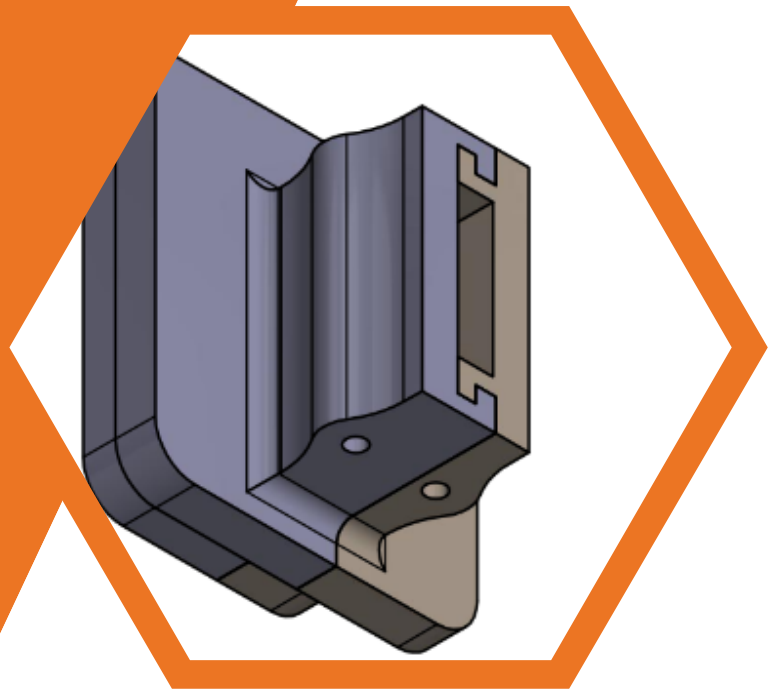

CASE STUDY

PROTOTYPE MACHINING: TURNING CAD DESIGNS INTO TESTABLE COMPONENTS

OVERVIEW

When a UK fusion technology company was developing a continuous soldering machine, it needed bespoke PTFE guide components to test within the new equipment.

With the machine still in development, the customer required prototype parts that could be evaluated in the intended application before finalising the design and progressing to larger production quantities.
Fluorocarbon worked from the customer's preliminary 3D CAD model to assess the design, review suitable material options and manufacture a small batch of prototype components for testing.

The project demonstrates how Fluorocarbon supports customers during product development, turning early-stage designs into physical components that can be tested, evaluated and refined before production begins.

THE ENGINEERING CHALLENGE

The customer was developing a continuous soldering machine that required bespoke guide components to direct material through the process. The guides needed to provide a low friction contact surface while withstanding repeated movement and wear.

The design comprised two sleeve-style components, each made from two machined halves that fitted together using an interlocking dovetail feature. Two sizes were required, including a longer component approximately 215 mm in length.

At this stage, the machine design was still evolving and final production drawings were not yet available. The customer therefore needed a manufacturing partner who could work from preliminary CAD data and produce prototype parts without requiring the entire design to be finalised first.

Material selection was another consideration. Virgin PTFE and a lightly glass-filled grade were both under consideration, making it important to assess the options against the application's requirements before committing to a specification.

The immediate priority was to manufacture parts that the customer could test in the development machine, helping inform the next stage of the design process.

OUR APPROACH

Fluorocarbon's engineering team reviewed the supplied STEP model to establish a practical manufacturing route for the proposed components.
The team assessed the geometry, including the internal guide profile and interlocking dovetail connection, and developed preliminary manufacturing drawings to support prototype production. This allowed the design to be reviewed from a machining perspective before material was committed.
Virgin and filled PTFE options were considered in relation to the application's requirements, including friction, wear resistance, dimensional stability and machinability.

Particular attention was given to the mating features of the two halves, ensuring the components could be manufactured as matched pairs and assembled to form the required guide profile.

By combining design review, material knowledge and in-house CNC machining, Fluorocarbon was able to progress the concept into physical prototype parts while the wider machine design was still under development.

THE SOLUTION

Fluorocarbon machined the bespoke guide components from solid PTFE-based material, producing two component sizes for use in the customer's development machine.

Each guide was manufactured as a matched pair of halves, incorporating the required internal profile and dovetail connection. The split design allowed the components to be fitted around the process path and assembled into the intended sleeve configuration.

The initial batch provided the customer with physical parts to evaluate within the continuous soldering process, offering a practical opportunity to assess the design in its intended operating environment before committing to higher production volumes.

Rather than waiting for a fully finalised drawing package, the customer could progress machine development with prototype components manufactured from the preliminary CAD model.

This approach provided a foundation for further design development and a potential route towards repeat manufacture as the machine design matured.

WHY FLUOROCARBON

Developing a new product or machine often involves testing designs, evaluating materials and refining components before production requirements are fully defined.

Fluorocarbon supports this process by combining polymer material expertise, design-for-manufacture input and in-house machining to produce bespoke prototype components from customer CAD data.

Our prototype machining service can help customers:

- Evaluate designs in practice – turn digital models into physical parts for testing in the intended application.
- Assess material options – consider suitable polymer grades against requirements such as friction, wear, temperature and dimensional stability.
- Identify manufacturing considerations early – review component geometry and mating features before committing to production.
- Progress development without waiting for final drawings – establish a viable manufacturing route while designs are still evolving.
- Prepare for future production – use prototype evaluation to inform design refinement and subsequent manufacturing requirements.