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Grinding It Out

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March. The dead of winter here in New England. With a little luck we'll make it through to spring... March is also a month set aside to celebrate (at least for a day...) all of us of Irish descent. There's a lot of us Irish-folk here in the New England area. And with us comes the sentiment of L-U-C-K. "The luck of the Irish." You've heard it, whether you have red hair or not...

It's nice, and we use it to our advantage from time to time, but when it comes to the manufacturing industry, luck doesn't have much to do with the precision that is needed to complete each and every job, now does it? There's little to no room for error, and chance need not apply.

That said, if you happen to be looking for a contract manufacturing partner to help you with a piece of your job, luck has found you. The partner you've been looking for likely resides in the pages you hold in your hands. If you're a contract manufacturer looking to broaden your outreach, luck has also found you. It's a double rainbow... Reach out to us with the news as it's happening on your shop floor and under your facility's roof. We can't tell your audience what's happening if we don't know. So, with a little luck, we hope that you'll read this, and that you'll indeed get in touch. Let's move the industry forward and get working on the job ahead. We're the resource you need to find that pot of gold you've long been on the search for.

Until next time, best of luck!



March 2020

# THE Gateway MAGAZINE

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## GRINDING AND HONING FOR OVER 30 YEARS



## BAY STATE MACHINE

GRINDING & HONING

Bay State Machine has specialized in grinding and honing for over 30 years now. And while 30 years seems like a lot, there's still a youthful excitement that runs rampant at Bay State Machine – in many ways, they're just getting started and treat every job like an opportunity to move their piece of the industry forward.

Robert Stafford founded Bay State Machine in 1989 after working for a machine shop in Coventry, RI for 15 years. He had a desire to start his own business and shape the way it worked, so, he took the first step and bought out a dormant tool and cutter grinding shop just to get a couple grinders and some assorted equipment under his guise.

He started with no customer base and has built the business into a solid small operation that is a trusted partner with an extremely loyal following.

### INDUSTRIES SERVED:

- *Aerospace*
- *Machine builders*
- *Military*
- *Technology*
- *Anyone with a grinding need!*

Bay State Machine takes great pride in the “family” environment they've built amongst their internal workforce which boasts an exceptionally high retention rate. Their full-time pool of 8 employees have an average of 12 years of service to the company, while the longest tenured operator has been there since the company's inception back in '89. With a shop full of state-of-the-art equipment, and restless attention to training detail, they provide high precision accuracy on parts and hold tolerances as close as .0002”. They can provide tight concentricity, shoulder requirements, and superb surface finishes on a single part or 5,000 pieces.

EQUIPMENT LIST INCLUDES:

- ***Cylindrical grinders***
- ***ID grinders***
- ***Tool grinders***
- ***Surface grinders***
- ***Honing machines***
- ***Inspection tools and technology***

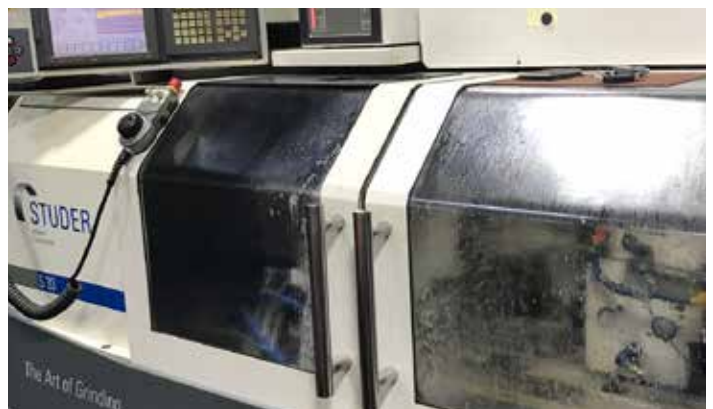
Robert handles the quoting on new prospective jobs and works with the customer to achieve the most efficient grinding process. When a job arrives from a customer, a quality inspection is performed to make certain the part is to print specifications. If it agrees with the print in hand, a detailed list of each step is set up on a job traveler that each employee uses with the print to carry out the detailed operative steps.

Following the inspection phase, a job then reaches the operator which controls the quality of the output, with a final inspection being held prior to shipping, which ensures that the job is met to the high standard Bay State works tirelessly to achieve. If an operator sees a deviation from the print tolerances, they immediately know they need to stop and resolve any discrepancy before moving forward. They have a very well equipped quality control room to further help them inspect size.

Their capabilities include the operation of 9 cylindrical grinders handling up to 14" OD up to 80" long, 5 ID grinders, 5 surface grinders, 2 honing, and 1 power stroke honing machine(s). They have several OD CNC equipped grinders, and their latest acquisition is a Studer S-33 automatic grinder with the capability of handling up to 26" on center.

(CONTINUED ON PAGE 6)

BAY STATE FULL-TIME POOL OF  
8 EMPLOYEES HAVE AN AVERAGE  
OF 12+ YEARS OF SERVICE TO  
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Bay State Machine does offer pickup and delivery with a 75-mile radius, but will go beyond that for special needs. By-and-large, they're in the business of making thing easy for their pool of customers and will go above and beyond to ensure the satisfaction of every client they're working for – from the quoting phase on up through production and delivery.

The company does grinding work for a multitude of customers that may not have the capacity or bandwidth to handle the job themselves. This customer pool includes:

- ***Manufacturers***
- ***Machine shops***
- ***Tool and die shops***
- ***Mold shops***
- ***Production facilities***
- ***And many more...***

Bay State Machine desires to work closely with their customers to produce nothing but Grade A, top-quality parts at a competitive price, delivered on time with a smile. This direct line of communication ensures that nothing about a job gets “lost in translation.”



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## COMPANY SHOWCASE: BAY STATE MACHINE



The reason for their success is in the notion that Bay State understands the cost associated with customer parts, and their employees are very well trained on the latest and greatest industry best practices. Their team treats each job and each customer with a top priority degree of respect. They are all business and ready to handle the next project with care while delivering “peace-of-mind” to the customer in process and performance. They recognize they are likely performing the very last step of a part and that the particular part in their shop is likely needed in a hurry to meet a stringent production schedule. Thus, they understand how to produce effectively and efficiently to make sure nothing gets held up and put to chance.

### Words to Work By (Bay State Machine’s Mission):

- *Quality*
- *Experience*
- *Efficiency*
- *Precision*
- *Quick Turn Around*
- *Dependability*

(CONTINUED ON PAGE 10)



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## COMPANY SHOWCASE: BAY STATE MACHINE



In short, Bay State Machine acts as a direct business partner to their customer and care relentlessly about the parts entrusted into their hands and want to ensure that the final product – whatever it may be and wherever it comes to culmination – is accomplished with no compromise whatsoever from any possible vantagepoint.

You could take a look and make the claim that the work Bay State Machine is doing is a grind, and you'd be right – it is! But boy do they love what they do... And if you're in the market, you'll love the work they produce (for you!) as well.

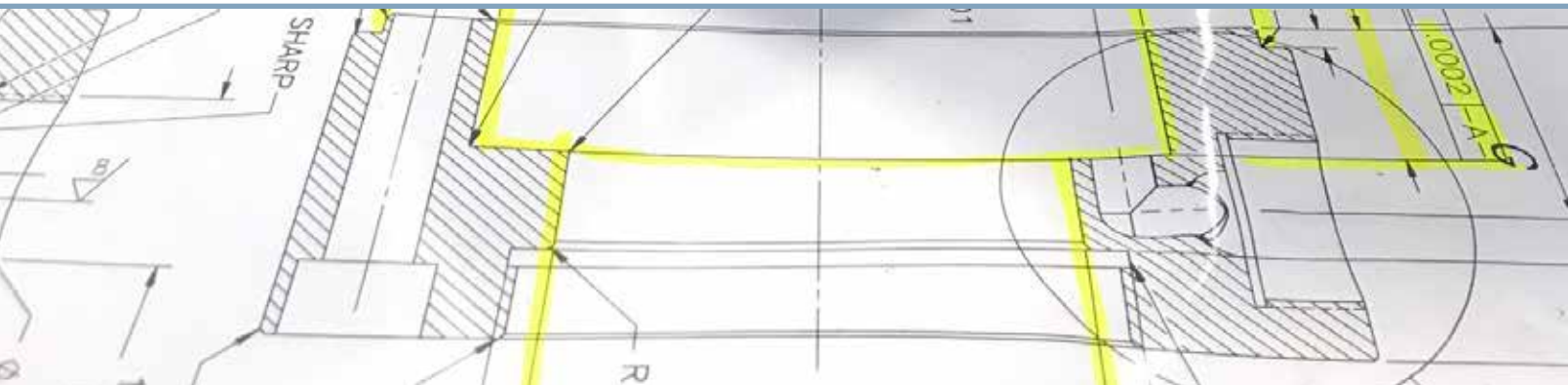


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## GRINDING IT OUT – UNDERSTAND ALL YOUR (GRINDING) OPTIONS TO GET THE JOB ACROSS THE FINISH LINE

**There are so many different types of grinding as it relates to the manufacturing industry.**

So many... You've likely heard myriad terms associated with grinding in the daily conversations you have on the shop floor, in the boardroom, or out in the field with customers, vendors, and your competition. The advancement in grinding since the turn of the century has improved greatly and fits in to many different applications that exist throughout the manufacturing process – from inception on through finished product. Grinding is an essential part of the industry, and thus, we thought it would be helpful to put together a piece that discusses some of the more common applications/types that exist in today's manufacturing landscape – while placing a strong focus on the finishing stage and putting the wraps on the task at hand.

Let's start with the obvious question (in the event you're new to the manufacturing world...)

***What is “grinding”?***

By-and-large, grinding is, at its core, a material removal process. It's two main functions as it pertains to manufacturing operations is, most commonly, as a finishing process – giving a piece and/or part its final shape and texture. The other, is its function of sharpening cutting edges of applicable tools in the shop environment, be they mechanical or handheld.

Alright, now that we've got that out of the way, let's get into the different types of grinding that you're likely to be exposed to in the manufacturing industry.

Photo supplied by: Bay State Machine, Plainfield CT

## SURFACE GRINDING

Surface grinding is the process used to produce flat, angular, and irregular surfaces. There exists four basic types of surface grinders in the industry which are:

- **Horizontal spindle/reciprocating table**
- **Horizontal spindle/rotary table**
- **Vertical spindle/reciprocating table**
- **Vertical spindle/rotary table**

## CYLINDRICAL GRINDING

Cylindrical grinding is, as the name suggests, the due process of grinding the outside surfaces of a cylinder which may be:

- **Straight**
- **Tapered**
- **Or contoured**

Cylindrical grinding operations resemble lathe-turning operations.

## CENTERLESS GRINDING

Centerless grinding machines eliminate the need to have center holes to stabilize the task at hand or the use of workholding devices. The process uses abrasive cutting to remove material from the workpiece. There are three main modes of centerless grinding which are:

- **Through-feed**
- **End-feed**
- **In-feed**

## INTERNAL GRINDING

Also known as “ID grinding,” Internal grinding is the process of removing material in a precise manner from an inside diameter of a cylindrical or conical workpiece – used to finish straight, tapered, or formed holes accurately.

## TOOL AND CUTTER GRINDERS

Grinding machines designed to sharpen:

- **Milling cutters**
- **Reamers**
- **Taps**
- **Other machine tool cutters**

## JIG GRINDING

Developed to accurately locate and grind tapered or straight holes with precision.

## THREAD GRINDING MACHINES

Developed to aide in dressing or truing the cutting periphery of the grinding wheel to produce a precise thread form on the manufactured part.

## CREEP-FEED GRINDING

Historically, creep-feed grinding is utilized as an economical solution for specific applications, such as:

- **In-grinding shaped punches**
- **Twist-drill flutes**
- **Various complex super alloy parts**

## HONING

Honing is an abrasive machining process which produces a precision surface on the manufactured metal workpiece by scrubbing an abrasive stone against the object along a controlled path to improve:

- **Geometric form**
- **Surface texture**

(CONTINUED ON PAGE 18)

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## WHY IS ALL THIS IMPORTANT?

We should note that the above is in no way a complete list of the different modes of grinding/finishing. But it's as solid start...

On the surface (no pun intended), it's good to have a well-rounded knowledge of that "goings on" in and around the shop. Grinding is often the last step of the manufacturing process prior to the actual shipping out of finished manufactured pieces and parts. It's important to know the different options that are at your disposal and to partner yourself with a finishing shop that understands the very application you're dealing with (if you're not handling the finishing task internally). Efficiency is the name of the game in manufacturing – especially when the pieces and parts at hand are the working piece of a bigger picture/product.

A snag at the grinding/finishing phase is a major league mistake in the event that a wrong choice leads to the scrapping of an entire order. Think about the negative impact that'll have on the bottom line and future impact of job acquisition. Grinding is no less important than the actual engineering phase.

*The finishing touch is imperative, so arm yourself with the knowledge of the myriad of different ways in which you can accomplish your unique need(s) so you don't find yourself wishing you had at the outset. Because starting over is the type of grind you don't want to find yourself participating in... That'll send your job grinding to a halt. (See what we did there...)*



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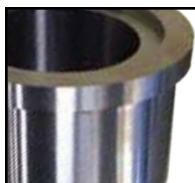


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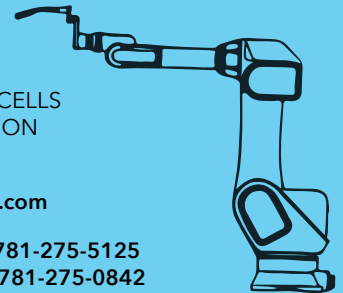
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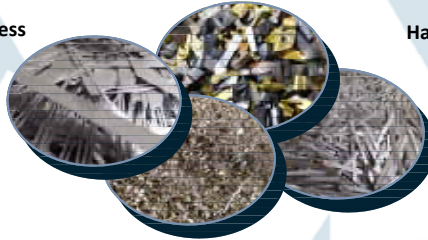
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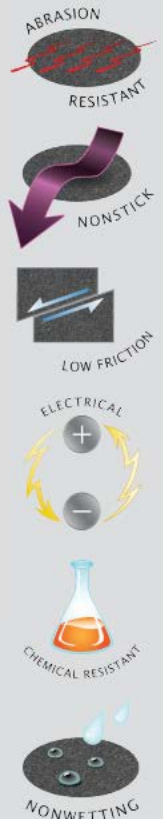
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Design-2-Part Shows provide manufacturing engineers and purchasing personnel the opportunity to meet contract manufacturers face-to-face to source custom parts, components, services, and design.

This show will feature over 250 exhibiting companies showcasing their design-through-manufacturing services in hundreds of product categories for the metal, plastics, rubber and electronics industries. D2P Shows are working shows—attendees are encouraged to bring sample parts and drawings and discover new ways to improve their products.

“There is a lot of excitement for our 2020 shows,” said Jerry Schmidt, President of Design-2-Part Shows. “We are encouraged by the record attendance that our events set in 2019. The increase in visitors and the buzz on the show floors indicates that U.S. manufacturing is experiencing a growth spurt.”

Show hours are 9:00-3:00 on both Wednesday, April 15 and Thursday, April 16.

*For more information about the Design-2-Part Show or to register for free show admission, visit [www.D2P.com](http://www.D2P.com). sive product portfolio, Mitsubishi and Carlson provide the newest in press brakes & laser cutting technology.*



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*March 18: Auburn, MA*

ROBOTIC AUTOMATION FOR MANUFACTURERS  
[massmep.org/event/robotic-automation-for-manufacturers/](http://massmep.org/event/robotic-automation-for-manufacturers/)

*March 26-April 23: Hartford, CT*

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[www.connstep.org/events/qep-spring-2020](http://www.connstep.org/events/qep-spring-2020)

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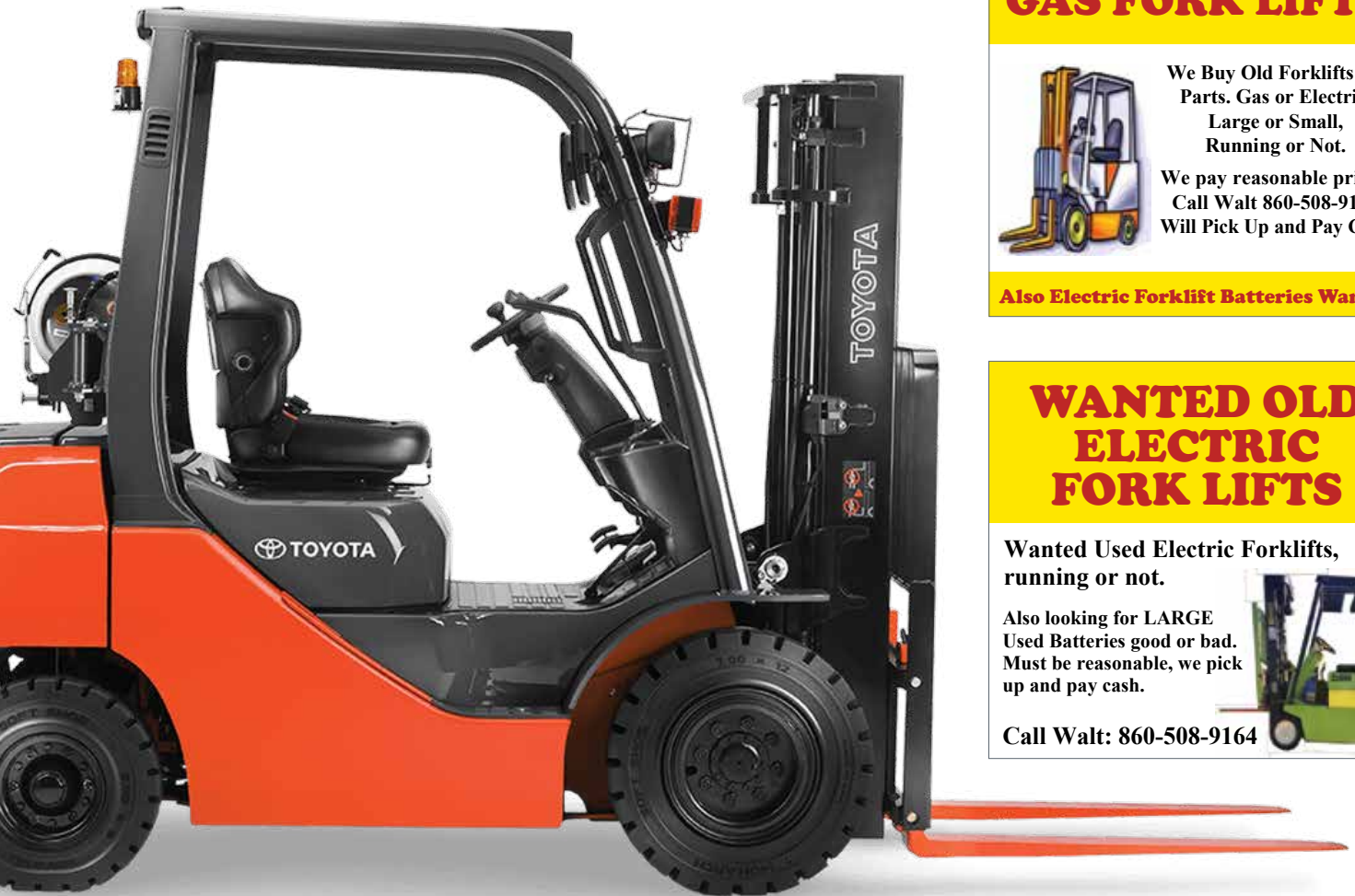
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**Howard Products' role as a precision sheet metal fabrication shop located in Worcester Massachusetts is, often, to provide the customer with a 'finish ready' part.**

For a variety of reasons, including corrosion, surface defects, and 'final look', Howard Products must 'do' something to the surface of the piece. That 'do something' most often involves surface finishing. Recently the company bought a Weber Surface Finisher. This machine, using planetary heads with brushes and grinding belts, not only removes 'burrs' or bits of metal left from shearing/punching operations but also 'sands' the surface preparing it for whatever 'finish' the customer requires, be it paint, or plating, or coating.



*Weber Surface Finisher*

### WHY CHOOSE THIS TYPE OF MACHINE?


This machine combines the flexibility of a 'simple' deburring mode to a more complex surface finisher involving revolving planetary heads. These heads spin over the part as it is carried along on a conveyor belt. As the piece passes under the head, it is deburred. How much or how little material is removed depends upon the metal used, the grinding media, and the machine adjustment.

If simple deburring is needed, the specific metal and its gauge, are loaded into the machine. The speed, pressure and 'grit' are selected. The part is fed onto the conveyor belt with burrs on one end, and comes out the other, burr free.

If a 'surface' finish is required. The surface finish specification is noted from the print along with the part material and gauge. Again, the information is fed into the machine, the appropriate belt installed, the part loaded, and out comes a part ready 'as is', or for paint, plating, or coating.



For Howard Products, the advantage of this machine is its ability to deburr and surface finish concurrently: a time saving plus. Equipped with dust collection, drying capability and safety requirements, it is a 'standalone' alternative to labor intensive 'hand filing' or backstand grinding parts.

**Our THANKS for this submission goes to: Martha Hawley, Howard Products, Inc. 7 Brookfield St., Worcester, MA 508-757-2440**



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