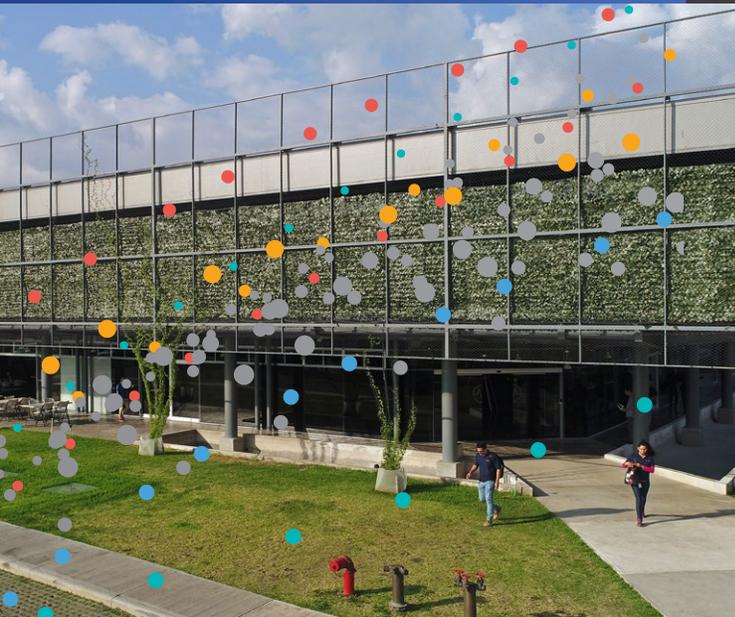


Capabilities:

Forward Thinking Manufacturing



For over half a century, Micro has been a leading supplier to fortune 100 clients and brands all over the world. Delivering micro metal and plastic componentry for OEMs as well as assembly for precision electromechanical products.



mic-tec.com/capabilities

Capabilities: Machining



Our Machining Capability

Precision manufacturing requires only the closest tolerances at scale, especially when the consequence of failure is high. Our state of the art Costa Rica facility offers complete machining of most materials.

- Turning (Swiss Turn)
- Milling (Hard Milling)
- Cutting
- Drilling
- Laser
- Polishing and finishing.

Specialization

We specialize in Swiss-turn, hard milling and EDM, with the ability to go smaller than almost anyone else.

Appetite for complexity

Pur half century track record reveals that we take on projects that others have often failed at. We thrive in complexity and our components often come with high consequence of failure and multiple operations.

Our people

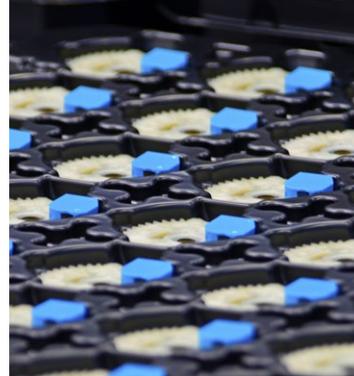
The expertise of our people ensures consistency as we push the limits of what is possible at a reduced size and increased scale.

Capacity

We execute parts of any size and quantity, often well into the hundreds of thousands and millions. At this scale, we guarantee repeat consistency and we see this as our essential differentiator.

Specialization

We standardize our tooling and machines where possible. Where there is no standard, we create custom components to get the job done. At Micro, we will create a custom drill or custom component where required because we are vertically integrated. We account for wear and tear, anticipating when a tool will reach its end of life on a machine, to customize the production flow efficiently. We have tested our tools over and over and understand the limits and capabilities that impact wear, in order to compensate for it.



Who relies on Micro



Capabilities: Stamping



Over Half a Decade of Experience

At Micro, our fine stamping has run for 55 years and our specialty lies in 0.001-inch thickness using specialty and precious metal alloys. Good stamping requires great tooling, and our tooling is designed and built in house by Micro for that very reason, often with 0 clearance tolerances.

Die Maker Apprenticeship

Fine stamping still retains both art and science, and for that reason we preserve the age-old tool and die maker apprenticeship program to pass down knowledge from craftsmen to craftsmen, to keep the trade alive.

Micro's Maintenance Standards

Our rigorous die maintenance program ensures the quality of our parts are maintained over the life of the die, and that the dies are always maintained and in proper working order, with a system of replacements available to support the life of the program at any time.

Speed & Precision

Our high-speed presses and skilled technicians produce fine metal stamping of any shape, at virtually any size, and made of almost any metal, alloy or composite material. Once machinery and dies are set, our processes can run in a highly-automated manner to create greater cost efficiency per part and highly consistent quality and accuracy.



Who relies on Micro



Capabilities: Machining



Our Molding Capability

Micro molding technology is changing at a rapid pace and although molding equipment has improved in recent years, we still require a high skill levels from the machine operator to see the desired result.

For that reason, Micro employs only the best and most highly skilled workforce, and offers in depth training to ensure operators are consistent.

Tolerances include:

- 0.05mm - Plastic
- 0.005mm - Metal

Scientific Injection Molding

We employ a methodology titled "Scientific Injection Molding" or SIM for short. SIM uses a series of scientific tests to collect data and based on that data, we can optimize the most robust process for production. SIM eliminates process variability and variation from shot to shot and run to run, often associated with injection molded plastics.

These tests include;

- Viscosity curve
- Cavity balance study
- Gate seal study
- Hold pressure optimization
- Cooling time study, and
- Design of experiments

Monitor & Control

In addition, we also use cavity pressure sensors to monitor and control in-process molding parameters, which enable us to know if it's a good part even before the mold opens. Besides injection molding, most all our moldings have automation or an additional process integrated into production (such as insert molding, pad printing, or over-molding). This is seen in applications such as automotive sensors and cardiovascular medical devices.



Who relies on Micro



Capabilities:



Assembly & Automation

Creative Efficiency

At Micro, our capability extends to custom automation. We assemble parts and units of any size, leveraging our in-house intelligence and skill set to operate at maximum efficiency and economy. Our solutional bandwidth for automation and assembly is matched only by our own creativity and our modular and recyclable methodology, drive down setup costs whilst increasing precision.

The Rise of Hubotics

Old automation processes are often problematic and do not compare to Hubotics (the practice of robots mimicking humans in action and movement). We believe there's an inflection point is coming whereby this standard assembly approach will be retired for replaceable, modular, human-mimicking robotics.

Engineering and Manufacturing Working Together

Micro's in-house engineers are closely connected to the sub-component manufacturing level to assist with stamping, injection molding and micro machining. Because we can understand the upstream processes involved, we develop superior automation that seamlessly handles the sub-components into the process for final assembly which is typically driven by robotics on *rotary* or *walking beam automation*. We use various handling systems such as:

- [Tape & Reel](#)
- [Bowl Feeding Systems](#)
- [Shaker Tables](#)

From there, we use pick and place robots with customized end-of-arm to handle parts and assemble components to within thousands of an inch.

- [Screw driving / Screw insertion](#)
- [Heat staking](#)
- [Ultrasonic welding](#)
- [Dispensing systems](#)
- [UV bonding](#)
- [Wire welding \(0.003-inch diameter\)](#)
- [Stamping insertion / staking](#)

We use vision systems and inspection sensors to ensure proper placement, assembly and function for critical components.



Who relies on Micro



Capabilities:



Clean Room ISO Class 8 Capabilities

Micro's Controlled Environment

Because our main factory is held in a controlled environment and to a higher cleanliness standard, we're use more modular and flexible clean rooms on demand, maintaining our efficient layout, and adapting to client needs with maximum responsiveness.

Rapid Clean Room Deployment

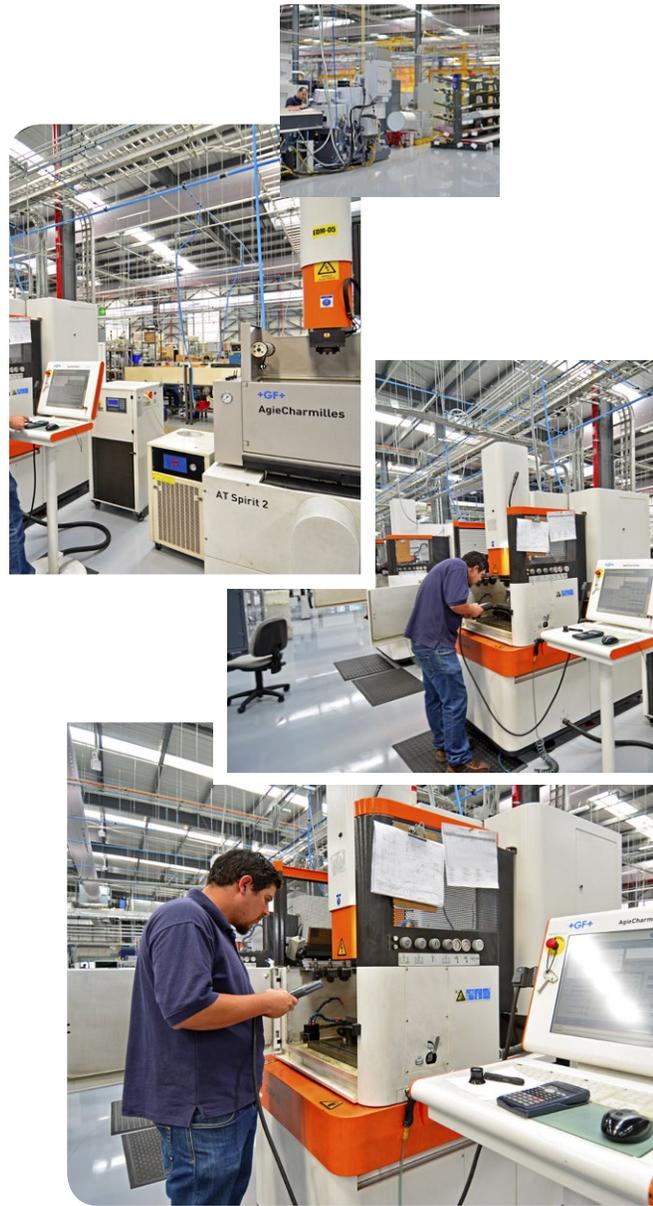
At Micro, we can deploy modular and cost effective clean rooms that are easily scalable and quickly validated, responding to client needs on a dime.

A Segregation Approach

Mostly, manufacturers create clean rooms to segregate the areas that need to be clean and whilst we can and do execute that approach when needed, Micro's modular workplace model allows us to create an entirely clean factory floor and segregate the unclean areas via non-clean rooms. Anything that creates contaminants into the air goes into our Micro non-clean rooms, each with its own HVAC system for disposal. With this approach, we take cleanliness standards to a new level of consistency whereby cleanliness becomes nominal.

ISO Class 8

For medical clean room requirements, we erect soft-sided modular rooms in the form of clean plastic tents that are movable, easy to expand, and completely validated to ISO Class 8.



Who relies on Micro



Capabilities:



Logistics: (VMI) Vendor Managed Inventory

Working in the Most Demanding Industries

With decades of experience serving automotive OEMs as well as the most demanding industries on the planet, Micro has cultivated an ability to manage not just our production standards but how they integrate into client assembly lines.

Vendor Managed Replenishment

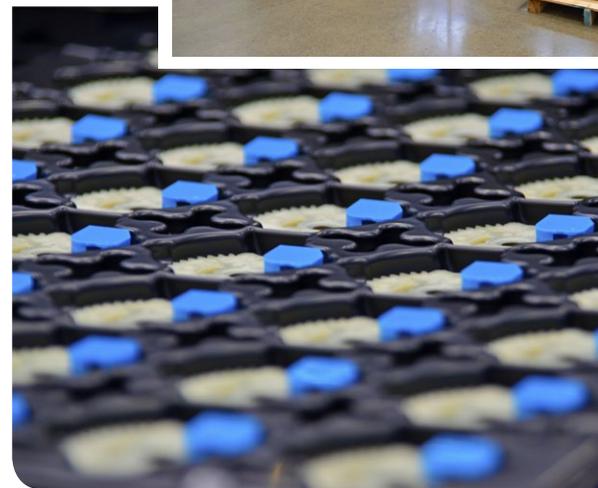
Often, we can set up supermarkets inside of your warehouses with vendor managed replenishment. The result is seamless and efficient part management for you, providing peace of mind and efficient space usage.

Shipping to over 39 Countries

Centrally located in Costa Rica, Micro's Central American warehouse provides maximum responsiveness in handling efficient and economic logistics for clients, and currently, we ship direct to over 39 countries.

Seamless Operation

Our experience in logistics allows our parts to freely flow across borders without any issues and with JIT integration, we empower you to operate at nominal inventory levels, confident that Micro can deliver what you need on time, when needed.



Who relies on Micro



Capabilities:



Rapid Prototyping & Additive Manufacturing

Fully Integrated

At Micro, our process integration allows us to control a part design all the way through to production. In "Micro Labs", we have a function inside of Micro dedicated to taking ideas that solve challenges and create newly improved designs.

The Power of MicroLabs

MicroLabs can take an existing customer design and provide alternative iterations to enhance productivity and function, or start from scratch with a brief.

By building 3D parts quickly, Micro prototypes, iterates and or creates efficient dies, molds and machine parts assembled together into a final product.

Rapid Prototyping

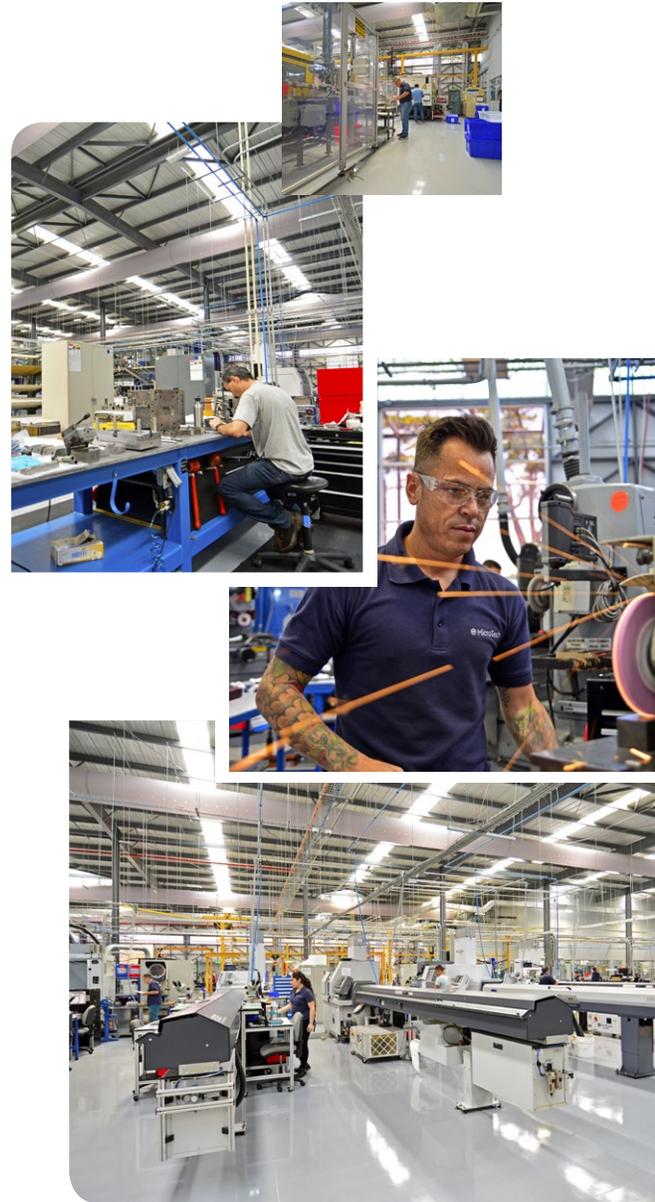
Rapid prototyping via additive manufacturing (3D printing) gives customers quick feedback loops and empowered iterative design, empowering them to move quickly towards production and improvement.

More Solutional Bandwidth

Moving outside of the engineering office onto the factory floor, Micro give clients the intelligence they need to decide how best to manufacture a component. In some instances, it's not an either/or scenario but a combined/collaborate approach that gets the best outcome for the most efficient outlay.

The Future of Additive Manufacturing

Whilst additive manufacturing is advancing at a rapid rate, it is yet to be perceived as a serious production option. In the future, we foresee that the economies of scale that additive manufacturing will should make it a viable option for clients to consider even for larger runs without sacrificing precision, finishes or tolerances.



Who relies on Micro



Capabilities: Engineering



One Company: Two Parts

Micro offers two parts; MicroTech, and MicroLabs. MicroTech is designed for manufacturing, creating simplicity via a robust approach, and ease of scale. In MicroLabs, we provide innovation engineering to our clients that drives better manufacturing capabilities.

Engineering Capabilities

MicroLabs engineers engage a disruptive process that reinvents the wheel and more innovatively imagines solutions for your challenges and problems. Through this process, we assist clients with design, prototyping, problem solving, value-added revisions and project management.

Complete Integration

Our engineering department personnel are hand-picked, working in tandem with our completely vertically integrated processes, and available to engineer solutions that augment your engineering team's capacity.

Each Micro Engineer has a core competency and is a subject matter expert - However they are also trained in real-world problem solving to better understand your real engineering problems and how to provide solutions that work in production.

Embracing all Industries

Our diversity in different markets such as aerospace, automotive, HVAC and medical enables us to adapt solutions already proven out in other industries and deliver you something entirely new for your application



Who relies on Micro



Our Certifications



An end-to-end one stop shop with single point accountability across design, manufacturing and logistics.

- ▶ **SIGMA Certified across many areas of the business with a company-wide at least 5-sigma quality mandate by 2020.**
- ▶ **ISO Certifications**
 - ISO 13485:2003 certification
 - ISO 9001:2008 certification
 - ISO/TS 16949:2009 certification
- ▶ **Quality (PPM)**
 - <100 ppm for low pressure, micro position sensing
 - <10 ppm for single component to sub-system integration
 - 0 ppm in Automotive.
- ▶ **Tolerances:**
 - 0.05mm - Plastic
 - 0.005mm - Metal
- ▶ **Precision:**
 - Stamping +/- 0.012mm
 - Assembly +/- 0.08mm
 - Molding +/- 0.05mm
 - +zero flash
- ▶ **Capabilities**
 - Plug and play logistics and VMI with global JIT
 - and TQM Total Quality Management
- ▶ **Shipping**
 - We ship over 1 billion parts per year to 39 countries.
- ▶ **Volume**
 - Over over 500,000,000 safety critical components delivered in 55 years of operation including
 - 200,000 units delivered weekly to Industrial / Aerospace
 - 5,000,000 units delivered weekly to Auto / Semi-Con
 - 150,000 assembled units delivered weekly to Medical

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