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**PLASTIC DESIGN** INC.  
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Acrylic vs Polycarbonate**

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COVER PHOTO : **PLASTIC DESIGN INC.** | North Chelmsford, MA

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Summer is right around the corner, bringing that New England sunshine and hopefully some new opportunities for your business. As we ease back into a more “normal” way of life, it’s a great time to focus on how companies can thrive in the coming season.

In this issue we shine our spotlight on Plastic Design, Inc. in North Chelmsford, Massachusetts, who specialize in turning simple to complex ideas into reality. PDI utilizes the latest in automated fabrication equipment and expert computer aided design capability to supply finished product to your specifications in any quantity.

And speaking of plastic, for our insight article we dig into the advantages of working with plastic, and the differences between machining two common forms of material, acrylic and polycarbonate.

We hope you enjoy the issue, please share your feedback with us and as always check out our latest news and past issues at [TheGatewayMag.com](http://TheGatewayMag.com).

Enjoy the start of a productive Summer,



June 2021

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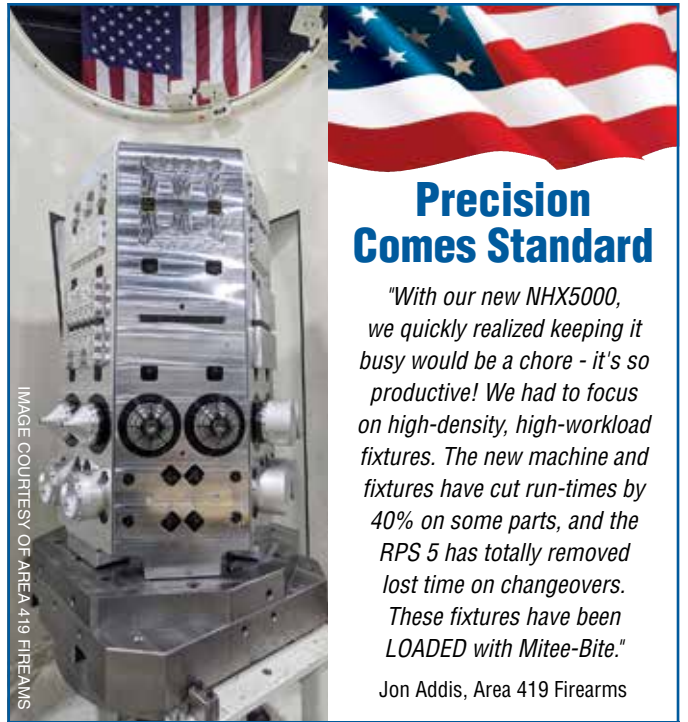
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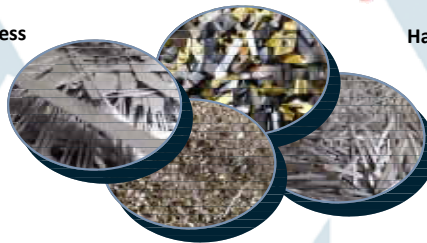
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# PURVEYORS OF PURPOSEFUL PLASTIC MANUFACTURING: MEET PLASTIC DESIGN INC.



**This month we sat down with the folks over at Plastic Design Inc. (PDI) out of North Chelmsford, Massachusetts and presented them with a handful of questions that would best place their company in the spotlight.**



To start, Plastic Design Inc. have positioned their core competencies into four key buckets.

They are as follows:

DESIGN

Plastic Design, Inc. will work from your drawings or create a design for evaluation based on your needs. Their design team has the ability to take your idea to a turnkey product or system without formal documentation. With all the resources available in house, cost control is assured.

CUSTOM FABRICATION

Plastic Design, Inc. specializes in turning simple to complex ideas into reality. PDI utilize the latest in automated fabrication equipment and expert computer aided design capability to supply finished product to your specifications in any quantity. From the one-off prototype to a full production run, their highly trained staff of engineers and technicians have years of experience in plastic fabrication, and are dedicated to producing a quality product at a reasonable price.

COMPLIANCE

Plastic Design, Inc. products can be produced to meet or exceed your pertinent standards specifications such as Factory Mutual, Semi, NFPA, OSHA, and many others.

ONSITE SUPPORT

Plastic Design, Inc. offers on-site surveys to review new projects as well as evaluations of an existing system requiring modifications to extend their current usefulness. Engineering support is also available in preparing system specifications to ensure the finished product meets your expectations. Virtually any aspect of pre and post production engineering support is available.

PDI's state of the art 30,000 sq. ft. facility has 21,000 sq. ft. of open manufacturing area with complete manufacturing capability.

The following is an overview of PDI's current manufacturing equipment:

- 14 – N2 feed Plastic Welding Stations  
*(NOTE: All in-house welding is done using nitrogen)*
- 1 – Anderson Exact 5' x 10' CNC Machining Center
- 1 – Kern Laser 52" x 100", 400 watt CO2 Laser
- 1 – Anderson Exact Plus T.C. 5' x 12' CNC Machining Center
- 1 – Holz-her Precisions 5' x 12' Panel Saw
- 1 – Wegener Computer Controlled Butt Welding Machine for 10' wide sheet
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- 1 – Stainless Steel Plasma Cutting & Welding
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**What you're about to read is the meat of that conversation. If you have any further questions, or would like to learn more about Plastic Design Inc, their contact information can be found at the end of this feature. Without further ado, please join us in learning all about Plastic Design Inc, and what they've been working to accomplish within our industry for 40+ years of experience in their industry.**

*Please, fill us in on the history of Plastic Design Inc.:*

Founded in 1976, Plastic Design Inc. has established itself as a leader and innovator in the field of custom plastic fabrication. The unique demands of the markets we serve are rarely satisfied by generic or mass produced products. Our expertise lies in creating products that meet the specific needs of each customer. PDI's experience within the biomedical, pharmaceutical and semiconductor industries has resulted in the development of cutting edge products and methods by which they are produced. Application of the latest manufacturing technologies ensures that our products comply with the strict tolerances and requirements of these industries. Our engineering depth and strategic alliances allow us to produce products ranging from simple cabinetry to the most advanced, fully automated stations. Working from a professional design, rough sketch or simply an idea, PDI can make your concept a reality.

In November of 2017, PDI acquired Keller Products. Keller Products was founded in 1990 as a supplier of engineered filtration products for the industrial market. The major initial product line was a series of cartridge filters utilizing the unique Keller plastic stacked disc washable filter element. To meet customer requirements, cartridge filters with replaceable filter elements and bag filters were added to the line. Keller industrial filters continue to enjoy a substantial market in filtration of cooling water, municipal water supplies, pond and well water.

The Current owners of Plastic Design Inc are Daryl Flynn and Kurt Flynn Both have over 30 years of experience in the Plastic Fabrication Field.

***What are PDI's operative offerings? What do you do?***

Plastic Design has its roots in custom fabrication, however we have honed these fabrication skills to build a company that has the ability to provide solutions in the areas of semiconductor fume hoods, materials handling, biomedical products, clean room essential products, CNC routing, laser cutting, and machining of plastic. With the addition of the Keller Filter Division we have the ability to sell filtering and machine tool tramp oil solutions.

PDI has a wide array of products from tanks used in semiconductor manufacturing, fume hoods used in R&D in the pharmaceutical & biomedical industries to custom displays for casinos to products for the NHL.

***What types of industries do you typically serve on a day to day business?***

PDI supplies systems and products to meet the demanding needs of industries from biomedical and pharmaceutical to microelectronics and photonics.



***Any additional points you would like to tell potential buyers about?***

Based on our years of experience we have the ability to bring many solutions to the table. We have the ability to bring a design idea to a reality.

Tell us about your company's people (longevity, special abilities).

Many of our employees have been here for over 10 years and we have several who have been here for over 25. Our company is more than a business it is a family.

***What is your company's level of technology?***

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***What does PDI have for in-house services?***

PDI offers OEM builds, Kan Ban stocking, engineering services, contract manufacturing, and most often, the custom fabrication of components.

***Have any process(es) been added or improved in recent times that your present customers should know about?***

We are currently working on an agricultural line of products as well as bringing some of our solutions to an e-commerce platform.

***Does your company offer special services?***

We have done reverse engineer and/or product improvement, although its done on a case by case.

***Fill us in on PDI's quality, quantity and quoting practices:***

Plastic Design, Inc. is dedicated to having the finest quality plastic fabricated products while ensuring our customers' needs are met through personal service and continuous improvement while meeting applicable requirements.

***Are you QS certified? Do you offer SPC? Any certifications your company has received?***

We are ISO9001:2015 certified

***What types of quantities are you presently producing, or want to produce?***

We do it all! From a single piece prototype for a new startup, to high volume OEM, including new product development.

***If you offer delivery services, what geographic area, or radius, do you cover?***

We do offer a delivery service, although try to keep it within an hour of the office. However, we do work for customers all over the country.

***Do you have any customer testimonies you'd like to quote?***

Daryl Flynn, President of Plastic Design, Inc., was recently highlighted in an article by his alma mater, Bentley University, for the company's efforts in supplying medical frontline workers with personal protective equipment (PPE). Here's an excerpt:

Unlike other alumni who are running into production roadblocks due to a lack of materials amid the pandemic, Daryl Flynn '93, co-president of Plastic Design, Inc. is lacking people. Namely, workers at his custom plastic fabrications company in Chelmsford, Mass. When we spoke, Flynn was overseeing a limited staff of 13—far lower than the usual 40 on the factory floor.



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“It’s fear,” he says. Pick a crisis: fear of the virus, fear of spreading the virus. “You can’t manage fear,” he adds. “That’s something they really don’t teach you.” However, Flynn himself isn’t afraid. “I’m a realist,” he explains. “I look at the numbers. I wash my hands. It’s contagious, but I’ll take my chances.”

Because what’s on the line are nine-inch face shields—thousands of them. A plastic line of defense far surpassing any cloth mask an essential worker can find on Etsy.

Flynn’s parents bought Plastic Design, Inc. in the mid-’80s. At 19, Flynn started working at the company, and joined up full-time after graduating from Bentley in 1993, as did his brother Kurt ’95, two years later. Since then, the duo has kept the family business in stride with the times, evolving from custom display cabinets to biomedical products and even casino tables. If you’re playing roulette at Foxwoods, chances are you’re sitting at a table made by the Flynn brothers.

When COVID-19 struck, Flynn answered the call of a friend: an anesthesiologist looking for safety glasses. “I had some extra material lying around, so I asked him if I could make a face shield instead,” Flynn says. He went into work the next day and mocked up a design using existing materials from a project he had done for the U.S. Navy—plastic shields used to encase wires on the ships.

“He said it was great.”

### ***What one thing would you like prospective customers to know about your company?***

Utilizing the unique properties of the many plastic materials available today, Plastic Design, Inc. supplies systems and products to meet the demanding needs of industries from biomedical and pharmaceutical to micro-electronics and photonics. With the latest in automated fabrication equipment and expert computer aided design capability, Plastic Design, Inc. can supply any quantity, from the one-off prototype to full production runs. Should your need be for a simple bio-isolation chamber, a fully automated semi-conductor etching tool, or a totally unique innovation, Plastic Design, Inc. will address your project in a quality, timely, and cost effective fashion.



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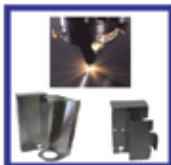
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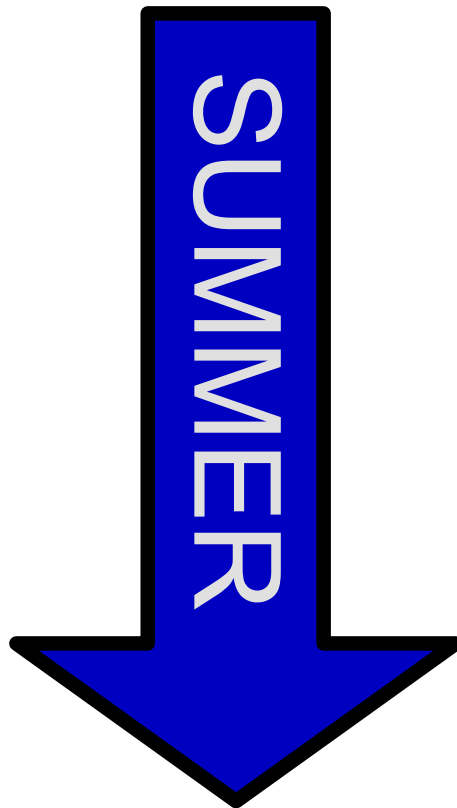


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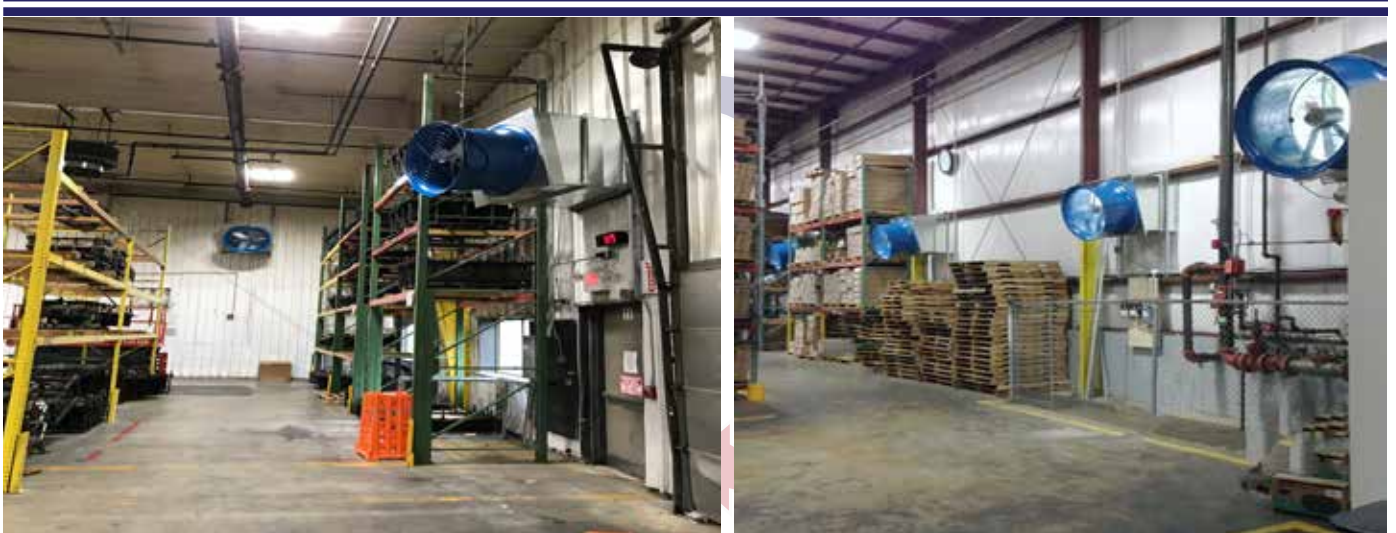


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# TALKING PLASTIC: THE ADVANTAGES OF PLASTIC WELDING AND THE DIFFERENCE BETWEEN ACRYLIC AND POLYCARBONATE MACHINING

**This month we put the spotlight on Plastic Design Inc., and we thought we'd further the insight by talking shop about what plastic weld manufacturing is, the advantages of working with plastic, and the differences between machining two common forms of material, acrylic and polycarbonate. Much of the following verbiage was originally presented in Plastic Design Inc.'s blog and repurposed with permission for the advantage of our Gateway Magazine readers.**

**Let's dive right in.**



## PLASTIC WELDING PROCESS

The use of thermoplastics in parts creates a demand for joining processes that can accommodate intricate joint lines. Plastic welding is a process similar to metal welding that creates a permanent, molecular bond between thermally sensitive components. Plastic welding eliminates the need for adhesives or mechanical fasteners to create a single part from multiple pieces. We're certainly no stranger to the concept here, but it's still an interesting study when it comes to taking a peek behind the curtain. One of the most common processes of plastic welding is by means of hot gas welding.

Hot gas welding is a process that joins thermoplastic materials using a hot-gas torch that directs hot air to the joint surface and weld rod. Once the materials have softened from the heat, the heated weld rod is pressed to the joint surface, bonding the materials together to complete the weld. This process is capable of bonding small and intricate components and is also ideal for repairs.

## ADVANTAGES OF PLASTIC WELDING

Plastic welding offers many advantages over other bonding processes, including:

- **Cost-effective.** Plastic welding eliminates the need for extra solvents, reduces energy outputs, and has a low cycle time, which increases productivity with lower costs per unit.
- **Fast and clean.** Since there is no weld flash with plastic welding, it is a safe, fast, and simple process. The end product has a cleaner look with invisible or nearly seamless lines.
- **Highly versatile.** No matter the size or geometry, plastic welding provides a huge range of versatility. Plastic welding can accommodate high-volume orders quickly.
- **Permanent.** The molecular bond created from plastic welding is permanent; therefore, you can be assured that any internal components remain safe and undisturbed.
- **Works with almost all thermoplastic polymers.** Very few thermoplastic polymers cannot be welded. If your company uses many thermally-sensitive plastics, plastic welding should be effective for nearly all of them.

## ACRYLIC MACHINING VS. POLYCARBONATE MACHINING

Acrylic and polycarbonate serve as the two most frequently used clear plastics, with both materials offering distinct advantages and disadvantages. Some industry professionals may find it difficult to choose between the two plastics for their unique machining applications. To facilitate this selection process, we put together the following dialogue that provides an overview of acrylic and polycarbonate, their advantages and disadvantages, and their typical applications.

## ACRYLIC VS. POLYCARBONATE

Before deciding whether acrylic or polycarbonate best suits your machining needs, it is important to understand the differences between the two plastic materials. Each exhibits particular advantageous and disadvantageous characteristics that make one or the other more appropriate to use in a given application.



### LET'S START WITH ACRYLIC:

#### **Description:**

- Transparent thermoplastic plastic
- Also referred to by the trade name Plexiglass
- Available in a wide range of colors and opacities

#### **Advantages:**

- High strength (4 to 8 times stronger than glass)
- Superior clarity (making it a suitable alternative to glass)
- High durability (resistant to a broad range of temperatures, weathering, and UV radiation)
- Broad versatility (easily fabricated through a variety of techniques and bonded with adhesives and solvents)
- Low cost (less expensive to manufacture than other materials, including polycarbonate)

## **Disadvantages**

- More susceptible to cracking than polycarbonate
- More susceptible to chipping than polycarbonate
- Poor heat resistance (loses structural integrity at temperatures over 160-degrees Celsius and will warp or melt when exposed to open flame)



## AND NOW ON TO POLYCARBONATE:

### **Description:**

- Naturally transparent thermoplastic
- Available in several formulations including FDA compliant, glass filled, enhanced bearing, and wear grades

### **Advantages:**

- Superior strength (200 times that of glass)
- Superior transparency (transmits light as effectively as glass)
- High durability (high-impact resistance)
- High machinability (easily manipulated and shaped using various fabrication processes)
- Minimal creep (less likely than other plastic materials to warp or deform under pressure)

### **Disadvantages:**

- More susceptible to scratches than acrylic
- More susceptible to denting under impact than acrylic (due to greater flexibility)
- High costs (more expensive than acrylic)

## COMMON PRODUCT APPLICATIONS FOR ACRYLIC AND POLYCARBONATE

Due to their differing characteristics, acrylic and polycarbonate find use in varying product applications. Some of the most common products made from acrylic and polycarbonate include:

### **Acrylic:**

- Aquariums, terrariums, and other animal enclosures
- Desiccators and dry boxes
- Glove boxes
- Lighting fixture lenses
- Radiation shields
- Retail fixtures
- Windows and glass alternatives

### **Polycarbonate:**

- Architectural facades and features
- Bulletproof and bullet-resistant windows
- Clear manifolds
- Face shields
- Machine safety glass
- Point-of-Purchase (POP) retail displays
- Sight glasses

### **Some of the most common uses for acrylic or polycarbonate machining include:**

- Biomedical and pharmaceutical
- Cleanroom
- Storage equipment
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***The pros of polycarbonate and acrylic fabrications include:***

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- Weather resistance. Both plastics are capable of enduring fluctuating temperatures, varying moisture levels, sunlight exposure, and other weather conditions.
- Lightweight. Both materials are lightweight, shatterproof, and transparent, making them excellent alternatives to glass.
- Color customization. Polycarbonate and acrylic can both be colored while still maintaining their transparency.
- Chemical resistance. Polycarbonate is resistant to a range of chemicals, including many acids.
- UV protection. Polycarbonate has an inherent UV filtering capability and is commonly used for eyewear manufacturing or outdoor applications.
- Electrical insulation. Polycarbonate is naturally a good electric insulator.

***If you have any questions on the usage of acrylic and/or polycarbonate in machining and manufacturing processes, feel free to reach out to our friends at Plastic Design Inc. who were gracious enough to supply us with a lot of these thoughts. Their contact information can be found at the end of their company feature within the pages of this issue.***

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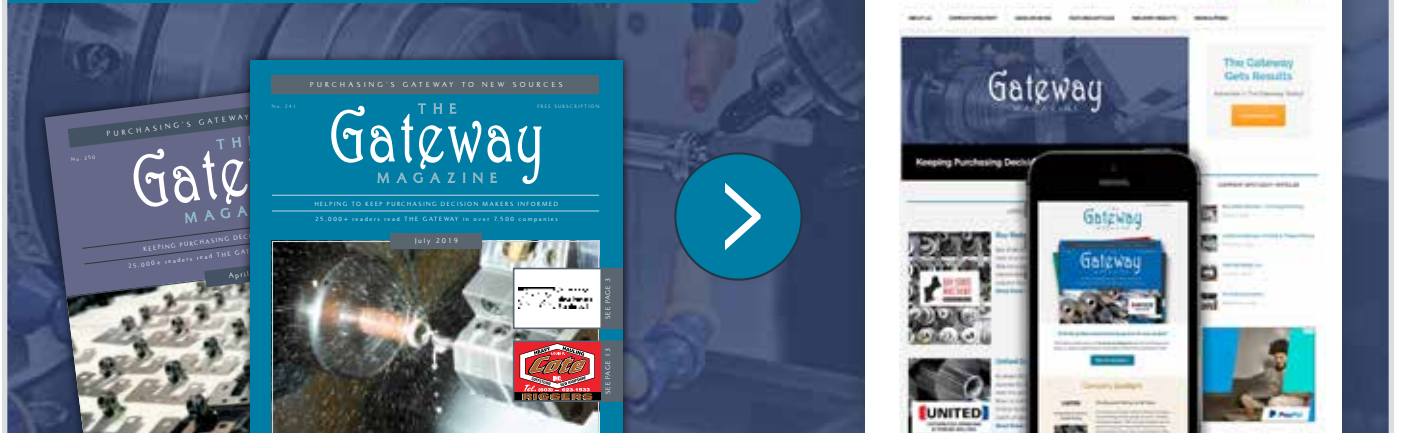


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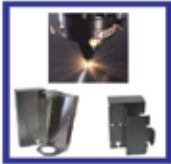
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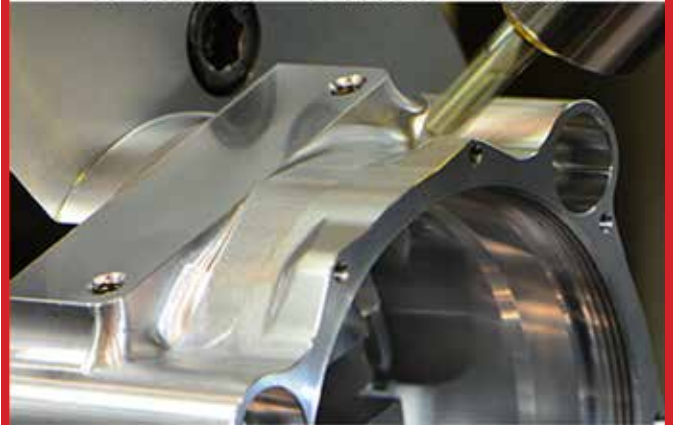
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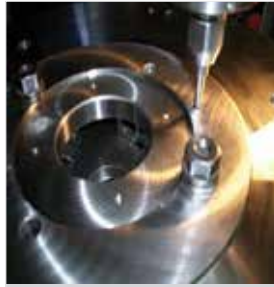


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