

PETERSEN PRECISION ENGINEERING LIVING AND DYING ON QUALITY



Photos provided by:
Petersen Precision Engineering

General Manager at Petersen Precision Engineering Fred Petersen in front of one of their 10 Kitamura HX250 machining centers at their Redwood City, Ca. location.

Petersen Precision Engineering is a 53-year-old, privately owned company located in Redwood City, Ca. In its infancy, PPE (Petersen Precision Engineering) was primarily a grinding and lapping job shop supporting the emerging data storage industry in the Bay Area. They've been at the same 48,000sq.ft. location since 1972, but recently opened a 10,000sq.ft. satellite manufacturing facility in nearby Roseville, Ca. to keep up with the current growth demand.

PPE developed over the years from a high precision grinding and lapping job shop into a prime destination for the medical, aerospace, and defense sectors. In the 1980's they began expanding their technology into CNC machining and never stopped. Today's PPE is more advanced, more efficient and producing amazing parts without letting go of 53 years of standards and traditions.

"We never lost sight of the processes and skillsets that this company was built from," tells PPE general manager Fred Petersen. "Grinding and lapping are still an essential segment of what we manufacture, but the scope of services has vastly expanded since my father started the company. All our work is based around tight tolerance fine blanking, fine grinding, lapping, wire EDM, all combined with CNC machining and the ability to perform all those things under one roof for very intricate parts. Fine blanking, if you are not familiar with it, is a specialized type of stamping in heavier materials, requiring less secondary machining. It uses counter pressure to extrude the material as opposed to just shearing it, resulting in a high-quality edge with virtually no die break. We maintain a fully staffed tool and die shop designing, fabricating, and maintaining all our fine blank dies and CNC tooling in house. Blanchard

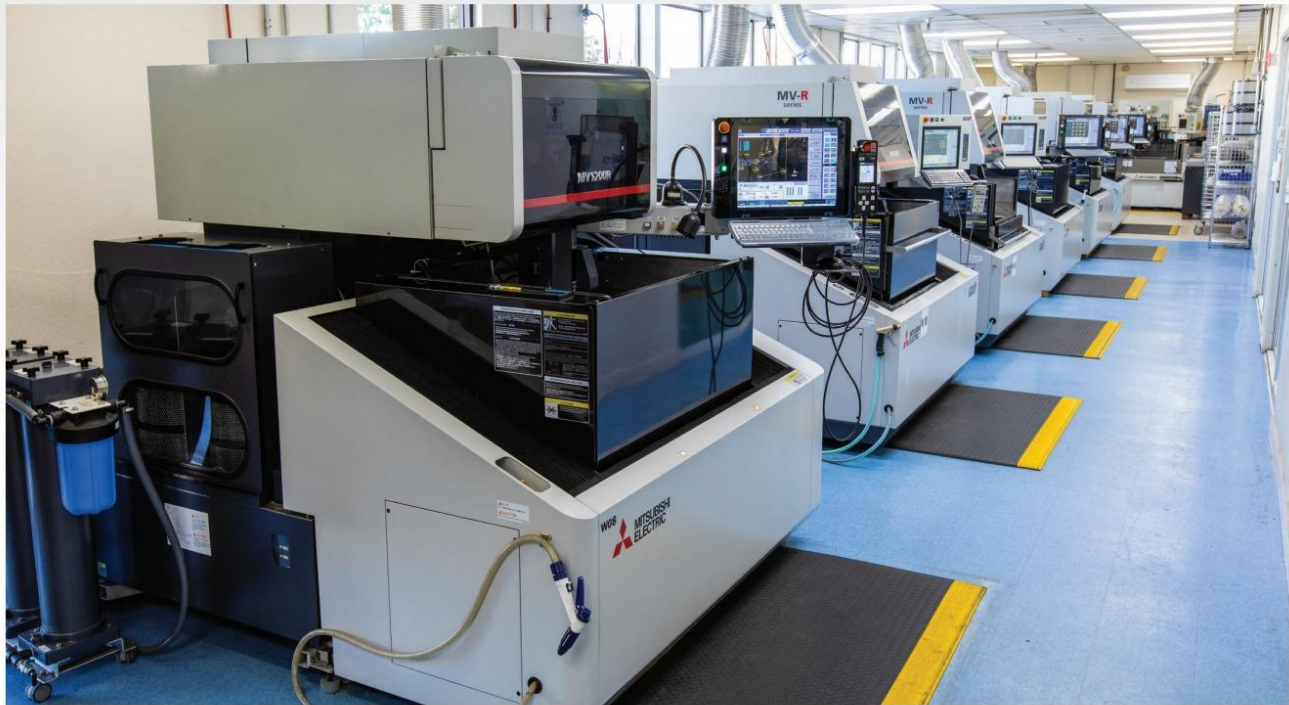


PPE's new 10,000sq.ft. manufacturing center has 10 Kitamura HX-250 mills, a 2Xi Spark changer, a Mazak mill, a Mazak lathe and support equipment.

grinding, surface grinding, centerless / OD grinding, creep feed grinding, and double disk grinding are our bread and butter for not only our own parts but for other local companies that need those outside processes. When you add in CNC turning centers, Star Swiss screw machines, and 4 axis milling, we pretty much have everything covered in-house." Their aerospace customers like the confidentiality and security that goes along with a one stop shop and their medical clients appreciate being able to just make a single

call and know everything is handled.

Fred Petersen as the name implies is part of the Petersen in the Petersen Precision Engineering, but his background differs from most involved in a family business. His manufacturing journey started like all the rest when he was big enough to sweep a floor or debur a part. He was three years old when his dad started the company, but he spent most of his career working globally for other companies. "I got my master's in engineering in 1988 and



PPE's EDM department is all Mitsubishi MV1200R wire machines. One of them has a 4th axis that really elevates their abilities.



worked here through then,” tells Fred. “As a young man I took a design engineering job for a global corporation in the magnetic recording heads and disk drive industry. I spent ten years with them in a senior technical role that took me to places like Singapore to retool a factory there and help implement the new at the time ISO standards at one of their manufacturing facilities. After that, I spent 16 years in Santa Barbara working for a privately owned company much like this one. In that company I oversaw engineering, operations, customer service and quality of very high-volume manufacturing of precision hard disk drive and semiconductor components, both in the US and various locations in Asia.”

In 2015 Fred took on his current role as general manager at Petersen Precision Engineering. Even though it isn't a small operation, PPE is still very family oriented. Fred's son and nephew both work at PPE as well nonrelated workers who have spent decades with the company. “Many employees are husband/wives/children/grandchildren,” continues Fred. “One of our CNC operators has worked here for close to 30 years. She, her two daughters, and a granddaughter all run CNC machining centers. We have 150+ employees and that number goes up constantly. It is a busy place, but for 50 plus years this has been a great place to work. People know that there is steady employment, good pay, a great team around them, and that we are making parts that make a difference.”

PPE produces intricate parts with feature-to-feature and profile tolerances of ± 0.0005 " and positional tolerances of ± 0.001 " or better. Grinding and Lapping processes commonly holding flatness, and thickness tolerances measured in millionths of an inch. Between the two locations and three buildings PPE have over fifty CNC machining centers and more on the way. “We started out as a job shop and we maintain a lot of that heritage when it comes to buying machining centers,” tells Fred. “We've always valued flexibility and a quality made machine that will have a long and useful lifespan. We adopted Cincinnati tape machines in the early 80's to compliment the grinding and lapping and to expand the business. Mid-decade we got into true modern style CNC with Matsuura mills and Okuma lathes.” The progression is ongoing, and as PPE's support for medical device OEMs grew so did their need for improving processes. By the early 2000's PPE was diving headfirst into horizontal machining centers. “To compete you couldn't afford to do three or four ops on a vertical mill,” details Fred. “With our Makino A51nx, Mazak PFH-4800 and Kitamura Mycenter HX250iG horizontal mills and their 4th axis we can get a part almost complete, before running a quick finish operation on a vertical mill. Our target is to get as much done in the first pass and minimize the number of, and the complexity of the work holdings. As you know, work holding is often one of the

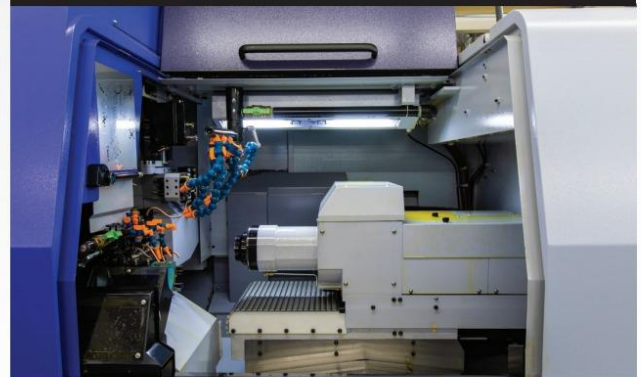
biggest challenges of efficient production. We devote a lot of time into developing the needed precision work holding tooling, thus enabling repeatability of the process to best utilize the capabilities of the machine. We've invested a great deal in new technology over the past few years, but really ramped things up at the end of 2019 and well into the pandemic. Since then, Paul Riley of CNC Solutions has sold us five Kitamura Mycenter HX250iG for this location, and ten more for our new manufacturing location in Roseville. Clancy Machine Tool set us up with an additional four palletized vertical YCM mills, and since 2017 we revamped our EDM department with seven new Mitsubishi MV1200R wire machines, several Star Swiss Screw machines, a Blohm grinder, double disk grinders and a ton of support equipment. The list goes on."

PPE's customer base is split between aerospace/defense parts and medical device components. The majority of medical is manufactured from stainless or a hardened stainless material, while aero/defense lean towards aluminum, titanium, Inconel, cobalt, and other exotic alloys. They are ISO 9001 and AS9100 certified and sell direct to Raytheon, Honeywell and Medtronic. "Arguably the coolest parts we make go into an aerospace sensor with critical features machined on the Kitamuras," touts Fred. "We start with a fine blanked part from an exotic \$200 a pound alloy. We fine blank it, lap it, tumble/debur it a couple times, machine it, heat treat it, then wire EDM another set of features. On the medical side we make a variety of components for electro surgical devices. Those are best be described as a device that clamps, cauterizes, or seals vessels/tissue and cuts the tissue. They need a very precise metal components produced efficiently and economically at the highest of quality levels."

PPE's parts range in size from tip of your pinky finger to the size of your fist. That sweet spot explains all their Kitamura HX250 machining centers. It is the smallest of Kitamura's horizontals with 10" pallets and has the perfect size work envelope for PPE. "Our parts are intricate with 3-5 hour run times for a load of parts" explains Fred. "Loading and unloading is a minor process, so having a multi pallet pool isn't necessary. At any given time, we might have eight machines dedicated to running a single part and another five machines running five different parts. The great thing about having ten of these machines in Redwood City and another ten in Roseville is being able to interchange them as necessary. We have machines that have run the same two parts for 10 years straight. I know accuracy and speed are what the sales guys want to hear you tout about their machines, but honestly there isn't a machining center in here that doesn't deliver in those areas. It is the often less talked about, less sexy features that are worth mentioning. Two of those come to mind on the Kitamura 250s: footprint and power consumption. You get a whole lot of machining



PPE opened primarily as a grinding and lapping shop. Today those core competencies are still in play with proven machines side by side with the latest technology.



SR-38 type B

PPE has five Star Swiss screw machines to handle the needs of their medical and aerospace customers.

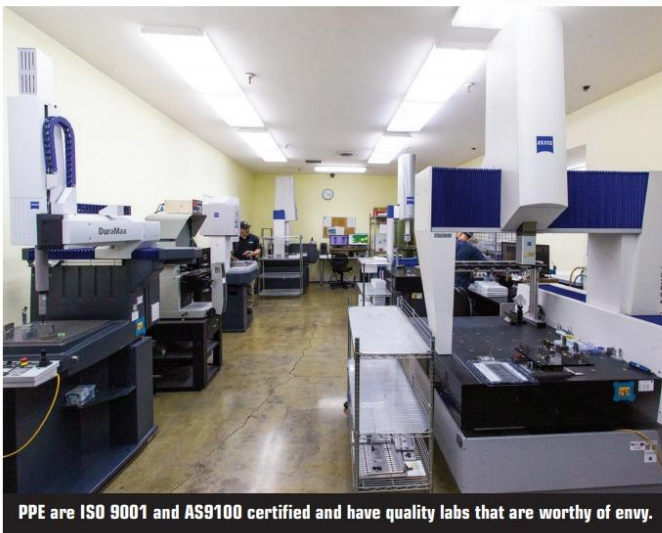


Fine blanking uses counter pressure to extrude the material as opposed to just shearing it. Fine blanked parts require less secondary machining.

pro prowess in a small area. We are packed in tight, and really value the size of the 250s. Because of their size we can have more of them. Because of their size they are also very efficient when it comes to power usage. The accuracy is top tier, and we run them 22 hours a day at maximum RPM, six days a week. Admittedly, we are not doing giant Inconel hog outs, but everything we do machine needs to be precise."

PPE has a separate aspect they call jobbing. "We've kept to our roots and operate as a job shop to the other industry professionals in the Bay Area with our grinding

and lapping departments," tells Fred. "We offer material prep, Blanchard grinding, surface grinding, centerless / OD grinding, double disk grinding, and lapping services on customer supplied parts. You can see living history all over the shop with a mixture of old and new technology. Many of our staff have worked here for decades and the core knowledge in some of these processes is substantial. I've made a conscious effort since coming back to document and garnish as much knowledge as possible throughout all the departments. Writing of work instructions is part of our ISO system, but it's also about detailing 53 years of carnal knowledge. Things that my father developed in the 60s and others after him, pockets of knowledge that few people today know, and few can do. Tribal knowledge is a great thing to talk about and respect, but it can be dangerous because it can go away with people, and you lose process control. My quality background has me seeking out the tribal wisdom and documenting it in an engineering fashion so that it becomes a process. We as a company are process oriented and will to continue down that path. Processes are the key to quality, and we live and die by quality. We can't always compete on price, but we deliver on quality, and customer service. Customers like ours know exactly what they are paying for, and the value added that comes along with partnering with Petersen Precision Engineering.



PPE are ISO 9001 and AS9100 certified and have quality labs that are worthy of envy.