



INCREASED SAFETY AND PRODUCTION CAPACITY WITH REDUCED COSTS FOR GAS-LIQUID REACTIONS

“How a chemical producer replaced a hazardous batch process with a Flow Reactor skid and achieved higher capacity, lower CAPEX and improved safety.”

THE CHALLENGE

Our client faced a critical production decision: Their 10 m³ batch reactor used for hydrochlorinations had reached end-of-life while the existing process also presented several operational limitations:

- **Strict safety and regulatory compliance:** Large volumes of gaseous HCl required strict safety measures and complex permitting procedures.
- **Capacity bottleneck:** The batch process had a 9-day cycle time, limited throughput and flexibility, while demand for the product was increasing.
- **High energy consumption:** The reaction required cooling to 0 °C, resulting in substantial energy usage and operational costs.

THE SOLUTION

The hydrochlorination step is performed in a continuous gas-liquid reactor skid based on Flowid's SpinPro dynamic flow reactor technology. Continuous operation enabled:

Reduced reactive material.

Efficient gas-liquid mass transfer.

Rapid heat removal in exothermic reactions.

The reactor volume is reduced by a factor of 40,000, dramatically improving intrinsic safety by minimizing reactive material in the system.

The compact skid design allowed installation within the existing production infrastructure, enabling a hybrid setup where flow technology complements existing batch operations.



KEY RESULTS

- Production capacity: +50% increase within a smaller footprint
- Energy consumption: >80% reduction
- CO₂ emissions: >80% reduction
- Reactor volume: 40,000x smaller
- Investments / costs: Lower CAPEX and OPEX



STRUCTURED SCALE-UP APPROACH

Flowid applies a phased methodology to introduce flow technology:

1. Chemical & Technical Feasibility: Evaluation of chemistry and equipment fit
2. Proof of Concept: Validation at lab scale with the SpinPro
3. Pilot Skid: Continuous unit
4. Production Skid: SpinPro R3 or R4
5. Commissioning, maintenance and service level agreements

Flowid - Expect more from your chemistry!

If you are considering converting your process to flow or evaluating a retrofit for this step, feel free to reach out to us.