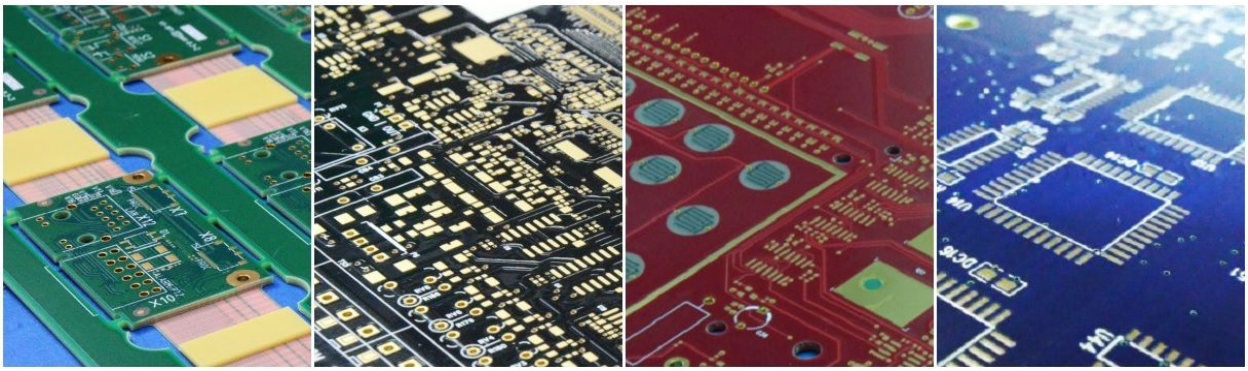
7 IMPORTANT QUESTIONS TO ASK PCB MANUFACTURERS

A CHECKLIST FOR IDENTIFYING QUALITY PCB PARTNERS



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Introduction

Finding the right PCB manufacturer requires thorough investigation. So, when looking into a list of fabricators it is important to ask the right questions. This checklist gives your company seven questions to ask potential PCB partners. Asking these questions will help you evaluate the quality level of manufacturers so you can ensure the right fit.

Questions:

1) How do you handle traceability?

2) What testing equipment do you have?

3) Is all testing done in-house?

4) What kind of wastewater treatment system do you have?

5) Can you provide details about your equipment maintenance program?

6) How will fabricated boards be protected from corrosion after fabrication?

7) What other industries do you have experience with?

The following sections provide details about the seven questions and why they are important. They also provide suggestions for the standards that manufacturers should be meeting in each area.

Question #1 - How do you handle traceability?

Traceability is key to ensuring high quality at the lowest possible cost per board. According to ISO 8402, traceability is:

"The ability to trace the history, application or location of an entity by means of recorded identifications."

Having a well-run traceability program allows the PCB manufacturer to trace any issues with a particular board to their root cause. They might trace the issues to a specific step in the production process or back to a particular materials supplier.

Being able to quickly identify the cause of issues enables the board house to deal with them more effectively. In fact, leveraging traceability systems in lean manufacturing has been shown increase product quality by 18%.[1] When implemented, traceability systems can also result in a nearly 10% reduction in total product cost.[2]

Key Aspects of a Traceability Program

Incoming Materials

PCB manufacturers should work with laminate vendors that assign lot and date codes to all incoming materials. Lot codes for raw materials should follow the board through every step of the process. Manufacturers should use materials on a First In First Out (FIFO) basis.

Chemical Solution Composition Checks

PCB manufacturers should frequently perform stringent chemical solution checks in their chemical labs. Some checks may be performed hourly, while others may be performed every few hours.

[1] Monette, F., & Van Bogart, M. (2009). Track, Trace and Control; High Production Output at Low Costs. Cogiscan.
[2] Monette, F., & Van Bogart, M. (2009). Track, Trace and Control; High Production Output at Low Costs. Cogiscan.

Equipment Maintenance

Every time the manufacturer performs maintenance on a machine, it should be logged. They should perform maintenance regularly and reports should be detailed.

Lot and Date Codes on Finished Boards

Every finished board should have a lot and date code stamped on it. This ensures that any failures can be traced back to the materials used, the chemical solutions used or any maintenance issues.

Question #2 - What testing equipment do you have?

Having the right testing equipment is key. Manufacturers should have both Automated Optical Inspection and Bare-Board Testing capabilities.

Recommended Testing Equipment

Automated Optical Inspection (AOI)

Automated Optical Inspection (AOI) equipment can visually check boards faster and more accurately than the human eye can. A camera autonomously scans each board looking for defects. The machine quickly brings any potential issues to the operator's attention.

Bare-Board Testing

Manufacturers need to test unpopulated boards for opens and shorts. An "open" is a missing connection between two points that should be connected. A "short" is a connection between two points that shouldn't be connected.

For small batches, fabrication houses can perform a "flying probe" test. For larger batches, they can create a "test fixture."

Question #3 - Is all testing done in-house?

Manufacturers need to do all testing in-house to ensure quality and traceability. This includes both AOI and bare-board testing. Outsourced board testing can lead to untraceable failures. While in-house testing can be more expensive, it enables the

manufacturer to maintain complete control over the production process. This leads to higher quality output.

Question #4 - What kind of wastewater treatment system do you have?

Wastewater treatment is important for a number of reasons. These include corporate and moral responsibility, and the ability to meet environmental regulations. Typically, wastewater from PCB manufacturing contains high amounts of copper. This copper can be recycled by heating the sludge and converting copper hydroxide to copper oxide.

Aside from copper, wastewater can contain metals such as chromium, lead, nickel, zinc and iron. The wastewater containing these metals can be treated by processes such as ion exchange, membrane filtration and batch treatment of concentrated wastes.

ISO 14000

Environmentally responsible manufacturers should be ISO 14000 certified. The ISO 14000 family of standards deals with how companies minimize their environmental impact.

Question #5 - Can you provide details about your equipment maintenance program?

In order to ensure ongoing quality, it is important for manufacturers to perform regular equipment maintenance. Preventative maintenance should be performed on a schedule that is determined for each piece of equipment. A piece of equipment can have either a time-based schedule or usage-based schedule. Key maintenance information can be stored in a maintenance database.

Maintenance Database

Manufacturers should document all schedules for equipment maintenance and store them in a centralized database. At the beginning of each week (or at another regular interval) they should print out a maintenance update. The printout lists all the equipment that is due

for maintenance. They can use this printout as a guide for scheduling upcoming maintenance.

Once maintenance has been performed, the manufacturer should record its completion in hard copy. They should also record it in the database, which serves as the governing document.

Question #6 - How will fabricated boards be protected from corrosion after fabrication?

Climate-controlled storage is critical for boards that have been fabricated but are not yet assembled. The rooms where boards are stored should have a relative humidity level of 20% to 35%. They should be kept at a temperature of around 20 degrees celsius (68 degrees fahrenheit).

Of course, it is important for the fabricator to store boards under these conditions. But it is also important to ensure that these conditions are maintained after finished boards leave the fabrication house. In some cases, boards may be sitting around for months before going to assembly.

In these circumstances, the purchaser needs to ensure that the place where they are stored meets the above climate-control requirements. It is also important for the manufacturer to be using a “First In, First Out” (FIFO) system. This helps minimize the risk of corrosion.

Question #7 - What other industries do you have experience with?

Aside from having experience in your industry, having experience in certain other industries can give you a good indication of a manufacturer’s quality. Companies that manufacture boards for the life-safety or medical device industries are held to a very high standard.

With medical equipment there can be zero failures. Otherwise, lives are on the line. So, if a manufacturer has experience with these types of boards, you know that you can hold them to a high standard for your product as well.

Conclusion

Receiving answers to the seven questions in this checklist document will give you a good indication of the quality level of PCB manufacturers. Keeping these questions in mind as you look into PCB manufacturers will help ensure that you make the right choice for your company.

About Gabrian International

Gabrian International (H.K.) Ltd. was founded in 1995 to connect companies in North America and Europe with high-quality manufacturing partners in Asia. The company offers PCB manufacturing, PCB assembly and turnkey manufacturing services.

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