

Procurement Guide

An Introduction to Quality Systems at Protolabs

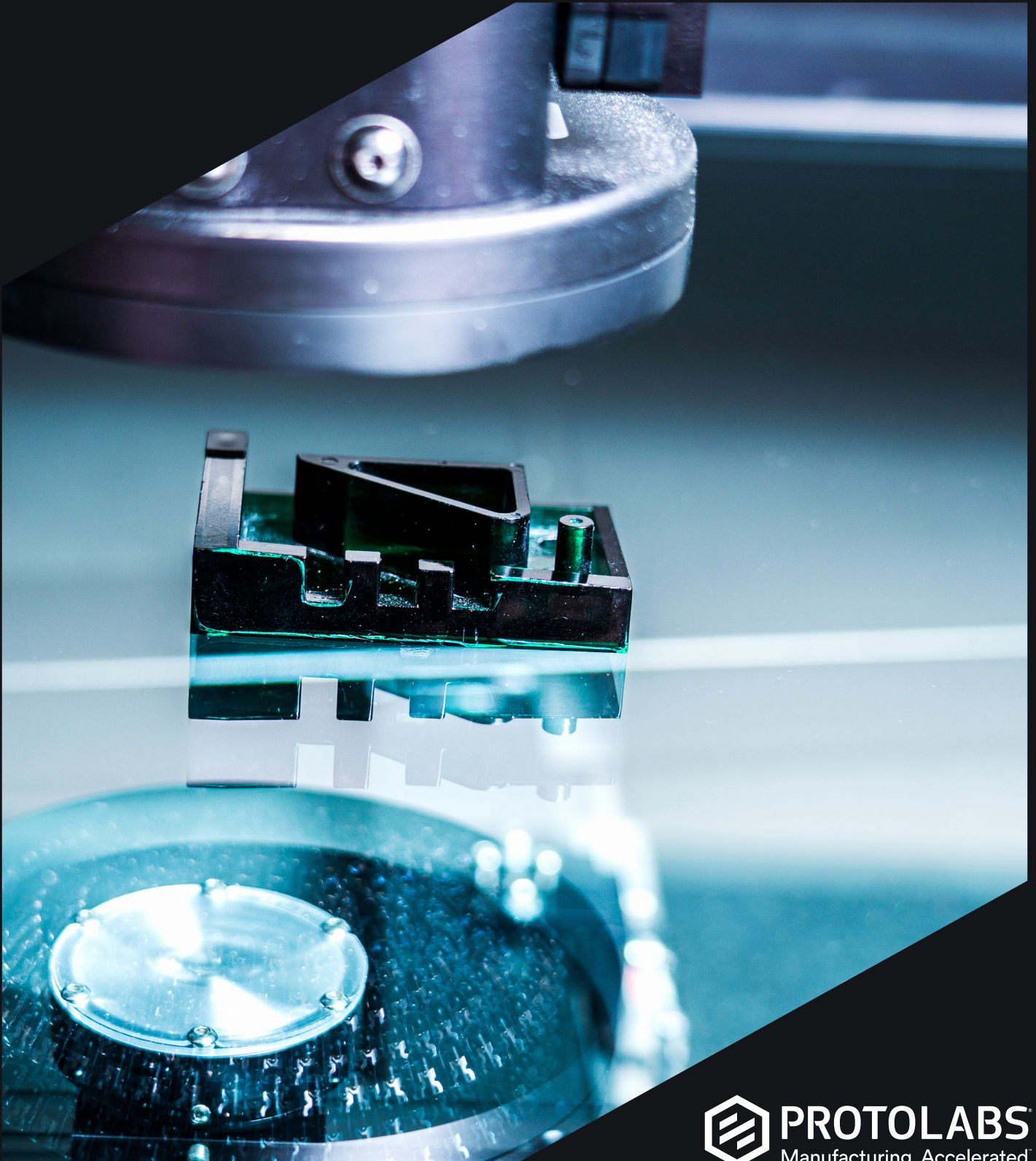


Table of Contents

About Us	3
Services	4
U.S. Facilities	5
European Facilities	6
Global Digital Manufacturing Locations	7
Financial Information & Bank Details	8
Management Contacts	9
Protolabs Quality Policy	10
Protolabs Registered Certifications	11
Suppliers & Partners	12
Traceability	12
Inspection Process	13
Calibration	14
Risk Mitigation	14
Nonconformance Controls	14
Training	15
Product Stewardship	15
ITAR	
Environmental Health & Safety	16
Commitment to Sustainability	17
Injection Molding	18
Manufacturing Capabilities	18
Secondary Operations & Post-Processing Capabilities	19
Quality Inspection Capabilities	20
CNC Machining	21
Manufacturing Capabilities	21
Secondary Operations & Post-Processing Capabilities	23
Quality Inspection Capabilities	24
3D Printing	25
Manufacturing Capabilities	25
Secondary Operations & Post-Processing Capabilities	28
Quality Inspection Capabilities	31
Sheet Metal Fabrication	32
Manufacturing Capabilities	32
Secondary Operations & Post-Processing Capabilities	33
Quality Inspection Capabilities	34

This guide covers our standard quality and compliance measures.

If you have elevated needs, please reach out to us at 877-479-3680 or customerservice@protolabs.com to find a solution.

About Us

Protolabs is the fastest and most comprehensive digital manufacturing service in the world. Our own digital factories in the United States and Europe, in tandem with our broad-reaching global network of manufacturing partners, enable our customers to unlock superior supply chain advantages through our advanced manufacturing capabilities and pricing options in injection molding, CNC machining, 3D printing, and sheet metal fabrication. The result? One manufacturing source—from prototyping to production—for product developers, engineers, and quality and supply chain teams across the globe to fulfill their manufacturing needs with the leading digital manufacturer of custom parts.

Our company was founded in 1999 by Larry Lukis, a successful entrepreneur and computer geek who wanted to radically reduce the time it took to get injection-molded plastic prototype parts. His solution was to automate the traditional manufacturing process by developing complex software that communicated with a network of mills and presses. As a result, plastic and metal parts could be produced in a fraction of the time it had ever taken before.

Over the next decade, we would continue to expand our injection molding envelope, introduce quick-turn CNC machining, and open global facilities in Europe. In 2014, we launched industrial-grade 3D printing services to allow product developers, designers, and engineers an easier path to move from early prototyping to low-volume production. And in 2017, we expanded our machining capabilities and introduce sheet metal fabrication into our suite of services. But that's not all! We added a digital manufacturing network, Protolabs Network in early 2021 to bring more options to our customers. Protolabs has its own digital factories in North America and Europe, and a broad network of vetted and qualified manufacturing partners in North America, Europe, and Asia. Our growth and expansion of capabilities over the past two decades has always been about providing our customers with the best possible digital manufacturing experience in the industry. That continued evolution will never stop, and is what helps shape our vision and mission as a company.

Headquarters Location

5540 Pioneer Creek Drive Maple Plain, MN 55359 Hennepin County, US
[protolabs.com](https://www.protolabs.com)

Phone 877-479-3680
Fax 763-479-2679
Email customerservice@protolabs.com

Key Contacts

Quality Department
qualitysystems@protolabs.com

Remittance
paymentadvice@protolabs.com

Sales Tax
salestax@protolabs.com

Accounts Receivable and Credit
credit@protolabs.com

Invoicing
invoicing@protolabs.com



Services



Injection Molding

Quickest and most reliable provider of quality molded parts

- Prototyping and production
- Online quotes with interactive design feedback
- Parts in as fast as 1 day
- Thermoplastic molding
- Liquid Silicone Rubber (LSR) molding
- Overmolding
- Insert molding
- Bridge tooling



CNC Machining

Fastest source for machined prototypes and production parts

- Unmatched in-house production capacity
- Online quotes with interactive design feedback
- Parts in as fast as 1 day
- 3- and 5-axis Milling
- Turning with live tooling
- Anodizing and chromate plating



3D Printing

Industry leader in high-precision and micro-resolution parts

- Six additive manufacturing technologies
- Broad material selection
- Instant online quotes with DFAM analysis
- Parts in as fast as 1 day
- Selective Laser Sintering
- Multi Jet Fusion (MJF)
- Stereolithography (SLA)
- Carbon DLS
- PolyJet
- Direct Metal Laser Sintering (DMLS)
- Digital Light Processing (DLP)



Sheet Metal Fabrication

Leading provider of quick-turn sheet metal parts

- Prototyping and low-volume production
- Online quotes in hours with DFM analysis
- Parts in as fast as 1 day
- Laser cutting
- Punching
- Press brake forming
- Welding
- Powder coating

Note: Broad manufacturing capabilities within all four of our manufacturing services are possible through our own factories and global manufacturing partners.

U.S. Facilities

We have our own manufacturing facilities and offices in the U.S. and Europe along with trusted manufacturing partners around the world through Protolabs Network. All of our owned factories, as well as our manufacturing network, have dedicated quality control teams on staff. Our sales and customer service teams are available to assist with orders and answer any questions about our services.

Name	Address	Total Sq. Ft.	Office Sq. Ft.	Manuf. Sq. Ft.	Year Established	Construction Material
Global Headquarters	5540 Pioneer Creek Drive Maple Plain, MN 55359	95,800	95,800	0	2007	Pre-cast Concrete/ Steel and Glass
Injection Molding	15197 Boulder Avenue Rosemount, MN 55068	129,000	18,250	110,750	2011	Pre-cast Concrete
Injection Molding & Tool Fabrication	2600 Niagara Lane N Plymouth, MN 55447	166,000	32,000	134,000	2014	Concrete Block
CNC Machining	8500 Wyoming Avenue Brooklyn Park, MN 55445	211,900	61,000	150,900	2018	Pre-cast Concrete
	15 Charron Avenue, Nashua, NH 03063	75,220	18,391	56,829	Leased	Mixed-metal Block
Sheet Metal Fabrication	22 Charron Avenue, Nashua, NH 03063	52,300	7,500	44,800	2021	Mixed-metal Block
3D Printing	3700 Pleasant Grove Church Road Morrisville, NC 27560	77,000	22,000	55,000	2016	Pre-cast Concrete
	3615 Pleasant Grove Church Road Morrisville, NC 27560	64,000	16,000	48,000	2023	Pre-cast Concrete
Protolabs Network Americas Inspection Cross Dock	8500 Wyoming Avenue Brooklyn Park, MN 55445	211,900	61,000	150,900	2025	Pre-cast Concrete
Protolabs Network of Manufacturing Partners	With vetted, qualified, and trusted manufacturing partners in North America, Europe, and Asia, Protolabs can best serve your needs with broad capability, pricing, and lead time options.					

For global addresses, please visit protolabs.com/about-us/locations.

Key Figures

- Owned manufacturing square footage: 600,279
 - Office square footage: 270,941
 - Total square footage: 871,220
- 1,638 U.S. total personnel
 - 976 U.S. employees in manufacturing
 - 662 U.S. employees in offices

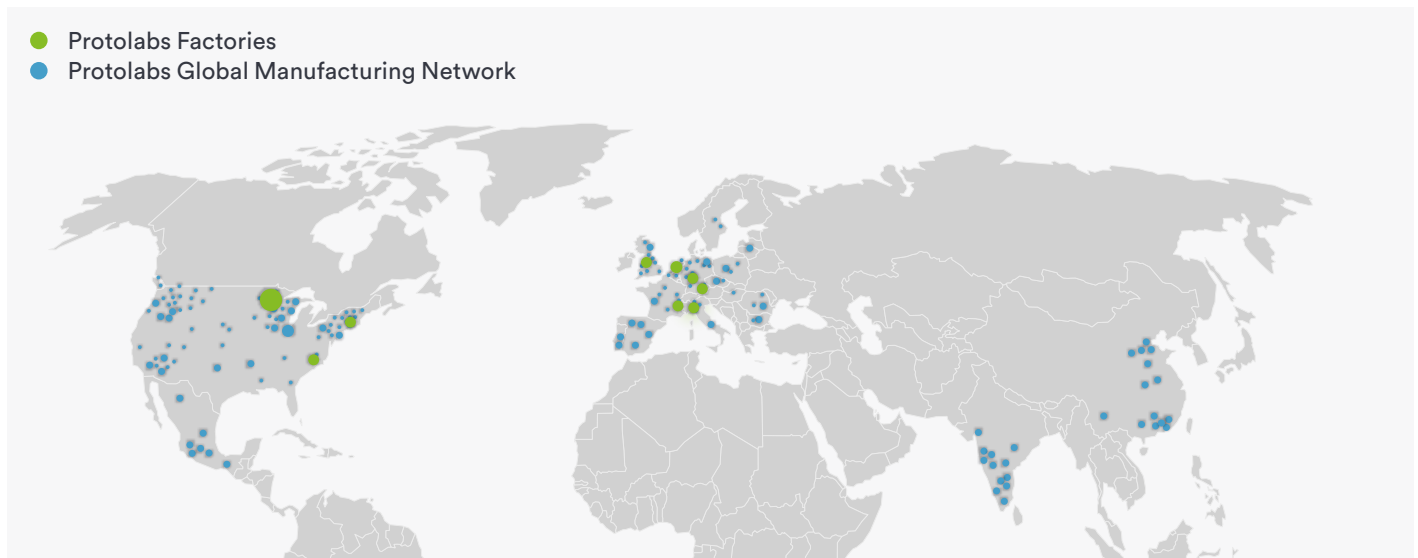
European Facilities

Name	Address	Total Sq. Ft.	Office Sq. Ft.	Manuf. Sq. Ft.	Year Established	Construction Material
Sales Office, France	Savoie Technolac Parc Ouragan, bâtiment A 20 Rue du lac Majeur, BP 331, 723377 Le bourget-du-lac cedex, France	7,545	7,545	0	2009	Pre-cast Concrete/ Steel and Glass
Sales Office, Italy	Via Biandrate, 24, 28100 Novara, Italy	1,938	1,938	0	2012	Pre-cast Concrete/ Steel and Glass
3D Printing	Hermann-Oberth- Straße 21 85640 Putzbrunn, Germany	6,500	61,000	150,900	2023	Pre-cast Concrete/ Steel and Glass
CNC Machining	Halesfield 8, Telford, Shropshire, TF7 4QN, UK	15,990	1,816	14,174	2005	Pre-cast Concrete/ Steel and Glass
Injection Molding						
Protolabs Network Headquarters	Danzigerkade 23A, 1013 AP Amsterdam, Netherlands	12,174	12,174	0	2019	Pre-cast Concrete/ Steel and Glass
Protolabs Network EU Inspection Cross Dock	Nieuwe Hemweg 7E, 1013 BG Amsterdam, Netherlands	4,950	0	4,950	2023	Pre-cast Concrete/ Steel and Glass
Protolabs Network UK Inspection Cross Dock	Halesfield 8, Telford, Shropshire, TF7 4QN, UK	15,990	1,816	14,174	2005	Pre-cast Concrete/ Steel and Glass
Protolabs Network of Manufacturing Partners	With vetted, qualified, and trusted manufacturing partners in North America, Europe, and Asia, Protolabs can best serve your needs with broad capability, pricing, and lead time options.					

Key Figures

- Owned manufacturing square footage: 170,024
- Office square footage: 75,783
- Total square footage: 245,807
- 662 EMEA total personnel
- 309 EMEA employees in manufacturing
- 353 EMEA employees in offices

Global Manufacturing Locations



Manufacturing with Protolabs



Financial Information

Proto Labs, Inc. is a public company and is traded under the ticker of PRLB on the NYSE. The names of our board members can be found on our website.

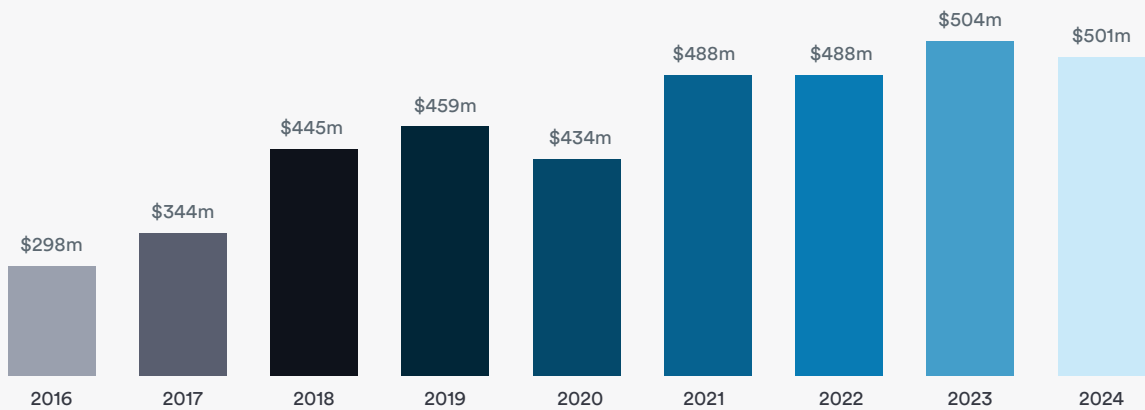
Incorporated in 1999 in the State of Minnesota.

Considered a large company by business class, and manufacturer of custom-made parts.

FEIN (Tax ID#): 41-1939628
DUNS: 13-212-9250
SIC: 3089, 3449, 3544
NAICS: 333511, 332710, 326199, 332117, 332322, 332311

Cage Code: 5W0A2
Fiscal Year: Jan 1–Dec 3
Company Registration: 5366160
VAT Registration: GB 180 9946 67

Revenue by Year (Millions)



Bank Details

**Payment Terms
Offered to Customers**

- Cash in advance
- Cash before shipping
- Credit card (Visa, MasterCard, American Express accepted)
- Credit terms upon approval only

Wire transfer or ACH information can be provided from the credit team at credit@protolabs.com (U.S.) or creditcontrol@protolabs.co.uk (Europe).

U.S. REMIT TO ADDRESS (FOR CHECKS ONLY):

Proto Labs, Inc. PO Box 856933
Minneapolis, MN 55485

GERMAN REMIT TO ADDRESS (FOR CHECKS ONLY):

Proto Labs Germany GmbH Hermann-Oberth-Straße 21
85640 Putzbrunn

PROTOLABS GMBH
Bank: Commerzbank AG
Bank Address: Leopoldstr. 230 80807
München, Germany
Account Number: 271045700
BIC / Swift: COBADEFXXX
IBAN: DE78 7004 0041 0271 0457 00
VAT Registration: DE 305 062 987

UK REMIT TO ADDRESS (FOR CHECKS ONLY):

Proto Labs, Ltd. Halesfield 8,
Telford, Shropshire, TF7 4QN
PROTOLABS LTD.

If paying in EURO, please note our bank details are as follows:

Bank: Barclays Bank PLC
Bank Address: 15 Colmore Row, Birmingham, B3 2BY
Account Number: 65422100
Sort Code: 20-07-71
Swift: BARCGB22
IBAN: GB07 BARC2007 7165 4221 00

If paying in GBP, please note our bank details are as follows:

Bank: Barclays Bank PLC
Bank Address: 15 Colmore Row, Birmingham, B3 2BY
Account Number: 33173496
Sort Code: 20-07-71
Swift: BARCGB22
IBAN: GB60 BARC2007 7133 1734 96

Management Contacts



President and CEO
Suresh Krishna
suresh.krishna@protolabs.com



CFO
Dan Schumacher
daniel.schumacher@protolabs.com



COO
Mike Kenison
mike.kenison@protolabs.com



CMO
Brian Peters
brian.peters@protolabs.com



**VP of Sales and Customer Service,
AMER**
Sean Farrell
sean.farrell@protolabs.com



**VP of Sales and Customer Service,
EMEA**
Pjotr Horowitz
pjotr.horowitz@protolabs.com



Sr. Director of Global Quality
Joe Goodhart
joe.goodhart@protolabs.com



Director of Legal and Compliance
Jacob Heilman
jacob.heilman@protolabs.com

Main Phone Number: 877-479-3680

Protolabs Quality Policy

Customer satisfaction is the primary objective of Protolabs' Quality Management System (QMS). When you work with us, you are working with a manufacturer that adheres to stringent ISO standards and applies continuous improvement to everything we do. Our ProtoExcellence continuous improvement culture is rooted in the Shingo principles for organizational excellence. We know that customer satisfaction is a result of highly skilled employees who continuously seek perfection through operational excellence and drive quality assurance to improve quality, reduce costs, and deliver value to our customers at unprecedented speeds.

Quality control is a key part of our manufacturing services. Whether in our own factories or our manufacturing network, a dedicated team of Protolabs' employees will perform final inspection on your order with the goal of preventing escapes. We've developed a set of processes to ensure the highest manufacturing standards are applied to every order, including tracking the performance of manufacturers in our network to ensure orders meet our quality standards.

With that as the backdrop, our quality policy is concise and encompassing, and our employees live it every day.

We achieve customer satisfaction through:

- Quality Parts. On Time.
- Meeting Requirements
- Continuous Improvement
- Employee Development



Protolabs Registered Certifications

Service	Site	ISO 9001:2015	AS 9100D	ISO 14001:2018	ISO 45001:2018	ISO 13485:2016
Global Headquarters	5540 Pioneer Creek Dr, Maple Plain, MN USA 55359	✓	✓			
CNC Machining Injection Molding 3D Printing Sheet Metal	Protolabs Network HQ: <ul style="list-style-type: none">Danzigerkade 23A, 1013 AP Amsterdam, Netherlands Inspection Operations: <ul style="list-style-type: none">Nieuwe Hemweg 7E, 1013 BG Amsterdam, NetherlandsHalesfield 8 Telford, Shropshire, TF7 4QN, UK8500 Wyoming Ave, Brooklyn Park, MN USA 55445	✓	✓			
CNC Machining	8500 Wyoming Ave, Brooklyn Park, MN USA 55445	✓	✓			
	15 Charron Ave, Nashua, NH USA 03063	✓	✓			
	Halesfield 8, Telford, Shropshire, TF7 4QN, UK	✓		✓	✓	
Injection Molding	2600 Niagara Lane N, Plymouth, MN USA 55447	✓				
	15197 Boulder Ave, Rosemount, MN USA 55068	✓				
	Halesfield 8, Telford, Shropshire, TF7 4QN, UK	✓		✓	✓	
3D Printing	3700 Pleasant Grove Church Road, Morrisville, NC USA 27560	✓				
	3615 Pleasant Grove Church Road, Morrisville, NC USA 27560 (DMLS)	✓	✓			✓
	Hermann-Oberth-Straße 21, 85640 Putzbrunn, Germany	✓		✓		
Sheet Metal Fabrication	22 Charron Avenue Nashua, NH 03063	✓				

Note: Protolabs Network has numerous manufacturing partners with additional certifications, including ISO 13485 and IATF 16949.

Suppliers & Partners

Whether it is our own digital factories or our network of manufacturing partners, we evaluate and select external providers for their ability to meet our requirements. The type and extent of control applied to our suppliers and purchased product is dependent upon the risk to our ability to deliver products that meet requirements. We communicate requirements to suppliers and apply appropriate controls to suppliers of raw materials and external service providers as needed. In addition, we monitor the performance and on-time delivery of the most critical suppliers to ensure they consistently deliver to our requirements.

Traceability

Identification and Traceability

We identify outputs of manufacturing processes by capturing relevant manufacturing information and identifying product status in our intranets. It is our policy to identify, store, and issue materials that meet requirements specific for each order.

Material certificates, mill certificates, and Certificates of Analysis, as well as DFARS-compliant material certification, and domestic compliant material certifications may be available upon request.

Customer Property

We identify, protect, and maintain customer property provided for use or incorporation into the product. Customer property includes customer-owned material, components, intellectual property, and personal information. Customers who opt for the on-demand manufacturing option in injection molding have ownership of their molds; Protolabs retains ownership of customer molds for those using prototype tooling. Whenever customer-specified requirements for property management are beyond our control or capability, it is our policy to refuse custody of such property. All proprietary 3D CAD files, intellectual property, or customer information is protected. Server redundancies are also in place, so data is protected and backed up.



Inspection Process

The scope of our product monitoring and measurement system includes receiving inspection, machine-based inspections such as automated part probing and tool checks, quality control (QC) checks, in-process inspection, and final inspection. Our own digital factories and Protolabs Network both have in-house quality control teams whose primary purpose is to ensure our customers receive quality parts.

Receiving Inspection

Incoming materials are not used or processed until they have been inspected or otherwise verified as containing materials required by the purchase order. Material certificates, Mill certificates, and Certificates of Analysis, as well as DFARS-compliant material certification, and domestic compliant material certifications may be available upon request.

In-process Inspections

In-process inspections are performed, where applicable, by manufacturing personnel in accordance with work instructions and Protolabs' policy. Records of in-process inspections are maintained in customers' electronic batch record. Records are available upon request.

Machine-based Inspections

We use many proprietary machine-based automated checks to ensure that processes are adequately controlled.

Dimensional Inspections

Dimensional checks are performed on parts against QC-check dimensions set up by our technical operations staff when processing a customer quote. It is Protolabs' policy to perform dimensional inspection on the x, y, and z extents of a customer's part, whenever possible. A customer may specify additional inspection requirements, which we support through our range of metrology services.

Final Inspection

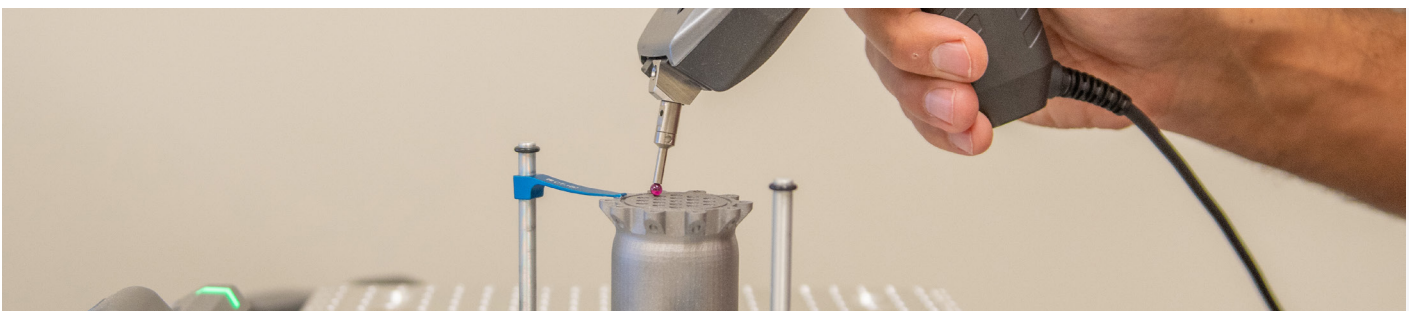
Finished products and completed services may be verified by final inspections specified in work instructions. Orders are inspected by qualified quality control (QC) personnel using an appropriate sample sizes, and are inspected dimensionally and visually for cosmetic quality. Our QC teams have access to an array of calibrated inspection tools and equipment, including Coordinated Measurement Machines (CMM) with proprietary process augmentations to accelerate the inspection process. Various reports are available to document inspection results, including Dimensional Inspection Reports (DIR), First Article Inspection (FAI) reports, and Production Part Approval Process (PPAP).

Evidence of Conformity

Inspection records are maintained for a minimum of ten years. These records include final inspection authority and identify and confirm that the part produced conforms to the customer-provided 3D CAD file or print when appropriate. Various inspection reports, as well as Certificates of Conformance (CoC), can be generated with shipments.

Product Release and Delivery

Product is not normally released or delivered until all planned inspections have been completed, and records have been maintained providing evidence of conformity with acceptance criteria and identifying the person(s) authorizing release of product for delivery to the customer.



Calibration

The calibration of our measurement equipment is outsourced to an ISO 17025-certified third party. National Institute of Standards and Technology (NIST)/United Kingdom Accreditation Service (UKAS) traceable records are kept for all measurement equipment.

We ensure monitoring and measuring equipment used to verify product are properly controlled and maintained. The third-party calibration service is called in annually (or more often as needed) to check, calibrate, and if necessary, repair equipment. Users check equipment for any signs of wear or damage prior to use. When deterioration is apparent in equipment, the user requests a replacement.

All calibrated equipment is clearly marked with calibration due date, date calibrated, gauge ID number, certificate number, and designated location of use.

When measurement equipment is found to be out of calibration, a quality engineer investigates the effect the out of tolerance condition may have had on finished product. Appropriate action is taken, when necessary, to rectify the situation.

Risk Mitigation

With facilities around the world that offer various digital manufacturing services, we can provide unmatched in-house capacity, along with a broad network of global manufacturing partners, to ensure your parts are shipped on time, every time. We have a robust disaster recover program in place for our owned digital factories that includes:

- IT Disaster Recovery
- Emergency action plans for quick employee notification
- Strategically located generator backups
- Tested process to shift work between regions
- Risk analysis of natural disasters

We also collect surveys and request disaster recovery plans from critical suppliers.

Nonconformance Controls

It is our policy to ensure that outputs that do not conform to requirements are identified and controlled to prevent unintended use or delivery. The controls and related responsibilities and authorities for dealing with nonconforming outputs are defined. We deal with nonconforming outputs in one or more of the following ways:

- By taking action to eliminate the detected nonconformity.
- By authorizing its use, release, or acceptance under concession by the customer.
- By taking action appropriate to the effects or potential effects of the nonconformity when nonconforming outputs are detected after delivery.

Records of the nature of the nonconformities and any subsequent action taken, including concessions obtained, are maintained. When nonconforming outputs are corrected they are subject to re-verification to demonstrate conformity to the requirements.

Training

Staff members performing work affecting product quality are competent on the basis of appropriate education, training, skills, and experience. Training and subsequent communication ensure that staff are aware of:

- Our quality policy
- Relevant quality objectives
- Their contribution to the effectiveness of the management system, including the benefits of improved performance.
- The implications of not conforming with the management system requirements

Records of training are retained.

Product Stewardship

Protolabs is committed to being a socially responsible corporation that conducts business ethically, respectful of the rights of humans, communities, and the environment. Visit our website for more information on our policies, including Conflict Minerals, REACH, RoHS, Prop 65, TSCA PBT, and PFAS, POPs. As a custom manufacturer of parts based on our customer's designs and raw material selections, we respond to product stewardship requests (e.g, RoHS, REACH, Prop 65, Conflict Minerals, TSCA PBT, PFAS, POPs) on a part-specific basis.

Requests for information can be directed to customerservice@protolabs.com.

ITAR



We ensure that employees outside of the U.S. don't have access to any parts or part information for ITAR-classified projects. This means keeping separate databases for different countries, having procedures in place to ensure that any parts or information we share publicly or between locations aren't ITAR controlled, and not allowing non-U.S. persons access to the manufacturing floor or other secured areas. We also prohibit photo, video, and audio recording from visitors in our offices and manufacturing facilities.



Environmental Health & Safety

Protolabs complies with all local, state, and federal environmental regulations, and other regulatory requirements pertaining to environmental law and conservation. Protolabs maintains all relevant statutory documentation and permits. Leadership ensures that specific environmental regulations and best practices are adhered to and that educational resources for best practice decision making are available throughout the company.

- We conform to all regulatory body standards.
- We maintain all appropriate permits related to: storm water, industrial wastewater, air quality, hazardous waste disposal, and Form R & SARA reporting. We are in good standing with OSHA and have no open or outstanding citations.
- All workplace accidents, injuries, and near misses are documented and tracked. Injuries are investigated for root cause and to identify corrective action plans.
- We have a personal protective policy in place, which is adhered to by employees.
- We conduct training including, but not limited to: new hire orientation, employee right to know (hazard communication), forklift training, electrical safety, fire safety, hoist training, lockout tag out training, CPR/first aid, safe lifting, etc.
- We set EHS performance expectations and goals, and communicate the status of those goals to all manufacturing employees through monthly meetings.
- We routinely conduct internal department safety audits. Action items generated during these audits are tracked and completed by the company safety committee.
- We conduct pre-employment background checks, as well as reasonable suspicion and post-accident drug screening.
- We maintain a well-kept facility using a third-party cleaning service on a set schedule. We also have active contacts for pest control, lawn care, snow removal, and other building maintenance services.
- All office and manufacturing areas are conditioned with temperature and controls to maintain consistent and comfortable work conditions for both our employees and our process equipment.

Protolabs' UK and German facilities have ISO 14001 in place for environmental compliance. Protolabs' UK facility has ISO 45001 for health and safety compliance. Protolabs also has a health and safety committee, which reports on all incidents.



Commitment to Sustainability

Understanding the impact of climate change and the significance of environmental conservation is core to our business operations. Protolabs is committed to actively assessing risks that may have environmental impacts, as well as actively improving the conservation of natural resources and general influence on environmental health. Protolabs is deliberate in the consideration of climate change as a business element, and in fostering a corporate culture that is enthusiastic about the impact made on the community.

Protolabs' leadership is accountable for the administration of our environmental and sustainability policy. Leaders consider environmental impacts and climate change as part of normal operations.

In addition to legal compliance, Protolabs considers best practices relating to environmental conservation, pollution prevention, and sustainable solutions to business operations. As part of its normal business operations, Protolabs will seek to reduce energy consumption, and replace, modify, or remove activities and/or equipment that produce waste, and/or generate negative impacts to air and/or water.

Employees are expected to comply with required training, documented policies, and work instructions. Employees participate in company environmental initiatives, kaizen events, and performance improvement programs. Through a culture of continuous improvement, Protolabs continuously improves its environmental management system and its environmental performance.



Injection Molding

Manufacturing Capabilities

Injection molding works best for on-demand production, bridge tooling, pilot runs, and functional prototyping. Our affordable aluminum molds and quick turnaround times help reduce design risks and limit overall production costs. We produce molds and fulfill parts orders in our owned digital factories in North America and Europe.

We have more than 200 presses between both U.S. factories and our EMEA factory that include:

- 33 ton to 500 ton
- Primarily electric Toshiba presses with some hydraulic Cincinnati presses
- Liquid silicone rubber processed on 44-ton to 165-ton Arburg presses

Available materials can be found at protolabs.com/materials.

Capabilities

- Low- to mid-volume plastic injection molding
- Liquid silicone rubber (LSR) molding
- Insert molding and overmolding
- Thousands of materials both direct purchased and customer-supplied
- Real-time pricing and design for manufacturability (DFM) analysis within quote
- Maximum part size in factory: 18.9 in. x 29.6 in. x 8 in.

Protolabs' Network of trusted manufacturing partners exponentially expands our manufacturing capabilities.

Locations

Plymouth, US facility
2600 Niagara Lane N,
Plymouth, MN 55447

Rosemount, US facility
15197 Boulder Avenue,
Rosemount, MN 55068

Telford, UK facility
Halesfield 8, Telford,
Shropshire, TF7 4QN, UK



Injection Molding

Secondary Operations & Post-Processing Capabilities

Choose from a wide selection of secondary operations and post-processing capabilities. These processes strengthen parts, improve cosmetic appearance, provide customization, and other benefits.

Mold Texturing

Apply industry standard textures to a mold. With mold texturing you can expect the equivalent of a Mold-Tech finish.

Threaded Inserts

We stock and install an assortment of commonly used standard inserts in UNF and metric sizes.

Pad Printing

Transfer a two-dimensional image, like a company logo, onto a three-dimensional object. All images are reviewed for size, color, and complexity restrictions.

Laser Engraving

Laser engraving can be applied to the mold or directly to final parts for information such as logos or part numbers. Laser engraving ensures crisp, consistent information on each part or serialization.

Basic Assembly

Basic assembly includes fastening molded parts together that we've manufactured and/or applying of labels to individually bagged parts.

Part Cleaning

Part cleaning is available through a trusted third party providing washing or deep cleaning of parts by various methods, including ultrasonic cleaning, vapor degreasing, and ISO Class 7 clean room and packaging.

Painting

Lead time: 7+ business days.

Required inputs:

- CAD/part link with part quantity, material
- Area(s) to be painted
- Plugging/masking requirements
- Paint color/Pantone number and finish

UV Part Printing

Transfer a full color two-dimensional image, like a company logo, onto a three-dimensional object. All images are reviewed for size, color, and complexity restrictions.



Injection Molding

Quality Inspection Capabilities

Visual inspections to our workmanship standard are conducted by an inspector on a regular basis throughout the run from start up until the order is complete. Measurement of overall dimensional extents (x, y, and z dimensions) are conducted.

The following inspection options are available upon request. Please contact your account manager for details and a quote.

Dimensional Inspection Reports

A Dimensional Inspection Report on molded parts can be performed on part orders from new or existing Protolabs molds.

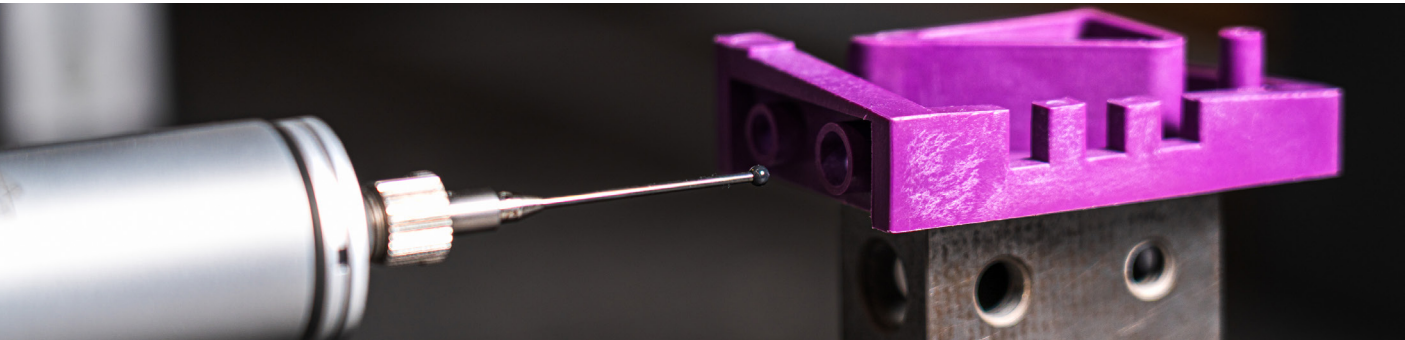
No Impact to Lead Time

Quality Inspection Report Upon request a report is generated with the results of the standard inspection process.	CTQ Partial FAI A dimensional FAI of critical features (25 features maximum) with no impact to lead time (print required at time of order).	CTQ DIR with Capability Study A 30+ part dimensional capability study of critical features (10 features maximum) with no impact to lead time (print required at time of order).
---	---	---

Additional Lead Time: 5+ Business Days

Dimensional First Article Inspection Report Traditional FAI available through a trusted third-party providing conventional inspections, which include most GD&T measurements.	Production Part Approval Process (PPAP) A Protolabs-specific version of the industry standard PPAP documentation meeting most of the 19 elements of a Level 3 PPAP. This offer also includes a Dimensional Inspection Report.	Custom Inspection Available Traditional inspection or capability studies performed using a suite of equipment. No limit on number or type of dimensions (material and geometry dependent) with GD&T possible as well.
---	--	---

Note: Inspection offerings availability may vary by factory.



CNC Machining

Manufacturing Capabilities

Quick-turn CNC machining works best for prototyping, form and fit testing, jigs and fixtures, and functional components for end-use applications. We have hundreds of high-speed CNC machines housed in our AS9100-certified factories that manufacture parts in as fast as one day. Orders are delivered on time, every time, so customers can stay ahead of schedule.

Available materials can be found at [protolabs.com/materials](https://www.protolabs.com/materials).

Our own factories have more than 1,000 mills and lathes in the U.S. and Europe that include:

- Hard metal mills
- Soft metal mills
- Plastic mills
- Soft and hard metal lathes

We use multiple toolsets based on efficient cutters for a particular plastic or metal material. The machine then rapidly mills parts out of the block in a subtractive manufacturing process that uses either 3- or 5-axis milling. Material traceability and associated material and finish certificates are available.

For full U.S. capabilities, visit [here](#). For full European capabilities, visit [here](#).

Protolabs' Network of trusted manufacturing partners exponentially expands our manufacturing capabilities.

Milling Capabilities

Maximum Dimensions

Maximum depth that can be milled is 2 in. (50.8mm) from either side of part.

For specific milling dimensions by material, see maximum part extents for machining.

Minimum Dimensions

Size: 0.25 in. by 0.25 in.

6.35mm x 6.35mm

Nominal thickness: 0.040 in. (1.0mm)

*Maximum material conditions

**Maximum workpiece size is 40 in. x 31 in. x 14 in.

Maximum Part Size

3-axis milling*

VF3: 39 in. x 26 in. x 25 in.

990mm x 660mm x 635mm

VF3: 36 in. x 24 in. x 13 in.

914 mm x 610 mm x 330 mm

5-axis milling**

20 in. x 12 in. x 4 in

508mm x 305mm x 102mm

16 in. x 16 in. x 16 in.

406mm x 406mm x 406mm

Turning Capabilities

Maximum Dimensions

Diameter: 3.95 in. / Length: 9 in.

100mm x 228mm

Minimum Dimensions

Diameter: 0.16 in. / Length 0.05 in.

4mm x 1.27mm

Wall Thickness:

0.020 in.

0.5mm

Angle: 30°

For full U.S. turning capabilities, visit [here](#). For full European turning capabilities, visit [here](#).

CNC Machining

Manufacturing Capabilities

Axis	Material	US	Metric
3-axis	Hard Metals* Brass	10 in. x 7 in. x 1.75 in.	254mm x 178mm x 44.5mm
	Copper	10 in. x 7 in. x 2.75 in.	254mm x 178mm x 69.9mm
	Aluminum Plastic	10 in. x 7 in. x 3.75 in.	254mm x 178mm x 95.3mm
3-axis**	ABS Acetal	10 in. x 14 in. x 1.75 in.	254mm x 356mm x 44.5mm
	ABS Acetal Nylon	22 in. x 14 in. x 0.75 in.	559mm x 356mm x 19.1mm
	Aluminum	22 in. x 14 in. x 3.75 in.	559mm x 356mm x 95.3mm
5-axis	Hard Metals* Brass Aluminum Copper	2.6 in. x 2.9 in. x 3.9 in.	559mm x 356mm x 95.3mm

*Hard metals: Titanium (6Al-4V), Stainless Steels (303, 304, 316, 17-4PH), Alloy Steel (4140), Carbon Steel (1018).

** Denotes two-sided machining only.

Locations

- Minneapolis, U.S. facility
8500 Wyoming Avenue,
Brooklyn Park, MN 55445

Telford, UK facility
Halesfield 8, Telford,
Shropshire, TF7 4QN, UK
- New Hampshire, U.S. Facility
15 Charron Ave.
Nashua, NH 03063



CNC Machining

Secondary Operations & Post-Processing Capabilities

Choose from a wide selection of secondary operations and post-processing capabilities. These processes strengthen parts, improve cosmetic appearance, provide customization, and other benefits.

Plating

- Anodizing
- Chromate
- Gold
- Silver
- Nickel
- Tin
- Zinc
- Passivation

Powder Coating

Add color powder coating to parts to improve cosmetics and durability.

Wet Paint

A liquid coating is applied to your part to provide an aesthetically appealing finish. The process is offered in virtually any color and is commonly paired with a primer layer to improve paint adhesion and durability.

Bead Blast

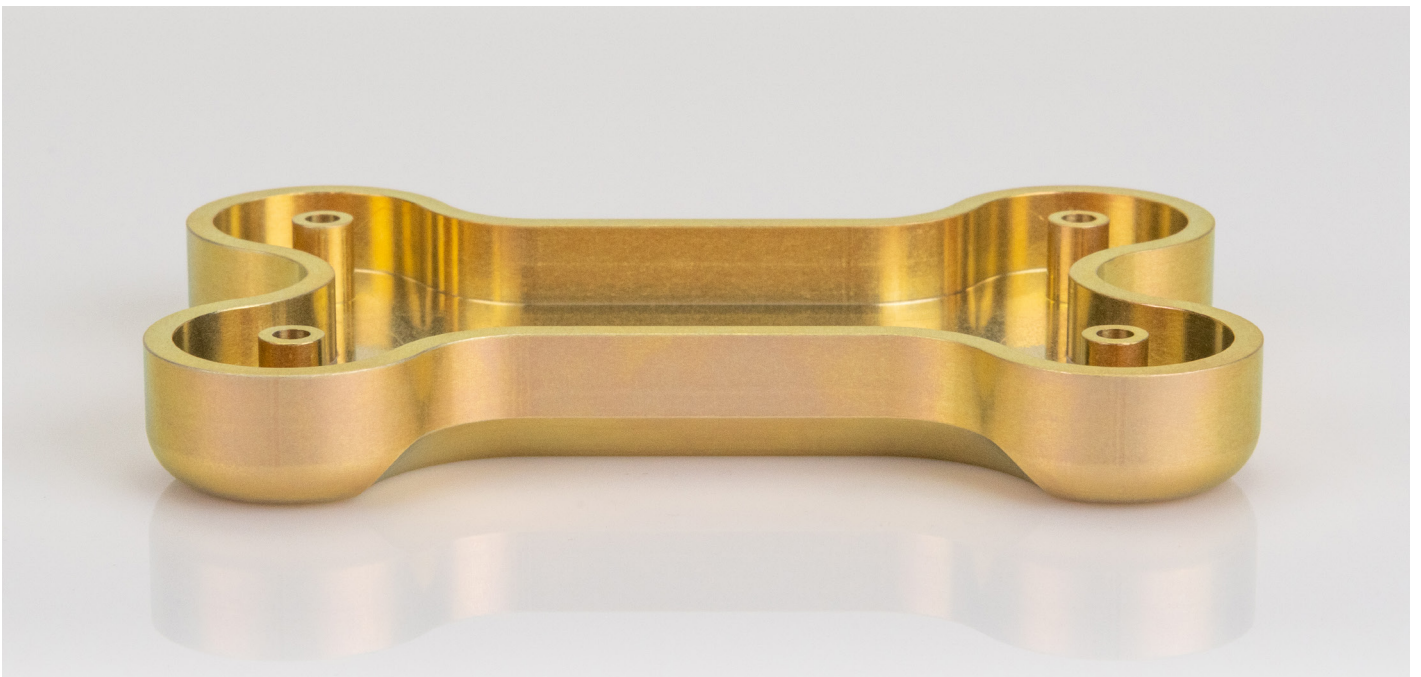
Light bead blast to provide uniform finish and light texture.

Part Marking

- Engraving
- Machine Engraved Backfill
- Silk Screening
- Ink Stamp

Press Fit Hardware Installation

Incorporate off-the-shelf hardware components to facility assembly.



CNC Machining

Quality Inspection Capabilities

Inspection Processes

Parts are inspected for cosmetic conformance to workmanship standards and dimensional conformance typically on X, Y and Z dimensions. Dimensions are assured through the use of hand tools as well as CMM.

Nonconformance Controls

Nonconforming material is segregated, and a re-build order is generated. Segregated material is destroyed.

Please contact your account manager for details and a quote.

Dimensional Inspection Reports

The following options are available upon request.

No Impact to Lead Time

Basic Production Quality Inspection Report

Inspected for cosmetic conformance to workmanship standards and dimensional conformance typically on limited dimensions.

Dimensional Inspection Report

Verifies numerous dimensional specifications without requiring a 2D drawing maximum) with no impact to lead time (print required at time of order).

Additional Lead Time: 1+ Business Days

First Article Inspection (FAI) Report

FAI produced on template conforming to AS9102C standard.

Verifies the sample part conforms to all dimensions provided on a 2D drawing.

Protolabs quality control will inspect 100% of dimensions provided on a 2D drawing, including GD&T.

Quoted tolerances apply.

Production Part Approval Process (PPAP)

A Protolabs-specific version of the industry standard PPAP documentation meeting most of the 19 elements of a Level 3 PPAP.

This offer also includes a Dimensional Inspection Report.

Note: Inspection offerings availability may vary by factory.



3D Printing

Manufacturing Capabilities

Industrial 3D printing is an additive manufacturing process that works best for functional prototypes, complex designs, reducing multipart assemblies, and end-use applications. Our rigorous quality control measures and commercial-grade equipment create highly precise parts every single time.

More than 150 3D printing machines in the U.S. and Europe, across six additive manufacturing technologies that include:

SLA

- 3D Systems Vipers
- ProJet 6000s
- ProJet 7000s
- iPro 8000s/ProX 800

PolyJet and 3D Printed Silicone

- Objet260 Connex3
- Objet350 Connex3
- Objet500 Connex3
- Keyence AGILISTA 3200W

Carbon DLS

- M2 Printer

SLS

- sPro60s
- sPro140s

MJF

- HP Multi Jet Fusion 4210s
- HP Multi Jet Fusion 5210s
- HP Multi Jet Fusion 5610s

DMLS

- Concept Laser Mlabs
- Concept Laser M2s
- Concept Laser Xline 2000R
- EOS

Carbon 3D Digital Light Processing

Available materials can be found at protolabs.com/materials.

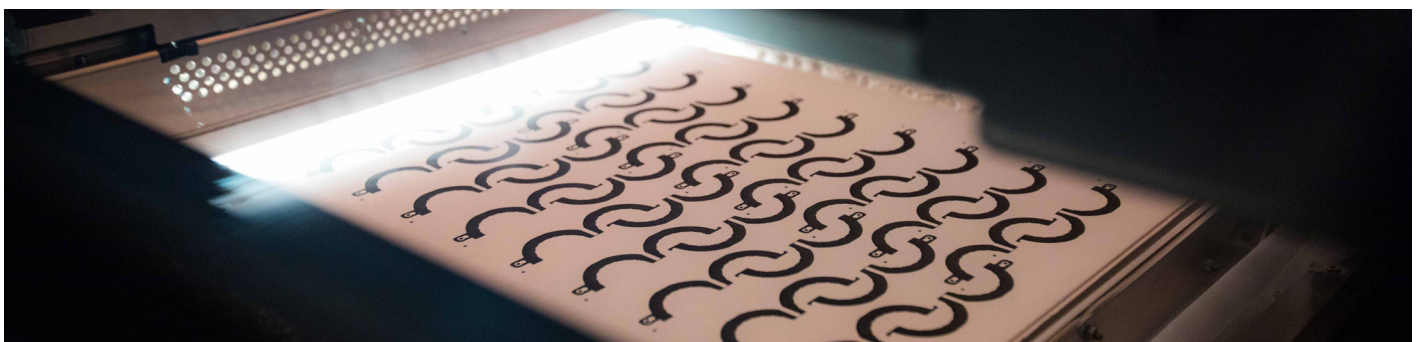
Protolabs' Network of trusted manufacturing partners exponentially expands our manufacturing capabilities.

Locations

Morrisville, U.S. facility
3700 Pleasant Grove Church
Road Morrisville, NC

Morrisville, U.S. facility
3615 Pleasant Grove Church
Road Morrisville, NC

Putzbrunn, Germany facility
Hermann-Oberth-Straße 21,
85640 Putzbrunn, Germany



3D Printing

Processes

Stereolithography (SLA)

Normal Resolution	US	Metric
Maximum Dimensions	29 in. x 25 in. x 21 in.	736mm x 635mm x 533mm
Layer Thickness	0.004 in.	0.1mm
Minimum Feature Size	0.010 in. XY draw plane (0.016 in. Z build direction)	0.25mm XY draw plane 0.406mm Z build direction
High Resolution	US	Metric
Maximum Dimensions	10 in. x 10 in. x 10 in.	254mm x 254 mm x 254 mm
Layer Thickness	0.002 in.	0.5mm
Minimum Feature Size	0.005 in. XY draw plane (0.016 in. Z build direction)	0.13mm XY draw plane 0.406mm Z build direction
Micro Resolution	US	Metric
Maximum Dimensions	5 in. x 5 in. x 2.5 in.	127mm x 127mm x 63mm
Layer Thickness	0.001 in.	0.025mm
Minimum Feature Size	0.0025 in. XY draw plane (0.008 in. Z build direction)	0.07mm XY draw plane 0.2mm Z build direction

PolyJet

Normal Resolution	US	Metric
Maximum Dimensions	19.3 in. x 15.4 in. x 7.9 in..	490mm x 391mm x 200mm
Layer Thickness	0.00118 in.	0.03mm
Minimum Feature Size	0.012 in.	0.30mm

Selective Laser Sintering (SLS)

Normal Resolution	US	Metric
Maximum Dimensions	19 in. x 19 in. x 17 in.	400mm x 250mm x 460mm
Layer Thickness	0.004 in.	0.10mm
Minimum Feature Size	0.030 in.	0.75mm

3D Printing

Processes

Multi Jet Fusion (MJF)

Normal Resolution	US	Metric
Maximum Dimensions	11.1 in. x 14.9 in. x 14.9 in.	282mm x 378mm x 378mm
Layer Thickness	0.00315 in.	0.08mm
Minimum Feature Size	0.020 in.	0.5mm

Carbon DLS

Normal Resolution	US	Metric
Maximum Dimensions	15.7 in. x 9.8 in. x 18.1 in.	400mm x 250mm x 460mm
Layer Thickness	0.004 in.	0.10mm
Minimum Feature Size	0.100 in.	2.5mm

Direct Metal Laser Sintering (DMLS)

Normal Resolution	US	Metric
Maximum Dimensions	9.6 in. x 9.6 in. x 13.0 in.	244mm x 244mm x 330mm
Layer Thickness	0.00118 in.	0.03mm
Minimum Feature Size	0.015 in	0.38mm
High Resolution	US	Metric
Maximum Dimensions	3.5 in. x 3.5 in. x 2.9 in.	89mm x 89mm x 74mm
Layer Thickness	0.00079 in.	0.02mm
Minimum Feature Size	0.006 in.	0.15mm
Normal Resolution (X-Line)	US	Metric
Maximum Dimensions	31.5 in. x 15.7 in. x 19.7 in.	800mm x 399mm x 500mm
Layer Thickness	Inconel: 0.00236 in. Aluminum: 0.00157 in.	0.06mm 0.04mm
Minimum Feature Size	0.015 in.	0.381mm

3D Printing

Secondary Operations & Post-Processing Capabilities

Choose from 3D printing finishing options that strengthen parts, improve cosmetic appearance, and other benefits.

Clear Coating

Clear coating is available and commonly applied to parts to create a clear cosmetic finish. Painting is also possible on 3D-printed parts. Some sanding and polishing will be needed to make the surface smooth, after which the part can be masked off and painted with whatever colors you like—just send the Pantone numbers with your design upload, together with a CAD model indicating which color goes where. The parts are sprayed with an automotive-grade paint. Soft-touch painting is also available.

Plating

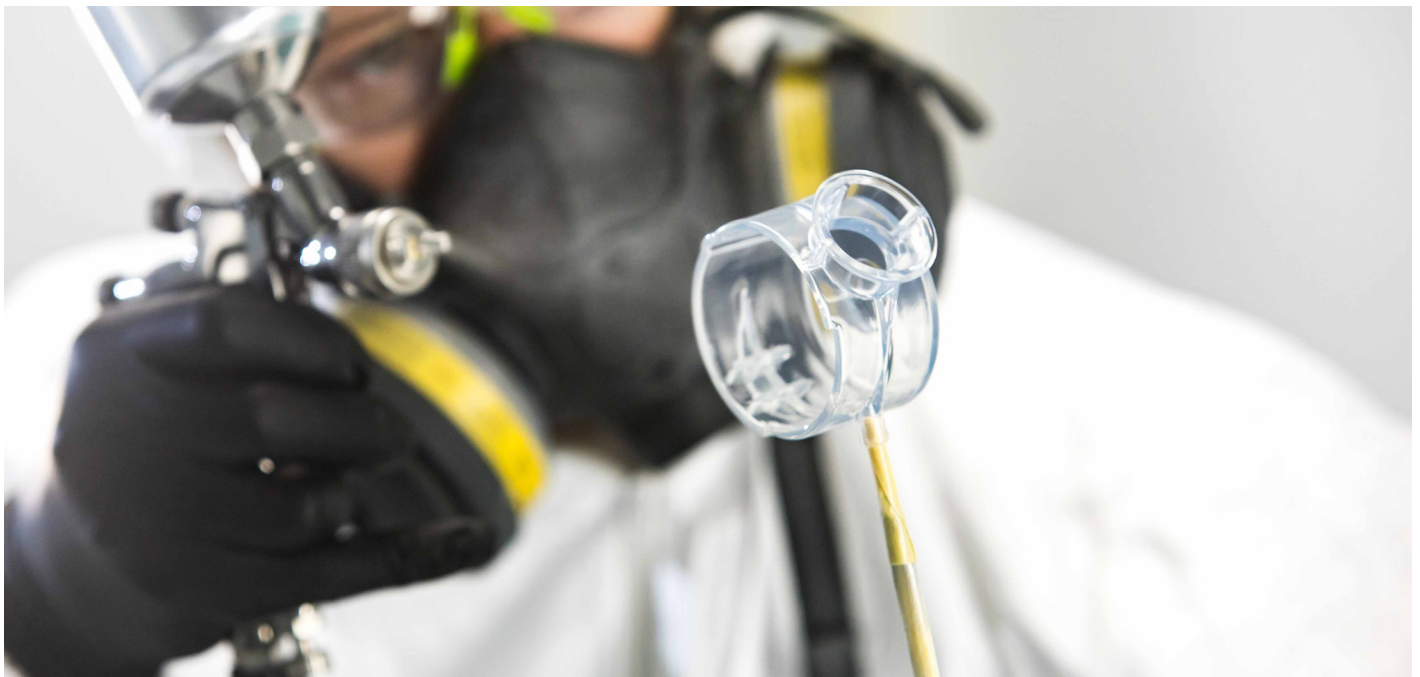
Plating on 3D-printed parts increases strength and durability of plastic parts. Electroless nickel plating is a great way to mimic a cast aluminum or magnesium part for light-weighting purposes.

Dyeing

Dyeing of stereolithography (SLA), selective laser sintering (SLS), Multi Jet Fusion (MJF), and PolyJet parts is possible at Protolabs. SLA parts can be dyed black, green, red, blue, or yellow. The finished parts are simply bathed in hot dye for a short while for a consistent color. This option is one of the fastest, lowest-cost ways to make printed parts cosmetically appealing. There's no chance of masking off certain areas like there is with painting, but for SLA, SLS, MJF, and PolyJet parts, especially those made of translucent acrylic or polycarbonate-like materials, this is often an excellent option.

Decaling

Decaling provides a great way to attach company logos, safety warnings, and other graphic to increase cosmetics or functionality. We don't supply these products, but can apply them for you. Note that adhesive and thermal-transfer decals won't stick to the rough surface typical of some 3D-printed parts, making sanding or otherwise smoothing of the target surface a prerequisite to decal application.



3D Printing

Secondary Operations & Post-Processing Capabilities

Texturing

Texturing improves the finish of 3D-printed parts by making them less slippery, improves ergonomics, and enhances cosmetic appearance. When prototyping 3D-printed parts that will later be injection molded, it's possible to apply a spray texture to mimic a Mold-Tech brand-like finish used in many mold cavities. This same technique can be used to apply a soft-touch paint or urethane clear coat to a 3D-printed part, a process that also improves weather and sun resistance on the UV- curable materials used with SLA.

Polishing

Polishing is possible on 3D-printed parts to create a high-quality finish. Again, some level of smoothing is needed to apply paint and decals, but highly cosmetic surfaces can be taken even further. If this is a requirement, you'll need to identify your finish expectations on your part with a drawing or screenshot.

Heat Treating

Heat treating metal parts built with direct metal laser sintering (DMLS) eliminates heat-induced stress and potential warping. It's also used to harden DMLS metals, strengthen them, make them less prone to cracking and fatigue, or make them more pliable. If you're looking for an extremely tough and hardened 3D-printed metal, stainless steel 17-4 PH is a solid option.

Secondary Machining

Secondary machining is available for both metal and polymer materials if a more accurate, smooth surface is required outside of our standard offering. We also offer other high-requirement operations for our parts including boring or reaming tight tolerance holes and tapping those which require threads that cannot be printed. Depending on the material, we possess the ability to place inserts into parts through either heat- staking or gluing into place.



Metal 3D Printing

Secondary Operations & Post-Processing Capabilities

Production Capabilities for Metal 3D Printing

Looking for an additive manufacturing solution for production projects? With our metal 3D printing technology, you're able to choose from several secondary processes like post-process machining, tapping, reaming and heat treatments that produce end-use production parts. To ensure high-quality parts, we also offer powder analysis, material traceability, process validation, and inspection reporting, and our direct metal laser sintering (DMLS) 3D printing process is ISO 9001 and ISO 13485. It's industrial 3D printing designed around your project needs - whether prototyping or production.

1. Expertise

Consultative quoting and design feedback from our experienced engineering team and reliability from a manufacturer that has 3D printed millions of unique geometries over the last two decades.

2. Project Management

Dedicated project management support for all your production needs from part design to finishing processes.

3. Scale

More than 100 industrial - grade metal and polymer 3D printers across five additive manufacturing technologies supporting production projects in various engineering-grade materials.

4. Quality

Rigorous process controls and engineering staff focused on achieving parts with tight tolerances, dimensional accuracy, and robust mechanical properties.



Post-Process Machining

Achieve tight tolerances while having the design freedom of additive manufacturing.

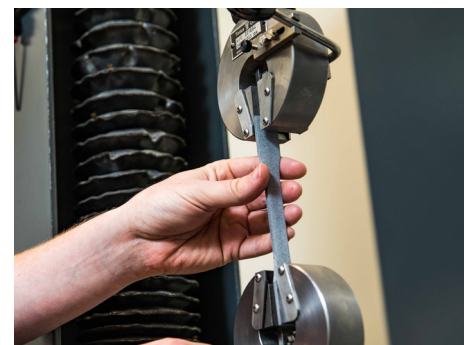
- 3- and 5-axis milling
- Turning
- Wire EDM
- Tapping



Powder Analysis & Material Traceability

Analysis of powder and traceability of the supplier to meet your production requirements.

- Traceability
- Chemistry
- Particle size and distribution analysis



Mechanical Testing

Certified testing to confirm mechanical requirements on production parts.

- Tensile
- Hardness Testing
- Fatigue
- Vibration

3D Printing

Quality Inspection Capabilities

Inspection Processes

100% of parts are inspected for cosmetic conformance to workmanship standards and dimensional conformance is performed using spot checks on designated features. The following inspection options are available upon request.

Nonconformance Controls

Nonconforming material is segregated and placed in nonconforming state in our software. Material is then dispositioned using MRB procedure.

Please contact your account manager for details and a quote.

Dimensional Inspection Reports

The following options are available upon request.

Additional Lead Time: 2+ Business Days

Reference Report

Results of dimensional inspection against drawing, on a sampling of parts.

Formatted report with bubbled part image and result summary chart, without pass/fail indication.

Dimensional Inspection Report

Results of dimensional inspection against drawing, on a sampling of parts, with pass/fail indication.

Formatted report with bubbled part image and result summary chart.

First Article Inspection (FAI) Report

FAI produced on template conforming to AS9102C standard.

Verifies the sample part conforms to all dimensions provided on a 2D drawing.

Protolabs quality control will inspect 100% of dimensions provided on a 2D drawing, including GD&T.

Quoted tolerances apply.

Note: Inspection offerings availability may vary by factory.



Sheet Metal Fabrication

Manufacturing Capabilities

The rapid sheet metal fabrication process is often used through the various stages of prototyping and low volume processes. Typical sheet metal parts include flat work, mounts, covers, brackets, enclosures, and cabinets.

Whether you need 1 part or 100, we have the capacity to quickly manufacture your sheet metal components and scale to production when you're ready.

For full design guidelines, visit our [website](#).

Capabilities

- Thk range: 0.024 in. – 0.250 in.
0.61mm – 6.35mm
- Flat part size (max.): 47 in. x 39 in.
1194mm x 991mm
- Flat part size (min.): 0.50 in. x 0.50 in.
12.7mm x 12.7mm

Protolabs' Network of trusted manufacturing partners exponentially expands our manufacturing capabilities.

Material Selection

- 304-2B, 304 #4
- 316-2B
- 5052-H32
- 6061-T6 flat only
- Cold-rolled steel
- Galvanized steel
- Galvanneal steel
- Copper C110, C101
- Brass 260

Material traceability and associated material and finish certificates are available upon request.

Location

Nashua, U.S. facility
22 Charron Avenue, Nashua, NH 03063

Industrial Equipment

- 7 laser cutters: IPG
- 3 punch presses: 2 Weidemanns, 1 EM
- 13 press brakes: Cincinnati Maxform & Proform, Toyo, Amada, Bystronic
- 10 hardware machines: Haeger & PEMserter
- Countersink and tapping machines
- Welding tools
- 3 powder coat booths and 3 ovens



Sheet Metal Fabrication

Secondary Operations & Post-Processing Capabilities

Choose from a wide selection of secondary operations and post-processing capabilities. These processes strengthen parts, improve cosmetic appearance, provide customization, and other benefits.

Plating

- Anodizing
- Chromate
- Gold
- Silver
- Nickel
- Tin
- Zinc
- Passivation

Powder Coating

Add custom powder coat color to parts for improved cosmetics and durability.

Wet paint

A liquid coating is applied to your part to provide an aesthetically appealing finish. The process is offered in virtually any color and is commonly paired with a primer layer to improve paint adhesion and durability.

Part Marking

- Engraving
- Machine engraved backfill
- Silk screening
- Ink stamp

Press Fit Hardware Installation

Incorporate off-the-shelf hardware components to facility assembly.

Part Assembly Welding and/or Hardware



Sheet Metal Fabrication

Quality Inspection Capabilities

Inspection Processes

All parts are visually inspected prior to shipment, and dimensions are assured through the use of hand tools.

Nonconformance Controls

Nonconforming material is segregated and placed in nonconforming state in our software. Material is then dispositioned using MRB procedure.

Please contact your account manager for details and a quote.

Dimensional Inspection Reports

The following options are available upon request.

No Impact to Lead Time

Dimensional Inspection Report

Verifies numerous dimensional specifications without requiring a 2D drawing.

Additional Lead Time: 1+ Business Days

First Article Inspection (FAI) Report

FAI produced on template conforming to AS9102C standard.

Verifies the sample part conforms to all dimensions provided on a 2D drawing.

Protolabs quality control will inspect 100% of dimensions provided on a 2D drawing, including GD&T.

Quoted tolerances apply.

Production Part Approval Process (PPAP)

Protolabs-specific version of the industry standard PPAP documentation meeting most of the 19 elements of a Level 3 PPAP.

This offer also includes a FAI report.

Note: Inspection offerings availability may vary by factory.





PROTOLABS
Manufacturing. Accelerated.

Contact Us

5540 Pioneer Creek Dr.
Maple Plain, MN 55359
United States

Phone 877-479-3680
Fax 763-479-2679
Email customerservice@protolabs.com