# 5 Things to Consider When Selecting Your Thin Film Deposition system Vendor

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Enabling Innovation

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When it's time to specify a thin film deposition system for your application, what's your first step? Do you outline a list of requirements such as the deposition technology, number of sources or the process monitors needed, and then search for vendors who can deliver on those needs? If you're like many engineers, you're probably thinking "yes."

According to a recent poll done with one of our webinar partners, we found that an overwhelming majority of engineers (82%) believe that **the most important element to consider when selecting a system is the performance** - things like film properties, throughput, and uptime. So, if system performance is what you're really after, why are you starting at the component or hardware level?

## There's a Lot to Learn from Microelectronics

Due to the tremendous investment required, semiconductor microelectronics companies benefit from an industry-supported roadmap for future process development. No single company can afford to develop proprietary equipment and as a result their capex spending is aligned with the roadmap, and they typically use many identical tools per fab. They also see quick vendor response and often work with just 4-6 different vendors.

By comparison, manufacturers in smaller markets such as semiconductor lasers, precision optics, or medical devices tend to have proprietary, company-specific processes. They spend their capex on just one to a few similar tools per fab, they often see variable response times and they can be working with 20+ vendors. The entire equipment development and procurement process isn't nearly as optimized.

But the biggest difference between the two? **Who defines the hardware.** As an example, consider the comparison between the semiconductor microelectronics and semiconductor laser industries shown in the table below:

| INDUSTRY | SEMI MICROELECTRONICS | SEMI LASERS |
|---|---|---|
| Market Size | $350 Billion | $5 Billion |
| Process and Equipment Development Plan | Industry-supported Roadmap | Tightly held, company specific |
| Capital Spend in Physical Vapor Deposition | ~$3B (BCC reports)<br>Many identical tools per fab | ~$200M (Denton estimate)<br>1 to a few "similar" tools per fab |
| Equipment Requirements | **Vendor** defines hardware to meet process specifications | **Laser manufacturer** defines hardware to meet process specifications |
| Vendor Support | Response time in hours; dedicated on-site service engineers | Variable response time; service engineers may not be local |
| Number of Vendors | 4-6 | 20+ |

## Application-Specific Configurations Make the Difference

Often, a manufacturer defines a list of hardware and specifications (what we call a "bucket of parts" approach) and then looks for an integrator to pull all of the parts together. These requirements are not application-specific, because the decisions are driven not by a focus on the end results (film properties), but rather by a focus on the parts that are needed to create the system. While this may lead to functional hardware, and can work for simpler applications or R&D, it's a risky approach for key process steps.

In the microelectronics world, however, the manufacturer specifies the film requirements *first*, then the equipment vendor defines the hardware to meet the process specifications. The focus is on the output and working backwards to identify hardware needed to achieve the goal. They can leverage the experience from many different customer applications to bring a holistic view to the configuration. This is truly **an application-specific design that results in a working production process.**

Specifying **FILM REQUIREMENTS FIRST** lets you benefit from your vendor's experience

## How to Choose a Thin Film Deposition Solution Provider

1. **Select a single vendor for collaboration.** When you work with several vendors, you become the General Contractor, responsible for the entire manufacturing process flow and acting as a go-between for vendors who have little to no insight into how their individual tools need to work together. When you partner with a single vendor, they have a much deeper understanding of your factory requirements and manufacturing process flow, and they act as the project coordinator, providing a superior level of service and response. This translates to better integration into manufacturing, minimal training investments (all tools have a similar look and feel), and faster production qualification. All of this ultimately leads to higher factory uptime - the holy grail of production.
2. **Ensure they are a partner - not just an integrator.** The right partner should take the time to learn and understand how their solution fits into your entire business. They should assess your needs and interpret your requests in order to best advise you, not just deliver on specifications that you provide. The right vendor will help you understand industry trends that might impact you, as well as offer educational resources and information. They shouldn't be just trying to "sell" you.
3. **Look at performance data as an evaluation proofpoint.** Leverage the experience and knowledge of your vendor, who should have a deep history with the tools and has likely solved similar challenges for other companies. You will need to know that the vendor can achieve your specific required range. Make sure that they can provide data so that you can see the specifications you're signing off on.
4. **Remember that good service is critical.** When juggling dozens of vendors, varying response times are par for the course. But when you choose just one supplier (or a limited few), you can make service a major deciding factor. Choose a company that is trusted (has done work for other reputable companies in your space) and responsive (providing quick and useful answers to inquiries), and offers personalized support (you aren't just an account number). Is their service line accessible and reliable? Another important factor is physical reach - do they have regional field support? Are they able to cover diverse geographic locations?
5. **Benefit from experience in multiple technologies.** Since you're looking to build a partnership, remember to select a partner who has experience in many deposition technologies, not just the one you need right now. This way, your vendor will be able to continue to support you as your business grows and expands into future capabilities. In fact, the right partner will guide you through the challenges of expanding into new capabilities.

Taken together, these strategies position you to make the most of your vendor relationship. You may be able to cut upfront costs with a multi-vendor/integrator approach, but you will achieve a **lower total cost of ownership and better overall return on your capital investments** if you follow the partnership approach that we advocate. And, you'll have a partner on your side that you can lean on for knowledge, direction, and support when you need it.

Ready to talk to a thin film deposition solution provider who takes the partner approach?
Contact Denton Vacuum today for an expert assessment of your application.

## About Denton Vacuum

Denton Vacuum empowers the global optics and R&D markets, helping engineers optimize processes and solve production challenges while improving manufacturing yields and gaining efficiency and throughput. Our continued commitment to research and development of thin film technology, including our proprietary integrated diagnostic systems, enables predictable, repeatable performance in a wide process window.

Our breadth of technologies and market focus have paved the way in diverse applications from advancing electron microscopy with freeze etch and freeze fracture equipment to providing market-leading solutions for IR detectors, semiconductor lasers, and precision optics.

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