

Low-Cost Custom Prototyping In Today's Automated Production Environment

The solution lies in learning to evaluate your supplier.

Present day manufacturers rely on increasingly complex technology to produce massive volumes of quality parts at a reasonable cost. Technical advancements in automated assembly lines, computer-guided milling machines, robotic welders, and "just-in-time" inventory systems have evolved to serve a bottom-line consciousness that demands high production rates and reduced unit costs.

Ironically, the same automated equipment that is so well suited for making thousands of cookie cutter reproductions of established products can, by virtue of its complexity, inhibit new product testing and development because extensive assembly line alterations and tool and die changes make short, experimental production runs prohibitively expensive. As a result, many high-tech industries and start-up companies are returning to pre-industrial revolution craftsmanship, in the form of hand fabrication, to prototype, test, develop and even produce many of their new products.

The problem lies in finding a fabricator that has the expertise to help in product development, the ability to produce a quality product, a willingness to make design changes as the product evolves, and the capacity to perform all of the above within a short time frame.

The solution to the challenge of selecting a suitable fabricator lies in learning a little about what can be expected from the hand fabrication process and putting this knowledge to good use.

By researching the following areas manufacturers should be able to find a metal fabricator that meets their needs.

1. Technical Support

Confirm that the shop has engineers or technical support available to readily provide design assistance. This is especially important early in the development process where many potential pitfalls and unnecessary costs can be avoided by relying on the fabricator's expertise.

A good fabricator will be able to aid their clients in speeding up the R&D process and make suggestions that expedite development of new products.

2. Small Production Runs

Determine that the shop can fill small quantity orders to facilitate product prototyping and, if necessary, make changes. This is vital since hand fabrication permits the rapid production of product prototypes and is ideal for completing production runs that are too small to warrant extensive tooling changes.

Hand fabrication permits producing parts that are unique or out of the ordinary. If a client needs to make a few copies of a part and can't justify paying huge fees for engineering and retooling, hand fabrication is ideal since parts can be made with little or no tooling. After the initial run, design changes can be made easily without involving additional charges for tool and die alterations.

3. Secondary Operations

Make sure that the fabricator can provide all secondary operations including installation of terminals and inserts, drilling, notching, abrasion, tumbling, soldering, brazing, laser cutting, and silk screening, etc. Finishing the work at one location simplifies scheduling, assures responsibility for quality, improves security and facilitates design changes. A client may start with a container or enclosure that requires a stepped bend, or corners that are notched to fit into a particular spot. If, after trying it out, he wants to change the size, add vent holes, or change the brazing or soldering process, a well-equipped fabricator should be able to make these changes at minimal additional cost.

4. Close Tolerances

Check that the fabricator uses inspection equipment calibrated and traceable to the National Institute of Standards and Technology requirements. Fabricators should also perform quality control checks at every stage of production.

If one part has to fit inside another part, and there is only a few thousandths of an inch of play, tolerances become very important and have to be maintained for the entire product run or the product is useless.

5. Quick Turnaround

Confirm that the fabricator meets deadlines and responds quickly to large or unplanned orders. Some metal forming shops maintain an inventory of standard dies and molds in order to hasten the production of stock shapes. The resulting savings in engineering and design costs also help reduce the total unit costs. The faster the client gets their prototype the sooner it gets tested, ready for the market, and making money.

6. Inspection

Make sure that the fabricator inspects 100 percent of the finished parts rather than making random spot checks.

A fabricator should be able to custom make products to very stringent military quality specifications.

Not one part should go out that doesn't meet the customer's design requirements. To assure low rejection rates, parts should be tracked on computerized statistical process control charts which reference all quality assurance information within the manufacturing process.

7. Quality Control Check List

Prepare a quality control checklist and submit it to potential hand fabricators. Information on this list establishes that the fabricator has mechanisms in place to track the purchasing, handling and storage of materials; ascertain that tools are calibrated; guarantee that finished products are inspected; and trace what happens to rejected parts.

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