# Here's to the future

## The evolution of three-piece can leak testing and present-day technology

As we all know, the contents of food cans spoil when exposed to air. However, this also applies to non-food cans. The quality of the end product or the functionality of the metal container depends entirely on a leak-free can.

Even the smallest of holes – such as a pin-sized hole that is undetectable by the human eye – can lead to the exposure of air and ultimately a spoiled or defective end product. A company's reputation depends on leak detection.


Picture caption

### The history of can leak testing

Testing for leaks didn't start as soon as the can was invented. About 70 years after canning was invented in the 1880s, factories started producing cans using automatic machinery.

About a decade or so later, in 1895, William Stevenson invented one of the first can testing machines. To determine whether a can had a leak, the machine put the can under water and an operator watched for bubbles rising from the can. Imagine being the operator that had to look for bubbles coming from cans all day long. This leak detection method was slow and cumbersome, limiting the full potential of the can production line. However, this was the original leak detection method.

In 1922, the modern aerosol can was developed and this paved the way for an even greater need to develop an automated method of detecting small leaks in cans. In 1935, a man by the name of William Cameron of Cameron Can Machinery patented the modern automatic can tester.

The original can tester used mechanical bellows as the first mechanical control system to detect leaks, replacing the burdensome water leak detection method. When a hole was detected, the bellows triggered a limit switch, firing a solenoid to keep track of the reject. The earlier air testers only had the capability of running 300 cans per minute (cpm). Even with a mechanical bellows control system, the leak testing process continued to limit the full potential of the can production line, because the line is only as fast as the slowest process.

After many years of refurbishing and repairing air testers for its own can plants, in 1956, Borden Machinery developed its own three-piece can leak tester. Borden not only continued to make cans for its own products, but it started to make can machinery for can makers. Borden Machinery was later known as Randolph Machinery Operations and then was sold to Alcoa.

### Pocket testing

There are several methods of checking for leaks during the can production process for three-piece cans, including the use of air pocket testing and decay testing, as well as visual systems. Our focus will be on pocket testing and the use of control systems for leak testing.

Up to this point, the can leak tester was still limiting the full potential of can production lines to 300cpm. Electronic sensing and control technologies helped reduce costs and increase quality in a variety of ways, helping machinery work at optimum productivity and reducing downtime. The use of electronic control technology sets the stage for our present day technology, where the access of information is crucial to predicting and preventing downtime.

### The Hyde Park way

In 1963, a company called Hyde Park Electronics was founded. It originally set out to improve the performance of a Borden pocket air testing machine with the use of electronic controls. After many attempts, the company's technology proved to enhance the performance of the air tester, increasing the quality of the end product tremendously and speeding up the process, enabling the can leak tester to go from 300cpm to 800cpm. Borden was its first of many customers.

In the 1970s, Hyde Park Electronics engineered the first control system for Borden testers, which included a few components: a TD5 pressure transducer, the PS10 pressure amplifier and the memory display MD2/MD3.


Picture caption

During the can leak testing process, the can is fed into the pocket and then the pocket closes, sealing the can inside the pocket. The inside of the can is pressurised with 10psi for sanitary cans or 100psi for aerosol cans. If there is a leak in the can, the pocket area outside of the can becomes pressurised. At a certain location on the tester, the pocket passes by a pressure transducer and the pressure outside the can is measured. The control system attached to the transducer determines if the measured pressure exceeds a predetermined value and is a reject.

Hyde Park Electronics upgraded the technology of the MD2 and MD3 to the MD20 in the early 1990s. The MD20 effectively works in the same way as the MD2 and MD3; however, the MD20 introduced troubleshooting capabilities and an information screen.

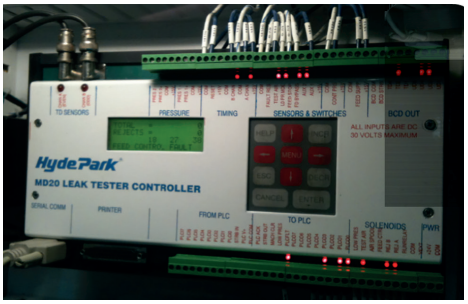
Although the MD20 upgraded the technology, it was still very difficult to set up and adjust using a keypad and a small screen. It was also not capable of storing or displaying much information and reported the pressure within the pocket as a binary number, instead of a true pressure value.

Most can manufacturers with a Borden tester will find these older generation tester controls; however, the MD2, MD3 and MD20 are no longer on the market for purchase. We must look to the new technology in can leak testing for solutions.

**New technology**

The evolution of the can, as well as can leak testing up to this point, demonstrates the spirit of continuous improvement within the can making industry. The technology continues to build upon itself.

Today can leak testing has been enhanced even further with the use of present day technology. But today's technology brings more than just added benefits and ease of use; it brings something very important: access to more information. Information helps prevent downtime and predict maintenance issues. Ultimately, it leads to a better end product.



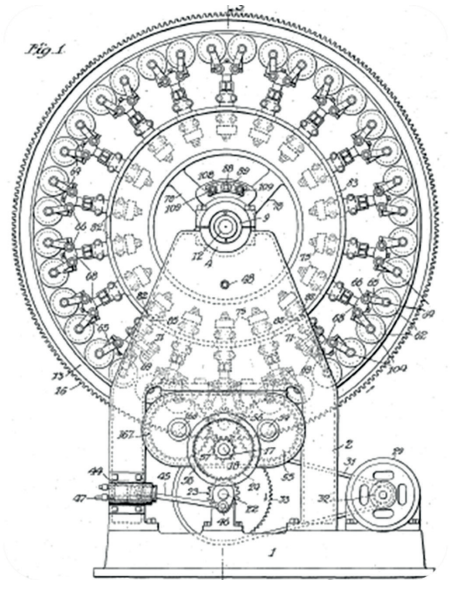

Picture caption

> **The importance of looking back at our history to see where we were and how far we've come, allows us to look forward to the future of leak detection with excitement and wonder"**

**Prime Controls can leak testing control provides valuable information**

TestAlert was engineered and manufactured by Prime Controls to dramatically update the information and reporting capabilities of the Borden can leak tester control system.

Picture caption




Picture caption

Prime Controls had been servicing the previous generation tester controls from Hyde Park Electronics for several years when the need for such an update became obvious. Can makers had an increasing need for information during the leak detection process, such as true or absolute pressure values within each pocket, historical information about each pocket, and reporting capabilities. The ultimate need for more information during the leak detection process would enable can makers to predict maintenance issues, preventing costly downtime and increasing the efficiency and output of the can production line.

TestAlert consists of three main components: the MD30 Control, the Absolute Pressure Transducer and a Human Machine Interface (HMI). The MD30 Control is the heart of TestAlert, incorporating the latest technology with a fast processor, operating beyond any known testing speed.

The absolute pressure capability produces a true pressure value, as opposed to a binary number seen in previous generation controls. The system is smart. Instead of just displaying the number of the last rejected pocket, like in the earlier technology, it keeps track of so much information that the operator doesn't have to predict potential issues.

The HMI makes using TestAlert very simple, with a touch screen display, colourful alerts, recommended courses of action and more. Many additional features of TestAlert will prove to benefit the can plant, including simple set-up, saving companies time and money.

**The future of leak detection**

Regardless of the method of leak detection used, whether pocket testing, decay testing, visual systems or some combination of each, the key takeaway is that leak detection is an important part of quality control during three-piece can production. As the industry evolves and at today's requirement, which calls for more information to improve operations, turns into the unknown requirement of tomorrow, we can appreciate the fact that the industry continually seeks improvement, providing methods to improve the quality of the can and the production process.

The importance of looking back at our history to see where we were and how far we've come allows us to look forward to the future of leak detection with excitement and wonder. Here's to the future.

**For more information:**
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