



**THERMAL PROCESSING  
TRAINING**

# **Module 19. Container Handling**

**Section 431.2(a)(1-3) - Containers and Closures**

**Section 431.6(i) - Post-Process Handling of Containers**



# Purpose and Objectives



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- Purpose of Module 19
  - Provide knowledge of good and bad practices for container handling.
- Performance Objective
  - Can assess container handling and identify poor practices.



# Introduction



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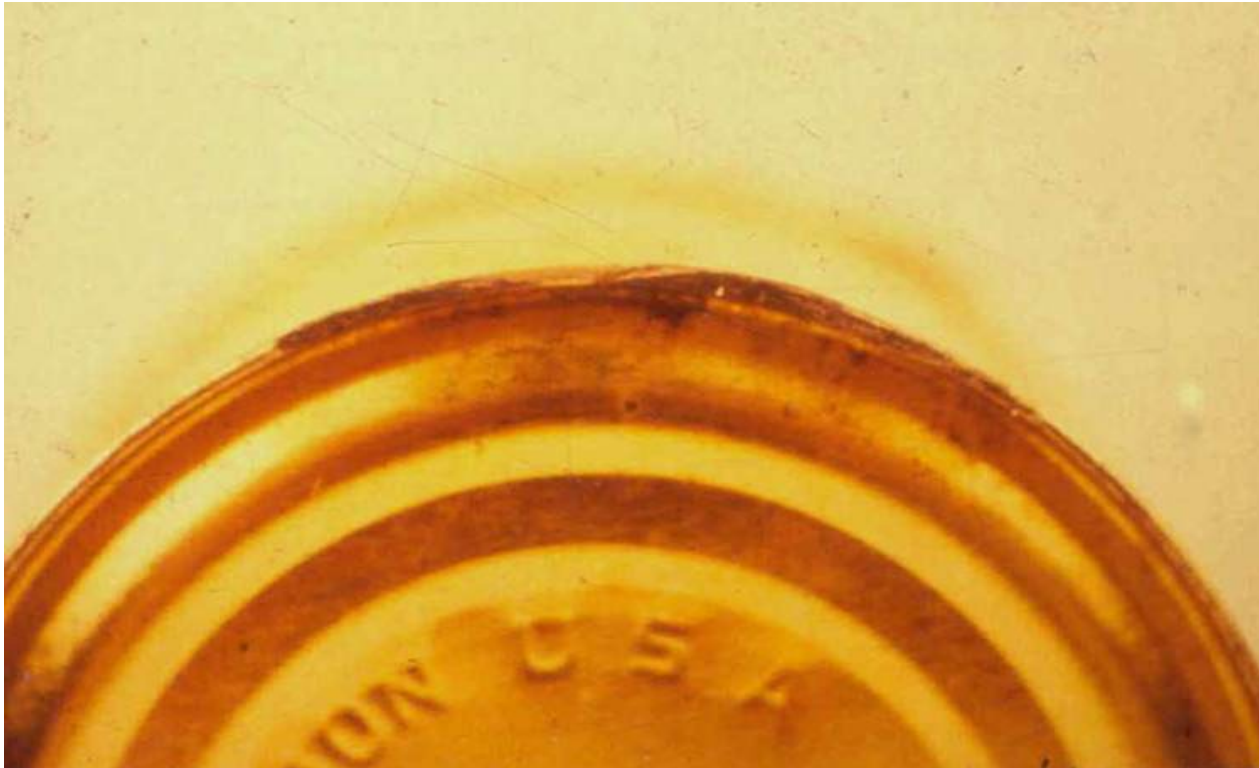
- Causes and prevention of loss of container integrity
  - Container integrity is easily taken for granted
- Leaker spoilage diagnosis
  - Causes of leaker spoilage
  - Investigation of leaker spoilage



# 1978 Botulism Outbreak Caused by One Can with a Gouged Double Seam



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# 1982 Botulism Outbreak



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Can body torn at  
can Mfr.'s end



# Food Containers



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- **Must maintain hermetic seal under commercial operating conditions**
- Applies to all commercial containers
  - Metal can/tray
  - Glass jar/bottle
  - Semi-rigid & rigid plastic
  - Flexible pouch
  - Paperboard containers



# Requirements for Safe Preservation of Canned Foods



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- Hermetically sealed container to prevent microorganism re-entry
- Heat process to ensure product commercial sterility
- Post process handling that protects container integrity



# Requirements for Safe Preservation of Canned Foods (2)



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Can  
damage  
can  
cause  
good  
seams to  
leak.





# Pre-production Container Handling



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- Examine empty containers
  - Determine methods for cleaning
- Minimize rough handling
  - Look for handling procedures that may damage containers prior to filling



# Blanching



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- Raw vegetables are cooked in hot water or exposed to steam
- May affect container integrity, the thermal process and product quality



## Blanching (2)



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- Shrinks product to assist in the proper filling of container
- Expels cellular gases to reduce strain on container during thermal processing



# Filling



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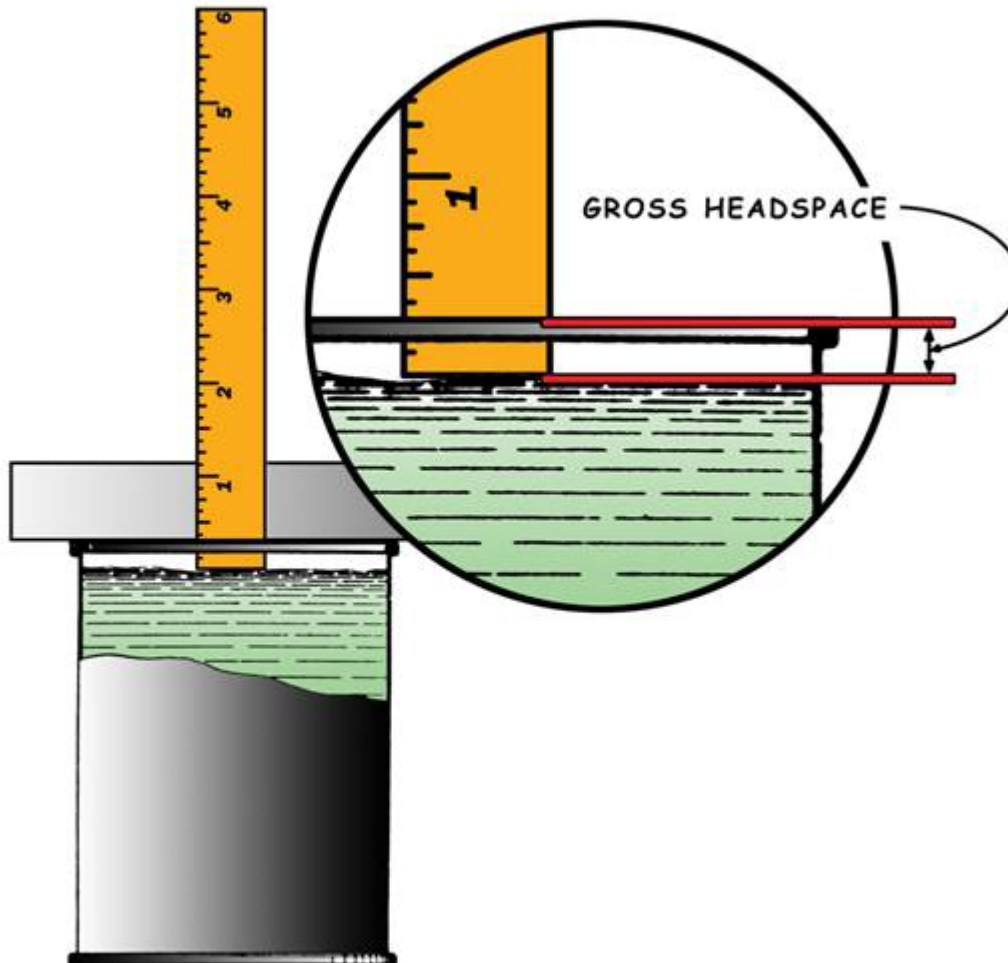
- Provide adequate headspace
- Prevent product from being trapped in seam or seal
- Provide for correct fill weight and product characteristics



# Measuring Headspace



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# Container Closure to Prevent Leakage



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- Maintain seaming/sealing equipment
- Prevent over-filling
- Avoid damaged containers



# Container Vacuum



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## Important Points:

- Reduction of the oxygen level in the container
- Protects containers from distortion
- May affect heat transfer during thermal processing



# Checking Vacuum



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# Benefits of Container Vacuum



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- Presence of vacuum normally indicates that seal is intact
- Low oxygen content minimizes undesirable chemical reactions

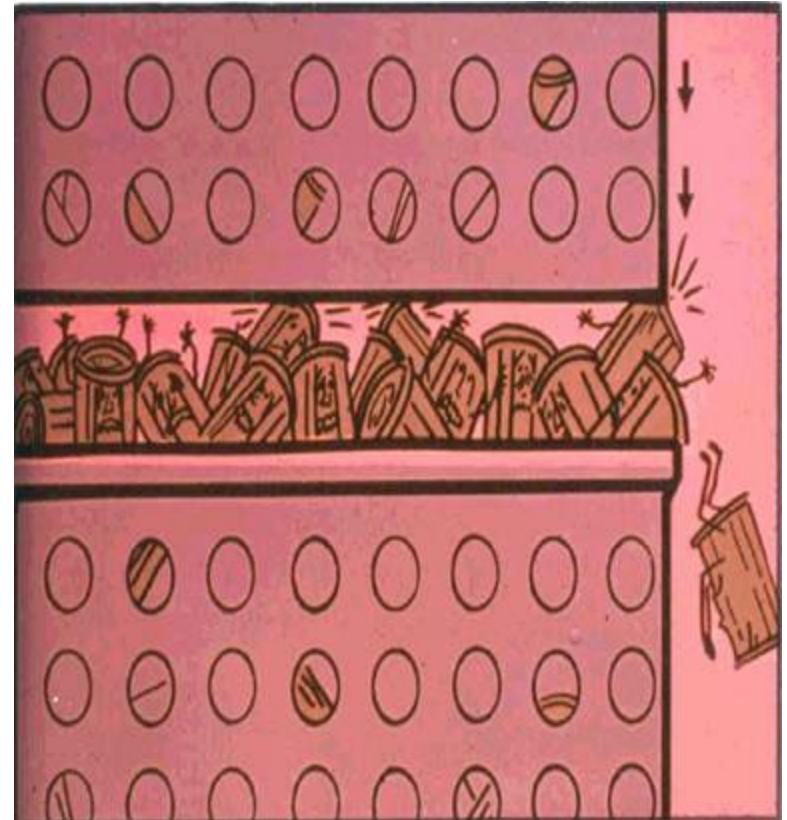


# Thermal Processing Operations



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- Examine retort racks for damage
- Design loading/unloading systems to minimize damage
- Operate retort properly

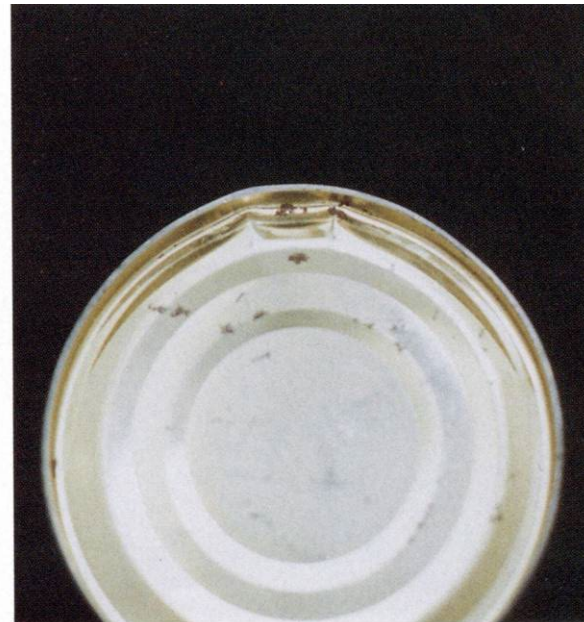


# Container Buckling



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- **Prevented by adequate container vacuum and/or pressure cooling**
- May cause strained seams/seals to leak



## Container Buckling (2)



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Excessive buckled or swollen cans may be caused by malfunction during thermal processing, by microbiological growth, or by hydrogen swelling.





# Container Paneling



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- Inadequate pressure control during cooling (pressure too high and/or exposure time too long)
- Not considered serious



# Influence of the Cooling Operation



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- Containers usually water cooled
- Seams or seals under stress
- Minute amount of cooling water may enter container



# Cooling Cans in Cooling Water Canal



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## Post Process Handling (2)



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- **Careful handling necessary through:**
  - Labelling
  - Palletizing
  - Casing
  - Warehousing





# Leaker Spoilage in Canned Foods



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- Vacuum may draw bacteria through a less than secure seal
- Spoilage due to bacterial contamination after processing



# Cause of Leakage



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- Container defect occurring during manufacture or closing
- Momentary failure of seal
- Damage in warehouse or store



# Post-cooling Container Handling Bacterial Contamination



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- May develop on wet and soiled container handling equipment
- Transferred to seam/seal areas
- May cause recontamination spoilage

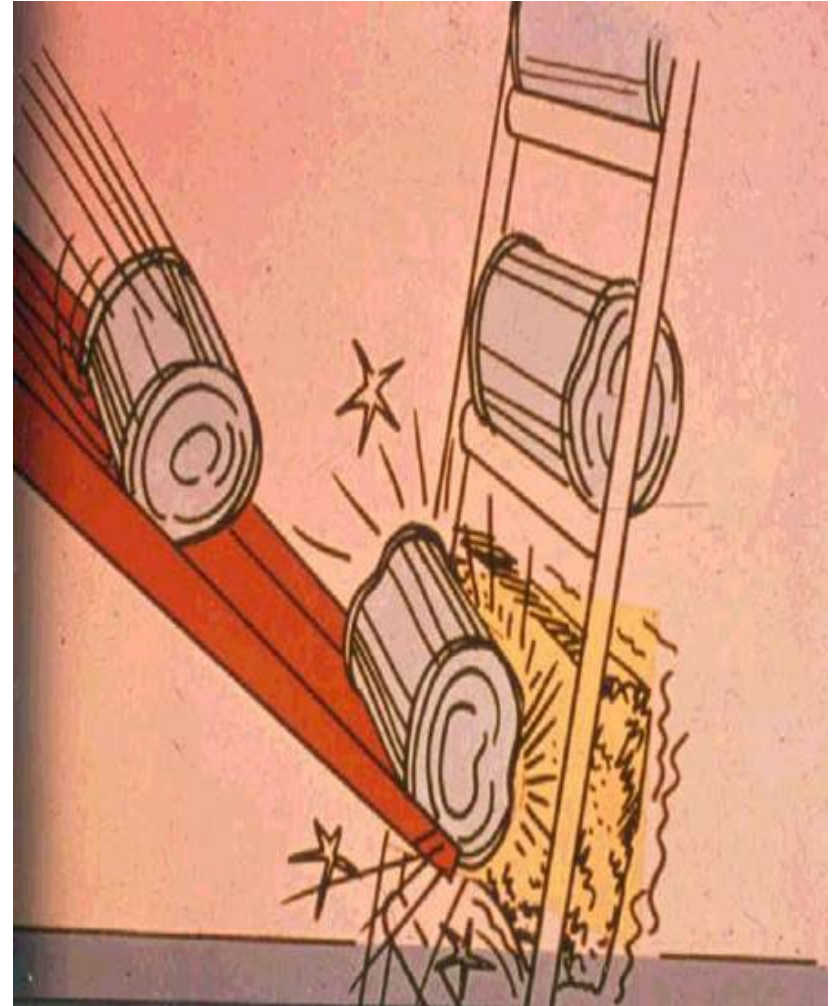


# High Speed Container Handling



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- Small dents may occur that cause momentary leakage
- If bacteria are present, some may be drawn through seam



# Can Abuse Versus Microbial Count



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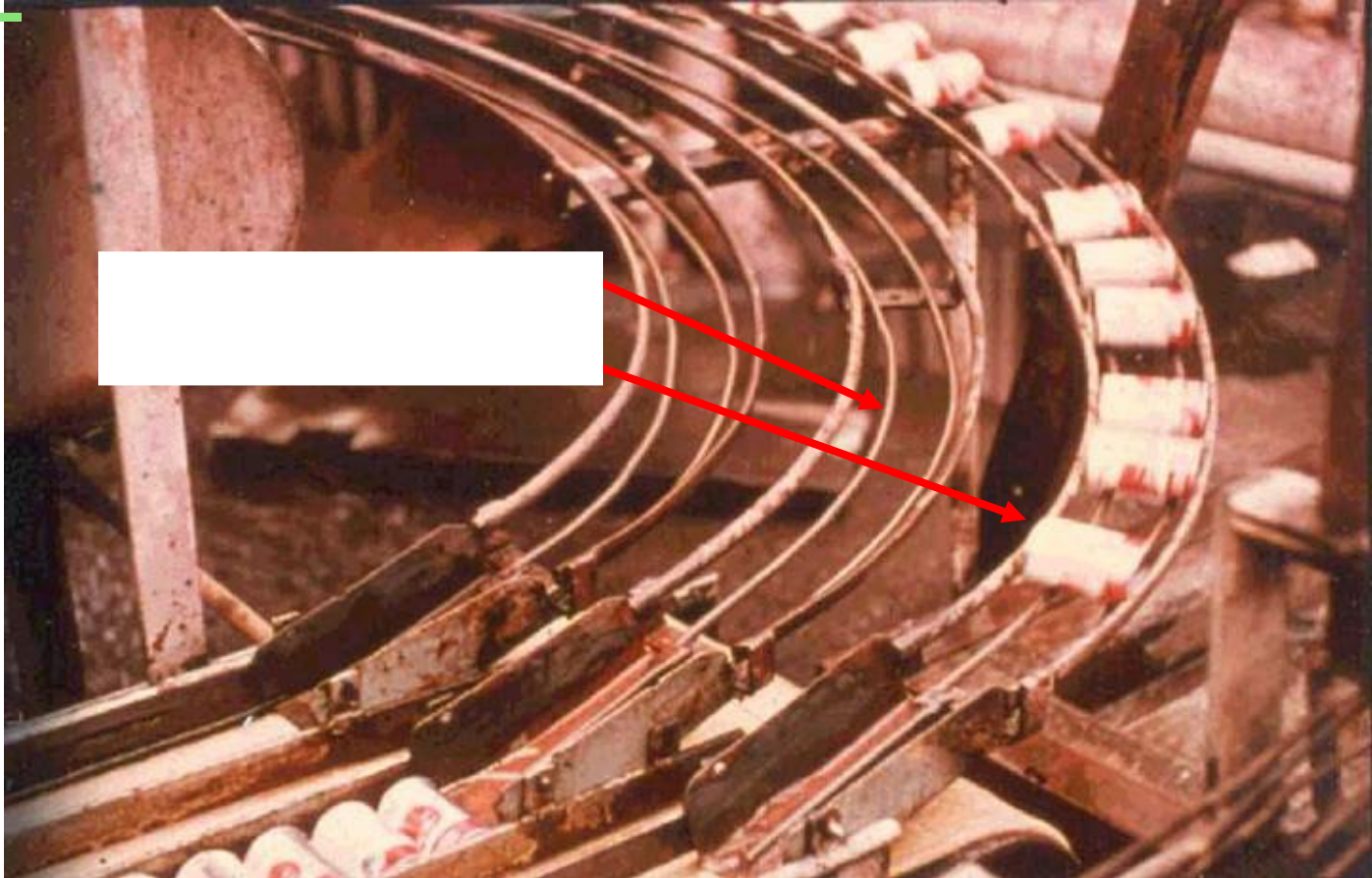
- Can abuse influences spoilage rate more than the number of microorganisms on seams



# Can Runways



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Constructed in a manner that prevents double seams from contacting contaminated surfaces

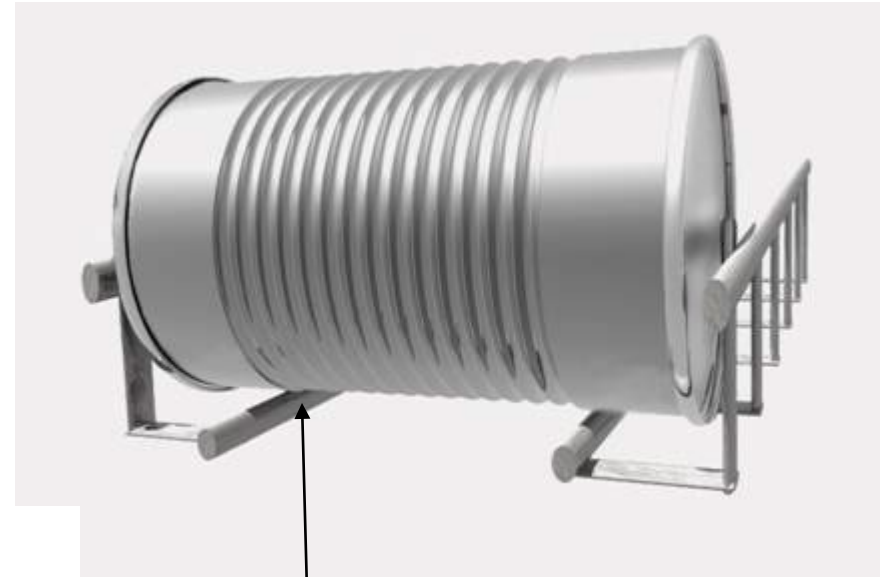




## Can Runways (2)



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**Rolling cans on the body**



# Container Handling Lines



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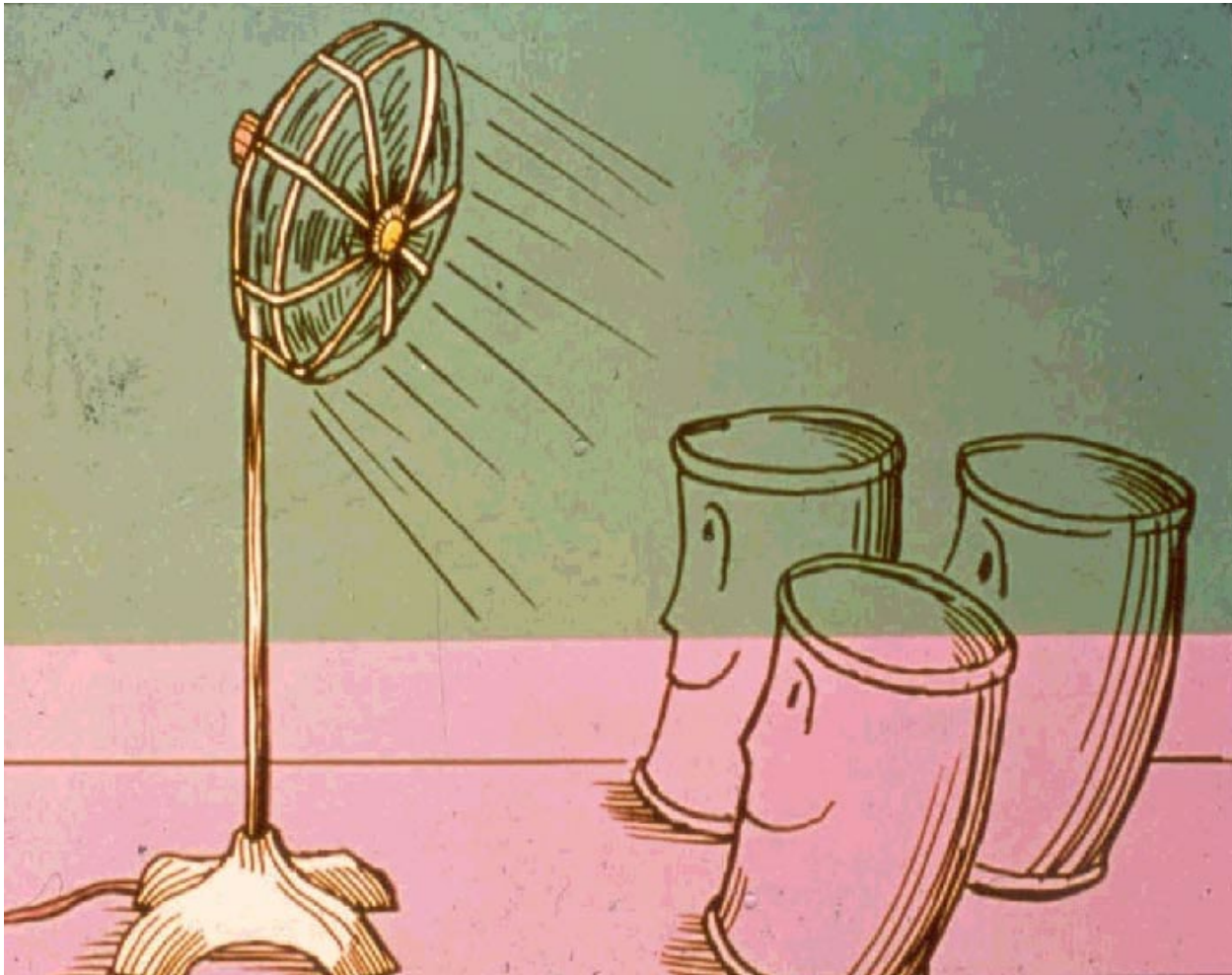
- Tracks, belts and bars that contact container should be cleaned, sanitized and kept dry







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Good quality air must be used to dry containers.



## Key Points



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- Leaker spoilage occurs from re-entry of microorganisms after the thermal process.
- Blanching and filling controls play a role in forming a good vacuum.
- The seal surfaces need to be free of product debris during sealing.
- Rough handling of containers may lead to leaker spoilage.



## Key Points (2)



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- Container cooling water should be chlorinated or otherwise effectively sanitized.
- Post-process equipment should be cleaned and sanitized.
- Examine containers at several points in the line and look for defects. When defects appear, investigate back to the last point on the line where examination revealed no defects. Find the cause of the defects and repair.



# Questions



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*Questions?*

