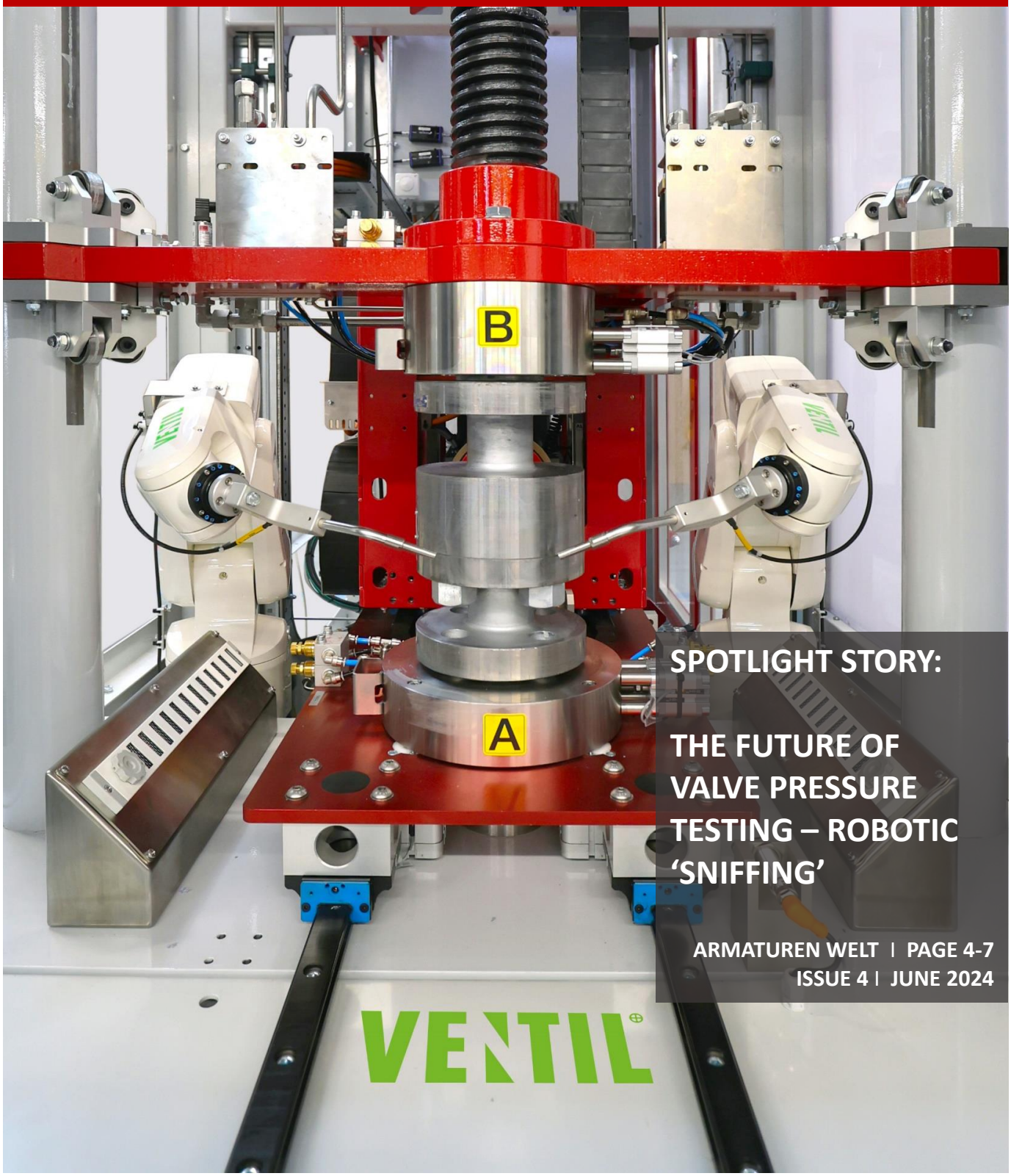
SPOTLIGHT ON

Ventil Test Equipment:

“Revolutionising valve production through pressure testing“



SPOTLIGHT STORY:

THE FUTURE OF VALVE PRESSURE TESTING – ROBOTIC ‘SNIFFING’

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In the spotlight: Ventil Test Equipment

Revolutionising valve production through pressure testing

Ventil Test Equipment has been in business for more than 70 years, accumulating extensive experience in quality control and pressure testing over the last few decades. Despite the valve industry's daily innovations, pressure testing, particularly for Factory Acceptance Testing, has seen little significant advancement. However, in 2023, Ventil began designing and producing their most innovative and effective pressure test bench to date.

The ultimate CNC pressure test bench from Ventil – setting new standards for cycle times in pressure tests. Photo: Ventil Test Equipment

Pressure testing has evolved significantly over the past decades, especially after the introduction of Industry 4.0 principles. This critical step ensures that a produced valve is of sufficient quality and integrity to perform reliably after installation and to not cause direct, potentially catastrophic harm. While there are differences between applications, valve types and test standards, one thing is certain: all manufactured valves must be pressure tested to some extent. It's simply the law. Manufacturing environments sometimes perceive pressure testing as an interruptive process. It adds no additional value to the materials and, quite frankly, is often a slow and inefficient process requiring a lot of manpower. In fact, Ventil's experience with valve manufacturers concludes that 80 to 90% of production bottlenecks are directly related to pressure testing. This waste of potential can be optimised or solved by using the right technology. Let's break down and present Ventil's ultimate CNC test bench.

Save time on pressure tests

Every test performed consists of handling, setting up the tests and waiting time. The combination of these results in a cycle time which, ideally, matches the time to produce a single valve in the factory. Handling can be improved by automating steps, integrating ergonomic tools for the operator or even integrating robotics. A clever way of working will always improve the total cycle time. Today, the return on investment for integrating a robotic arm for loading and unloading is between 1 to 3 years, depending on the application and valve size. The ideal configuration would be a test cell consisting of a test bench and robotic arm, which can be loaded with valves and proceed to test each one without human interaction.

By leveraging robotics technology, manufacturers can achieve higher levels of safety, productivity & efficiency. Photo: Ventil Test Equipment

A key benefit? It could run 24/7. More importantly, the robotic software is integrated into Ventil's in-house developed CNC valve testing software, which anyone can learn without the need for complex training.

Setting up a test generally consists of process steps in the test bench to facilitate the test itself, such as a shuttle to load the valve, a clamping station to create a leak-tight seal and automatic opening and closing of the tested valve between body and seat tests. These steps generally make up 40% of the cycle time and can easily be improved by automation, eliminating waiting time for an operator, increasing the speed of the actions themselves and cleverly using consumables to increase their lifespan and reduce production interruptions. Ventil's self- and energised seals are a great example of how clever

design can directly contribute to productivity.
Finally, the waiting time is generally dictated by the test standard being followed. For instance, EN12266 states test times depending on the valve size – 15 seconds, 1 minute, 2 minutes, etc. But the same standard also allows a reduced test time, as long as evidence can be provided that the test result is representative, based on statistics or technical methods. That's exactly where the largest potential lies.
Using different test fluids can facilitate shorter test times while being able to detect and quantify leakages earlier and more accurately. Imagine a body test using water versus using helium. Helium leaks at a much quicker rate, is automatically detectable using an electronic instrument and is detectable at a much lower concentration compared to water. So, a helium leakage will appear earlier, can be detected and quantified earlier and is detected automatically. The result: a huge potential reduction in cycle time, balanced against the high cost of helium and a mass spectrometer.

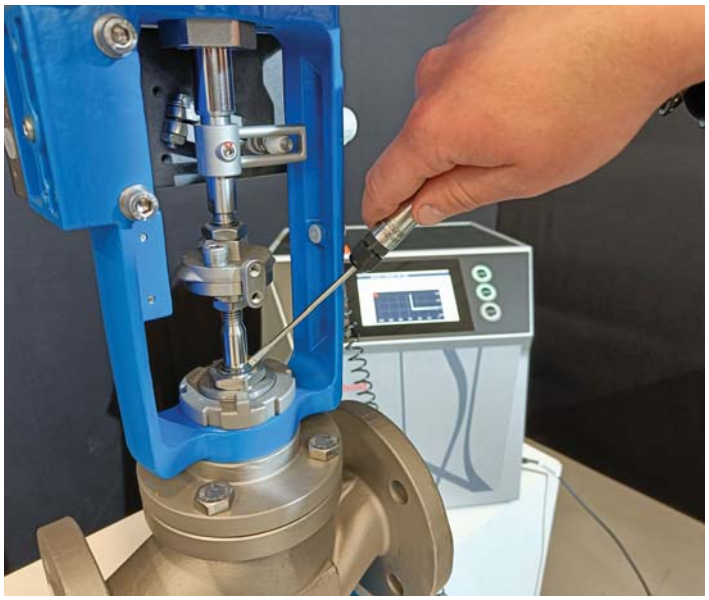
Ventil offers a wide range of technical solutions to improve ergonomics and thus increase productivity. Photo: Ventil Test Equipment

The real game changer: R&D projects and field experience

Ventil spent nearly two years collaborating with Shell Global Solutions to find a more cost-effective alternative to helium. Originally intended for Fugitive Emission Testing, the results led to the creation of the ultimate CNC test bench. In the Netherlands, forming gas is approximately 1/10th the cost of helium while being able to measure with the same sensitivity if the right equipment and conditions are used. In the first-ever use case, the waiting time per valve was reduced from 3 minutes to only 45 seconds, based on a body test, seat test A towards B and then B towards A. Ventil's niche is the profound understanding of gas leakages and the clever integration of the right technology to ensure consistent test results and keep investment costs proportional.

Use manpower more efficiently

The world's first test benches with clamping stations were invented to reduce the labour required to create a temporary seal without the need for blind flanges. These time savings directly increase productivity and justify the investment in a test bench. Today, it is becoming more



Helium leak testing saves valuable time in production. Photo: Ventil Test Equipment

The testing technology adapts to different industries and different requirements. Photo: Ventil Test Equipment

evident that manpower is harder to attract into a manufacturing environment, and the cost of labour is increasing. This generally means that the available hands should be used efficiently for tasks where they are needed. For the test bench, it generally means that steps are automated. An even more interesting proposition is the introduction of multi-station test benches, particularly their multi-thread functionality. Multi-station test benches allow an operator to work on multiple stations simultaneously to increase output. The multi-thread function allows the operator to independently start an individual test on each station, where the stations share common resources such as pressure pumps. This concept allows an operator to focus on important tasks without having to invest in multiple test benches. The best part about Ventil's multi-station concept is the possibility to retrofit stations for future capacity increases.

A Semi-Automatic Ventil VCB-3500 used in daily operation testing NOREVA Check Valves 20"- 80". Photo: Ventil Test Equipment

Use data to create value

The value of testing is not limited to a Pass or Fail result. It is the first step to digitise the valve industry and a fundamental source of data to facilitate digital product passports. Data capturing is a key technology to allow valve manufacturers to participate in smart contracts and remain competitive in the near future.

Captured data is also an essential tool to diagnose production processes and predict maintenance. Incremental pressure loss throughout a tested batch can be used to predict tool deterioration in a lathe or milling station. It could also indicate a shift in maintenance interval for the test bench itself. These kinds of conclusions are the fundamental philosophy behind investments in Industry 4.0. Factory health, based on quality, is captured from the produced valve itself. Ventil's CRS 2.0 valve test software is continuously developed to include advanced machine monitoring, integrate new datapoints and facilitate new data and conclusions.

Customised solutions with 2 to 6 test stations for faster and repeatable performance. Photo: Ventil Test Equipment

Presenting the ultimate CNC pressure test bench

Ventil commissioned the first in a series of the self-proclaimed 'ultimate CNC pressure test bench' in 2024. It is a two-station test bench fully integrated into an

The Full-Automatic Ventil VCB-ULTRA reduces production test cycle times that generally leads to cost savings. Photo: Ventil Test Equipment

automated welding cell. No human interaction is required to operate the test bench, which has an average cycle time of 94 seconds for each station. These cycle times are 90% shorter compared to a conventional test bench, realised by testing with forming gas in combination with the right hydrogen measuring equipment and robotics. The entire test is contained in a high-impact test chamber to ensure safety and create ideal measuring conditions. All system integration is done by Ventil, and all those systems are operated using their intuitive CRS 2.0 software. It is the future of automated pressure test benches, being produced today.

About Ventil

Ventil is a manufacturer of pressure test benches and repair equipment for valves and pressure equipment. Their headquarters is based in the Netherlands, with production locations in the United States and United Arab Emirates, and sales and service branches throughout the world. Employing around 120 people worldwide, Ventil has a global presence and a vast knowledge base in the field of valves. Their contribution to international standards and connections with end-users, manufacturers, service companies and third parties is unique in the market and gives them a unique perspective on valves and testing of valves.

Ventil offers expert advice to find the most efficient solution for the customer. Photo: Ventil Test Equipment

VENTIL®

Facts & Figures

Company:	**Ventil Test Equipment B.V.**
Product portfolio:	**In-house design, custom engineering and manufacturing of VALVE TEST- & REPAIR EQUIPMENT, as well as leak detection, automation and robotics.**
Service:	**Equipment maintenance, break downs, troubleshooting, inspection visits, safety assessments, spare part deliveries, remote monitoring, operating assistance and operator training.**
Branches/Industries:	**Valve manufacturing, service & repair, energy & power, utilities, process, chemical, fugitive emission, leak detection and other pressure retaining equipment.**
Employees:	**120 (globally)**
Foundation:	**1954**
Headquarter:	**Ventil Test Equipment B.V. Polakweg 6 2288 GE Rijswijk (The Netherlands)**
Worldwide representatives:	**Ventil Test Equipment is represented in over 100 countries worldwide and has subsidiaries in the Middle East and the United States.**
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Ownership:	**Private**