

Carbon Digital Light Synthesis™ (DLS)

A rapid 3D-printing process that produces robust, high-performance parts

About

The partnership between GKN Additive (Forecast 3D) and 3D-printing technology company Carbon equals greater capabilities for the automotive market as well as added value for prototyping.

Carbon Digital Light Synthesis™ (DLS) is a rapid 3D-printing process that uses digital light projection, oxygen-permeable optics, and programmable liquid resins to produce robust, high-performance parts comparable to traditional manufacturing plastics. This process accelerates high-value product development cycles while using the same platform specifically designed to provide a cost effective path from prototyping to high-volume production.

Benefits

- Isotropic parts with exceptional surface finish
- Best-in-class material performance
- Highly precise fine features
- Excellent accuracy and repeatability
- Technology built for rapid scaling from prototype to production

Applications

- Automotive interior and exterior parts
- Electrical connectors
- Parts that require flame-retardant material
- Tough and durable industrial applications



Carbon machines at the GKN Additive Facility in Auburn Hills, Mich.

Process

1. GKN Additive (Forecast 3D) reviews order file to evaluate and align on customer requirements.
2. Project technicians review customer CAD files to ensure data integrity and part printability, providing feedback for potential improvements.
3. Once aligned and approved on order objective, customer receives order confirmation reflecting detailed project schedule and ship date.
4. Carbon 3D printers produce parts using resin-based materials initially cured with DLS light engine.
5. Parts are cleaned and thermally cured using programmable oven with material-specific thermal profile.
6. Parts are cooled and postprocessed to customer's requested finishing level.
7. Quality assurance team reviews parts for official sign-off and release to customer.

Build volume (x×y×z)	74 x 4.6 x 12.8 in , 189 x 118 x 326 mm
XY; Z resolution*	75 µm; 25, 50 or 100 µm
General accuracy	Up to ±0.003 in + 0.001 in per in dimension size. Up to ±70 µm + 1 µm per mm dimension size
Production repeatability and accuracy	Up to ±0.002 in. Up to ±40 µm

*Z resolution is adjustable from single-digit microns to multiple hundred microns, and can be optimized through working with Carbon on your target application.

Materials

EPX 82. A high-strength, epoxy-based engineering material with excellent, long-term durability and mechanical properties, comparable to lightly glass-filled thermoplastics.

EPX 86FR. A flame-retardant resin with unmatched combination of functional toughness, high strength, and long-term stability.

RPU 70. This rigid polyurethane – comparable to acrylonitrile butadiene styrene (ABS) – is a good choice for parts that require strength, toughness, and moderate heat resistance.

RPU 130. A strong, tough, and heat resistant resin with a unique combination of performance attributes, making it comparable to an unfilled thermoplastic such as nylon and polypropylene.

EPU 40. This high-performance polyurethane elastomer is a good choice for applications where high elasticity and tear resistance are needed.



Carbon machines in action



A bicycle water-bottle holder/cage printed using Carbon DLS

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.