



SI PROTECH

CASE STUDIES & PROCESS GUIDE

From CAD to Component

Project Journey

See how great ideas become production-ready products – from initial concept through to full-scale injection moulding.

01

CONCEPT & CAD
DESIGN

02

FAST PROTOTYPING

03

3D MODELLING &
REVIEW

04

DFM OPTIMISATION

05

TOOLING &
READINESS

06

PRODUCTION &
ASSEMBLY

INTRODUCTION

Every successful component starts with a concept

Turning a concept into a high-quality manufactured part requires expertise at every stage of development.

Our “**From CAD to Component**” process provides a look at how customer ideas progress from initial design through to full-scale injection moulding production.

Through a combination of engineering expertise, rapid prototyping, advanced 3D modelling, Design for Manufacture (DFM) optimisation, and precision injection moulding – with assembly where required – we help customers take their products to market with confidence.

WHAT THIS MEANS FOR YOU



Reduced risk

Issues resolved in design, not in production.



Improved performance

Parts engineered for how they'll really be used.



Faster time to market

A clear, joined-up route from idea to output.

The six-stage process

EACH STAGE IS DETAILED ON THE FOLLOWING PAGES

01



Initial Concept
& CAD Design

02



Fast Prototyping
& Design Validation

03



3D Modelling
& Engineering Review

04



Design for Manufacture
(DFM) Optimisation

05



Tooling &
Production Readiness

06



Full-Scale Injection
Moulding & Assembly

 THE PROCESS

From idea to validated design

01

STAGE ONE



Initial Concept & CAD Design

Your idea is captured as a detailed CAD design, built around how the part needs to perform, be made and be used.

KEY CONSIDERATIONS

- | | |
|---|--------------------------------|
| ◇ Product performance requirements | ◇ Material selection |
| ◇ Assembly integration | ◇ Cost-effective manufacturing |
| ◇ Long-term durability and sustainability | |

02

STAGE TWO



Fast Prototyping & Design Validation

Rapid prototypes put a physical part in your hands early, so the design can be tested and approved before tooling.

WHAT WE VALIDATE

- | | |
|---------------------|--------------------------|
| ◇ Form and fit | ◇ Functional performance |
| ◇ Ergonomics | ◇ Assembly compatibility |
| ◇ Customer approval | |

03

STAGE THREE



3D Modelling & Engineering Review

The 3D model is reviewed in detail by our engineers to identify and address anything that could affect moulding.

AREAS REVIEWED

- | | |
|---|--------------------------------|
| ◇ Wall thickness optimisation | ◇ Draft angle analysis |
| ◇ Structural reinforcement requirements | ◇ Material flow considerations |
| ◇ Potential moulding challenges | |

THE PROCESS

From optimised design to production

04

STAGE FOUR



Design for Manufacture (DFM) Optimisation

The design is refined so it moulds efficiently and consistently – improving quality while controlling cost.

OPTIMISATION FOCUS

- | | |
|--|-----------------------------|
| ◇ Reducing sink marks | ◇ Eliminating warpage risks |
| ◇ Improving mould filling | ◇ Optimising gate locations |
| ◇ Reducing cycle times | ◇ Minimising material usage |
| ◇ Quality control and metrology considerations | |

05

STAGE FIVE



Tooling & Production Readiness

The production tool is built and proven through trials, confirming the process is ready for volume manufacture.

WHAT WE CONFIRM

- | | |
|--------------------------------|------------------------|
| ◇ Tool performance | ◇ Dimensional accuracy |
| ◇ Process repeatability | ◇ Material consistency |
| ◇ Quality control requirements | |

06

STAGE SIX



Full-Scale Injection Moulding Production & Assembly

Your component moves into full production, with assembly carried out where required.

WHAT YOU CAN EXPECT

- | | |
|----------------------------------|-------------------------------|
| ◇ High repeatability | ◇ Tight tolerance control |
| ◇ Consistent quality | ◇ Efficient production cycles |
| ◇ Scalable manufacturing volumes | |

EXAMPLE PROJECT JOURNEY

Industrial Electronic Device Enclosure

How a DFM-led approach turned a problematic design into a durable, cost-effective, production-ready component.

! THE CHALLENGE

A customer required a durable plastic enclosure for an industrial electronic device. The original design contained thick wall sections that increased the risk of sink marks and unnecessarily extended cycle times.



Thick wall sections
in the original design



Risk of sink marks
affecting finish and quality



Extended cycle times
increasing production cost

→ OUR APPROACH

- 1 Created a fully detailed **3D CAD model**.
- 2 Produced **rapid prototypes** for fit and functional testing.
- 3 Conducted a comprehensive **DFM review**.
- 4 Reduced wall thickness variation and added **strategic ribbing**.
- 5 Optimised gate locations to improve material flow using **material flow simulation**.
- 6 Validated the design through **tooling trials**.
- 7 Moved the component into production on **high-quality injection moulding equipment**.

✓ THE RESULT



Improved dimensional stability



Reduced material consumption



Faster production cycles



Lower unit costs



Consistent production quality



SI PROTECH

— START YOUR PROJECT —

Have a concept ready to become a **component**?

Talk to our team about your design. We'll help you move from CAD to production-ready parts — with expertise at every stage.

CALL

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VISIT

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