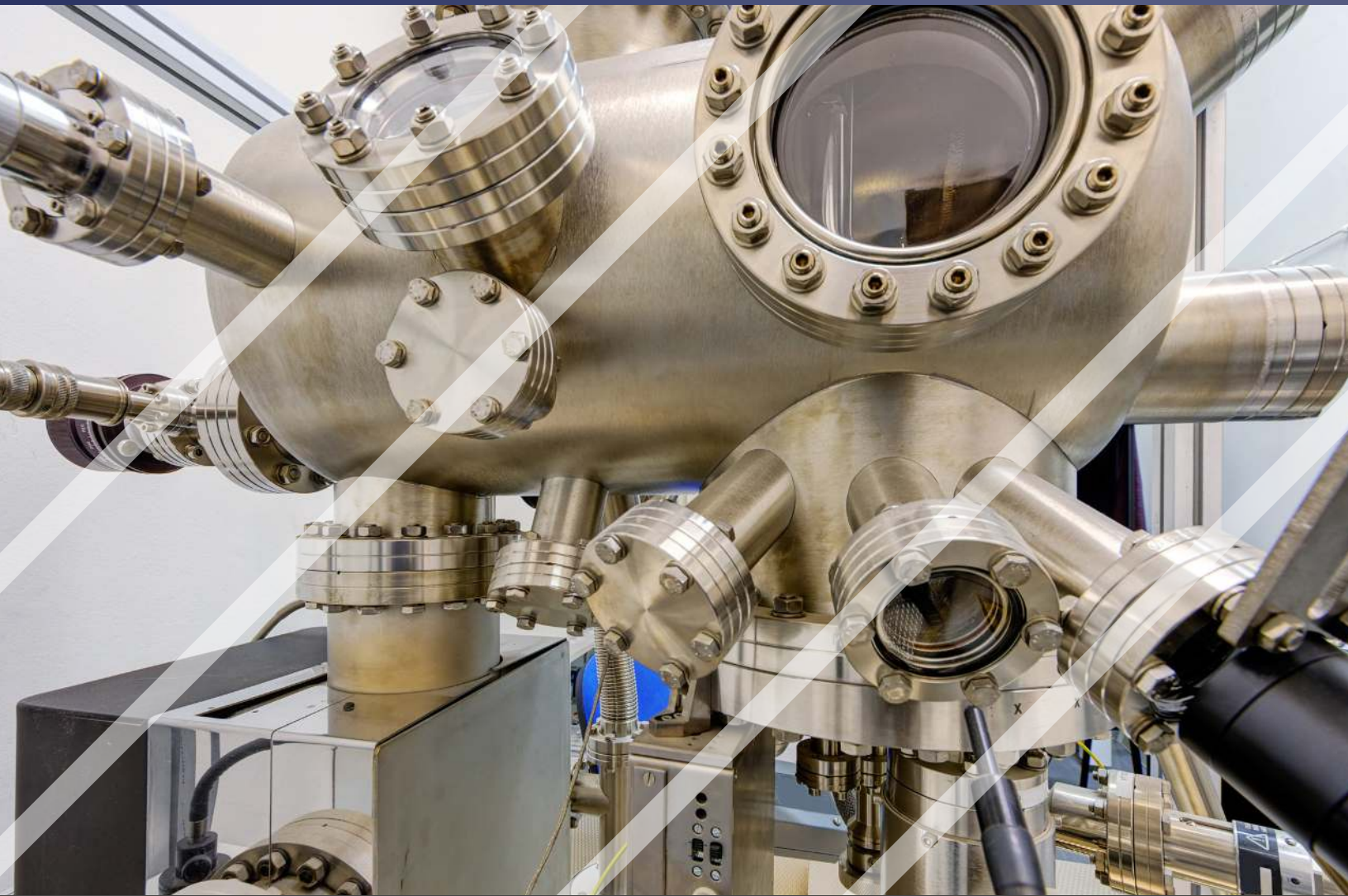




How to Choose the Right Vacuum Chamber



Vacuum chambers are specialized equipment used to build sensitive components like semiconductors as well as to perform vacuum coating. Vacuum chambers also appear in research environments to develop new healthcare strategies and experiment with subatomic particles.

Depending on their end use, vacuum chambers may be made with aluminum, stainless steel or steel and can come in many different sizes and shapes. Customers need to be careful when selecting this equipment to be sure that the chambers serve their intended requirements. This selection guide addresses the key things you need to know before buying and the common pitfalls in the purchase process.

What Are the Key Things Customers Should Know When Buying Vacuum Chambers?

Customers must investigate the following aspects of potential vacuum chamber producers before making a selection:

- **Capabilities of the manufacturer:** You must know whether the manufacturer has the capabilities to make vacuum chambers to your specifications. Do they have the necessary machine tools? Are they able to make chambers of the sizes and vacuum levels you need? Are they a design house or purely a manufacturing outfit? Do they possess the appropriate welding procedures and certifications?
- **Materials and manufacturing processes:** It's important to learn about the materials used to make vacuum chambers as well as the significant processes used to manufacture them. Some of the most prevalently used processes include machining, welding, surface finishing, and plating. Material considerations include: thermal, magnetic, and conductive characteristics; as well as outgassing rate, machinability, and chemical reactivity.
- **Testing and maintenance:** Do you have sufficient expertise in testing vacuum chambers via pump-down and commercial leak testing equipment, such as a helium leak detector; or Residual Gas Analyzer (RGA) when required? Do you have a cleanroom for conducting testing and performing final assembly? Are you able to clean them well on a periodic basis? These skills are necessary to ensure that your chamber is made to specifications and works well throughout its lifetime.

Customers must ensure that the manufacturer has the infrastructure and skills required to deliver a vacuum chamber to customer specifications. Additionally, customers must be able to periodically maintain and test the chambers to ensure good performance.

Common Pitfalls in the Vacuum Chamber Purchase Process

It's important to avoid making the following errors when purchasing your next vacuum chamber:

- **Failure to assess the manufacturer's capabilities:** Four-axis machining is a must-have capability for manufacturers seeking to build vacuum chambers; for more complex chamber geometries, 5-axis machining is advantageous. This equipment maximizes the amount of design choices available and improves productivity. Similarly, you must ensure that the manufacturer can make chambers of the size you desire. Whereas **Keller Technology Corporation (KTC)** builds medium and large chambers, other manufacturers specialize in building small vacuum chambers.
- **Design simulation vs. manufacturing:** Some customers approach the vacuum chamber manufacturer with specific designs that may not be compatible with the latest vacuum chamber techniques. Generally, the manufacturer has the appropriate tooling for the chambers in which they specialize, and it's the customer's goal to find the manufacturer whose tooling is most compatible with their design.





KTC's Strengths in Vacuum Chamber Manufacturing

KTC stands apart from our competitors on many fronts. Many of our competitors build vacuum chambers on a one-off basis with no follow-up afterward. On the other hand, we at KTC specialize in building a higher quantity of vacuum chambers within short turnaround times and nurturing relationships with customers in the process.

Our production capacity allows us to build up to 10 vacuum chambers in a month for each of several customers. This large capacity also gives us the ability to build larger-sized chambers at the same rate and within the same turnaround times. Our equipment is specially designed to handle large and heavy loads, as it includes:

- Large envelope machine tools
- High bays
- Tall cranes

We can build chambers that cover three different levels of vacuum requirements:

- Rough vacuum
- High vacuum
- Ultra-high vacuum

These chambers can be as large as 10 cubic feet in size, or they can be cylindrical with 5-foot diameters and 25-foot lengths.

We can also build highly complex chambers for special orders. Some vacuum chambers we've built have taken intricate shapes; other chambers, aluminum for example, have been machined entirely from a single piece of material.

Our manufacturing facility is outfitted with highly specialized machine tools that not many manufacturers possess, and when required, we can build in advanced controlled environment rooms. We're skilled in the high-level vertical integration of vacuum systems that consist of components such as:

- Chambers
- Pumps
- In-vacuum mechanisms
- Plumbing
- Electromechanics
- Optomechanics
- Radiation and acoustic shielding
- Robotics interfaces
- Controls
- Software

We are a U.S.-based company with a strong reputation for quality products. We have facilities in Buffalo, NY, and Charlotte, NC, and both are **ISO 9001 certified in quality management**.

FAQs from Customers



Some questions we frequently receive from customers include:

Q: How long has KTC been in the business?

A: Keller Technology has been in business for over a century. Starting out as the Duplex Buffing Machine Company in 1918, Keller Technology Corporation has since evolved into a global leader in providing manufacturing and engineering services.

Q: What does KTC specialize in?

A: We build many types of chambers in small and large production volumes. Although we can fulfill one-off orders, our capabilities are uniquely suited to fabricate mid and high-volumes of complex chambers quickly and cost effectively.

Q: What is KTC's production capacity for vacuum chambers?

A: Customer requirements vary considerably; 10 to 150 chambers per year for a given customer is typical. We are continuing to expand our capacity.

Q: Can KTC design vacuum chamber to meet our requirements?

A: KTC does not design vacuum chambers at this point. We routinely review chamber designs for manufacturability, and build them if the designs meet our tooling and machining capabilities.

Q: What are the industries that KTC supplies?

A: We undertake jobs for both research facilities and manufacturing firms. Although the primary industry we serve is semiconductor manufacturing, we also build chambers for:

- Chemical vapor deposition (CVD)
- Physical vapor deposition (PVD)
- X-ray free electron laser facilities (XFELs)
- Ion implantation
- Neutron spallation facilities
- Microscopy
- Proton therapy equipment
- Linear accelerator systems (LINACs)
- Synchrotrons
- Cyclotrons

Q: What materials does KTC work with?

A: We work with aluminum, plated steel, and stainless steel.

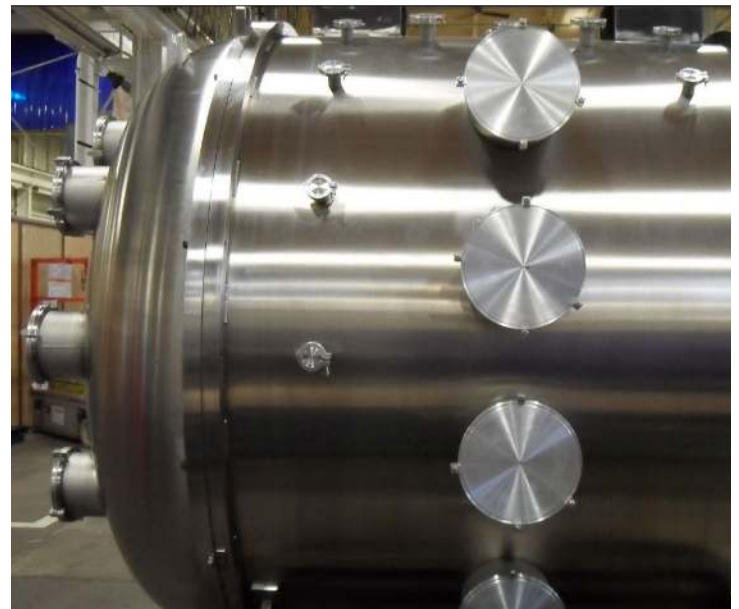
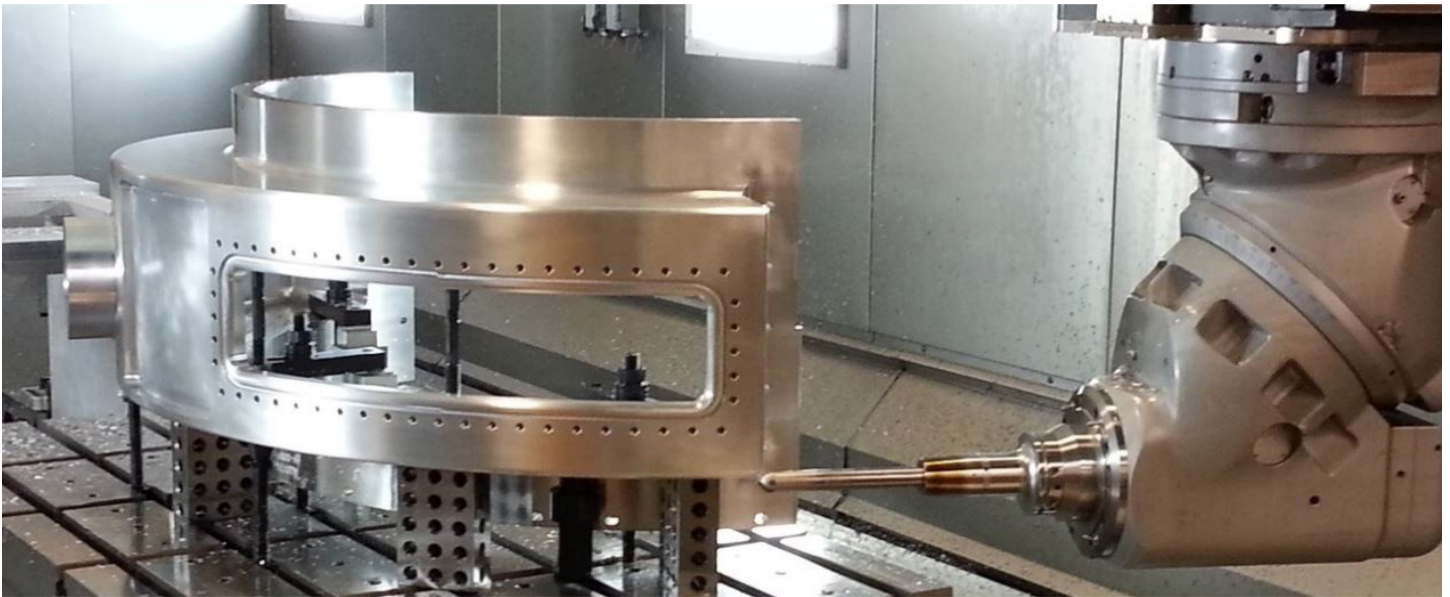
Q: Are KTC's welding shops segregated by the materials they use?

A: Yes. Our steel and stainless steel shops are segregated to avoid cross-contamination.

KTC: Your Source for Quality Vacuum Chambers

KTC specializes in the precise fabrication of production-volume, large form-factor vacuum chambers as well as chambers with complex geometry. We help researchers and semiconductor related manufacturers get the most from their processes.

Contact us with any questions you may have on vacuum chambers.





About Us

Long History Built on Quality Performance

Keller Technology Corporation was founded in 1918 as the Duplex Buffing Machine Company—which offered custom and standardized buffing machines, as well as general machine shop services. The company grew as a general machine job shop servicing the local industries of metropolitan Buffalo, New York, and was renamed J & A Keller Machine Company, Inc.

Over the next 40 years, the company grew both in size and capabilities providing machine assembly building and manufacturing services to customers located throughout the United States. Upon entering the '80s, the name was changed to Keller Technology Corporation to reflect the company's expanding global scope of operations and capabilities.

Presently operating from facilities in Buffalo, New York—Charlotte, North Carolina and affiliates in Seoul, South Korea—Keller Technology offers a range of “Build-to-Print,” “Design & Build” and Contract Manufacturing services for a wide variety of high-technology industries.

Our corporate mission is focused upon total reliability, providing our customers quality performance, value, schedule adherence, and technical compliance.

Keller Technology Corporation remains a family owned and managed corporation with fifth-generation participants, supported by a skilled and talented staff of professionals. Find out how we can help with your manufacturing needs.

CONTACT US



www.kellertechnology.com
sales@kellertechnology.com

Buffalo, NY
2320 Military Road,
Tonawanda, NY 14150