

TapTone

APPLICATION NOTES

News and information from Teledyne TapTone, a leader in the package inspection industry.

Identifying pressure defects in LN2 dosed beverage cans

Tested: LN2 dosed aluminium beverage can

Tested with: TapTone Proximity Sensor

The purpose of the test was to prove the effectiveness of the TapTone Proximity System in testing LN2 dosed aluminum beverage cans for leaks or low pressure. Leaking containers can cause product spoilage and under-pressurized containers will become damaged due to the lack of container rigidity. Over pressurized containers will also become damaged as the can end bulges as a result of excess internal pressure.



A can of juice passes underneath the proximity sensor.

By placing a TapTone Proximity system after the retorter on LN2 dosed dairy based drinks or after the cooler on LN2 dosed hot filled beverages, leaking and under-pressurized cans will be detected before they leave the processing plant.

TECHNOLOGY CORNER *How it works*

Proximity technology is used to measure pressure or vacuum in food cans, beverage cans, glass jars, and bottles with pop-up lids by measuring the lid deflection. The proximity sensor produces a continuous magnetic field that monitors the distance of the metal lid and produces a proportional analog voltage. The continuous proximity signal is digitally sampled to produce a merit value of the lid profile. The profile value is then compared to user set limits where containers with lid deflection outside these limits are rejected.



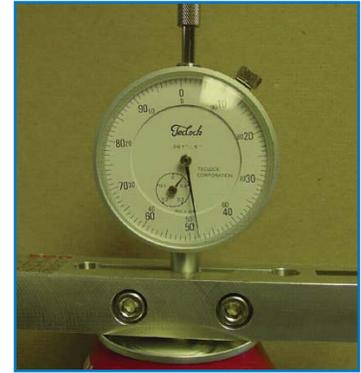
T-4000 Controller and Proximity Sensor



TEST

The evaluation was performed on 11.5oz and 23.5oz, 2 piece aluminum beverage containers. Each container is liquid nitrogen dosed to generate internal pressure. The cans contain a hot filled, non-carbonated beverage.

Deflection of the cans was measured using a calibrated countersink gauge. The measurement was taken from the chines to the rivet at the center of the can. When the can is pressurized, the can end domes up reducing the distance between the chines and the rivet. When the can has no pressure, the can end is flat and the distance between the chines and the rivet is greater. The evaluation showed that the deflection of a can pressurized to 23psi was approximately .050". The deflection of a non-pressurized can was approximately .080". This difference of .030" between a pressurized can and a non-pressurized can generated a large difference in merit value and is easily detectable with a proximity system.



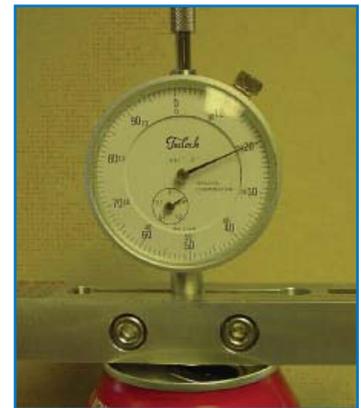
Good can with internal pressure of 23 psi from LN2 dosing. Deflection shows .052" from the chines to the rivet on the pull-tab.

Additional Test Data

| INTERNAL PRESSURE | MERIT VALUE |
|-------------------|-------------|
| 25 psi | 140 |
| 11 psi | 106 |
| 7 psi | 95 |

Note: The test above was conducted on a can that has been under pressure for an extended period and has had the time to develop a set or memory of its pressurized shape. In production, the can end will not have the chance to develop a set and the difference between a pressurized can and a flat can will be more pronounced. The proximity system will detect deflections as small as .010" - .015" depending on variables in the application.

Test location would be post cooler on the pull tab end of the can. If cans are inverted, a TapTone Force system is recommended.



Flat can with no internal pressure. Deflection shows .080" from the chines to the rivet on the pull-tab. Center of can end has dropped from loss of internal pressure.

SUMMARY

The test data shows that the TapTone Proximity system can differentiate between a good pressurized container and a container with low pressure.

RECOMMENDED SYSTEM OPTIONS

1. X-ray Fill Level Sensor - Fill level is critical to controlling the internal pressure in LN2 dosed containers. The X-ray fill level sensor will detect over fills and under fills that may result in an improperly dosed can.



2. Down Can Sensor - used to detect cans that have fallen over on the line and were not inspected.



3. Proximity Test Can - The TapTone Curvature Test Can provides a repeatable curvature for gauging the performance of your TapTone Proximity System

- The test can has two individually adjustable ends to set pass and fail merit values.
- The hard coat anodized aluminum construction provides excellent durability in production environments.



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