

Important Questions and Considerations When Purchasing Used Capital Equipment

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Since the demand for used semiconductor fabrication equipment gained traction in the late 90's, around 2,000 companies emerged worldwide as buyers and sellers. The reason for the demand for used or remanufactured equipment remains the same as when SEC/N President Gary Alexander stated in 2000: "that quality remanufactured equipment is often available at a fraction of the cycle time and cost of new equipment."

In today's world of multi-million dollar capital equipment, the cost savings when buying used can average as much as 50%. While the benefit of lower costs continues to be a primary driver, other considerations have emerged as critical factors such as installation, parts availability, maintenance, service, quality, training and safety.

Key Questions

Whether it's for a new, existing or startup facility, the advantages of buying used can be derailed if these issues are not addressed. Following are some of some of the key questions any buyer of used equipment should consider:

- Are special permits required, including building permits and tool install permits?
- Does your local authority require fire protection?
- Are certified seismic calculations required and available?
- Can it meet current codes and regulations?
- Is a third party electrical evaluation required in your city?

Many cities and jurisdictions require a building permit (electrical, mechanical, plumbing, structural, etc.) for constructing a new facility or modifying an existing one. In addition, some require an additional permit for each tool located in the facility. This allows the fire, structural or electrical inspection authority to determine if the incoming equipment is safe and meets applicable national, state and local codes. In many cases, a third party will be asked to provide an independent evaluation of the equipment, especially if it involves sophisticated technology.

- If Hazardous Process Materials (HPMs) are to be used, what sort of precautions have been taken?
- If hazardous gases are involved, are the gas cabinets certified?
- Is it safe?

HPMs require special consideration. In large organizations, this is usually the responsibility of the Environmental, Health and Safety (EH&S) manager. In smaller companies, the responsibility falls on management. In either case, OSHA requires every employee to be guaranteed a safe working environment.

The gas cabinets housing HPMs should come with a tracer gas analysis. This will ensure that, with the cabinets connected to the specified exhaust duct at specified flow rate, any HPM leak will be safely carried away from persons working in the area. Other considerations such as alarms, automated

shutdown of gas systems and fire protection are also part of the HPM safety evaluation and risk analysis.

- Who will install the equipment?
- Are spares readily available?
- Is after sale service available?
- Is training available?

Installation can be handled in several ways. Many remanufacturers only offer their product with buyer site installation and start-up. While this adds to the cost, it ensures a working and tested tool in a minimum amount of time due to their specific expertise and familiarity with the equipment.

Another option is to engage the services of a third party specializing in tool installation and startup. These companies are usually comprised of skilled technicians and engineers who were formerly employed by the original equipment manufacturer (OEM). The least attractive option is to have ones own employees install the tool since they do not have the required familiarity with the tool. Plus, they usually have other duties to perform and cannot devote the attention this project requires. As a result, they will likely have to wait for expert advice to solve current and future problems that arise.

Having access to readily available spares is essential to make this purchase viable and a success. Many OEMs discontinue stocking and production of spare parts five years after the production of the tool has ceased. In many cases, third party vendors stock and manufacture replacement parts. However, it is extremely important that these are of equal quality compared to the originals.

Another source of spare parts is acquiring equivalent tools that have been removed from service, similar in concept as getting a carburetor off a scrapped car at the local junkyard. Since these are essentially decommissioned spare parts, there is a risk in not knowing how well they will perform, if at all.

After sale service on used equipment is available from many sources. If purchased from the OEM, paid for service will normally be provided after the warranty period. Some remanufacturers also offer paid service. Again, third party companies offering tool installation will also have service as part of their menu.

Training is an important issue in any organization especially when it is tool or process specific. The same organizations that provide after sale service can usually offer operator and maintenance training as well.

Buyer and Seller Responsibilities

Both buyer and seller will negotiate and ultimately determine the price based on the following:

- Is the tool complete or will you supply some of the peripherals (pumps, cabling, chillers, etc.)?
- Is the tool "as is, where is"?
- Are modifications required to make it useable?
- Is interconnect cabling supplied?
- What sort of documentation is provided?

Some used equipment sellers who are not in the business of rebuilding or refurbishing, simply want to minimize or eliminate their responsibilities, get a quick turn of their inventory and sell the equipment "as is, where is", perhaps even at a small profit margin. This means that the buyer gets the equipment in whatever shape it is and takes all responsibility for the packing, crating and shipping of the equipment.

Such equipment could be a shell sans pumps, chillers, interconnect cabling, deposition sources, targets, heating elements, deposition power supplies, monitors and gas control systems. Since there

is typically no evidence that the tool was operational in the recent past, it becomes the buyer's responsibility to determine what peripherals are required, their specifications, and how to interface their operation and control with the tool.

In this scenario, documentation is usually quite minimal, even non-existent. Unless the buyer has a source of third party documentation, a purchase of this type is risky as attempting repairs without documentation can be an expensive venture.

On the other hand, if the buyer already has a tool of this type and is simply adding to their production line, this can be a way to reap substantial savings. A typical scenario is that after the original, new tool has been used for 5-10 years, it could be sent to an offshore facility as part of an expansion and a means to keep costs down.

- Is the equipment described as refurbished, reconditioned or remanufactured?
 - Refurbished usually means that equipment has simply been cleaned, possibly with minor repairs performed.
 - Reconditioned typically means that all repairs have been made to bring the equipment back into near-perfect or perfect working order.
 - Remanufactured generally means that the equipment has gone back to the original manufacturer and has been worked on by expert technicians. Companies that specialize in rebuilding certain tools to original manufacturer's specifications also offer remanufactured equipment. Others offer "remanufactured equipment" with improvements and upgrades that exceed the original specifications and enhance performance.

It's not unusual for each seller to have their own definition of the above terminology, and could use them interchangeably. Always question the seller and get the clarification in writing.

- Is there any warranty?

Most "as is, where is" sales are just that; you accept the equipment in its current state and pay for everything including shipping, installation, etc. At the other end, sellers offering remanufactured equipment often are very proud of their work and tool enhancements and will offer some sort of a warranty, usually as an extension of the installation they provide. Refurbished equipment rarely comes with a warranty while some sellers might offer a shorter, 90-day warranty for reconditioned equipment. Again, make certain the warranty terms are in writing.

- Are process recipes included?

On automated process equipment, some remanufacturers have developed specific process recipes as part of the tool improvement over the original manufacturer's specs. Since this could possibly have a positive impact on performance, the recipes may be a valuable portion of the tool purchase.

Ask for samples to be produced on your substrates for evaluation in your testing facilities before agreeing to the added cost.

- Where will final acceptance take place?

Final acceptance is that part of the transaction where the tool is found to meet all of the specs and the final payment for the tool is paid. The supplier's location is probably the worst place for acceptance. The facilities are usually sparse and the cleanliness standard is most likely not yours. Push for pre acceptance at the supplier and final acceptance at your facility after installation. Remember, if you are required to have a third party evaluation, make it a contingent part of the acceptance.

General Considerations

- What is the reputation of the seller? Get references, talk to other purchasers. If the seller is reluctant to give out names, beware!
- Are you planning to ship it to another country? If so, does it have a CE for EU countries? If not, check with several third party companies that normally provide CE evaluation on this type of equipment to determine, first, if a CE mark is possible without considerable additional expense. Also ask for the cost of providing a "Certificate of Compliance" for the tool.
- Does it have an S2? The SEMI® organization has developed recommended guidelines for various types of processing equipment which have been used by many industries for the past 15+ years. These guidelines provide a standardized set of design and manufacturing criteria to be applied uniformly over a broad set of equipments.
- How does your insurance carrier feel about used equipment and its inherent liabilities? Definitely consult with your agent prior to finalizing the purchase for used equipment. There may be certain caveats that the carrier will insist be met before coverage can commence. For example, local jurisdictions require an electrical safety and code compliance inspection before the tool can be used in production. However, this does not guarantee that the tool actually works.
- Is it a good deal?

Summary

While the benefits to buying refurbished, reconditioned or remanufactured are real, especially in regard to cost savings, the bottom line is that there is always risk in buying used equipment. Part of the buying decision is to evaluate this risk against the presumed cost savings.

A good example is a buyer who purchases a used wet etch tool for a fraction of the cost of the new tool without performing any risk analysis/cost benefit study. The tool arrives and, on closer inspection, it is discovered that a pump is missing. In addition, the buyer learns that the electrical controls won't meet the current codes and have to be replaced.

Almost all fabs today rely on tool manufacturers or outside sources for rework and spares. By the time the tool is useable, it has cost more than a new one in terms of lost production time and actual out of pocket costs.

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