



**We come alongside and help you get it right the first time.**



## Applications Lab Services

- Discovery
  - Scope & Customer Requirements
  - Application Assessment & Feasibility
- Process Selection
- Assembly-Specific Design Support
- Preliminary Testing
- Reporting



## Prototyping Services

- Prototype Tooling, Design & Manufacture
- Prototype Part Builds
- Engineering Validation



## Pre-Production Services

- Pre-Production Tooling, Design & Manufacture
- Design of Experiments (DOE)
- Process Optimization
- Pre-Production Part Runs



**Improving plastic products**



**EXTOL<sup>INC</sup> PDC**  
PROCESS DEVELOPMENT CENTER

*Joining plastic parts together can be challenging. Customers come to us with a variety of questions... "How does this type of plastic weld? What process would work best for my application? What weld-joint design should be incorporated?"*

*Extol's Process Development Center (PDC) was formed to act as an extension of your engineering team. An extremely focused element of your team. We provide consultative expertise, creative tool-design, exceptional plastics-assembly machinery, and relevant testing equipment to form a bridge-to-production. In the end, you get the results you're after.*

**Extol provides a bridge-to-production.**

## The PDC provides 3 primary services:



**APPS LAB**



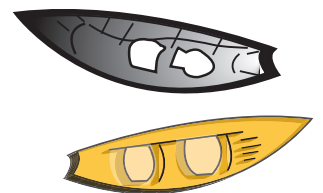
**PROTOTYPES**



**PRE-PROD.**

Applications engineers work diligently to capture your specific project requirements, assess part data for feasibility, recommend the best assembly processes, and provide assembly-specific design recommendations. A variety of tests and reports are generated for your review in the Applications Lab.

Next we work together to determine if the assembly design features and process methods meet your requirements and whether you're ready for pilot production or field testing. A full spectrum of prototyping services and validation testing are conducted and analyzed.



Lastly, our pre-production (design and manufacture) team will perform numerous forms of assembly testing and process optimization. Afterwards, you walk away with an excellent solution to your plastics-joining challenge.

Take a look in greater detail at the services that can benefit you, your team, and your next assembly project.



*Working with the Extol team has always been an easy experience. They hire engineers who speak the language and understand the technical aspects of our business. This kind of knowledge makes my job easier and has always helped to ensure the system ordered was exactly what my company required to get the job done.*



Production Engineer,  
DAA Draexlmaier Automotive of America LLC

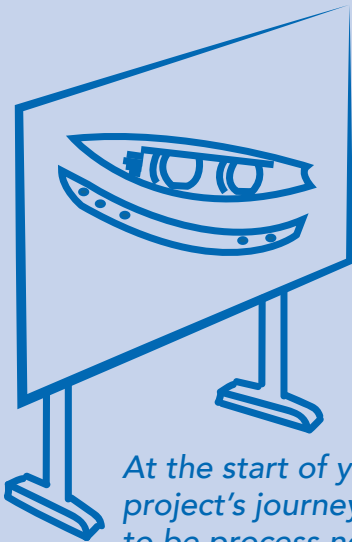
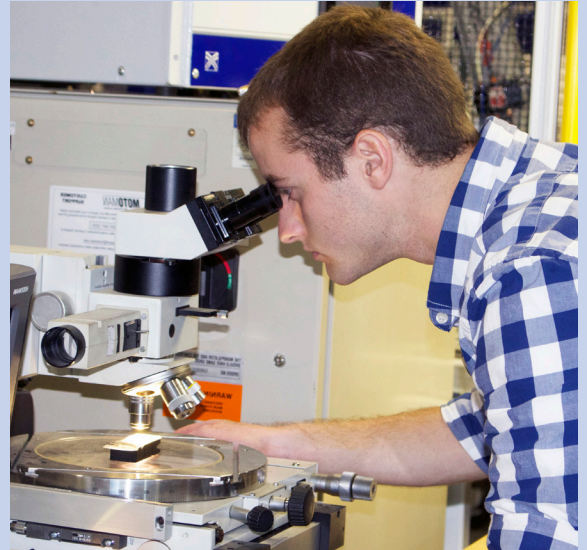


# APPLICATIONS LAB SERVICES

## Discovery

During the discovery stage, the Applications Lab team meets with your team to understand the scope of the project and the specific requirements that must be achieved. There is much to learn including: the material selection (type and filler), material characteristics (size and geometry), performance expectations (cosmetics, strength, and seal requirements), and manufacturing criteria (production volumes and cycle times).

The PDC is equipped to conduct a variety of assessment and feasibility studies with proven techniques and a broad range of lab equipment consisting of: servo-driven hot-plate welders; servo-driven spin welders; 6-axis robots integrated with InfraStake® and InfraWeld® modules; thermal punch and hot-air staking modules; along with 20 and 40kHz ultrasonic welding equipment. Scientific measurement tools are also employed to ensure a dependable plastics-joining solution such as: microstructure analysis, leak testing, burst testing, and tensile testing.



*At the start of your project's journey, it is best to be process neutral and let the application lead you to the technology.*

## Preliminary Testing

Using test samples, PDC engineers will provide you with information on: joint strength, cycle-times, aesthetic quality, and weld-joint optimization. Sometimes customers provide Extol prototypes or similar existing parts for testing. On other occasions we partner with resin suppliers and arrange for test plaques to be molded from customer-specified materials.

**Contact Extol at 800.324.6205 or [sales@extolinc.com](mailto:sales@extolinc.com) to get started on your next plastics-joining project.**

## Process Recommendation

Various methods are used to effectively join thermoplastic components together. The key is finding the optimal process for your application. The most common options include: vibratory energy (ultrasonics and vibration); circular, frictional energy (spin-welding); focused, infrared-light energy (infrared staking and welding), contact, thermal energy (hot-plate welding), and even applying hot-air. Each process is evaluated until a leading recommendation becomes clear.



## Reporting

Complementary, comprehensive lab reports are generated to provide a technical account of the project. The reports include an overview of the functional measurements of how the assembly performed during specific tests and trials. These lab reports are reviewed together to determine next action steps. There may be recommended changes to the design, process, or requirements until all objectives are met.



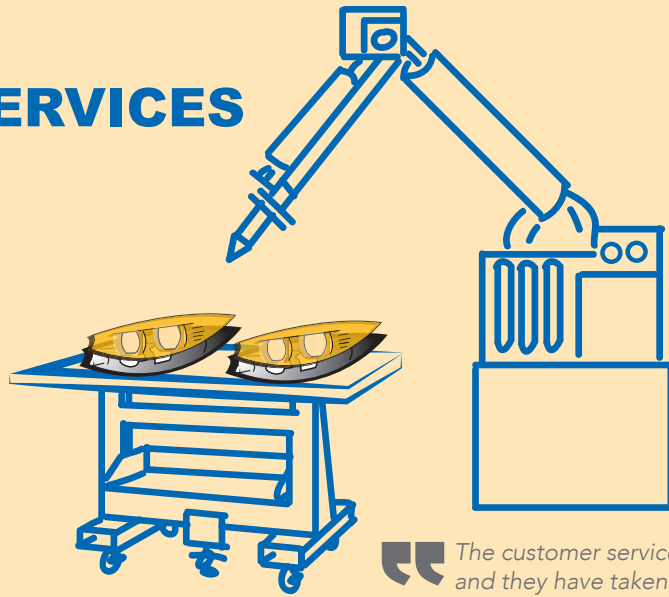


## 2

## PROTOTYPING SERVICES

### Prototype Tooling, Design & Manufacture

To help define the form, fit, and function of an assembly, the PDC designs prototype fixtures and tools. This is a low-cost, quick-turnaround method of supporting the project development process. Sometimes your design changes or a bug needs to be worked out. The PDC uses custom-crafted or 3D-printed prototype tooling to assemble sample parts and validate your application. You gain production-like components that you can actually get your hands on, along with the knowledge and flexibility to make any necessary changes to the prototype tooling or the prototype part.



*“The customer service is outstanding and they have taken care of all our needs with prototypes. The equipment is top-notch and has proven to be a significant benefit to company.”*  
Account Manager, Mursix Corporation

### Engineering Validation

After prototype tooling and assemblies are created, PDC engineers verify that the design meets your pre-determined requirements and design objectives. Any design issues are identified, and corrective actions are taken. It's significantly more economical to make necessary changes at this point versus after your product reaches the market.

### Prototype Part Builds

With Extol's PDC, customers have the ability to run part trials to test new plastic materials or product designs. Usually, prototypes are created to affirm part performance and the production process. But by building production-representative parts—parameter requirements and the feasibility of a component can be verified at an early stage. The PDC can produce sample and prototype parts that simulate production conditions and enable you to make well-informed decisions saving considerable time, money, and hassle down the road.

## 3

## PRE-PRODUCTION SERVICES

### Pre-Production Tooling, Design & Manufacture

Once the prototype tooling has been extensively tested and is performing well, it's time to design and manufacture pre-production or pull-ahead tooling. Your input on production volumes will significantly impact the type of tooling required. Accurate weld-joint design will enable you to make final production molds and tools.

### Process Optimization

It's common for Extol customers at this phase to begin optimizing production flow as well. In most cases our equipment is positioned within a production cell. Customers can (in real time) assess production challenges and opportunities prior to the installation of the equipment at the production facility – a significant advantage!

### Design of Experiments (DOE)



With our state-of-the-art DOE software and trained engineering staff, we are able to perform a thorough DOE on the assembly.

The goal of these tests is to determine an optimal combination of parameters that provide the best possible outcome for your unique application.

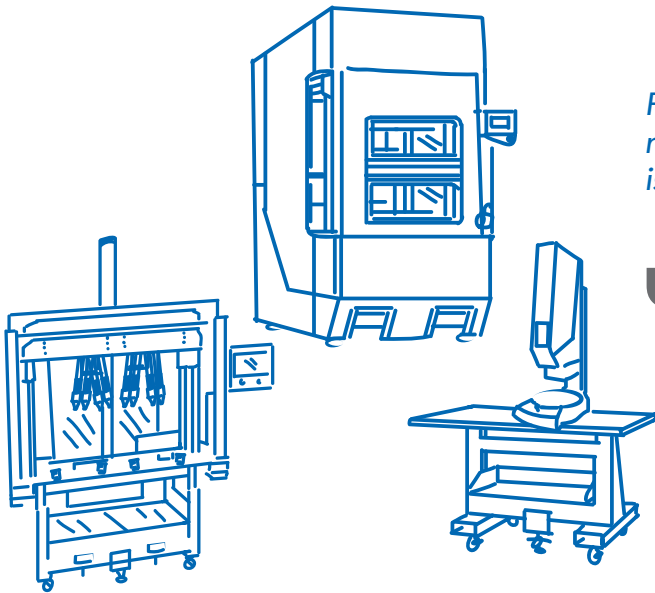
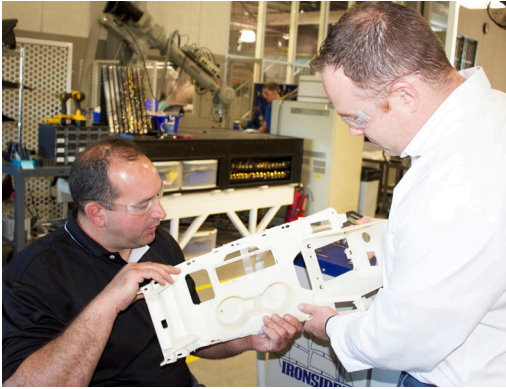
### Pre-Production Part Runs

A pilot run of production-suitable parts proves invaluable to confirm that the part design, tooling design, and process selection are working together correctly to meet your project requirements. Our goal is to provide real-world analysis of your project and ensure its success in a time frame that meets or exceeds expectations.



**EXTOL<sup>INC</sup>** PDC  
PROCESS DEVELOPMENT CENTER

Extol's Process Development Center is a valuable resource for you. Whether your project is proprietary, high-profile, or fairly straightforward... providing you with prompt and reliable plastics-joining solutions and attentive service from the initial stages of part design all the way to pre-production is our forte. We welcome the opportunity to partner with you on your next plastics-assembly project.



*Providing OEMs, tier manufacturers, and custom molders with fast, reliable plastics-joining solutions is what we do best.*

“ We currently have multiple Extol machines running which has brought tremendous gains in our capacity. The advancements on the production floor were instrumental in keeping us at the forefront of our market. The team we gained in our partnership with Extol has been monumental in the benefits that we have earned from their extensive experience and expertise in the plastics-joining arena. ”  
Production Maintenance Manager,  
World-Leading Medical Device Manufacturer



Please contact Extol's PDC team with your next plastics-joining project at 800.324.6205 or [sales@extolinc.com](mailto:sales@extolinc.com)



**EXTOL<sup>INC</sup>**  
Improving plastic products

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