



TapTone

APPLICATION NOTES

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

HOW TO DETERMINE IF A CONTAINER CAN BE INSPECTED WITH THE T4000 DUAL SENSOR COMPRESSION SYSTEM

PART 1 CONTAINER DESIGN

Tested: Various Plastic Containers
Inspection Desired: Leak Inspection
Tested with: T4000-Dual Sensor Compression

The purpose of this series of application notes is to explain how to determine if a container is suitable for inspection with a TapTone T4000-DSC.

The application note will be divided into three parts;

- Part 1** - Container Design
- Part 2** - Closures & Seals
- Part 3** - Fill Level and Contents



A bottle of juice passes through a TapTone 4000-DSC.

TECHNOLOGY CORNER *How it works*

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.



T4000 Dual Sensor Compression (DSC) System. Sensor has a cantilever design that suspends over the existing conveyor.



Container design

The T4000-Dual Sensor Compression system is designed to compress the side wall of a container then measure the tension of the sidewall with a sensor located behind the compression belts. The system requires that the container have uniform rigidity in the area of inspection regardless of the containers orientation. A container must have a surface area that is at least 38mm, (1.5inches) high to accommodate the 38mm compression belts on a T4000-DSC.

In a perfect world all containers would have straight sides with no shapes or contours to interfere with the inspection. In reality, very few applications involve this type of container. Most containers are designed with some contour on the sidewall of the container. Some containers have a narrow mid-section others have a bulbous mid-section. Some containers will have vacuum panels or retort panels in the sidewall to allow the container to keep its shape once the container draws a vacuum. Containers can have rigid corners or hand grips in the sidewall designed to make the container easier to hold.



Figure 1 is a hot filled juice container with horizontal rings around sidewall. This container could be squeezed anywhere in the mid-section as indicated by the dotted lines. (When inspecting hot filled containers, it is best to inspect while the container is hot. This topic will be covered in more detail in Part -3 of this series.)



Figure 2 is an industrial chemical container. The handle has a rigid edge that would interfere with the inspection. The bottom of the container has a uniform flat surface where the compression belts can contact the container as indicated by the dotted lines.



Figure 3 is a juice container with a multi-contoured body wall in the top half of the container. The bottom section of the container presents a large area for the compression belts.





Containers with contoured mid sections can be inspected using the tapered belt option. The compression belt has tapered upper and lower edges and a flat narrow mid section. This belt design allows the system to make contact with the midsection of the container without damaging the bulbous top and bottom. If a production line runs both contoured and flat sided containers, the tapered belt can be used on both containers.

Pouches, Cups and Tubes

Pouches, cups and tubes can be inspected on the T4000-DSC. The pouches and tubes must be standing in an upright position. The system will detect small holes in the dry headspace of the pouch or tube. The system will detect leaking seals or seams provided the leak path is large enough.

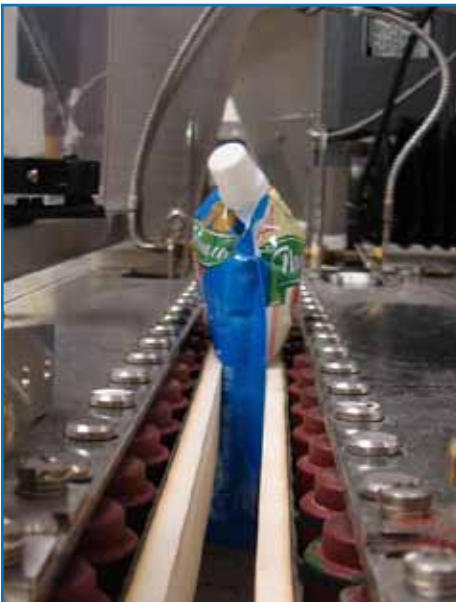




Figure 1



Figure 2



Figure 3

Container designs that may interfere with compression inspection

The images (above) are examples of containers with designs that limit the inspection capability on a T4000-DSC. The handle and hand grip in figure 1 and figure 2 do not leave any space for the 38mm belts to compress the container. The edges of the hand grip designs may have rigid corners that will interfere with the inspection. Some containers may have a contoured shape that requires the container be oriented before entering the compression belts. The container in figure 3 in the shape of a bear has rigid sides but the flat surface on the front and back of the container present an acceptable compression surface.

Sidewall Flexibility

The easiest way to determine if a container is flexible enough to be compressed in a T4000-DSC is to place the container between your fingers and squeeze it. Try to use two or three fingers to simulate a 38mm compression belt. If the container compresses to a point then stops this is typically a good candidate for compression testing.

To take your evaluation one step further, break the seal of the container. Can you squeeze the container a little more and push some of the head space out through the broken seal? If so, this container is a very good candidate for inspection using compression technology. When you squeeze with your fingers and find the container is too rigid or has rigid edges or corners that interfere with your hand test than take a photo of the container and send it to TapTone for a visual evaluation.



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