

Fused Deposition Modelling (FDM)



If you need a prototype model that will stand up to the rigours of functional testing - perhaps for a product that must have specific heat resistance, durability or strength properties – then FDM (or Fused Deposition Modelling) is what you need.

FDM is ideal for rapid production of small quantities of durable plastic prototype parts for testing, at relatively low cost, where the model must carry the properties of the real thing without actually being the final product.

This process guide describes the Prototype Projects approach to producing 3D FDM models that closely represent the strength, flexibility and durability properties of the final product.

What is FDM?

FDM is a prototyping process, also known as 3D printing, that commences with a 3D CAD model. The required part is built i.e. 'printed' onto a plate by a heated, computer-controlled print nozzle, which extrudes the ABS plastic material over multiple layers to create a profile.

Once complete, the 3D FDM model will closely represent the strength, flexibility and durability properties of the final product.

The process normally includes the formation of a support structure which can be removed by hand on completion. Further hand finishing can smooth out small surface irregularities and layer ridges for painting.



FDM Benefits

FDM prototyping is a popular choice for product designers and engineers, particularly – though not exclusively - in the automotive industry, because of its:

- ✓ Speed: FDM is ideal for rapid production of polycarbonate and ABS prototypes
- ✓ Low cost: FDM is a relatively low cost process
- ✓ Complexity: FDM is useful for producing parts with complex geometric features
- ✓ Properties: the model produced closely reflects the properties of the final product for strength, heat resistance, UV stability and water resistance
- ✓ Testing: Because of the above, FDM models are ideal for functional testing

While mechanically ideal for evaluating design and functional testing, FDM models are not suitable for assessing the eventual manufacturing potential of the part or product.

FDM Summary

PROCESS FEATURES

- ✓ Ideal for small runs of prototype parts for functional testing
- ✓ Short lead times - depending on complexity - from CAD to finished part, but slower than SLA
- ✓ Cost effective
- ✓ Small numbers of parts
- ✓ Complex 3D geometries

PROPERTIES

- ✓ Heat resistance
- ✓ Strength
- ✓ Rigidity
- ✓ Stability
- ✓ Surface may be ridged
- ✓ Can be hand finished for painting

MATERIALS

- ✓ ABS
- ✓ Polycarbonates

PRE-PRODUCTION APPLICATIONS

- ✓ Functional testing



About Prototype Projects

Prototype Projects is an expert prototyping bureau providing rapid prototyping and model making services for clients across a range of sectors.

With 30 years of experience built on a reputation for service excellence, Prototype Projects aims to help its clients build and maintain a strong competitive edge in engineering design and production.

Underpinning its commitment to excellence and service quality is an ongoing process of investment in prototyping systems, expertise and technologies.

Prototype Projects service capabilities include:

- ✓ SLA (Stereolithography)
- ✓ SLS (Selective Laser Sintering)
- ✓ FDM (Fused Deposition Modelling)
- ✓ CNC (Computer Numerical Control) Milling (4 Axis) & Turning
- ✓ Injection Moulding (Max Shot Weight - 100g PP/ 70-80g GF PA)
- ✓ Vacuum Casting
- ✓ RIM (Reaction Injection Moulding)
- ✓ CAD (Computer Aided Design)
- ✓ CAM (Computer Aided Machining)
- ✓ CAE (Computer Aided Engineering)