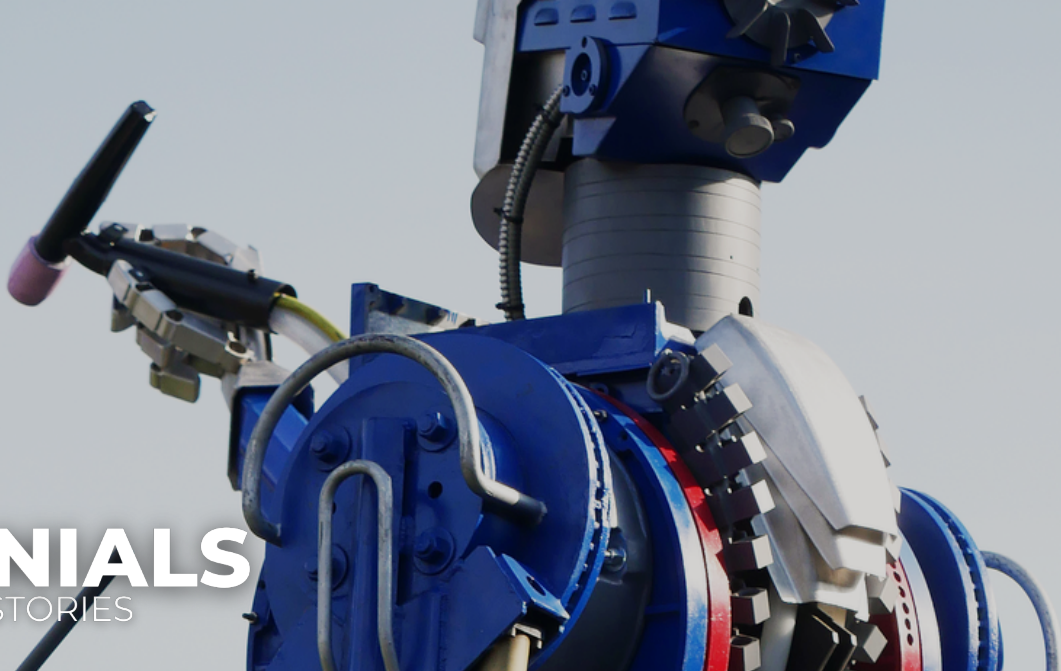


**CONTRACT WATERJET CUTTING SERVICES**



**39 Progress Circle Unit C Newington CT, 06111**

[www.icscuts.com](http://www.icscuts.com) [sales@icscuts.com](mailto:sales@icscuts.com)  
Phone: (860) 926-1155 Fax: (860)926-1156



# TESTIMONIALS

CUSTOMER SUCCESS STORIES

## CUSTOMERS WE'VE SERVED

ICS has had the privilege of cutting pieces for some of the world's most well-known aerospace companies and numerous prestigious universities that are currently at the forefront of innovative & technological advancements.

“ We cannot say enough about the quality and great turn around times from ICS. they are going to be an asset to our company. It has been very easy communicating with Rick to get exactly what we need. We are looking forward to a long relationship between ICS and our company. ”

“ Rick and Nick take incredible responsibility of every part they make for us. The quotes are reasonable, the turnaround times are fantastic, and the communication is top-tier. ”

“ Excellent communication with customer on specifications, when product available and overall customer friendly Delete ”

“ Everyone I have dealt with at ICS has been really great. All are very friendly, professional and just a pleasure to work with. RFQ's are responded to promptly and your pricing can't be beat. ”

“ Amazing company which far exceeds customer's demands with its exceptional customer service and lead time. Definitely a place I would recommend to all companies in need for water-jet. ”

“ Excellent work! I had a custom sign worked on by these guys and was blown away by the attention to detail and great communication throughout the stages of the job. Thanks again for a job well done and ahead of schedule! ”





# ABOUT ICS

INTELLIGENT CUTTING SOLUTIONS

## OUR START

The founders of ICS recognized a need to enhance the waterjet cutting service experience by implementing technology and management strategies that allow for the most efficient process possible.

After decades of experience in the aerospace industry, they had proven that there was a lack of reliable, customer-centric waterjet vendors in New England.

## OUR TECHNOLOGY

Intelligent Cutting Solutions (ICS) uses state-of-the-art Flow waterjet machines that have the fastest cutting speeds and highest accuracy in the industry. All of the machines used at ICS have the following cutting edge technology:

- Taper Compensation
- Dynamix XD 5-axis cutting head
- FlowCut Software
- HyperJet 94i-S Intensifier Pump
- Moto Jet 60,000 PSI intensifier pump



AS9100D,  
ISO9001,  
AND ITAR  
CERTIFIED

ICS is ISO9001,  
AS9100D and, ITAR  
Certified.



QUICK  
QUOTES

The ICS staff is trained  
to get you your quotes  
within 24 business  
hours.



COMPETITIVE  
PRICING

ICS offers you competitive  
pricing by at least 10%.



NEW  
TECHNOLOGY

State-of-the-art  
machines to provide  
you with the highest  
quality work.



FAST  
LEAD TIMES

ICS's main priority is  
waterjet cutting so your  
job can be completed  
within 5-7 business  
days.



EXPERIENCE

Extensive waterjet cutting  
background and, over a  
decade of experience in  
the aerospace industry.



# A CUT ABOVE THE REST

INTELLIGENT CUTTING SOLUTIONS

IN JUST

**2 YEARS**

ICS HAS

PROCESSED

**2,285**

JOBS

SHIPPED

**77,429**

PARTS

SERVED

**317**

CUSTOMERS

## ICS ADVANTAGE

Unlike many other fabricators and machine shops, ICS exists solely to complete customers' projects. Other waterjet vendors typically offer their waterjet cutting services to occupy their spare capacity and make supplemental income. As a result your projects receive ICS's full attention and can be completed quickly with shorter lead times.

## ADVANCED CAPABILITIES

### 5-Axis & Beveled Cutting

Dynamic XD™ cutting head technology that can cut bevels up to 60°. This allows ICS to cut complex 3D shapes. The cutting head wrist articulation has a motion capability of up to 89°.

### Stacked & Laminate Cutting

ICS's waterjet cutting services also include the cutting of stacked and laminated material. The abrasive waterjet process allows ICS to optimize output by cutting several inches of varying material at once in a single pass.

### Precision Cutting

ICS is capable of holding extremely tight tolerances for most materials. The ICS team specializes in serving the aerospace and defense industries, two of the most demanding in terms of tolerance requirements.

**95 %**

ICS's customers said they would highly recommend their services





# INDUSTRIES

INTELLIGENT CUTTING SOLUTIONS

From medical device manufacturing to architecture, waterjet cutting is utilized in almost every industry. The versatility of the technology ISC utilizes is what allows this process to be used in the production of so many products. The majority of ICS's work resides within the aerospace industry, this method of cutting is the aerospace industry's premier choice because of its high precision nature and the lack of HAZ (heat-affected zones).



## AEROSPACE & AVIATION

Precision in manufacturing is imperative for the aerospace industry, and there is zero margin for error. The lack of heat-affected zones during this process means that there is no thermal distortion, making waterjet cutting the superior cutting method for the aerospace industry.



## DEFENSE

The manufacturing of military machinery depends heavily on abrasive waterjet cutting. The waterjet machine's versatility allows for it to be used for a variety of materials and projects that are typically difficult to machine, including: composites, rotary blades, jet engines, and various metals up to 11" in thickness.



## ARCHITECTURE

Waterjet cutting in architecture is the preferred cutting process because of the machine's capability to cut thicker materials in irregular shapes while maintaining accuracy and cutting at fast speeds. This process is perfect for custom designs.



## AUTOMOTIVE

The versatility of a waterjet machine make it perfect for the automotive industry because its capable of cutting both interior and exterior components. Professionals in the automotive industry often use this process because of its precision, smooth edges, and lack of mechanical stress.



## MEDICAL

Waterjet cutting allows medical manufacturers to increase their productivity by cutting down on the time it typically takes to cut the materials they need. Waterjet cutting is often used for prototyping and for larger runs of components.

# WHY WATERJET?

## INTELLIGENT CUTTING SOLUTIONS

The graphic below highlights the distinct advantages of utilizing waterjet cutting and, compares waterjet technology to other common cutting methods.

<b>WATERJET CUTTING</b> 	<b>PLASMA CUTTING</b> 	<b>LASER CUTTING</b> 	<b>EDM CUTTING</b> 
<p><b>Process:</b> Erosion process using a mixture of high pressure water and garnet (sand)</p>	<p><b>Process:</b> Melting process using a high temperature gas</p>	<p><b>Process:</b> Melting process using a concentrated light beam</p>	<p><b>Process:</b> Erosion process using electrical discharge to erode material</p>
<p><b>Heat Input:</b> None</p>	<p><b>Heat Input:</b> High heat input</p>	<p><b>Heat Input:</b> High heat input</p>	<p><b>Heat Input:</b> High heat input</p>
<p><b>Thermal Damage:</b> No part distortion or thermal damage</p>	<p><b>Thermal Damage:</b> Significant distortion and thermal damage</p>	<p><b>Thermal Damage:</b> Significant distortion and thermal damage</p>	<p><b>Thermal Damage:</b> Significant microscopic thermal damage</p>
<p><b>Material Types:</b> All materials</p>	<p><b>Material Types:</b> Primarily steel, stainless steel, and aluminum</p>	<p><b>Material Types:</b> Primarily steel, stainless steel, aluminum</p>	<p><b>Material Types:</b> Only conductive material</p>
<p><b>Material Thickness:</b> &lt;11"</p>	<p><b>Material Thickness:</b> &lt;2-3"</p>	<p><b>Material Thickness:</b> &lt;1"</p>	<p><b>Material Thickness:</b> &lt;12"</p>
<p><b>Part Accuracy:</b> .001"</p>	<p><b>Part Accuracy:</b> .010"</p>	<p><b>Part Accuracy:</b> .001"</p>	<p><b>Part Accuracy:</b> .001"</p>
<p><b>Edge Cleanup:</b> None, part can be used as-is after cutting</p>	<p><b>Edge Cleanup:</b> Heavy deburring and slag removal required</p>	<p><b>Edge Cleanup:</b> Heavy deburring and slag removal required</p>	<p><b>Edge Cleanup:</b> Recast layer removal required by most aerospace customers</p>
			

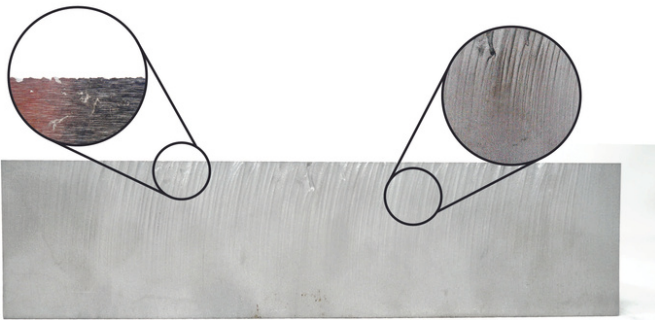




# EDGE FINISH

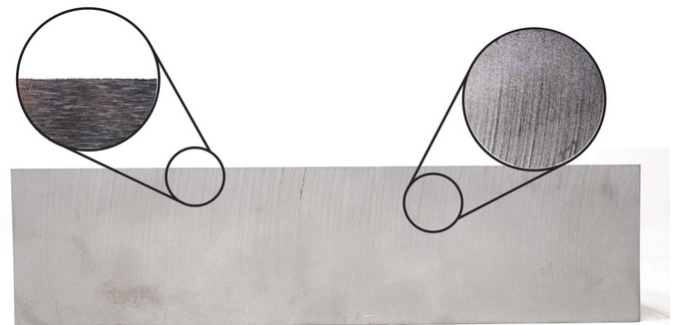
INTELLIGENT CUTTING SOLUTIONS

Intelligent Cutting Solutions (ICS) offers four levels of surface finish so you can get exactly what you need. Each finish is associated with a specific cutting speed, the smoother the surface finish the longer the cutting time.



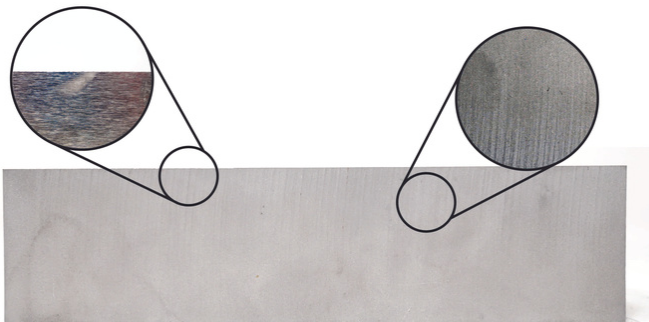
## 80% FINISH

The fastest cutting speed has an 80% resulting finished edge. This typically has very visible lines called striations. This is best suited for an application where the edge quality is not important or it will be machined after.



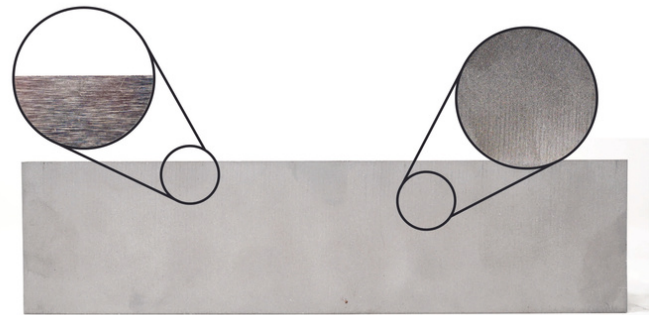
## 60% FINISH

60% is a medium-rough cut. The striations are not as noticeable as the 80% finish, and the pieces take a bit longer to be cut on the machines.



## 40% FINISH

40% is a decent finish and is achieved by slowing down the travel speed of the waterjet stream. This is our standard cut and is most often chosen by our customers.



## 20% FINISH

20% is a very high quality finish and is also the most accurate with a tolerance range of +/- .003". This finish operates on the slowest cutting speed.

## DESIGN TIPS

- Plan on a tolerance of .005"
- Minimum inside corner radius: .020"
- Minimum holes diameter of .100"
- Max material thickness (link to chart)
- Max sheet size: 10' x 13' (the size of our tables)
- Minimum slot cut width: .030"



# 5-AXIS CUTTING

INTELLIGENT CUTTING SOLUTIONS

Intelligent Cutting Solutions (ICS) uses state-of-the-art Flow waterjet machines that have the fastest cutting speeds and highest accuracy in the industry. The Mach 500 machines used at ICS Feature Dynamic XD™ cutting head technology that can cut bevels up to 60°. This allows us to cut complex 3D shapes. The cutting head wrist articulation has a motion capability of up to 89°.

SOFTWARE	WRIST ARTICULATION	VERTICAL TRAVEL
<b>FlowXpert Software</b>	<b>Mach 500</b> Up to 89° of motion	<b>Mach 500</b> 12 in [305 mm]

## CUTTING DYNAMIC WATERJET XD

Faster, More Accurate Bevel and 3D Cutting Dynamic Waterjet XD

### ACTIVE TOLERANCE CONTROL

Automatically compensates for part cutting errors of stream lag and taper that are inherent in all waterjet cutting. Powered by mathematical models, Dynamic Waterjet cuts parts faster and more accurately than with a standard, non-Dynamic waterjet.

### ACCURATE BEVEL AND 3D CUTTING

Brings the speed and accuracy of traditional waterjet cutting heads, (compensating for stream lag and taper) to bevel and 3D part cutting.

### FLEXIBILITY & VERSATILITY

Used in both underwater or above water operation, and pure or abrasive waterjet cutting.





# MATERIALS

INTELLIGENT CUTTING SOLUTIONS

Waterjet cutting technology is one of the fastest growing major machine tool processes in the world due to its versatility, our Flow waterjet machines are capable of cutting a wide range of materials in varying thicknesses. Abrasive waterjets can cut material from 1/16 inch to over 10 inches thick.



## METALS

ICS can seamlessly cut all metals including Inconel, titanium, aluminum, stainless steel, and 4130.



## STONE & TILE

ICS' versatile waterjet systems allow for a wide variety of applications when it comes to stone, tile and ceramic.



## GLASS

ICS has UltraPierce technology which allows us to properly dwell at the pierce point when introducing the stream hole without cracking.



## RUBBER, PLASTICS & FOAM

Flow Waterjet machines can produce a very narrow water stream, which is needed to achieve the cleanest of cuts on your materials.



## COMPOSITES

Composites typically cut by ICS include fiberglass, graphite, carbon fiber, reinforced plastics, and composite foam.



## THICK MATERIALS

The greatest advantages of this equipment is it's ability to cut many materials up to 11" in thickness.



## PRECISION CUTTING

ICS' machines are able to achieve beveled cuts due to our cutting edge technology. Our cutting head can articulate up to a 60 degree bevel.



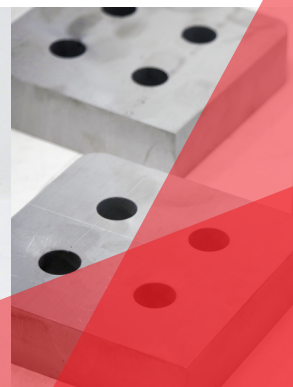
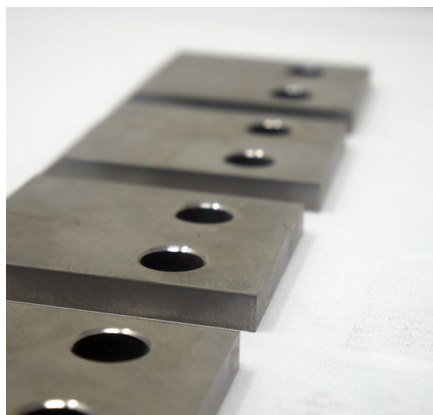
## STACKED & LAMINATED

ICS can optimize output by cutting several inches of material in one pass. Laminated material can also be cut multiple layers at a time.



## BEVELED CUTTING

ICS' machines are able to achieve beveled cuts due to our cutting edge technology. Our cutting head can articulate up to a 60 degree bevel.



# PRECISION CUTTING

INTELLIGENT CUTTING SOLUTIONS

Intelligent Cutting Solutions (ICS) offers precision waterjet cutting services that offer tight tolerance capabilities for most materials. Some of the most common tight tolerance requirements come from the aerospace and defense industries.

## WIDTH OF CUT

ICS exclusively uses Flow waterjet machines, which are known for their accuracy and minimal kerfs. This minimal kerf (.30"-.40"), is a result of the narrow stream. With such a precise range, ICS is able to maximize your material usage, reduce scrap, and save you money.

## MACHINE ACCURACY

- Linear straightness accuracy: +/- .0381 mm/m [+/- .0015 in/3ft]
- Repeatability: +/- .025mm [+/- .001 in]
- Ballbar circularity: +/- .0635mm [+/- .0025 in]

## CUTTING AXES AVAILABLE

ICS's machines are capable of cutting 2-axis, 3-axis, and 5-axis.

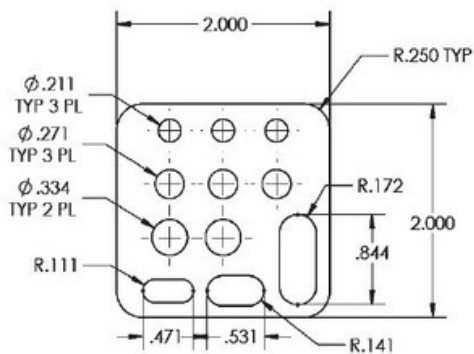
## LENGTH OF CUT

10' X 14'

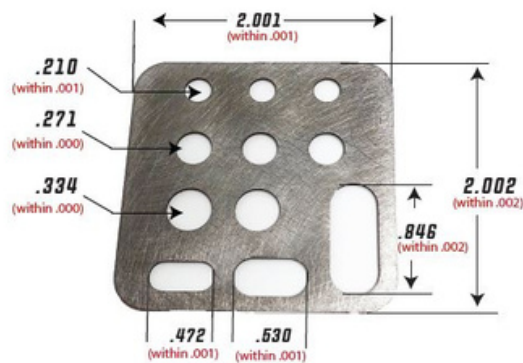
## EDGE QUALITY

ICS's waterjet cutting services provides you with the best edge quality, because the process does not introduce any heat or mechanical stress. In many cases, the edge finish can be used as is without the need for any removal or finishing.

(DIMENSIONS FROM DRAWING)



(ACTUAL RESULTS)



Base Material: .40" Thick Grade 5 Titanium Q5 Quality (Holds the best tolerances at the slowest cutting speed for accuracy) Typical example of the accuracy when using our state-of-art Waterjet Machines.







# THICK MATERIALS

INTELLIGENT CUTTING SOLUTIONS

One of the greatest advantages of working with Intelligent Cutting Solutions (ICS) is that the state-of-the-art equipment utilized can cut varying materials up to 11" thick. Very tight tolerances can be held when cutting anything under 4" thick. Materials over 4" in thickness still produce precise cuts, but the tolerances will have to be opened up to near net shape.

## MATERIAL THICKNESS

The chart below lists some of the materials the machines are capable of cutting, as well as their corresponding max thickness measurements.

Material type	Thickness
Mild Steel	10"
Aluminum	11"
Titanium	9"
Hastalloy	9"
Tool steel	9"
Rubber	10"
Glass	6"

## PART TOLERANCE

The chart below lists the tolerances that can be held with varying material thickness.

Material thickness range	Tolerance range
.062-.250"	.003-.005
.250-.500"	.005-.007
.500-1.00"	.007-.010
1.00-3.00"	.010-.025
3.00-10.00"	Plan on near net shape





# METALS & ALLOYS

INTELLIGENT CUTTING SOLUTIONS

Virtually any metal can be cut in the abrasive waterjet cutting process. Whether you are cutting mild steel for a structural application or an 8" thick titanium blank for an aerospace component, ICS's abrasive waterjet services can handle your job.

The abrasive waterjet cutting of aerospace alloys is ICS's most common process. Some of the frequently used material requests received include:



## STEEL

As with many other metals, steel comes in a large variety of qualities. Mild steel, the typical go-to choice for many fabricators, welders, and machinists. The waterjets can accommodate up to 10" in thickness.



## TITANIUM

Titanium is a material which is high-strength, low-corrosion, and light-weight. Titanium is often used in prosthetic devices and in the aerospace/aviation industry. The waterjets can accommodate titanium up to 9" in thickness.



## ALUMINUM

Components comprised of Aluminum have become increasingly popular in the aerospace industry. These alloys can also be seen quite often in the automotive industry. The waterjets can accommodate aluminum up to 11" in thickness.



## BRASS

Brass is a metal alloy that is made with a combination of copper and zinc. This alloy is often seen in decorative and mechanical applications. The waterjets can accommodate brass up to 9"



## STAINLESS STEEL

Stainless steel is a family of iron-based alloys with a composition that makes it both heat and rust resistant. The waterjets can accommodate up to 10" in thickness.



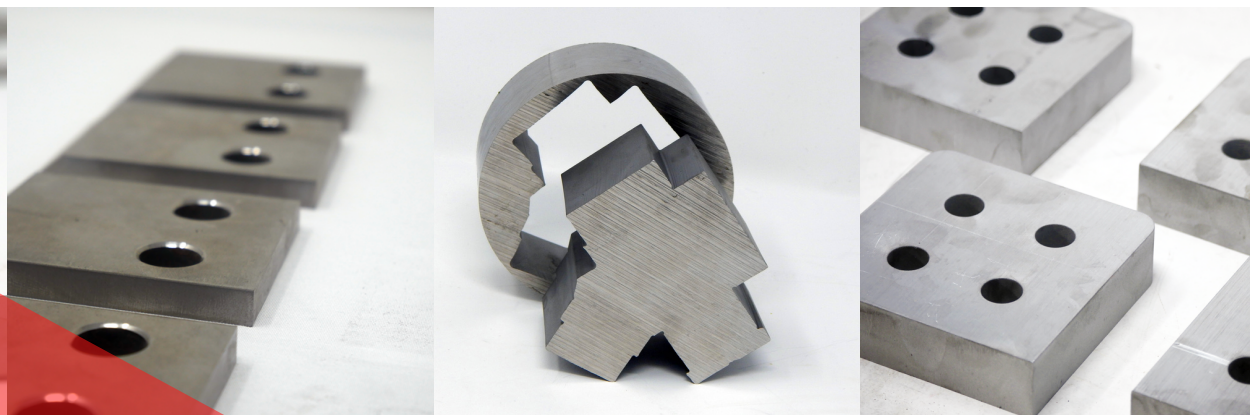
## COPPER

Copper is used in lots of different applications across various industries but is often seen in architectural work and signage. The waterjets can accommodate copper up to 9" in thickness.



## INCONEL

Inconel is a nickel-chromium based alloy. It is corrosion resistant and ideal for use in extreme environments, such as those of high heat and pressure. The waterjets can accommodate Inconel up to 10" in thickness.







# RUBBER, PLASTIC & FOAM

INTELLIGENT CUTTING SOLUTIONS

The Flow waterjet machines ICS uses are capable of cutting paper, plastic, rubber, and foam. At ICS, the most commonly seen materials in this category include rubber, glass, reinforced plastic, and composite foams. Since we use the latest waterjet technology, we can produce a very narrow water stream with extremely clean cuts.

Waterjet cutting is often used in cutting plastics for custom signage features, lettering and, logos. This technology allows for intricate details to be cut. These types of cuts typically can't be completed using traditional cutting methods. This expands the design limits currently set by cutting methods such as laser, plasma, and wire EDM.



## RUBBER

A versatile, all-purpose material that is used in many different industries. A material that is known for being flexible in terms of its mechanical properties and in regards to its chemical properties. All varieties of rubber are compatible with waterjet cutting.



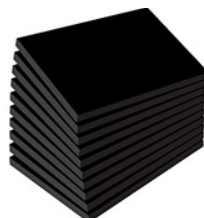
## FOAM

Foam is generally highlighted for its high strength to weight ratio and is often used for its thermal insulation properties. The more gas present in the foam and the lower the density the less strong the foam will be.



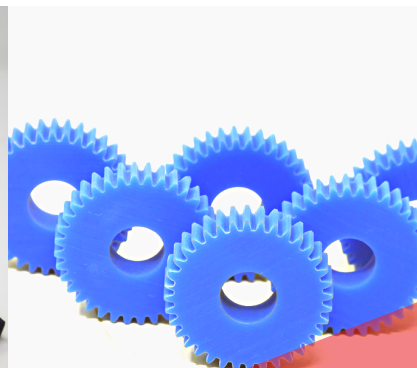
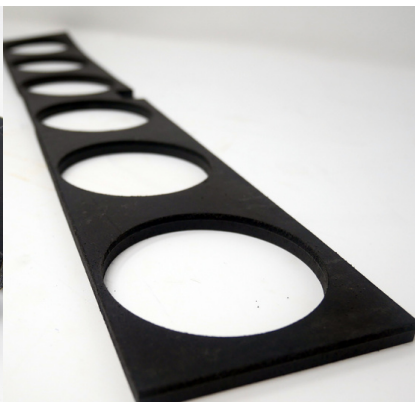
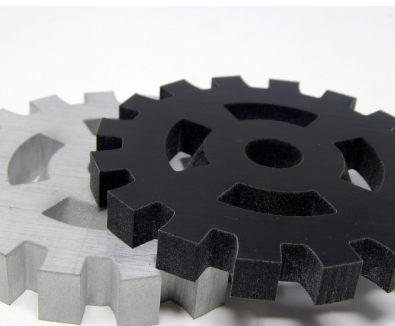
## ACRYLIC

A plastic material that is known for its incredible strength, and stiffness. This material is often used for aesthetic purposes due to its durability and superior attractiveness. Much lighter in weight and more resilient than its clear counterpart, glass.



## PVC

Polyvinyl Chloride (also known as PVC) has become the third most widely produced polymer of plastic. PVC has high hardness and mechanical properties and has good electrical insulation.





# OTHER MATERIALS

INTELLIGENT CUTTING SOLUTIONS

## GLASS

Cutting glass is no problem with Flow Waterjet machines. ICS has UltraPierce technology, which allows proper dwelling at the pierce point when introducing the stream hole so there is no cracking.

## LAMINATED & STACKED

ICS can optimize output by cutting several inches of material in one pass. Laminated material can also be cut multiple layers at a time.

## STONE & TILE

ICS also offers abrasive cutting of stone and tile. The machines used operates at high speeds without causing breakage.

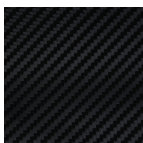
## COMPOSITES

ICS has the ability to process composite materials, the most common being graphite, carbon fiber, fiberglass, reinforced plastic, and composite foams. ICS's technology produces a very narrow water stream that has a low impact on composites which eliminates delamination, whiskering, and cracking.



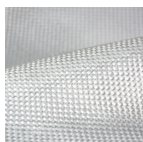
### G10

Components comprised of Aluminum have become increasingly popular in the aerospace industry. These alloys are seen quite often in the automotive industry. The waterjets can accommodate aluminum up to 11" in thickness.



### CARBON FIBER REINFORCED POLYMER (CFRP)

This fibrous composite material is extremely strong and light-weight. CFRP is often used in industries such as aerospace, because of its high strength-to-weight ratio.



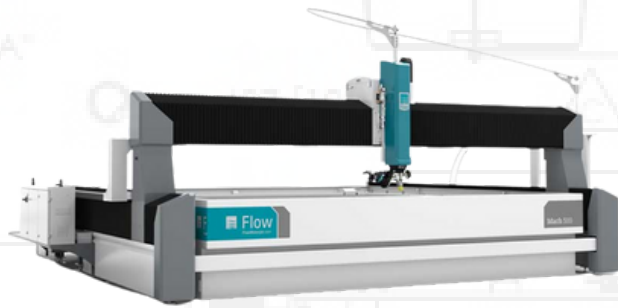
### GLASS FIBER REINFORCED POLYMER (GFRP)

This low-cost composite is made from glass fibers and is often seen in the architecture industry. This composite has a medium weight and a medium density.



# OUR TECHNOLOGY

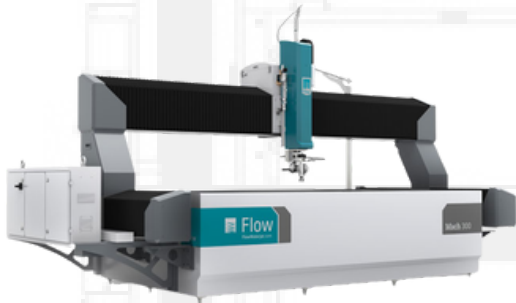
FACILITY & STATE-OF-THE-ART EQUIPMENT



## MACH 500

Our Mach 500 is Flow's most robust waterjet solution, unmatched in technology and design.

Dynamic XD™ cutting head: 5-axis cutting head technology that can cut bevels up to 60°. This allows ICS to cut complex 3D shapes. The cutting head wrist articulation has a motion capability of up to 89°.



## MACH 300

A system that was designed to deliver reliable performance that ICS can depend on. This waterjet solution is efficient and practical.

Dynamic cutting head: Dynamic waterjet cutting head with active tolerance control to produce more accurate parts at significantly higher cutting speeds



## HYPERJET® 94I-S INTENSIFIER PUMP

Delivers 94,000 PSI which almost doubles the cutting speed from most conventional waterjet pump systems.

## MOTO JET 60,000 PSI INTENSIFIER PUMP

Delivers 640,000 PSI and was built for dependability in tough industrial cutting applications.

INTELLIGENT CUTTING SOLUTION'S

## FACILITY FEATURES

### Humidity Controlled Storage

ICS's garnet storage system is humidity controlled to keep garnet dry at all times. ICS always has a 6 month supply of garnet in stock to prevent supply chain disruption.

### Spare Parts Inventory

ICS always keeps spare parts and backup pumps in stock to eliminate down time in the event that a machine requires maintenance.

# QUALITY & INSPECTION PROCESS

INTELLIGENT CUTTING SOLUTIONS

## QUALITY DRIVEN INSPECTION PROCESS

# FULL VISUAL & DIMENSIONAL INSPECTIONS

### Our Approach to Quality

Every job that comes into ICS receives a first-piece inspection to ensure the part is dimensionally accurate before the remaining quantities go through production. When any first article inspections are performed, the ICS team follows the AS9100 format, and the resulting records are documented and retained as necessary.

ICS conducts a 100% visual inspection and sample dimensional inspection for all jobs following the full production run. Dimensional inspection reports are available to all customers upon request.

## INSPECTION & MEASUREMENT TOOLS

# VIRTEK LASERQC

### Identify Quality Issues Quickly

ICS's Virtek LaserQC was designed for the manufacturing environment. This technology verifies system calibration before each scan to ensure repeatable accuracy. ICS's Virtek LaserQC pinpoints errors immediately which reduces scrap and rework efforts.

### Taking Quality to the Next Level

ICS's Virtek LaserQC captures more than 500 data points per second and quickly performs 100% inspections accurate to  $\pm 0.002"$  (0.05mm) for 2D measurements and  $\pm 0.010"$  (0.25mm) for formed measurements. The systems frequent quality control reports help to instill confidence in our customers.



## SYSTEM SPECIFICATIONS

### LaserQC® 1200 System Specifications

#### Scanning Accuracy

- $\pm 0.05\text{mm}$  (0.002") (2D only)  $\pm 0.25\text{mm}$  (0.010") for height measurement

#### Maximum Part Thickness

- 200mm (8.0") for 2D, 305mm (12.0") for AFM

#### Calibration

- Automated

#### Maximum Scan Zone (single scan)

- 1220mm x 1220mm (48" x 48")

#### Oversized Parts

- Capable with merged scan feature

#### Overall Dimensions (LxWxH)

- 2007mm x 1651mm x 2440mm (79" x 65" x 96")

#### Laser Class:

- Class II, meeting the 21CFR 1040 standard for CDRH certification in North America
- Class 2, meeting the 60825-1:2014 (3rd Ed.), standard for CE certification in Europe





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