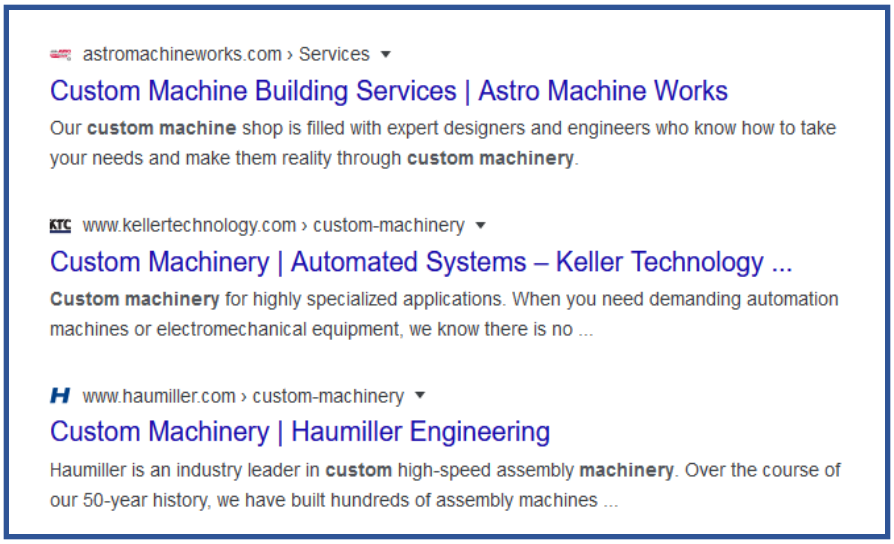
FINDING AND WORKING WITH A CUSTOM MACHINE BUILDER

The success of any custom machinery project will depend on finding, evaluating, and selecting the right machine builder for your specific automation needs. This is a process that must begin with careful forethought and preparation. To support this process, we will guide you through the following steps:

- Where to search for custom machine builders.
- Determining evaluation criteria and deciding on the right questions to ask potential builders.
- How to effectively communicate your requirements, and smooth the design process.

Locating a Specialty Machine Builder

The obvious first step in searching for a custom machine builder is a basic internet query. Begin with a reliable search engine like Google or Bing, and apply a variety of search terms. Some query suggestion might include "Custom Machinery" or "Custom Automation Solutions". A search of this nature will inevitably return a list of paid ads followed by organic search results, and may also include a subset of organic results for online directories (covered below). It's a good idea to review at least the first couple of pages of results; often, paid ads interfere with or bump quality organic results off the initial page of returns. Each search return will have a title followed by a brief description. In these descriptions, you'll notice keywords related to the company's skill sets and core competencies. If your returns are too broad, you can apply some of these core competencies as additional search terms. It can be efficient to single out companies that match your requirements verbatim but don't immediately rule out other machine builders that catch your eye. Some of them may have experience with your type of equipment that isn't reflected in the search return and may also offer other benefits. Compile a list of sites that interest you and take the time to investigate each prospective builder's website in depth.



In addition to search results, online Industrial-Directories are also excellent resources for identifying quality machine builders. Online directories are resources that aggregate information from a broad spectrum of companies and their services on a single website. This can simplify your search process while keeping a tighter funnel of relevant results. Three of the top directories are:

www.ThomasNet.com www.EngNetGlobal.com www.IQSdirectory.com

If neither directories nor search results return a suitable selection of custom machine builders, additional resources worth exploring include trade shows, trade publications, and professional societies specific to your industry.

Regardless of how you choose to identify your prospective candidate pool, make sure to highlight a list of the top five to ten builders before moving to a more in-depth analysis. Having a selection pool will provide important comparative data points related to lead time, capabilities, and other key factors for evaluation.

Evaluating Special Machine Builders

The stakes are high when building custom machinery, so it's critical that you properly vet the companies that have made the initial cut. Whenever possible it's best to employ the following methodologies to obtain detailed information from each manufacturer:

- Website review *be thorough.
- Phone interview *draft a list of questions.
- Facility visit (in-person or virtual) *prepare in advance.

Please bear in mind that most of the work performed by custom machine builders is covered by strict Non-Disclosure Agreements to protect the Intellectual Property of their customers. They may be unable to share an explicit description of project details that are similar to your needs. You can however measure each company against the others with specific considerations in mind. Some of the primary factors you will want to consider are detailed below.

Considerations:

1. Longevity

The custom machinery industry is challenging, and a company that has been in business for a long time has necessarily demonstrated they have the business and technical acumen to succeed. The industry is inherently volatile – work is often feast or famine. It's not uncommon for new machine builders or systems integrators to spring up during a good economy only to fold during the inevitable downturn, taking customer projects with them in the process. Many of these firms simply haven't developed the refined business practices and resilient architecture essential for success. Choosing a well-established machine builder with a long and steady history will help you avoid being subject to the steep learning curve inherent in the custom machinery business or victimized by a fly by night machine builder who didn't anticipate market challenges.

Longevity considerations are also important beyond the company history. The company you select must have seasoned management and ownership. Look at the duration the company has been under its current ownership. Are ownership and top management engaged and accessible to customers? Some machine builders are owned by large private equity firms or are part of larger industrial conglomerates. In these situations, ownership is entirely removed from day to day operations and customer relations. Longevity can also speak to the financial stability and solvency of a company; more on that later.

2. Organization

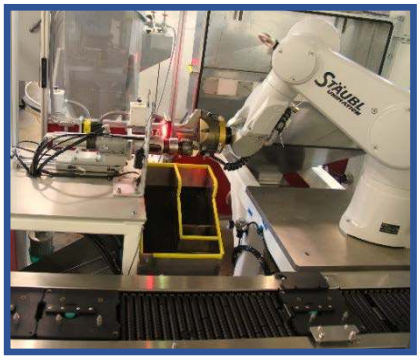
It's important to research the organization of prospective suppliers. Though not immediately apparent, how a business is structured may significantly impact your project. While all machine builders are seeking to earn a profit, privately owned firms are not subject to Wall Street or private equity influences that may be concerned with, and incentivized towards, short term profits over long term business goals. Privately owned firms are more motivated to please customers and make efforts to cultivate lasting relationships because they have the luxury of being able to focus on long term success rather than quarterly reports or short term profits. This is an often overlooked but important factor to consider

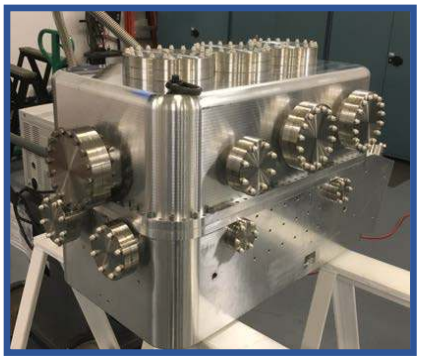
3. Size of the company

Bigger isn't always better, however, a successful machine builder must have the resources to accommodate your project including personnel, financial standing, equipment, and floor space. Provided the machine builder can comfortably handle the size and scope of your project, it's also wise to make sure that the company isn't too large. If your project is not several millions of dollars in value it may not register as a significant job for many large machine builders. If your project is considered small, relative to the rest of their business, it may not be treated as a priority, and risk getting put on the back-burner to make way for larger accounts or more established customers. An ideal supplier should fall into a "goldilocks" zone; large enough to handle your needs but small enough for your project to represent a significant (but not overwhelming) order.

4. Diversity of experience

When evaluating machine builders, it is very helpful to look at the diversity of their work and the markets they serve. A healthy distribution is important for two reasons:



- A machine builder tied too closely to a single customer or vertical can be financially vulnerable to sudden downturns in that customer's demand or in that market segment. Conversely, their capacity may be quickly overwhelmed by a surge in demand from that customer or market. Either situation may negatively impact your project.
- Diversity is also important from a technical standpoint. A machine builder who has worked in a variety of industries and applications will tend to be more creative through the experience they bring to bear. Out of the box, thinking and diverse experience can help achieve better, more efficient solutions.

5. Relevant experience

Experience can be key to success however depending on how unique your project is, you may find it difficult to locate a builder with specific experience. If a specialty machine builder lacks experience in the exact type of system you require, don't discount them immediately. It's worthwhile to explore their ability to demonstrate experience with similar machinery, applications, or other experience within your industry. Familiarity with regulations, standards, techniques, technical challenges, and terminology can reduce the learning curve and improve the efficiency of the project in both the design phase and during manufacturing. These qualities may be more valuable for your project than experience with specific types of machinery.

Does the custom machine builder routinely work in verticals that don't require precision, or cleanliness and aren't subject to regulatory scrutiny? If so, they may not be the best fit for a mission-critical medical, semiconductor, or nuclear application for example. However, if your project does not require this level of detail and precision you might want to look for machine builders who share your technical and business standards and operate in less quality intensive verticals. As mentioned previously, diversity of customer base is important however the types of verticals the machine builder works in are equally important. It's all about finding the right fit.

6. Quality Management System

A good machine builder regardless of the size will have a sound organizational structure. Look for a mature, documented, and active Quality Management System with an engaged internal-audit program and documented management review. Depending on the specialization of the company and markets served the builder should carry supporting certifications such as ISO 9001, ISO 13485, etc.

A lack of third-party accreditation may not be an issue, but, it should raise some flags. Certifications aren't necessary, but it may be worth questioning why a company hasn't worked towards a certificate. Similarly, a certificate hanging on the wall does not equate to an effective program. Some companies are interested in the prestige of credentials while others are focused on the benefits a functioning Quality System can provide. It's important to verify that certifications are in-date and that the company takes its program seriously at all levels.

To understand whether the QMS requires a deeper dive ask these basic questions:

- Is there a Quality Manual, and can it be reviewed on-site?
- How often is there a Management review of the QMS? Who participates?
- Are internal audit records available and current?
- How are suppliers evaluated and tracked?
- What are the procedures for nonconformance handling and corrective actions?
- How is a change in project specification handled?

Listen intently to the answers you receive. Are they happy to share information with you? Do the answers come easily, or do you get the feeling that they are relying on smoke and mirrors to appease you? Investigating these items will help you see the truth of the matter quickly.

7. Structured Project Management

Along with a Quality System, the machine builder must be able to demonstrate sound project management, engineering, and manufacturing processes and procedures. These organizational aspects are essential foundations for the proper execution of any project. A good project management system will be documented with Standard Operating Procedures which the machine builder should be willing to show you during a site visit.

Some questions that will help you understand their project management style include:

- What is the makeup of a typical project team?
- Is a project manager assigned to every project?
- What methods are used for communication updates?
- Will there be a single point of contact?
- Is a schedule published to the customer and maintained?
- What is the machine builders on time delivery percentage?

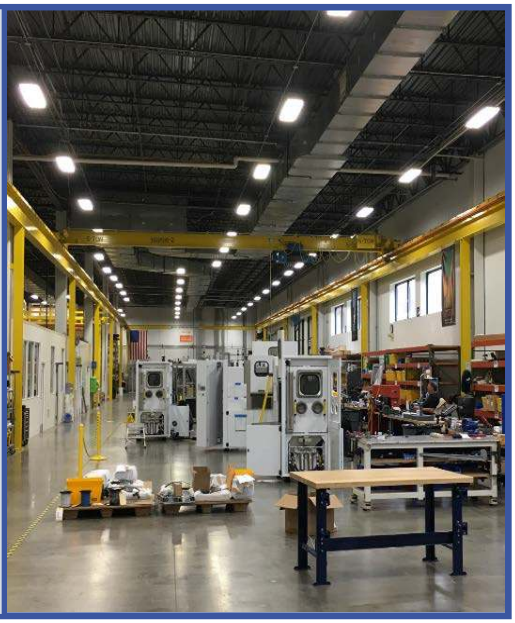
The answers to these questions should be reflected in their process documentation.
Look for it and be willing to ask for details.

8. Facilities

From the first impression walking in (or during a virtual tour), it's important to consider facilities as part of your evaluation. The facility should at minimum, be clean and well maintained. Facility upkeep and appearance says a lot about a company's culture and reflects the care it takes in everything that it does.

Important things to ask include:

- Is the facility secure?
- Is the floor space adequate for your short term and long term needs?
- Do they have options for overflow (nearby floor space/storage, ability to expand facility)?
- Do they have specific resources required for your project? E.g. clean rooms
- If your custom machine is tall or heavy, do they have overhead space and crane capacity?
- Are the materials flow and shop floor organized? (more on this later)
- Where applicable, do you see lean work cells?
- Is the information on key metrics shared visually?



Remember that fundamentally, custom machinery firms are job shops, and what's on the shop floor will probably look different each time you visit, but how the facility, equipment, and work stations are maintained will help you develop a solid read on the company values.

9. Supply Chain

Suppliers provide the materials, services, and critical infrastructure necessary for machine builds. Managing suppliers and understanding operational supply chain management ensures on-time delivery and product quality are achieved and repeatable. There are three basic pillars to supply chain management worthy of further investigation, that all successful custom machine builders should be intimately familiar with:

Sourcing and Supplier Selection - In today's global economy, there are dozens (if not hundreds) of options for the purchase of most parts and materials. Responsible supply chain management ensures that time and caution is taken in evaluating and selecting the suppliers that will be the best fit for the organization. Ask your prospective machine builder to review their supplier section process.

Supply Chain Management with Metrics and Feedback - Once a supplier has been vetted as capable and dependable, metrics and feedback must be documented on the supplier's performance. Successful businesses provide their customers with on-time delivery and quality products. Even the most basic business systems measure how frequently a supplier delivers on-time and how frequently a part must be returned as defective. Are these records maintained and available for review? Does the machine builder provide performance feedback to its suppliers to help them improve? What data is collected, and what is done with it, are key to understanding a prospective builder's relationship to their supply chain.

Security - The first and most obvious concern is physical security. The assurance that the material, part, shipment, etc. being provided remains secure from damage, theft, or contamination. The supply chain required for each custom machine is different as are the parts and materials required. The only commonality is that they all have value. Taking the time to address the protection of that physical value minimizes the opportunity for unseen costs or schedule disruption.

In addition to physical security, there is another less intuitive form of security; the protection of Intellectual Property (IP). It is critical that when digital or physical part files are sent out for fabrication, they are handled properly. In some cases, this may involve the use of specific file types or handling procedures, while in other circumstances it could be reflected in the physical labeling of the drawings, where they are stored, or how they are displayed during production. Physical and digital security are fields that hold risks for businesses. You don't get to pick the machine builder's suppliers, so pay attention to their selection process. Does your machine builder take the time to communicate security concerns clearly to all stakeholders?

Finally, there is a concern for the security of the supply chain itself. Be it through natural, technological, or manmade disasters; disruption of the supply chain during your project can be disastrous. It's important to consider whether builders maintain multiple facilities, and possess in-house capabilities to ensure project continuity in the face of an emergency or supplier failure. Additionally, you may want to consider whether the supply chain is regional, domestic, global, or a combination, and what risk that presents for your specific project. Lastly, inquire about supplier redundancy planning for high-risk components.

10. Material Management and Part Tracking

To be competitive in today's market a machine builder needs to be efficient. Good materials management is a key determinant of efficiency. Parts coming in the door should follow a logical path, inspection requirements should be defined well before the parts arrive. Once on-site, materials need to be tracked and controlled. Nonconforming items should be quarantined, and uninspected parts that require inspection must be clearly labeled so they don't end up on the product. How parts are kitted and presented to the assembly floor is critical for both efficiency and accuracy. The supplier should be able to demonstrate a methodology that allows the shop floor to pull material as required with validation points to ensure accuracy.

11. Customer Reference.

While it is ideal to get customer references it isn't always easy. In many cases, custom machine builders are not permitted to identify their customers because of the proprietary nature of the products, processes, and equipment they deal with. Some machine builders may be willing to share non-competitive references. In these cases, the reference may not be allowed to discuss any technical details but can provide good information on how the machine builder executed their project.

12. Intangibles and Culture

Every organization has a culture. It's difficult to quantify or measure but it's worth considering nonetheless. Culture can be seen in how a company treats employees, interacts with customers, and responds to criticism. Culture is also apparent in facility maintenance, cleanliness, capital investment, and even in the staff interactions. Ask what the organizational values of your candidate suppliers are. Does the prospective machine builder's culture mesh with your own? Culture can be very dependent on the industries served but is always worth considering.

The culture you require for successful project completion may be on the conservative side or, you may find it beneficial to partner with a company that is aggressively oriented. Company cultures do not always need to match or synch perfectly but they need to be complementary to the project. Aspects of culture will vary but any firm you choose to work with should at least be customer-centric, and unafraid of challenging assumptions to drive the best outcome for the customer.

Does your potential specialty machine builder treat you with respect, do they instill a feeling of confidence when you interact? Do they make you feel welcome and appreciated? At the end of the day, it's people working with people. The day to day execution of a project can become intense; make sure you are compatible with the people you'll be working with for the length of the project.

Communicating your Requirements to Special Machine Builders

Precursors to a Request for Proposal/ Request for Quote (RFP/RFQ).

1. Identify your reason to automate or employ the equipment you are looking for.

The reasons to automate are multiple and varied. Common drives towards automation include labor shortages, poor product quality, production bottlenecks, equipment downtime, and limited availability to spare parts. It may also be that the impending release of a new product or model is forcing you to dramatically modify or adopt new manufacturing equipment. Has the demand for your product exceeded production capacity? Are there processes that pose health risks or safety concerns?

Regardless of the reason, if you have committed to exploring and investing in custom machinery, follow the step by step approach below to guide you through outlining your needs, and defining the equipment specification.

2. Define goals and write them down.

Start with a prioritized list of the features the new equipment should have. Base this list on your experience with the current processes and existing equipment. Will a modernized duplication of the current machines solve all the problems you are having? Has the product or process evolved so dramatically over the years that developing a completely new system is justified? How flexible does the equipment need to be to accommodate future product variations? Should you strive to increase capacity, or focus on solving a specific quality problem? You may have to compromise to meet your budget so make sure to differentiate between your needs and wants.

Take the time to request input from your company's multiple operational groups during the step of goal definition. Each affected division or department will have its own perspective and wisdom to offer. Likely, they will quickly identify needs and expose challenges with existing equipment that you weren't aware of. By involving internal customers in the process early, they will be more likely to buy-in and take ownership of the new equipment when it's ready to be commissioned on the factory floor.

After your research is completed, invest the time it takes to record the thoughts in a formal Scope of Work (SOW) or Functional Specification (FRS) Document. The process of writing your requirements on paper forces you to organize and think things through more comprehensively. The scope/specification doesn't need to be three hundred pages long or take two months to write; keep it succinct and to the point. It's natural to find gray areas and uncertainty regarding how these goals will be achieved, don't let this hang you up. The FRS document will be an extremely valuable tool for explaining your needs to the potential equipment suppliers who in turn will help you execute the design and manufacture of the machinery.

Once you know the project is approved, and you get additional feedback from your selected equipment builder, refine the document into a detailed procurement specification.

3. Total Cost Analysis

Once you've defined the goals of your automation project, the next step is a Total Cost Analysis. Begin by identifying all the costs associated with the current manufacturing process.

Include questions like:

- What are the total labor content and current cost, fully burdened?
- What are the future labor trends in the region? How much does poor quality cost the company in non-value added inspections, penalties, and warranty returns?
- Does the current equipment meet evolving industry standards and safety codes?

- How much potential revenue is lost if production shortfalls cause sales loss to your competition?
- How long will spare parts be available in the future to keep the existing equipment running?

Intangible costs will be very difficult to put into terms of dollars and cents, but it's important to try to quantify them to fully capture the nuance of cost. Cost analysis is an extremely important step for demonstrating to management the TOTAL cost of the current process, and potential future liabilities, to help them make an informed decision on the most prudent path forward.

4. Project Budget and ROI

Prepared with a total cost analysis, and a functional specification document that defines the goals that you would like to achieve with the new equipment, you can effectively determine if the project is financially justifiable. Your company's management team can help you understand what payback formula they utilize for approval of capital expenditures. Keep in mind that a fully automated process can be extremely expensive and difficult to justify financially; conversely, a completely manual, LEAN, manufacturing system may be initially low cost, but far more expensive to operate over the long-term. Smart money is spent on solutions that offer an integration of standard manufacturing and custom semi-automatic equipment.

Engage Machine builders

Once you have identified the qualified machine builders whom you will solicit for proposals the next step is to engage them with a formal Request for Proposal/ Request for Quote (RFP/RFQ). The due-diligence research outlined earlier will help you to narrow the list of builders you intend to submit an RFP with. By this point, you should have a shortlist of machine builders that meet most or all your requirements. It's important to be aware that quoting custom machinery can be a time and resource-intensive process. The suppliers you solicit with an RFP should all have a fair chance of winning the work. Going to ten firms for a competitive bid will result in wasting a lot of time and money, and in many cases, you won't be receiving the bidder's best efforts. Keep in mind, the more fair and transparent you are with the bidders the more seriously your request will be taken.

Information/Documentation Package

The higher the quality and more complete the information you provide, the easier it will be for everyone involved in the quote preparation process. This includes you!

To being compiling your information package, if possible, provide an idea of your budget. This will help align your expectations with the prospective suppliers. Advise whether the project is currently funded or if it will be funded from an annual budget or a project-specific budget. If not yet approved, it may be beneficial to outline the timing of the budget approval process. While it's not necessary to share every detail with a supplier, it is very helpful to provide enough details to allow the machine builder to determine if the requirements can be met within budget.

A documentation package requires project schedule milestones. These dates can be rigid or flexible depending on the project but in all cases, should be an available component of the documentation. The dates set clear expectations and can help builders to understand how the project should progress, allowing them to plan staffing, ordering, and other factors.

To avoid misunderstandings, it's best to clearly define milestone dates such as:

- RFQ release date
- Proposal due date
- Order placement date
- Factory Acceptance Test (FAT) date
- Shipment date

The makeup of the documentation package and how you will interact with the machine builders during the RFQ stage depends on the status of your concept, design, SOW, or functional specification. It's common to differentiate projects as either Design and Build (D&B), or Build-to-Print (BTP); depending upon where most of the work for the project resides. Either way, it's vital to present the custom machine builder with a documentation package that is as organized and current as possible.

Common elements of a complete documentation package include:

- Scope of Work/Functional Specification
- Product samples and/or drawings, part variance issues
- Process information pertinent to the project
- CAD Models, PDFs, etc.
- Any special processes, non-documented requirements
- Performance criterion/FAT requirements
- Machine manual and/or training requirements
- Company-directed sources, preferred supplier info
- Company machine-building guidelines
- Company purchasing agreements

Questions from the machine builders will be common during quote preparation. This is normal, and in fact, a lack of request for clarification may indicate your RFQ isn't receiving the attention it deserves. A list of contacts for communication purposes is very helpful here to make the transfer of information, and address of questions as smooth and quick as possible.

The Decision

When the quotes have arrived, do not just reach for the one with the lowest cost. Take time to review the entire package. Consider who the builder is, their culture, accessibility, fit to the project, and all the other diligence points you have already identified. Select an equipment builder with a long history of success, a solid reputation, and expertise in your industry. The better the match between your project and the industry experience and capabilities the machine builder brings to the table, the less you expose yourself to risk. Often the best value is not the one with the lowest price. Success will be driven by the level of support you give, so once you've made the decision and chosen a machine builder give them your full confidence and buy-in. Do all you can to treat them as your partner…and an extension of your company.

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. Contact us to learn more about how we can help build your next custom machine.

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