

NEWS & VIEWS

Testing Excellence

VOLUME 23

Corrosion - a 50% drop in test voltage ?

Electrolyte used for enamel rating corrodes equipment and finds its way into any faulty connections or insulation. The resulting poor connections can cause a drop of as much as 50% in the applied test voltage. This means that cans with metal exposure may go undetected, leading to dissatisfied customers.

Reliable equipment is essential to test for metal exposure, ensuring the delivery of quality products to the end customer. It must be designed to withstand the effects of both electrolyte and the normal wear and tear of a production environment.

Unique Remote Monitoring

The combination of the new Can stand (SI9107) and the SI9100 Enamel Rater uses a unique remote contact monitoring system. This continuously checks the applied test voltage at the contacts of the can stand, and compensates for the effects of any losses in the connections or cables. You can be sure of the consistency and reliability of the test procedure because the right voltage will always be applied.

Built-in Circuit Check

A further feature is the circuit check test button, which applies a known load between the probe and contacts, and can be used at any time to ensure that the stand is operating correctly.

These features are the result of using FMEA (Failure Mode & Effect Analysis) techniques in the development of the new Sencon Beverage

Can Stands, based on our extensive application experience.

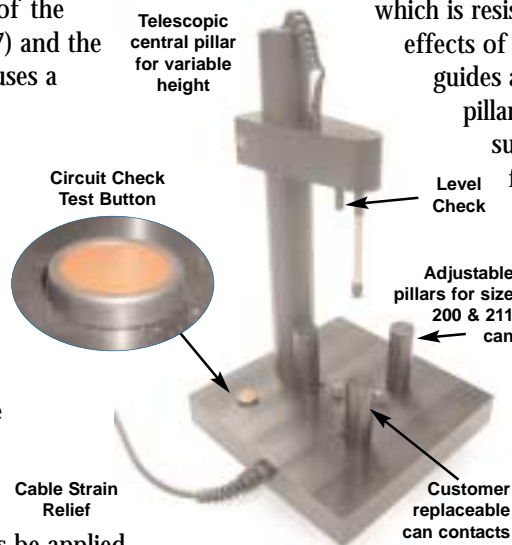
The potential for process errors was addressed in the original design. The level and contact checks ensured that the can was filled to the correct level, and can contacts were good. Now the potential failure modes and effects caused by the electrolyte have been addressed as well in this new design.

Rugged Construction

In addition to the monitoring and circuit test features already mentioned, the stand is made of a hardwearing polymer material, which is resistant to the corrosive effects of electrolyte. Adjustable guides and a telescopic central pillar make the new stands suitable for Beverage cans from 150ml to 568ml capacity.

Durable Moulded Connections

PVC has been removed from the connection cable. The polyurethane cable now used is more durable than PVC and is fitted with strain relief at both ends. The connection to the SI9000 or SI9100 is via a moulded plug and water resistant connectors to prevent electrolyte ingress. If the cable is damaged, renewal is now easy, with the terminal connections accessible through a sealed cover in the base.



For more information on the SI9007, SI9107 or SI9100, tick the boxes on the reply sheet.

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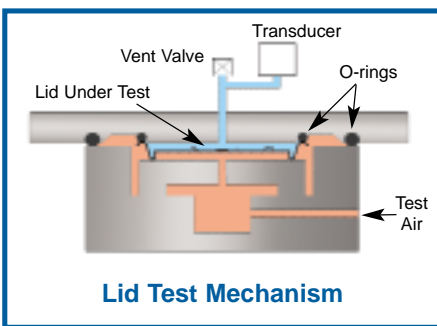
SENCON

CONTROL DOWN THE LINE

Helium or Air for Micro Leak Testing

Part 2

In part 1 - "Pressure testing for micro leaks in lids" (News & Views - Issue 22) - we saw how a combination of light and pressure testing on line helps to determine quickly when there is a problem in lid manufacture. In this issue we look at the choice of gas for this pressure test.



Obviously the most convenient is air, and a little physics shows why it is effective as well.

The leak rate through a virtual hole can be defined by the Hagen-Poiseuille equation. The leak rate (Q) can be characterized by:

$$Q = (\pi \times (\delta P) \times R^2) \div (8 \times L \times \mu)$$

Where:

Q = the leak flow rate

δP = pressure difference across the lid

R = radius of the pinhole

L = length of the hole or crack

μ = viscosity of the test gas

This equation tells us the following:

1. An increase in the pressure differential across the lid causes the flow rate through the leak to increase. Therefore, the easiest method to increase sensitivity is to supply increased pressure. There are some pitfalls here, however. More of this later.
2. The leak rate is inversely proportional to the length of the

hole or crack. A longer crack will leak less than a short one.

3. The leak rate is directly proportional to the square of the radius of the hole. Reducing the hole size by half produces 1/4 of the leak rate.
4. The leak rate is inversely proportional to the test gas viscosity. A less viscous gas produces a more sensitive test. Air has a viscosity of 0.0171, while helium is 0.0186. Helium is about 8% more viscous than air, so a pressure test can be less sensitive if helium is used as the test gas rather than air.

Wait a minute. Helium gives me a less sensitive test ?

If you are using pressure testers, helium produces a less sensitive test if it is flowing through the hole in a laminar (smooth) manner. However, when the hole gets too small (about 5 microns) the flow rate becomes molecular and the Poiseuille equation no longer applies.

Helium is used for alternative leak tests, such as mass spectroscopy. Generally these testers are more expensive to operate, and not easily installed on line.

Now back to pressure tests. We stated earlier that increased pressure gave increased sensitivity, but there were pitfalls. In a pressure tester such as the Sencon MLT, a volume of air is trapped above the lid under test and its pressure monitored by a transducer.

The behaviour of the pressure is approximated by the equation

$$PC = (Q \times T) \div V.$$

Where:

PC = the measured pressure change

Q = the leak rate through the lid

T = the elapsed time period

V = volume of sealed area above the lid

This equation tells us the following:

1. By measuring the pressure change of this fixed volume over a known time, we can determine the leak rate through the lid. No pressure change means no leak. A pressure increase is directly related to the leak rate.
2. Pressure is inversely proportional to the volume. If the volume falls, pressure will rise giving a false leak indication.

So this is why we say there can be pitfalls with too high a pressure with two possible scenarios, because:

1. Too much pressure causes seal creep, which reduces volume
2. Too much pressure causes the panel area of the lid to bulge into the test chamber.

Both of these effects occur well below the burst pressure

Given the wide variety of shapes sizes and materials, the parameters are best determined during commissioning.

What leaks can I expect to detect with the MLT Micro Leak Tester.

Use of air in the Sencon MLT provides an effective complement to on-line light testing, giving a detection rate better than 0.1cc on a 202/209 diameter lid. This is an economical solution for continuous on-line micro-leak testing.

For more information on the Sencon Micro Leak Tester, tick 'MLT' on the reply form. For part 1, download "issue 22" (pdf) from www.sencon.com/nv.htm

'Smart Sensor' adapts to punch material

Fourfold Problems for Sensors

For very good manufacturing reasons, can makers began to use nickel carbide for bodymaker punches.

The problem for sensor suppliers was now fourfold. Not only was the electromagnetic signature of

the punch almost indistinguishable from aluminium, but the signature of punches changed from batch to batch, along the length of the punch, and varied significantly with temperature.



BCM387 Sensor & Control Module

A Single Sensor Solution

With the introduction of its 387 'Smart Sensor' system, Sencon has done away with all the diversity of sensors, giving a single sensor/control module system suitable for any type of punch.

It doesn't matter to the can maker if he is changing from steel to carbide punches, or carbide to nickel carbide, the Sencon system can handle it. With its built in micro-processor and memory, the BCM system 'learns' and 'stores' the unique electromagnetic profile of the punch in just three dry strokes (no can present).

This is true even for 'mixed' tooling, such as a ceramic punch with a steel nose. From then on, the sensor can

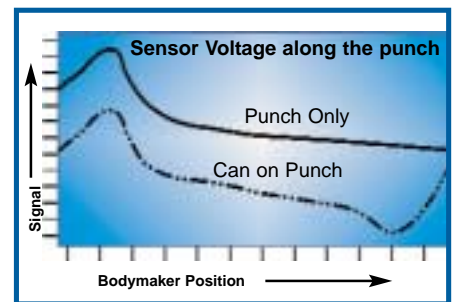
This is true even for 'mixed' tooling such as a ceramic punch with a steel nose

distinguish between the can and punch, giving positive reliable detection of short cans and tear-offs, protecting tooling and improving bodymaker performance.

Extra Features as Standard

The compact control module also offers high speed clutch/brake outputs, immediate or timed output for controlled positional stopping and configurable inputs for sink or source. A further option gives all of these as well as back stop, air strip and dome jam control together with short can, tear-off and dome jam indication.

Tick BCM system on the reply sheet.



A block of cups driven into the tooling once a jam occurs.

Typical damage to a bodymaker punch resulting from non detection of a short can.

New Life for Old Light Testers !

Over 90% of RT-5 and RT-6 users in the USA and Europe have discovered the benefits of upgrading to the Sencon Light Tester Package.

At the core of the original light tester is the light detector head, which has an analogue photomultiplier system as standard. It requires regular maintenance and adjustment, and its performance degrades over time.

ULTP Detector Head



Sencon has designed an upgrade to the light detector head based on a solid state electronics pack using a simplified lighting system.

The immediate benefits gained from upgrading to the Sencon Light Tester Package (ULTP) are:

- ✓ Rugged detectors
- ✓ Long life expectancy
- ✓ No degradation of sensitivity
- ✓ Simplified light source
- ✓ Complete replacement for old photomultiplier system
- ✓ Easy set-up and operation
- ✓ Lower service and adjustment

Sencon engineers will carry out the on-site upgrade and train staff.



Reynold's RT-6 Light Tester

Tick ULTP system on the reply sheet.

Getting the right start solves problems downline

Poor accuracy and poor application quality during the coating process nearly always impact at some point in the body making line.

High utilisation and minimum scrap are common key performance indicators for any line. In a coating line, assurance that each sheet is correctly coated gives everyone confidence that once they are turned into can bodies, problems won't appear such as; weld wire breaks, double sheets or uncoated body blanks.

The SC410 skew measurement system provides 100% on-line positional measurement, ensuring every sheet will have its weld margins correctly positioned. There are two



SC410 Skew Detector

bonus advantages with this system:

First, the coater's positional accuracy can be checked instantly to an accuracy of 0.2mm (0.008") during change-over. This gives more rapid set-ups.

Second, once the coater is running, data from the measurement system allows you to see the average positional deviation of the sheets. Incremental speed increases can be monitored to make sure sheet positioning is maintained.

This technique has allowed some lines to run 20% faster without loss of sheet control.

This safe speed increase has surprised operators who often felt that any increase would cause sheet handling

problems. The hard data from the SC410 gives everyone confidence that at each speed increase, sheets remain under control.

A double sheet detector that doesn't need setting !

With the potential of a 20% production increase, payback by the system can be very rapid indeed.

Double sheet protection is taken as a given, but a double sheet detector that doesn't need setting, avoids the risk of a sensor not being set correctly and missing a double sheet. Sencon's SC230 double sheet sensor automatically reset's itself during plate changes always ensuring it is set for optimum detection sensitivity. A simple Sencon solution to an ever-present risk.



SC230 Double Sheet Detector

Tick SC230/410 on the reply sheet.

This method has given up to 20% increase in line speed without loss of control

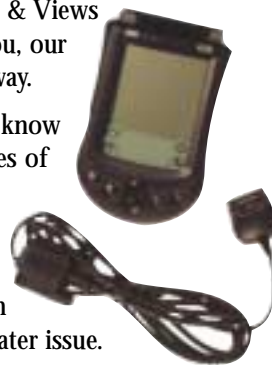
In Brief

Win a Palm Pilot through our latest survey

We are always looking for ways to keep News & Views fresh and up-to-date, and to ensure it is giving you, our readers, the information you want in a readable way.

We want as many of you as possible to let us know your views, so please take just a couple of minutes of your time on your next visit to our web site (www.sencon.com), and fill in the simple pull down menu form.

Your name will go into a new draw for a Palm Pilot, and we will let you know the winners in a later issue.



Video & Information on CD

We are continuing to develop this important side of our marketing information services. Currently the following are available:

- SI9100 Enamel Rater (Video CD)
- SI9600 Film Weight Gauge (Video CD)
- Sensor Selection CD (including Sencon's full product range)
- Repeatability & Reproducibility Spreadsheet

To receive any of these, or our 2003 Mouse Mat, then tick the appropriate box on the reply sheet.

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