

Why compressed air leaks matter

Resolving leaks in pneumatic systems will quickly save plants money and safeguard reliability, says Airsave's Pim Duterloo.

By David Sear



Airsave uses a noise detection system to identify compressed air leaks; a filter system enables operators to work in noisy environments.

Airsave's services

- Detection, reporting and repair of compressed air leaks
- Preventative and corrective maintenance of compressed air systems (excl. the compressor)
- Independent advice on improvements plus the latest technologies
- Pressure and flow measurements
- Designing and installing control panels, including CAD drawings and maintenance
- Assistance during shut-downs for maintenance

Picture the scene. You are an engineer working in a process facility and have just installed a pneumatically-actuated valve. No expense has been spared to properly set everything up: the valve has been sourced from an A-list supplier, fitted with a state-of-the-art positioner and connected to the plant's sophisticated control system. Shortly after commissioning, however, it is clear that the valve is not performing as expected. You check and double-check possible reasons: was the valve correctly sized, is a partial wire-break to blame or maybe there's a bug in the control software?

Or perhaps the root cause could be something much more mundane and often overlooked – your plant's pneumatic system. After all, if the compressed air delivery is unreliable, then devices connected to that system may not work as expected.

In that case you would do well to call in a company like Airsave, located in the Netherlands. They are regularly commissioned by process facilities to review, maintain and upgrade pneumatic systems, says company director Pim Duterloo. "Sadly many companies do not see pneumatic issues as an important area to tackle. Air is endless and compressed air leaks are innocuous, so pneumatic systems are not prioritized. Yet identifying and fixing air leaks will quickly save plants money and help to safeguard reliability at the same time."

Preparation is key

Since founding Airsave just a few years ago Mr. Duterloo has helped numerous companies in sectors as diverse as paper and cardboard production, foodstuffs, bio-ethanol production, etc, to improve their pneumatic systems. Whatever the client's business, the key to a successful

Meet Pim Duterloo

Coming from a family of entrepreneurs it is no surprise to learn that Mr. Duterloo started his first company whilst still a student. During his Operational Technology course he spent part of his third year looking at sustainability during his work-placement, saving his host company EUR 50,000 along the way. His college mentor suggested he enter a sustainability competition which he won, drawing the attention of representatives from a local bank. They were so impressed by his technical and commercial ideas that they awarded him a 'no strings attached' start-up capital! During his final year Mr. Duterloo then undertook a substantial project with a process facility, which involved running a complete scan of their pneumatic systems. This took in the compressor, the air quality, piping, leakages, etc, after which Mr. Duterloo recommended improvements to the compressor supply. After graduation, the self-same company then asked Mr. Duterloo to come back and continue working on their pneumatic systems. In addition to running Airsave, Mr. Duterloo often visits local schools to try and get more youngsters enthusiastic about 'hands-on' technology as a career.



project remains the same: understanding the customer's needs, open discussions and thorough preparation.

"What we do depends on the customer, his targets and his budget," says Mr. Duterloo. "Sometimes we simply perform an initial assessment and advise on logical actions to take. Forward-thinking customers may ask us to make an inventory of their pneumatic units and advise on suitable replacements for obsolete components. That way a timely replacement can be obtained should a problem occur. In many

instances however clients commission us to undertake a complete detection and repair project."

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Asked how compressed air leaks can be identified, Mr. Duterloo replies that several options are available. Airsave, however,



Thanks to his technical education and work experience, Mr. Duterloo is no stranger to the hands-on aspects of resolving problems in pneumatic components and systems.

prefers using a system based on noise detection. "The units we use are set up to detect noises at 40,000 Hertz, which is way above what a human ear can pick up. Filters enable the operator to home in on these noise sources and identify compressed air leaks."

Once all the leaks have been identified Airsave openly discusses the results of their plant survey with the customer. Mr. Duterloo: "in principle we of course follow the client's wishes but we will always deliver impartial recommendations. For example, one client's instructions were simple: go out and fix all the compressed air leaks. However, there were simply so many that we advised him it would be more cost-effective to actually replace the entire pneumatic infrastructure."

Airsave staff are used to working irregular hours when it comes to implementing repairs. "During a recent job we practically worked around the clock for an entire weekend. We accept that our clients cannot simply shut down their facilities as that costs them lost revenues. So we plan our activities to cause them the least inconvenience," explains Mr. Duterloo.

Advance preparation is key to ensuring on-site repairs run smoothly, he notes. "Then it is a simple matter of turning up with the requisite tools, all the necessary replacement parts plus ample manpower to complete the job properly and within the designated time-frame. Whenever logical we will pre-prepare more complex systems in-house, such as replacement control panels."

Mr. Duterloo readily agrees that what Airsave does is not exactly rocket science. Nevertheless, he receives a constant stream of enquiries, some from as far afield as the USA. "Sadly we are not yet in a position to accommodate clients that far away! But seriously, I believe that companies are increasingly turning to us as there is a growing shortage of qualified technicians. And that is a shame, as technology in all its forms is surely the key to sustaining a modern society. That's why I often visit local schools to try and get more youngsters enthusiastic about 'hands-on' technology as a career."

Actuator repairs

At this stage Valve World became curious as to the exact sources of typical compressed air leaks. Clarifying, Mr. Duterloo explains as follows: "speaking about the Dutch situation, most pneumatic systems immediately behind the compressor are constructed

The cost of compressed air leaks

Air has to be the cheapest commodity available in any process plant. After all, there is a free, continuous and everlasting source. However, that does not mean that compressed air is cheap – far from it, according to Mr. Duterloo. “The production of compressed air is in fact incredibly energy inefficient. Just 10 per cent of the required electrical energy that drives a compressor is converted into compressed air; the remaining 90 per cent is lost as heat! That is why compressors are sometimes fitted with heat exchangers in an attempt to recover as much energy as possible.”



Further, he notes that multiple small leaks can soon add up. “A 1mm leak in a 7 bar system can easily be costing a plant EUR 500 per year. To put that into perspective, during a recent audit of just two simple units in a process facility we identified no fewer than 83 leakage points! Solve these and you are starting to save significant sums of money indeed. Independent research data shows the return on investment for repairing leaks in pneumatic systems is often as low as just seven months.”

replace them. Personally I have to say I enjoy repairing larger actuators, especially as this is the most sustainable option.” Summing up, Mr. Duterloo advises plants to look afresh at their pneumatic systems. “Lots of first-time customers tell me ‘Oh, there’s no need, we ran a scan once’. But that is simply not enough. Just like any other system, pneumatic units need regular inspection and maintenance if they are to work efficiently and properly. Also, changes over the years can impact performance. For example, that compressor installed twenty years ago may now be undersized or oversized. We can run flow and pressure tests to check that. And don’t forget that a material which works well in one location might not be suitable elsewhere, such as in areas which require steam cleaning. And then there’s the environment to be aware of. So if your new factory is located close to the sea then you should consider salt and hence corrosion; if on the other hand you are sited in a warmer climate then opt for more robust hoses instead of standard products. Believe me when I say that there is more to creating and maintaining a compressed air system than first meets the eye!”

from steel pipes two inches in diameter and installed using threaded connections. Such pipelines are quite robust. It is the smaller branch lines with push-in couplings that tend to leak first, as do flexible tubes that can become porous. Such leaks probably account for the majority of all losses”

Other leaks can be found in pneumatic actuators fitted to process valves. “Typical problems we see include leakages via the exhaust port. These are straightforward to repair or replace, depending on the plant’s preferences. Small actuators are so cheap it makes economic sense to simply