

Fused Deposition Modeling (FDM)

For accurate prototypes and end-use parts with exceptional strength, flexibility, and stability

About

Using real engineering-grade thermoplastics, our Fused Deposition Modeling (FDM) process extrudes ABS (acrylonitrile butadiene styrene) plastic layer by layer, in a variety of thicknesses as fine as .005 per layer. Known for its robustness, FDM produces accurate prototypes and end-use parts with exceptional tensile strength, flexibility, high melt points, UV resistance, and more.

GKN Additive (Forecast 3D) is uniquely qualified to produce your prototypes and production components in our ISO 9001-rated manufacturing facility.

Benefits

- **Toughness:** high strength, durability
- **Resistance:** high heat deflection and chemical resistance
- **Invulnerability:** UV stability
- **Possibilities:** color options

Applications

- Functional prototypes that can withstand rigorous testing
- End-use production parts
- Large parts



This ukulele was produced using ASA in a standard finish.



These handles were produced using ABS M30 with a standard finish.

Process

1. GKN Additive (Forecast 3D) reviews the order file to evaluate and align on customer requirements.
2. Project technicians review the customer's CAD files to ensure data integrity and part printability, providing feedback for potential improvements.
3. Once aligned and approved on the order objective, the customer receives an order confirmation showing a detailed project schedule and ship date.
4. Additive technicians process the order with the requested material, resolution, and quantity, as well as the specified orientation (if any).
5. Additive finishers complete parts to the requested finish level and apply any additional postprocessing operations.
6. Quality assurance team reviews the requested finishing level.

Standard lead time	2–4 days
Standard accuracy	Typically within \pm a single build layer thickness for the first inch and \pm .002" for every inch thereafter
Layer thickness	.005 / .007 / .010 / .013 / .020 depending on material
Minimum feature size	Varies with material and extrude nozzle size used; generally .030" is a good rule of thumb
Minimum wall thickness	Varies with material and extrude nozzle size used; generally .040" is a good rule of thumb
Finishes	FDM parts can be painted, impregnated, sanded, and/or smoothed.

Materials

Standard

ABS-ESD7: static dissipative properties

ABS-M30: versatile and tough; 25 percent to 70 percent stronger than standard Stratasys ABS

ABS-M30i: high-strength material producing biocompatible parts

ASA: high-quality production-grade parts with exceptional UV stability

Engineering

Nylon 6: combines strength and toughness superior to other FDM thermoplastics

Nylon 12: enables applications requiring repetitive snap fits, high fatigue resistance, and press- (friction-) fit inserts

PC: accuracy, durability, and stability, creating strong parts that withstand functional testing

PC-ABS: the superior strength and heat resistance of polycarbonate and the flexibility of ABS

PC-ISO: an industrial thermoplastic that, in its raw state, is biocompatible (ISO 10993 USP Class VI)

High Performance

Nylon 12CF: strong and stiff blend of Nylon 12 resin and chopped carbon fibers

ULTEM 9085: mechanically well-rounded thermoplastic with FST certification

ULTEM 1010: high strength and low CTE

Antero 800NA: PEKK-based thermoplastic with chemical and heat resistance

ST-130: soluble technology that simplifies the production of hollow composite parts

Find out how GKN Additive (Forecast 3D) can take your product from prototype to production. Visit forecast3d.com today or contact us directly at (877) 835-6170 or hello@forecast3d.com to learn more.