



## **Frequently Asked Questions**

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## THE COMPANY

### QUICK SNAPSHOT

- Headquarters in Minnetonka, Minnesota, USA
- Materials & Electrophotographic Technology Center in Rochester, NY
- Incubation project inside of Stratasys
- Spun out in 2017 and created Evolve Additive Solutions
- 10 + years of development
- \$19m seed investment from Stanley Black & Decker and The LEGO Group
- Ongoing investments with \$100 million to-date
- Innovated a new category additive manufacturing process - STEP technology
- 100+ issued patents including a patented production technology using real amorphous thermoplastics

### WHO IS EVOLVE ADDITIVE SOLUTIONS?

**ANSWER:** Evolve Additive Solutions transforms how the world manufactures. Founded in 2017, the company offers an Additive Manufacturing platform, materials, software, service, consulting, and applications development. Evolve's SVP (Scaled Volume Production) platform allows for production agility, while creating uniquely functional products that increase speed to market and efficiencies in securing supply chains. Evolve's patented STEP (selective thermoplastic electrophotographic process) technology efficiently produces commercial grade thermoplastic production parts creating unique products that cannot be manufactured with traditional methods. The company is headquartered in Minnetonka, MN with a materials technology center based in Rochester, NY.

### IS EVOLVE ADDITIVE SOLUTIONS PART OF STRATASYS?

**ANSWER:** Evolve was an incubation project inside of Stratasys for 10 years before it spun out as its own entity in 2017.

### HOW MANY MACHINES DO YOU HAVE IN THE FIELD?

**ANSWER:** We currently have a total of 4 machines in service and a 5<sup>th</sup> one on its way as we speak!

### WHAT IS EVOLVE DOING TO ADDRESS SUSTAINABILITY?

**ANSWER:** Connected factory reduces carbon footprint and digital files reduce warehousing

### WHAT IS NEXT FOR EVOLVE?

**ANSWER:**

- Evolve continues to see opportunities with applications development and grow into new vertical markets growing its partner network
- We will be enabling 2 more print engines to facilities the co printing of colors and into to new materials
- We will be adding a 2<sup>nd</sup> platen to increase throughput capacity

## THE HARDWARE

WHAT IS THE SVP?

**ANSWER:** The SVP (Scaled Volume Production) platform, powered by STEP selective thermoplastic electrophotographic process) technology, is the capital equipment that produces 3D printed parts. The STEP process is based on proven 2D printing technology and utilizes the Kodak NexPress which was built as a digital production color press.

WHAT IS THE SIZE OF THE SVP BUILT PLATE?

**ANSWER:** The current dimensions are 12x24x4 in or 300x600x100 mm

WHAT IS THE SPEED OF THE SVP

**ANSWER:** The SVP can print 1 layer every 7 seconds

HOW MANY PARTS CAN FIT INTO A BUILD?

**ANSWER:** This depends on the application, part size, geometries, and performance needs.

## SUPPORT REMOVAL PROCESS

HOW LONG DOES THE SUPPORT REMOVAL PROCESS TAKE?

**ANSWER:** This depends on the build and part geometry. It is part geometry dependent. Traps / voids, blind holes etc typically take longer

HOW IS SUPPORT REMOVED?

**ANSWER:** We use a high Ph basic water solution to remove support, with heated ultrasonics and agitation in a support removal tank.

## THE TECHNOLOGY

WHAT IS STEP TECHNOLOGY?

**ANSWER:** Selective Thermoplastic Electrophotographic Process (STEP) technology is a patented innovative 3D printing process. It uses production-grade ABS amorphous thermoplastics to produce parts that share the high-quality and high-fidelity material properties of injection-molded parts. STEP technology prints 3D parts by using heat, pressure, and cooling to transfer and build-up thermoplastic toner on the build space. The placement of the thermoplastic toner is controlled at the voxel level.

HOW DOES STEP TECHNOLOGY WORK?

**ANSWER:** STEP technology uses heat, pressure, and cooling to produce parts. This occurs in a three-step process:

1. Imaging the piece to be printed
2. Precise alignment between the incoming layer and build

### 3. Fusing these layers together

This process produces a fully dense part, with the surface finish and mechanical properties of Injection molding. STEP uses toner and electrophotography to print parts. Instead of ink toner on paper, STEP machines print production grade thermoplastic toner on the build space. STEP controls the placement of the thermoplastic toner at the voxel level.

With tool-less production from idea to prototypes to final parts, you no longer have to design and wait on molds, or redesign your ideal part to fit limitations of injection molding for things like draft angles and minimum radius. You can go straight to production. Time to market is cut down drastically.

#### WHAT MAKES STEP TECHNOLOGY SO UNIQUE?

**ANSWER:** Evolve's STEP technology has carved out a new category in the additive manufacturing industry. AM Power and the ASTM have confirmed that STEP is truly unique and that no other AM technology competes directly

- Ability for production volume ABS, nylon, and elastomers
- Ability for multi-material printing; using multiple engines
- Co-material and co-printing at the voxel level (coming in 2024)
- Prototype through production with the same materials
- Ultra-high fidelity, production quality, end use parts at scalable volumes
- Fully dense parts that compete with injection molding
- High quality surface finish
  - Particle size of 22microns vs that of SLS/HSS which is 70-120
- Full fusion, full dense parts – fused layers
- Evolve is 13 microns per layer vs that of HSS which is 80-120 and SLS which is 50-300

#### WHAT BENEFITS DOES STEP TECHNOLOGY HAVE OVER OTHER EXISTING ADDITIVE MANUFACTURING PROCESSES?

**ANSWER:**

- Prototypes are easily manufactured with the same process as production without having to transition from prototyping to production
- Change designs from part to part with no downtime and no lead time
- Every run can be different—no changeovers
- Every run can have a different mix to respond to real-time changes in demand (high-mix production manufacturing)
- Enablement of intelligent-queue management, which means it automatically pull parts from the queue that can be changed in real-time
- Enablement of on-demand manufacturing for incremental quantities; you can run different parts from the queue concurrently or consecutively
- Low-mix production that creates an effortless mix and changeover between different production runs and applications
- No need to repurpose, mothball or dispose of specialized equipment

- Print parts when and where you want them, alleviating your logistics costs via a distributed manufacturing network

## THE MATERIALS

HOW IS TONER DELIVERED TO THE SVP? CAN I GET A 55G DRUM AND SOME FORM OF AUTOMATED TONER DELIVERY?

**ANSWER:** Today it is smaller cartridges loaded by the operator. As the production and installed base grows, we are looking at ways to bulk feed material, but this is a future feature offering

IS EVOLVE OPEN SOURCE FOR MATERIALS?

**ANSWER:** Today we only allow approved supply sources due to the stringent requirements of the toner quality and production process. Particles need specific sizes in the 20um range along with properties that both work in the STEP process and produce final printed parts with IM material properties, look and feel.

WHAT TYPES OF MATERIALS ARE AVAILABLE WITH THE SVP PLATFORM?

**ANSWER:** The SVP platform currently supports black and gray ABS as well as PA-11(A). We are working to expand our portfolio of material offerings and will be releasing new materials in 2024.

WHAT TYPE OF NYLON PA-11(A) MATERIAL IS EVOLVE ANNOUNCING?

**ANSWER:** PA-11 (A) which is an amorphous material (verses crystalline)

ARE PARTS MADE WITH NYLON PA-11(A) NOW AVAILABLE?

**ANSWER:** Yes, parts are now available, and you can upload your file for a price quote

CAN I PURCHASE THE NYLON, PA-11(A) MATERIAL FROM SOMEONE OTHER THAN EVOLVE?

**ANSWER:** No. Materials must be purchased through Evolve. The micronization process is specifically designed for use in the SVP machine.

WHY DID EVOLVE CHOOSE NYLON PA-11(A) AS ITS NEXT MATERIAL AND WHAT APPLICATIONS ARE BEST SUITED FOR USE?

**ANSWER:** Nylon PA-11(A) was selected because the market already exists today and Evolve is interested in capturing market share. Evolve's PA-11(A) material has superior material properties, it has high impact strength, it is usable in higher service temperature applications, snap-fit applications, and UAV's (Unmanned Aerial vehicles)

CAN I ORDER GRAY PARTS NOW?

**ANSWER:** Yes. gray is now commercially available, and you can upload your file for a price quote

WHAT MAKES GRAY SO UNIQUE?

**ANSWER:** Benefits of our gray include ease of chrome plating due to a lower amount of carbon black and it has superior structural color contract capability

## MARKETS AND APPLICATIONS

WHAT MARKETS DO YOU SERVE? AND WHAT TYPES OF APPLICATIONS ARE BEST SUITED FOR STEP TECHNOLOGY?

**ANSWER:** Parts created using STEP technology have multiple uses in multiple industries including:

- Badging and Emblems
  - External vehicle badging and trim for limited editions or low volumes
  - Interior vehicle garnish
  - Recreational vehicles such as ATV's, boats, and snowmobiles
  - Transportation interior badging for airlines, trains, and cruise ships
  - Customized luxury goods
  - Consumer good collectables
  - EV charging stations
  - Medical assistance equipment
- Medical Device
- Outdoor and Recreation
- Hobbies and Toys
- Irrigation, Fluid, and Airflow
- Electronics
- Scoreboard panels

## STEP PARTS NOW

WHY DID EVOLVE ENTER THE PARTS BUSINESS? AND WHY STEP PARTS NOW?

**ANSWER:**

- It's more than a parts business. We are offering an applications development service that facilitates identifying a business case for STEP part production
- We are expanding access to STEP technology around the world
- Evolve continues to see growth in the demand for parts printed using STEP technology
- SPN quoting and ordering portal is a way for us to make parts more accessible to the market

WHAT IS STEP PARTS NOW?

**ANSWER:** STEP Parts Now (SPN) is a network of step production centers of excellence that provides customer centric paid parts service delivering production volumes of high-resolution AM thermoplastic parts and application-specific solutions.

WHERE / HOW CAN I GET PARTS CREATED WITH STEP TECHNOLOGY?

**ANSWER:** Both sample and production parts produced by STEP technology are available via our website as well as strategic US partner, Fathom Manufacturing and European partner, alphacam (late Q1)

WHAT FILE FORMATS ARE ACCEPTABLE WHEN UPLOADING A PROJECT?

**ANSWER:** Our accepted file types include: STL, VRML/WRL, STEP/STP, 3MF, AMF

WHAT IS YOUR PRICE PER PART?

**ANSWER:**

- There are too many variables
- It depends on pack density and minimizing support
- Pack density dictates price per part