

Eight Great Things Manufacturing Engineers Must Know About Leak Testing Equipment to Maintain Quality Control without Sacrificing Production Speeds

Manufacturers report testing throughput increases of 50%.

Must quality engineers and production managers always be at odds? The former seeks perfection while the latter pushes for greater throughput. With the latest improvements in leak testing devices, both agendas can be served, as the best examples of this testing equipment help speed the quality control process without sacrificing accuracy.

Especially when manufacturing for critical applications, where every single product must be tested, the consequences for component failure can come back to haunt the manufacturer in the form of expensive liability claims. Yet, armed with some advanced knowledge about what to look for in leak testing devices, test engineers can increase the odds that all products will roll off the production line with absolute quality assurance without acting as an anchor to production schedules.

“We had some older manual testers we used in Mexico, but I can honestly say that our new automated testers have cut the test time in half, if not a little more,” says Brian Yutzy, Design Engineer at Marshall Gas Controls in San Marcos, Texas.

Eight Great Things Manufacturing Engineers Should Know About Leak Testing Equipment

1. Insist on application specificity
2. Look for equipment that automates the testing process as much as possible
3. Examine ease of operation
4. Check for fixturing that fits your product
5. Hold out for options in output
6. Consider repeatability
7. Demand good support from the supplier
8. Seek system flexibility for future upgrades

Such impressive gains come from a refocused emphasis on the process of selecting test equipment — one that recognizes the salient differences between devices. What follows are several important pointers that can help any manufacturing engineer determine which leak testing equipment can quickly recast the quality control department into a strong ally of the production schedule while still upholding the highest quality standards.

1. Insist on application specificity

A one-size-fits all approach only succeeds at being universally mediocre.

Leak testing equipment demands especially exacting attention to detail, since even very small leaks can mean the difference between product success or failure in critical applications. Any test equipment must be designed so that it can be adapted to accurately meet the needs of the quality check at hand.

“We used to build all of our test equipment from scratch and, although doing this worked for us, we needed to shorten our project time frame,” says Marshall Gas’ Yutzy. Since 1979, Marshall Gas Controls, a division of the S. H. Leggett Company, has been a high-volume manufacturer of high-pressure and adjustable liquid propane gas regulators, hose assemblies and pigtailed.

“We went looking for an alternative solution, and one of our reps pointed us to Uson, who we worked with to develop a system that fit our needs — they built in the necessary I/O cards, tools, and transducers.”

From its Houston, TX, headquarters, Uson L.P. has been at the forefront of leak testing and non-destructive testing for 50 years, pioneering the development of a broad range of testers designed specifically to address a wide variety of industrial manufacturing test applications.

For particularly challenging applications, the experience of the test equipment vendor accounts for the bulk of successfully channeling a leak tester’s capabilities for the benefit of a specific product. The vendor should consider each unique case, and then maximize the potential of the test equipment to fit that need through a redesign of the

tester or by reconfiguring it — with custom designed pneumatic circuits, for example — to integrate within the manufacturer’s production system.

2. Look for equipment that automates the testing process as much as possible

Ideally, test equipment must feature semi-automatic or fully automated leak detection systems that streamline product delivery, sealing, clamping, testing, and marking.

Timesaving features such as “infills”, which reduce volumes and allow for varying container sizes to be tested in the same chamber with minimum changeover time and expense; PLC connectivity; and remote-start input, can greatly speed the testing process. Additionally, the latest multi-channel testers, some of which can run up to 10 channels, automatically cycle through all the tests at the push of a button.

“Our Uson tester has several really good routines built in that simplify the programming and allow us to complete our testing quicker than before,” says Yutzy.

3. Examine ease of operation

A leak tester, no matter how capable its performance, is nothing if the human/machine interface lacks ready comprehension. Programming should be simplified by software with pre-formatted test configurations easily modified to each application.

Leak testers that work within the Windows® environment also lend themselves toward instant, intuitive operation. Added features to look for include touch screen input, large graphical displays, selectable engineering units, built-in diagnostics and remote troubleshooting.

With the old testers, I was the only one who could support them, so if anything went down, I'd have to jump on a plane — occasionally even to China — to reload the software,” says Yutzy. “But since our new testers are a standardized piece of equipment, the staff at our remote plants can program them by themselves.”

4. Check for fixturing that fits your product

Partly a product of application specificity, the physical process of affixing the product to the leak tester is extremely important, as failures here can quickly undue all other attempts at accuracy and expediency.

At a minimum, leak testers should have attributes like automatic clamping, sealing, and interlocking guards that perfectly match the orifices of the part under test. When speed counts, “quick connect” or “auto coupling” pneumatic self-sealing devices can be specified.

Some leak testers have the potential — by way of custom volume filling inserts — to accommodate industrial components ranging from lumens measured in millimeters, all the way up to 4.5-inch-diameter orifices.

On the other hand, when complicated products, such as those with unusual geometry or multiple orifices, require testing, then a vendor who manufactures custom couplings must be located. Find one who will arrange custom CNC work to create fixtures to handle square and other odd-shaped orifices.

5. Hold out for options in output

When it comes to certifying a manufacturing process, there's nothing like a good paper trail. A complete leak testing system must include options for documenting the testing process.

At a minimum, the tester should be able to input leak rates and other results right into a database such as Access® or spreadsheet such as Excel®, for archival purposes.

Other industry options for data downloading data include RJ-45 Ethernet connectors, RS-232 serial ports, PCMCIA

card slots, and USB ports. Also helpful are screens that display results at the control unit, for interrogation by a supervisor as required. Marking capabilities, whether by ink, percussion or laser, also speed and reinforce the documentation process.

6. Consider repeatability

As any quality control person will tell you, a test has no meaning unless it can be repeated with the same results.

Unlike reliance on the memory of an operator to initiate a sequence of tests, the automation of leak-detection actually improves repeatability because the testing process becomes non-subjective. Innate to some leak testing equipment, the ability to automatically compensate for temperature and humidity changes also helps assure consistent product quality.

“The one thing I'm really pleased with, is the fact that we get repeatable results,” notes Yutzy. *“Uson's Vector system is probably one decimal place more accurate than the equipment I was using before. This allows us to do the tests faster, yet still be comfortable with the results.”*

7. Demand good support from the supplier

Like most any other sophisticated piece of equipment, a leak tester is only as good as the support it gets after it leaves the factory. Here again, the number of years a supplier has been in business counts for a lot, as this adds to its knowledge base in following up on challenging applications.

Look for a supplier that offers custom system design, installation and commissioning services. Some suppliers provide online tools to help test engineers dial in their testing parameters. As an example, Uson provides online tables that offer quick calculations for: hole diameter to flow rate calculation; leak correlation for one gas relative to another; leak rate to pressure drop relationship; flow rate conversion; conversion for volume; conversion for pressure; and hole/size/flow rate approximation.

8. Seek system flexibility for future upgrades

Nothing is constant. Product variations, specification changes and the introduction of new components all mandate changes in testing parameters. A quality leak tester can accommodate such changes, saving the expense of having to buy a totally new piece of equipment.

A modular design suits future needs especially well, as users can choose only those features that may be needed for initial requirements, but later expand the same unit to add capabilities for more complicated applications easily and economically.

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