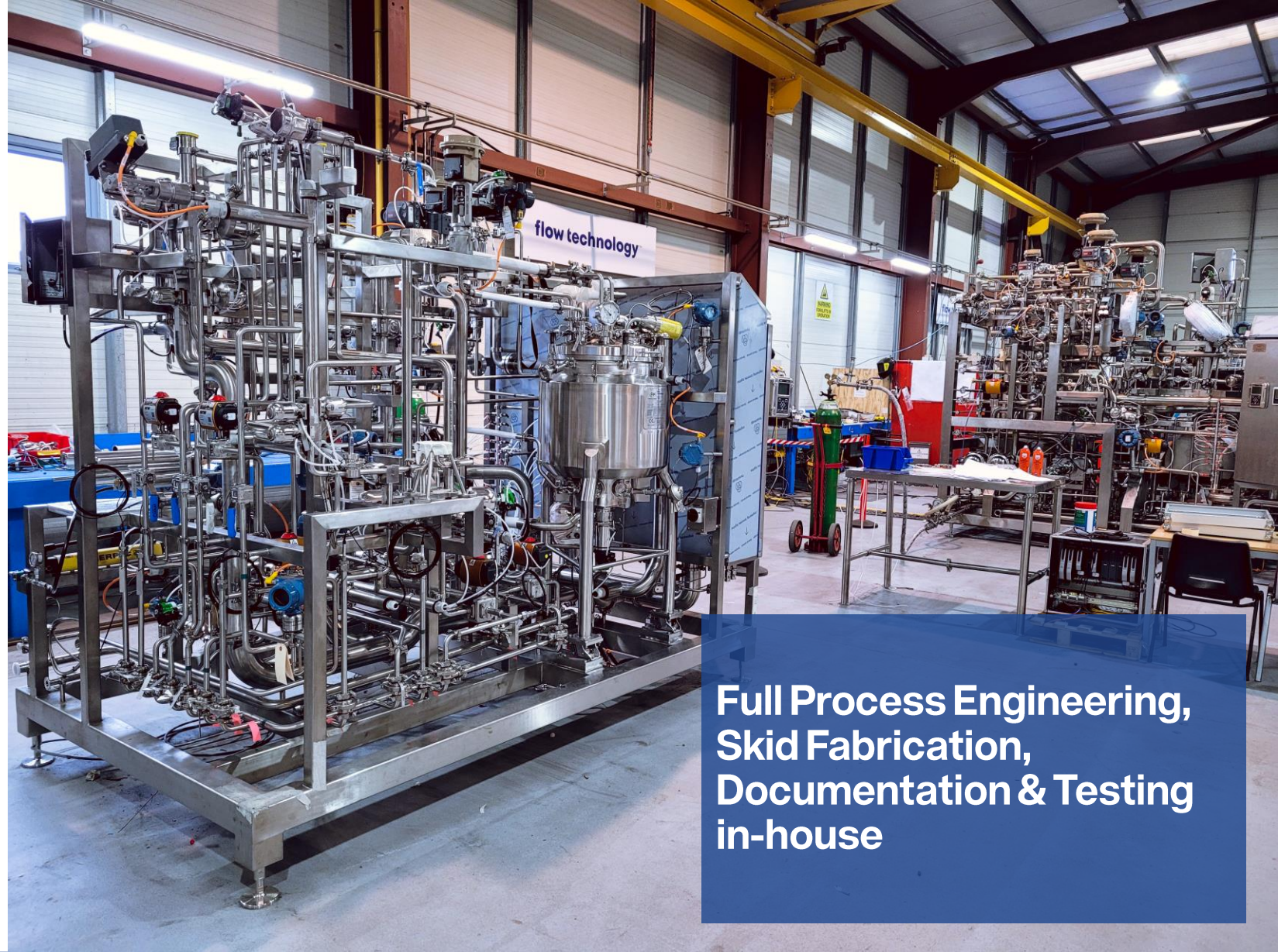


8 ISPE FOYA
Category
Winning Projects

What we do:

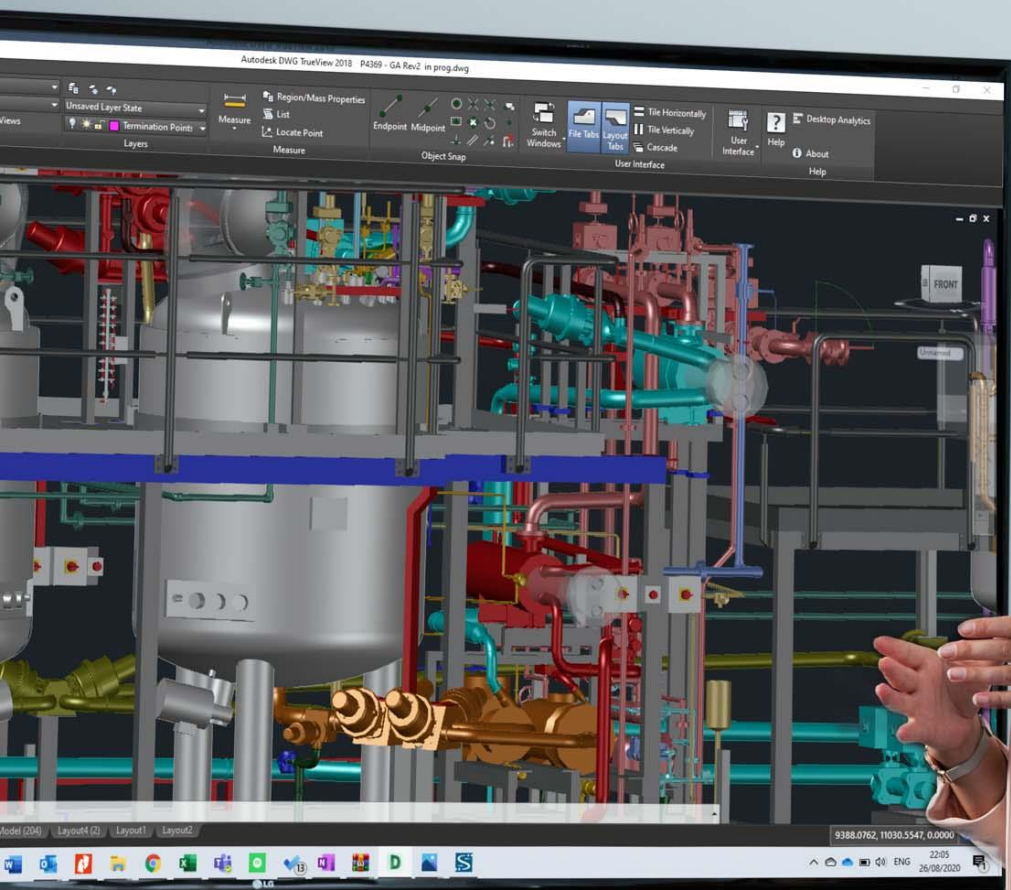
We design, build & deliver customized process skid systems to exacting customer requirements.

We deliver high quality systems, on time, with full regulatory & quality compliance, to the top biopharma companies in the world.



Full Process Engineering,
Skid Fabrication,
Documentation & Testing
in-house

flow technology™



Full Project Scope Capabilities

- Process Design
 - P&IDs, HAZOP, GAs, BOMs, Equipment Specifications, Layouts, URS (With Client), Automation & Electrical Scoping
- Commercial Proposals
 - Front End & Budget
 - Fixed price Lump Sum
 - Time & Material
- Project Management
- Detailed Design
- Quality Control
- Factory & Site Testing
- Handover Documentation
- Operator & Technician Training
- After Sales Support



Project Manager = Lead Project Engineer

- At Flow Technology, the Lead Project Engineer on a package also serves as the Project Manager.
- Our customers have a single point of contact for information on Schedule, Documentation, Technical Enquiries, etc.
- Information sharing and collaboration is more efficient, and questions are answered quickly

Process Expertise:

(Depth, Harvest, Viral, Nano, TFF/UFDf)

Clean-In-Place



Filtration



Chromatography
Liquid Handling



Buffer
Dilution &
Distribution



Buffer Prep



Upstream

Primary Capture

D/S & Purification

Fill Finish

Utilities

WFI & PW
Distribution & POU



Transfer Panels



TCUs & HTSTs



Biowaste
Deactivation &
Neutralisation



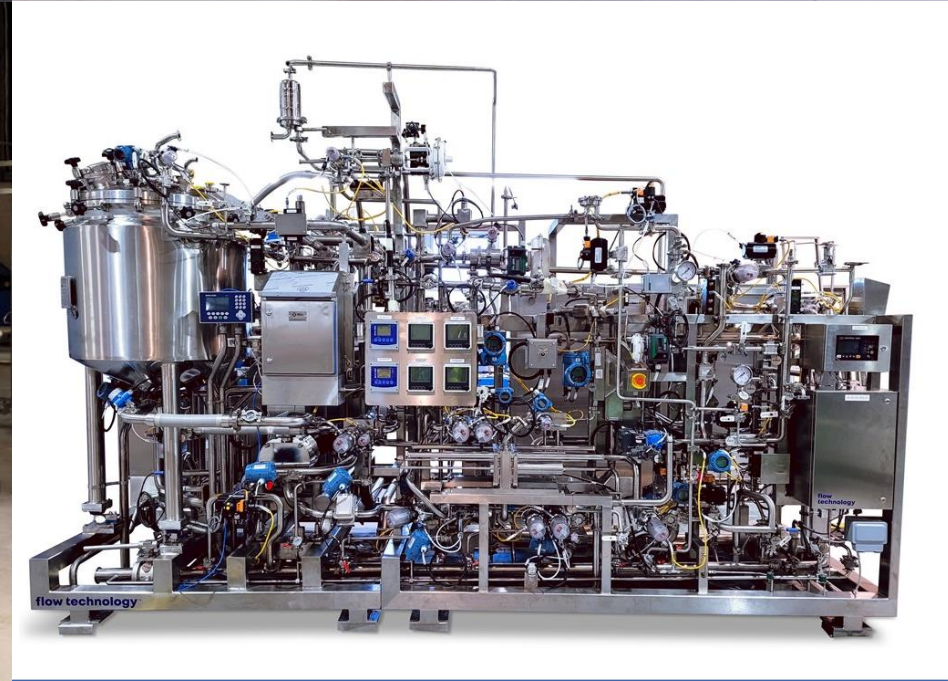
Single Use



Filtration System Capabilities

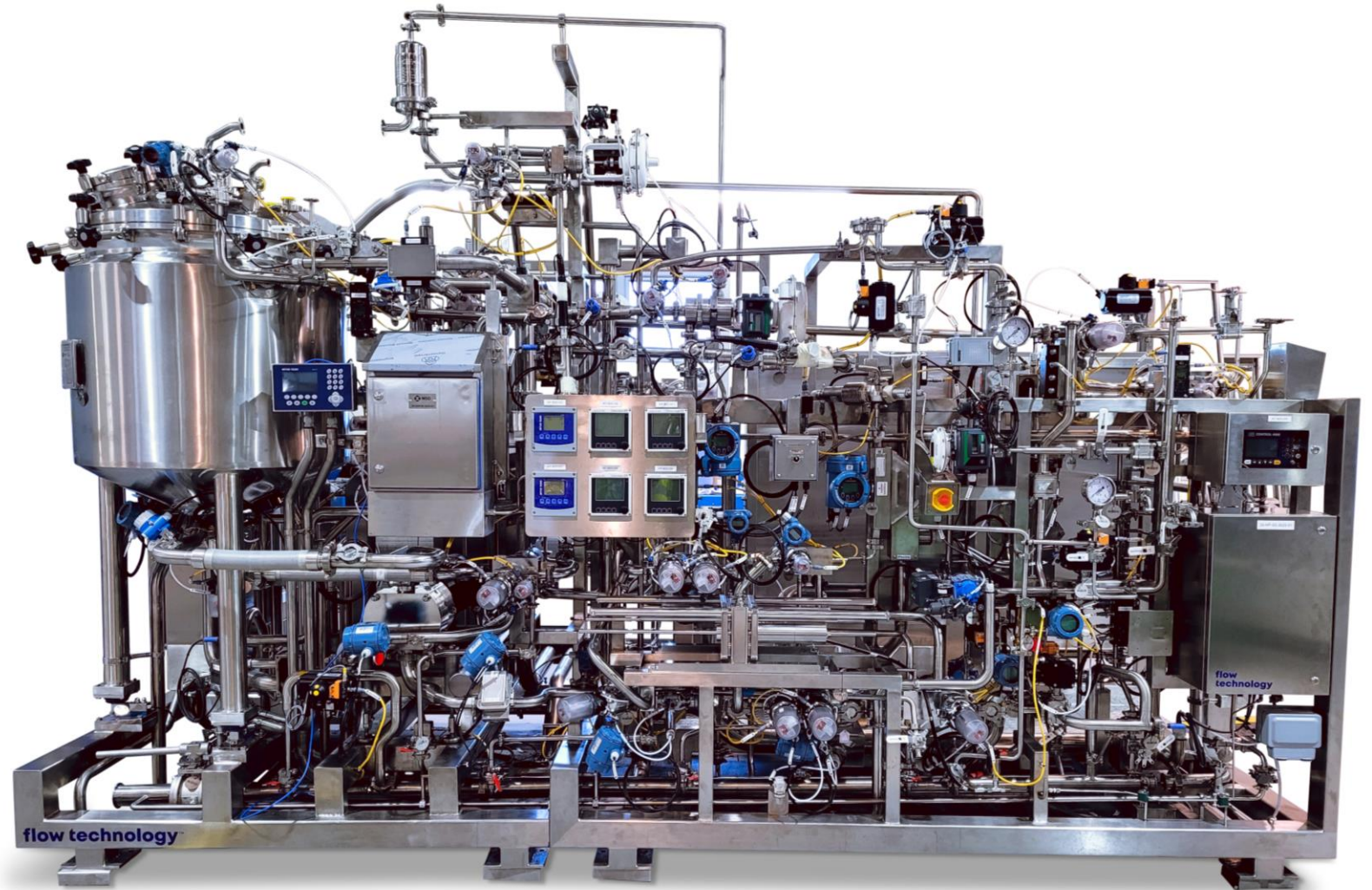
Technology Expertise

- Nano Filtration
 - Depth & Harvest Filtration
 - POD Filtration
 - Viral Filtration
 - TFF/Ultrafiltration Diafiltration
-
- Experience and expertise with multiple manufacturers of filters and media.
 - Fully customized solutions to match customer process, ergonomics and site considerations
 - Full FAT (Including SIP) capabilities at our state-of-the-art facility



Biotech Customer Ireland - UF/DF Skid

- Millipore PEH1150HHPT3 Membrane Holder, up to 8m² using Pellicon 3.
- 300L Retentate Vessel with Mettler Toledo load cells & Fluoroflex hosing.
- GEA Hilge Novalobe pump
- Emerson, Mettler Toledo, Endress & Hauser & Optek Instrumentation (pH, Conductivity, UV, Temp, Pressure).



Final UF/DF Skid, mAbs facility, Belgium

- 1.71 m² TFF area (Millipore Pellicon 3)
- 8.5 L/min nominal capacity.
- Quattroflow QF1200S 0.37kW feed pump
- 50L Retentate Vessel on load cells with 0.15kW agitator on VSD and 5" 0.2 micron vent filter.
- 1 x 30" 0.2 micron product filter.
- All wired to IO panel for DCS control.





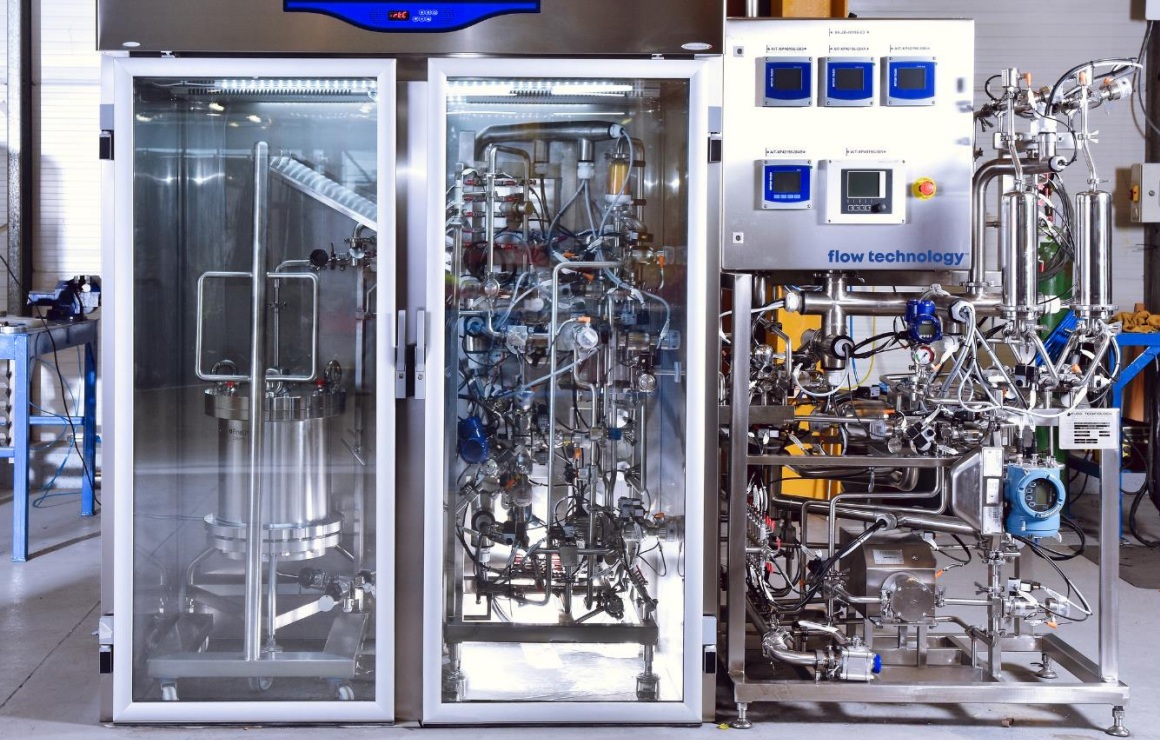
Chromatography Liquid Handling Skid System Capabilities

Technology Expertise

- Every Chromatography skid is unique and we work with clients to design, build and test a system to meet their requirements.
- Many of our Chromatography skids integrate inline dilution
- Experience ranging from small refrigerated systems to large systems feeding 2.4m diameter columns

Equipment & Platform Flexibility

- Experience and expertise with many manufacturers of equipment and components. We incorporate the customer's preferred equipment.



Case Study

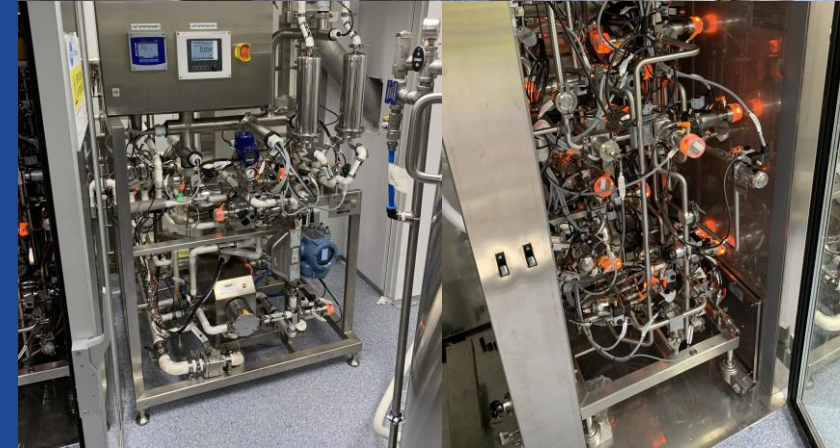
Unique Refrigerated Chromatography System

- A Biotech customer was introducing a new process which required the chromatography column and bags to be chilled.
- A purpose-built cold room would be cost prohibitive.
- Flow Technology developed the novel solution of utilising a commercially available refrigerator, and designing the chromatography system to be mobile, and wheeled in and out of the cold area.
- This reduced capital and maintenance costs, while also reducing the system footprint.
- Heat-generating components (e.g. pumps) were kept outside of the refrigerated area



System Overview

- Quattroflow Pump (50 - 450 l/hr)
- Sartorius Process Cartridge Filter housings, UniBloc-pump bubbletrap.
- 2000L Pre-Fabricated Refrigerator
- GEMÜ Diaphragm Valves, SVF Ball Valves.
- Conductivity, pH, UV, Air, Flow, Level, Pressure and Temperature sensors.
- RIO and MCP Panels
- System fully tested at FT Workshop

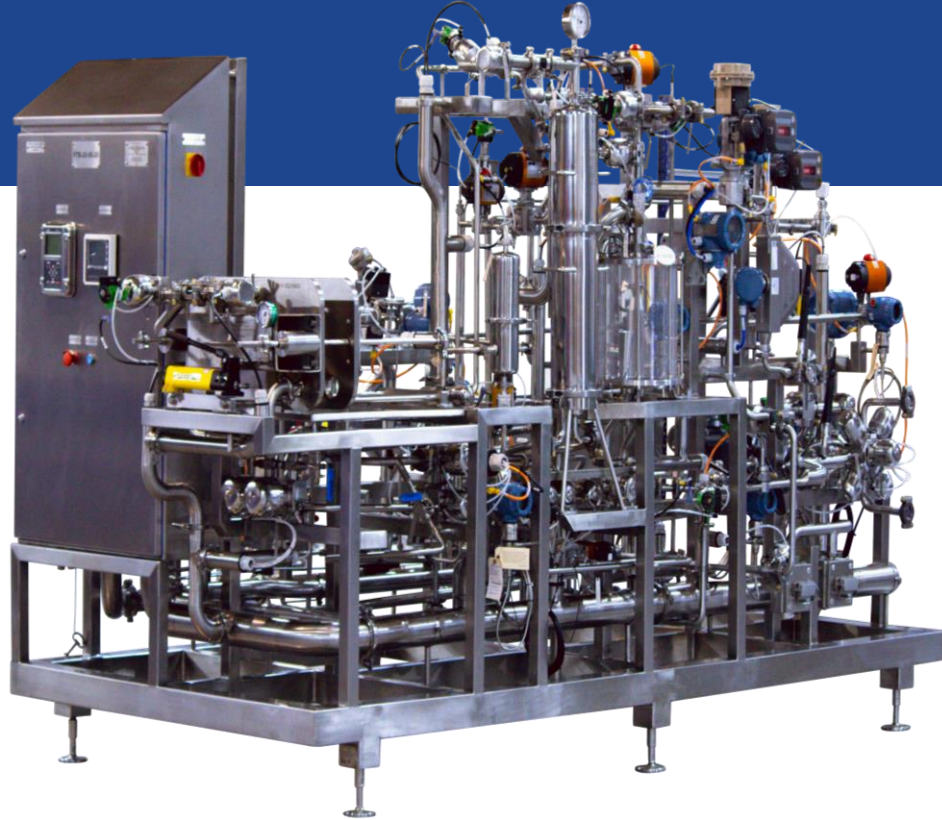


flow technology™

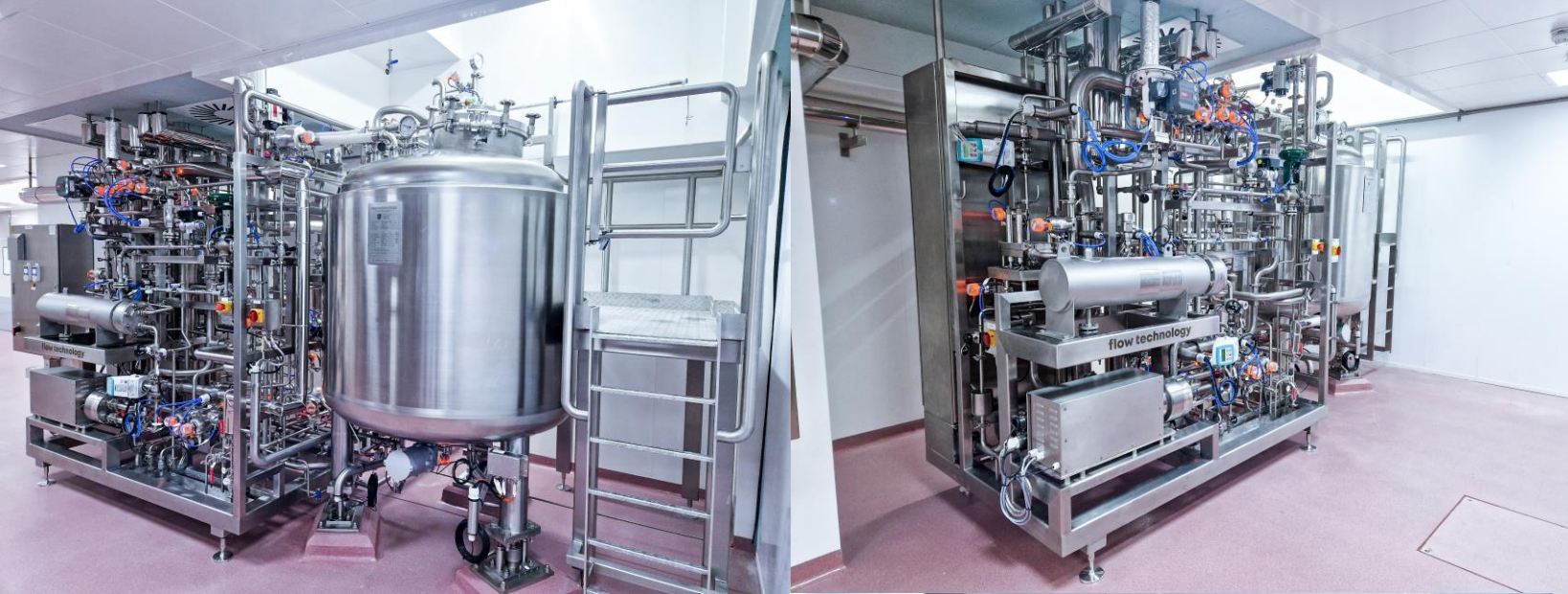
flow technology™

Chromatography Liquid Handling Skids, mAbs facility, Belgium

- Chromatography: Factor VII Affinity Skid
- 150-1800 L/hr Capacity, 17.5L Bubble Trap, 3x1.1m² Depth filter



- 2 x Chromatography: Capto MMC Skid & Capto Q Skid
- 58-700 L/hr Capacity, with 17.5L Bubble Trap



UF & Chrom Skid Systems, UK Site, 2023

Ultrafiltration Skid

- 1000L vessel with Alfa Laval Levimag & Siemens weigh cells.
- Quattroflow 5k pump
- ABC Heat Exchanger
- Pall Centrasette 5 membrane holder

Chromatography Skid

- 1,800L Vessel with Alfa Laval Levimag & Siemens weight cells.
- Quattroflow QF25HT pump
- Advanced Couplings Bubble Trap
- ABC Filter Guard and Filter.

Common Instruments & Valves

- GEMU Diaphragm & Ball Valves, Anderson Negele TTs, Siemens FTs, WIKA PIs, E&H PTs, Rosemount Cond, Broadley James pH, Optek UV, AQ-Mtech Air detector, Spirax Sarco Steam Traps



Large Project Case Study

Project Facts:

- 2016
- €1200M+ Investment
- Multi-Product Cell Culture Biologics Manufacturing facility, Ireland

FT Scope:

- 21 skids in total
- WFI Distribution Skids (6 loops @60m³/hr)
- Qty 4 Chromatography Skids
- Caustic Inline Dilution
- Buffer Ring Manifolds
- Harvest Product Heating and TCU
- Pre-Viral UF/DF



Pharma Case Study: Qty 3 Chromatography Skids with QTY1 Column Packing Skid



- Chromatography LH Skids including
- Buffer/Product Feed Pump
- AWFI Feed Pump
- Chromatography Guard Filter & Eluate Filter
- Advanced Couplings Bubble trap
- Sartorius sanitary filter cartridge with ABC Sanitary Filter housing
- Alfa Laval SX Series Rotary Lobe Pumps
- Chemineer In-line Static Mixers
- Equipment with Remote I/O Panels for integration to Clients Delta V DCS.

Flow Technology Design

- Development of detailed P&IDs
- Full 3D modelling for layout and detailed piping design
- Platform & skid frame design with structural calcs.
- Fabrication, FAT protocol generation and full testing
- Automation developed in partnership with Client



- UF/DF Skid including
- 2m³ UF Feed Vessel with heating/cooling jacket & Metenova agitator
- 40m² UF Membrane (Pall Centrasette 10 holder with Centrasette T Series Membrane Cassettes)
- Alfa Laval SX5/115 Sanitary Rotary Lobe Pumps
- Equipment with Remote I/O Panels for integration to Clients Delta V DCS.

Flow Technology Design

- Development of detailed P&IDs
- Full 3D modelling for layout and detailed piping design
- Platform & skid frame design with structural calcs.
- Fabrication, FAT protocol generation and full testing

Case Study: Biotech

Project Facts:

- 2019
- Biologics Manufacturing Facility, Swords, Ireland

FT Scope:

- WFI Point of Use Cooling Skids
- Chromatography LHS
- Viral & Depth Filtration Skids
- Harvest & Depth Filtration Skids



CIP Systems x 2, Biopharma Client, Ireland

Each Skid comprising of:

- 800L Wash Vessel & 800L Final Rinse Vessel
- 11kW GEA Hilge Hygia CIP Supply Pump (350 L/min)

- 488kW Shell & Tube Cooler (removable U-bundle)
- 854kW Shell & Tube Heater
- Chemical storage & metering system
 - 100L 316SS Day tanks for Sodium Hydroxide, Phosphoric Acid & Citric Acid
- Sera metering pumps with 1.5kW motors and PTFE Diaphragms



PW Distribution Case Study Pharma Site, Cork, Ireland

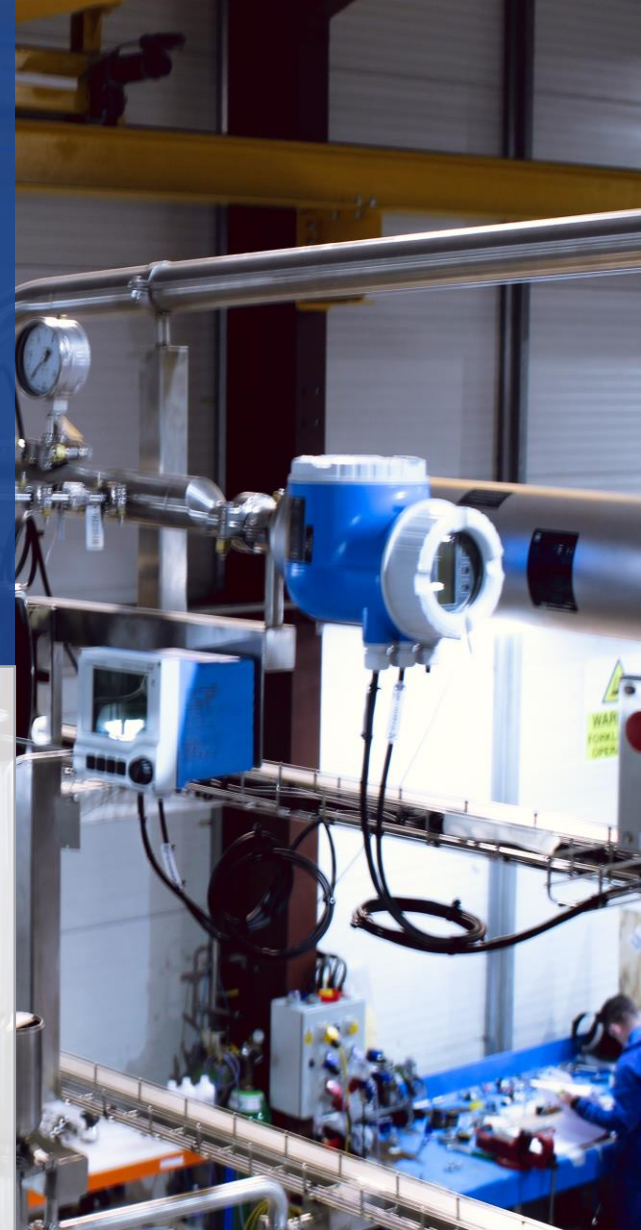
- 2021
- PW Storage, Sanitisation & Distribution System

Technology Overview

- 6kL PW Vessel, PED Cat III
- Allegheny Bradford Shell & Tube HXs (Sanitisation & Cooling)
- Hanovia PharmaLine UV Light Sanitization System
- Hilge Hygia 15kW Pumps, E&H Promass Flowmeter, Anatel PAT700 TOC Analyser

Process Parameters & System Details

- Loop max flowrate: 31.1m³/hr (80mm loop)
- Ambient (25°C) Operating temp
 - Sanitisation ramp up to 85°C over 60 mins
 - Sanitisation hold at 85°C for 180 mins
 - Cooling down to ambient over 90 mins
- Control: Loop pressure, Return flow, Temperature
- MCC & Electrical panels included.
- IO to Clients PCS system



Thank You.

David Greer
Engineering Director
dgreer@flowtechnology.ie
+353 87 686 0405

Ian Shanahan
Business Development Manager
ishanahan@flowtechnology.ie
+353 83 428 3994

flow
technology™

Railway Road, Charleville,
Co. Cork, Ireland.
P56 XY64