Berkeley Sourcing Group

Your Bridge to Quality Sourcing

CHECKLIST

What You Need to Go to Manufacturing

Berkeley Sourcing Group

Go-To Manufacturing Checklist

www.berkeleysg.com

SO, YOU HAVE AN EARTH-SHATTERING IDEA...

You've been telling all your friends and they love it. You got to work in the garage, and lots of duct tape and super glue later, you are convinced that Mark Cuban would personally invite you to be on Shark Tank… if you could only know your manufactured costs and be confident that you can make your product to scale. Ugh, how do you do that?!

By far the mot common question we get after ten years of working with hardware startups is,"What do I need to provide in order to get a quote from a manufacturer?"

To understand the answer to this question, you need to understand the process. Each product is manufactured according to its materials and the processes required to meet the defined specifications. This is the key point. You must be able to define what you are making, specifically, before you can get a specific quote. The thoroughness of your specification is directly related to the ability of your manufacturing partner to give you an accurate quote.

The tools used for these definitions range across different manufacturing partners and how their internal systems operate, but there are definitely some standards that work well across the board. Here, we will list the tools that we use, which will optimize us being able to work together, but these tools are useful for any other manufacturer as well as they will help you paint a very clear picture and leave very little room for error/confusion.

1 MANUFACTURING CHECKLIST

- [ ] Product Requirement Document
- [ ] Bill of Materials (BOM)
- [ ] Component Specifications
- [ ] Technical Files
- [ ] Your Prototype
- [ ] Quantities
- [ ] Materials & Processes

2 PRODUCT REQUIREMENTS DOCUMENT

This first document is often not required or requested by manufacturers as they usually expect you to be able to define all the of the needs of your product within the other documents.

However, we've been working with startups for a long time and understand that rarely happens. We think the product requirments document is key so that we can help think on your behalf of what is really required to make your product successful and be sure we've identified and filled any gaps in your other documents. Most importantly, there are countless large pitfalls that can happen along the way and we can help make sure those are identified and avoided ahead of time if we know the end goal.

This document describes the expectations of your product in the market. A word document will suffice.You should describe all of the tangibles and intangibles, as much as you can, in a succinct way. The details of the document will vary greatly with the product. If it is a fashion product, a lot more focus will be on the look and style that you are hoping to achieve. If it is a portable IoT device, you will want to define how long the battery should last, how waterproof it needs to be, how durable….

Here is a (short) list of the types of information you would want to include:

- aesthetics
- durability
- food safety
- certifications
- user interface
- target demographic
- intangibles of how it should look/feel/act
- potential problems you foresee and expectations of the results
- will it be used inside or outsideand UV resistance….

There may be many more requirements for your particular product. The more we can understand the total goal of what you are trying to make, the more we can help think on your behalf of how to reach that goal and provide the best options for getting there.

3 BILL OF MATERIALS

This is the list of components that make up your product. The complete list.

There are often many components to any product and it's easy to forget about some of them or make assumptions that can cause massive problems.

The BOM assures that all the components have been accounted for and allows them to be easily referenced. It also includes some basic information for clarity. It's easiest to see this as a spreadsheet. A good reference is an IKEA sheet with all the necessary screws, parts, brackets etc. Each part should have its own line, and will be made up of, at least, the part name, material and quantity of components per unit.

If you are making an electronic product, you will want to have a separate mechanical BOM and electrical BOM. Unless you are a DFMA expert, you will want some help to identify which components you have designed for that can be replaced by cheaper available components (or those with shorter lead times) either through your manufacturing partner or an experienced DFMA engineer. Having a clear BOM for electrical components makes this job much easierand more effective. For your electrical BOM, you should identify exact part numbers wherever possible.

4 COMPONENT SPECIFICATIONS

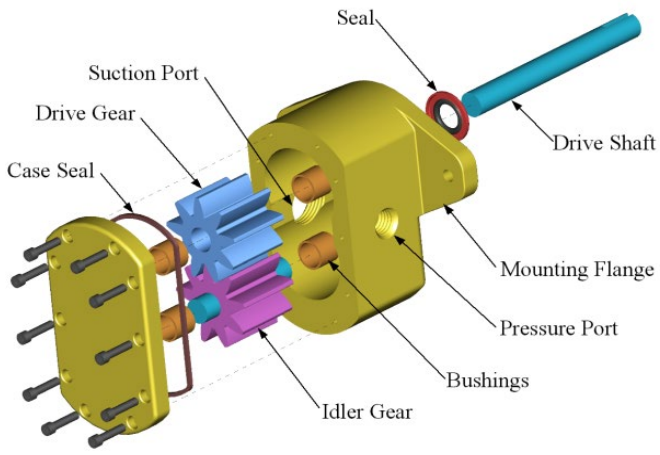
Component specifications represent a deeper dive of the BOM. They are not always necessary.

If you have specified what you expect to be made clearly enough in the rest of your documents, then you can skip this. But, remember, any room for error is room for a factory to come back later and remind you that you didn't specify that detail and the product will be more expensive or potentially not manufacturable, because of it.

Component specs are particularly important with things like motors or other complex components that can have a range of quality and features. If you can specify existing part numbers, that often provides the most useful information. If not, create a document that clearly defines the specifications you need for that component. Specifications should always be measurable and include tolerances wherever possible. For colors, use Pantone numbers.

5 TECHNICAL FILES

Some details can only be explained with specific software.



The most common examples of this are 3D and 2D drawings for mechanical parts, and Gerber files for board layouts. If you are looking for an exact quote for a plastic part, you will need a 3D file.

Besides defining the final product shape exactly, the manufacturer will use this to understand how the tool must be made and answer detailed questions: does it need sliders, are there undercuts, how will the part be ejected, what needs to be done to manage shrinkage….

This file also allows the manufacturer to exactly know how much material goes into the product (and runner) and thus they can calculate their cost of goods.

The complexity of the tool can affect the final cost of both the tooling and product price significantly and can potentially be redesigned to reduce cost, so you will want to have this sorted out if you want to know your real manufactured cost. Sometimes other processes can be used or redesigned for. Don't forget about the surface finishes!

6 YOUR PROTOTYPE

If a picture is worth 1000 words, then a prototype is worth 1000 pictures.

There's nothing better to describe your product clearly than with a good, working, physical prototype. While the above documents can give a lot of detail, as words, numbers, and files viewed on a computer screen, they are still limited and some things are just better understood, like feel and aesthetics, in a physical product.

Ideally, you'll provide a prototype to the manufacturer you are getting a quote from, that both looks like and works like your final product. Barring that, you'll want to provide the best prototype you reasonably can and then describe the differences, exactly, that you are looking to make in your mass-produced product. This may seem burdensome, but, remember, the more detail and accuracy in your description of what you are trying to make, the less risk the manufacturer needs to guess about and the more they can reduce your cost. It can also go a long way down the road to reducing lead times (minimizing mistakes) and produce a better quality product as there may be details communicated in that prototype that otherwise wouldn't be communicated until too late.

7 ORDER QUANTITIES

How many pieces are you going to make? It matters.

Different processes and materials may be more ideal for small runs, so even if you are trying to make exactly the same product, the manufacturing methodology (and thus the quote) needs to be optimized for the order size.

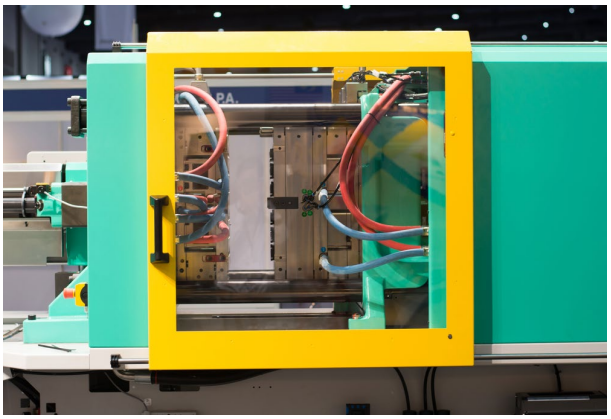
There is also a **minimum order (the MOQ - Minimum Order Quantity**) that a factory will accept. This applies even to components, so it can be a bit of a tricky business to manage all the costs and inventory to maximize the return on your investment. This is where working with folks that understand how to balance the available options and have existing relationships with subcontracting factories can come in handy.

Overall, the MOQ is a result of the amount of setup time and cost required to get into (and out of) production. Mass production is mostly an automated process, so to get that automation going, you need to put tools on the machines, calibrate temperature, color, input designs, schematics, etc. That work also requires a high level of engineering skill and management time from executives...and those experts get paid accordingly. Those set up costs are distributed over the production run volume, so if you are making a small amount, those costs can significantly increase your per piece cost and if the numbers are too small, factories don't even want to deal with it. Working with us, we can often negotiate a "setup fee" with the factory, so that at least they are willing to do these runs (and it keeps the relationship on good terms as well since everybody knows what is expected). If you are working with a factory for the first time though, strangely, this can be hard to negotiate (always worth a try though!).

8 MATERIALS & PROCESSES

Now that we've broken down the "engineering package" of what types of documents and files you should provide to your manufacturer to get a good quote, there's a bit more you should know as you're getting into this process. Manufacturing limitations, costs, opportunities, risks…are often defined by the material and process that is being made. If you have a pretty clear idea of what these details are for your product, you can better understand how to align your manufacturing plan with your marketing plan and cash flow to optimize your launch and overall business management.

The materials and processes define: the Minimum Order Quantities (MOQs), tooling and fixed costs, cost of goods, assembly methods, lead times, best prototyping practices, and many other details critical to your potential for success. While there are hundreds of thousands of types of materials and thousands of process, there are breakdowns and understandings that can be applied fairly generally in a very effective way. The primary breakdown is: plastics, metals/wood, electronics, printed/paper, and soft goods with a smaller category of rubbers/ silicone that we'll address as well.



Each of these categories use a handful of common processes that are used to make the large majority of components and products in that category. For example, nearly all plastic parts are made from injection molding. Most soft goods are made by cut-and-sew. These are tremendously different process from a business perspective. Injection molding has very high initial investment as the tooling is expensive.

8 MATERIALS & PROCESSES cont'd

Prototypes must be made as one-offs with a very different process than the manufactured product. But, once the tools are made and the process parameters defined, each part will come out nearly identical to the rest of the lot.

The exact opposite is true for cut-and-sew. The initial investment for tooling is very small, relatively, it is usually feasible to make a prototype that is identical to what a manufactured unit should be with the same general processes, and the manufacturing process often involves a lot more manual labor and thus inconsistencies in manufacturing can be a big problem.

Because it's so important to understand the basics of the materials and processes you are planning to work with in order to know how to plan your business, we are developing a series of follow-up ebooks to break down each of these categories. Even if only one small component of your product is made from a material in a different category, you should probably take the time to understand that category and how it will affect your business. Be on the look out for these in your email. When you signed up for this e-book you gave us information about your product. We will send out to you when they are ready.

8 IN CONCLUSION

So, the mystery is solved! If you can provide the items described above and you are working with a competent manufacturer, that should be enough information for the majority of products out there. In any case, it will get you off to a great start with your manufacturer and show them that you are down to business and will be a client they will be happy to work with. That also helps you get better pricing.

There will still be a million details to discuss; manufacturing is full of details. At BSG, we've gone through this process with over 700 hardware startups, so if you are not sure if you have enough information, we'll be happy to review what you currently have and let you know where the gaps are. We also offer our services to help you fill those gaps completely and cost effectively with our team on the ground in China. The best way to reach us for that is through our Request for Quote page or by clicking on the button below.

While it may seem like you can cut some corners here and there, at the end of the day, you will need all this information defined by the time you get to production. While some corners can be cut before production, it will mean that the manufacturing quote is that much less certain, and uncertainty usually indicates a price hike or other problems down the road. Thanks for reading and good luck with your hardware startup adventure!

Get a Quote