

# Case Study

## SolidTek Ltd

### Background

Knowsley-based SME SolidTek manufactures a unique range of solid chemical products designed for the residential heating market. All SolidTek's formulated products are manufactured in-house, within the UK, using EU-sourced raw materials.

SolidTek has disrupted the market by developing an innovative solid NSF-certified inhibitor product, the first and only solid product to have achieved this certification. The technology is unique as no other company is offering a 100% solid range of products in 100% recyclable plastic-free packaging.

The SolidTek teams wanted to gain a greater understanding of the current pilot scale process principles involving complex chemical mixing and curing unit operations. This would support the NSF-certified scale and corrosion inhibitor lead product to be produced reliably at higher volumes to meet UK and EU market sales forecast demand of £27 million gross in 2030, using an automated making and packing process.

### Challenge

Following an introduction to the Horizons team at Liverpool John Moores University (LJMU), a consultative support process via a combination of digital diagnostics and readiness level assessment resulted in various support opportunities. These centre on the digitisation and control of process variables, such as mixing time and rheological properties of in-process materials.

The underpinning of key process mixing and curing principles required input from knowledge base resources via applications of statistical methods such as Taguchi orthogonal array and standard factorial design. The impact of this was to improve lead product reliability, productivity, energy efficiency, and environmental impact via less waste and customer service levels.

Delivery Partner



### Solution

SolidTek took advantage of the improvement opportunities identified, resulting in supporting a short-term L6 student analytical lab scale Fact Find project, de-risked via LJMU Discovery Internship and Horizons Grant schemes.

The Horizons teams designed, resourced and managed the Fact Find project with added support from LJMU Knowledge Base resources, external accelerator partners providing hardware integrator, and remote access software and data storage/display expertise.

### Impact

The pilot scale manufacturing process has been successfully upgraded, incorporating underpinning key process principles and the digitisation of the control of process variables. The best practice design and operation developed at the pilot scale can now be utilised as a basis for the upscaled manufacturing process design and equipment fabrication, located at the existing SolidTek factory facility.

The successful optimisation of the production process, together with successful Horizons capital re-risk funding, will help the company to:

- Improve productivity by 1400 % (increased pack rate 2 to 30 per min)
- Enable the business to create at least six skilled jobs in the first four years.
- To meet projected market demands, which is conservatively estimated will double the business turnover by year three through increased productivity, capacity and an increase in sales.

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- Increase export sales significantly to the EMEA region. The teams have identified distribution partners for Western Europe and the Nordic region that will increase production requirements by 60-70% over the next four years.
- Create opportunities for science-based employment in the LCR region by establishing a lasting partnership with academic institutions, especially LJMU.

This project will also help Liverpool City Region deliver on key strategic themes, building a sustainable industrial future and developing a Zero Carbon Economy by reducing:-

- Residential housing market energy bills (typically 10-15 % reduction) via supplier warranty improved heat exchange surfaces
- Carbon footprint & water usage (97% carbon reduction resulting from plastic bottle reduction) of current established players in the residential heating market who supply liquid chemicals and filters.

The support provided by Horizons has helped to gain a better understanding of the current pilot scale process principles involving complex chemical mixing and curing unit operations.

In addition, digitisation and control of key process variables, mixing time and rheological properties of in-process materials have resulted in consistent reliable production of the lead product at a higher manufacturing rate, enabling SolidTek to meet UK and EU market Sales forecast demand of £27 million gross in 2030 using an automated making and packing process.

SolidTek will now put a plan in place (by Q1 2025) to commercialise and upscale the pilot scale manufacturing process via a permanent off-site installation, prioritising automatic packing to minimise payback time and maximise return on investment.

The company has also agreed to initiate a KTP Project to support a more meaningful engagement with LJMU to develop and transfer critical digital and process knowledge skills to support future product development projects.

**“Our partnership with Horizons has been a real eye-opener and has given us the means to consistently, reliably increase our manufacturing production rate, efficiencies, and de-risk digital innovation investment costs.**

**I would recommend anyone managing a manufacturing process to take advantage of what it has to offer.”**

Steve Crick, Director of SolidTek Ltd

