TAPTONE
APPLICATION NOTE
Volume 2, No. 7

LEAK INSPECTION IN HOUSEHOLD CHEMICAL CONTAINERS

Tested: Plastic Bottles with Screw Caps

Tested with: TapTone 4000 Dual Sensor Compression (DSC) System

The purpose of the evaluation was to prove the effectiveness of the T4000 DSC in identifying containers with defective or misapplied caps or imperfections in the thread area of the container. Common household cleaning products can contain ammonia, chlorine, formaldehyde, lye and acids. These chemicals can cause eye, skin and respiratory irritation. They can also damage fabrics, carpets and upholstery. A leaking container can represent a safety and environmental liability to the manufacturer. The T4000 Dual Sensor Compression system is capable of detecting leaks as small as 0.008 inches or 0.200 mm at speeds of up to 250 feet/min or 1.27 meters/sec.

Plastic Household Chemical Containers

TECHNOLOGY CORNER
How it Works

TapTone 4000- Dual Sensor Compression

The T4000-Dual Sensor Compression system finds and rejects leaking and damaged flexible bottles at production line speeds up to 250 feet per minute. The system is designed with dual parallel belts suspended over the customers existing conveying system.

As the container passes through the system, the dual parallel belts apply force to the sidewall of the container. This action compresses the headspace of the container which allows a comparative measurement to be taken at both the infeed and the discharge of the system. Comparing the container to itself between the infeed and discharge of the system, eliminates typical variations seen in the production environment (Fill Level, Product Temperature, and Container Density).

Utilizing advanced DSP technology the T4000 controller analyzes the comparative measurement and assigns a merit value to each container. If the merit value is outside of the acceptable range, a reject signal activates a remote reject system.

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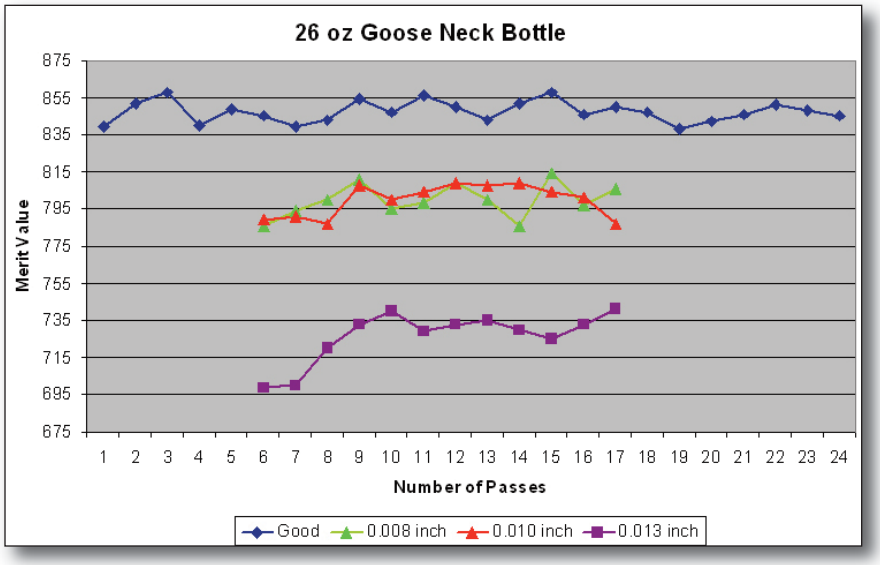
TEST

Testing was conducted on multiple styles of Household Chemical containers ranging in size from 14oz to 64 oz, (.5 liter – 2 liter).

Testing on the 26 oz, (.77 Liter) Goose Neck Bottle. Good, non-leaking containers were passed through the Dual Sensor Compression (DSC) system multiple times, to establish Entry, Exit and Leak merit values for non-leaking containers. The average Leak merit value for a non-leaking container was found to be 847.

To create leaking containers, the caps were removed from good containers and replaced with calibrated orifices of varying sizes. Containers with .008" and .010" (.203mm and .254mm) calibrated leak orifices were tested multiple times. The average leak merit value for both the 0.008" and 0.010" (.203mm and .254mm) leak was 800. This was almost 50 merit value points below the good non leaking container. The average merit value for the 0.013" (.330mm) leak orifice was then fitted and containers were tested multiple times. The average leak merit value for the 0.013" (.330mm) leak was found to be 727. This was 120 merit value points below a good, non-leaking container.



*Merit value is a calculated number determined using an algorithm to compute a resultant from a set of data values.

SUMMARY

The results indicate that the TapTone 4000 DSC system can successfully be used to detect leaks as small as 0.008 inches (0.203 mm) in Household Chemical containers at full production line speeds. .

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