



**THERMAL PROCESSING  
TRAINING**

# **Module 17. Closures for Glass Containers**

## **Section 9 CFR 431.2(c)**



# Purpose and Objectives



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- Purpose of Module 17:
  - Provide knowledge of common closures and techniques to evaluate closures for glass containers.
- Performance Objectives:
  - Can evaluate glass closure examinations and determine whether recorded results are complete and within specification.



# The Basic Parts of a Glass Container



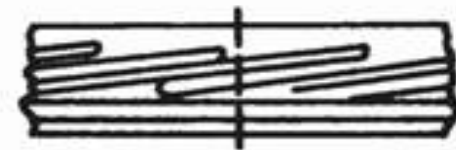
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- **Finish:** Holds cap or closure
- **Body:** Made in body mold
- **Bottom:** Made in bottom plate



CONTINUOUS THREAD  
(C.T. FOR SCREW CAPS)



PUSH ON  
TWIST OFF (PT)

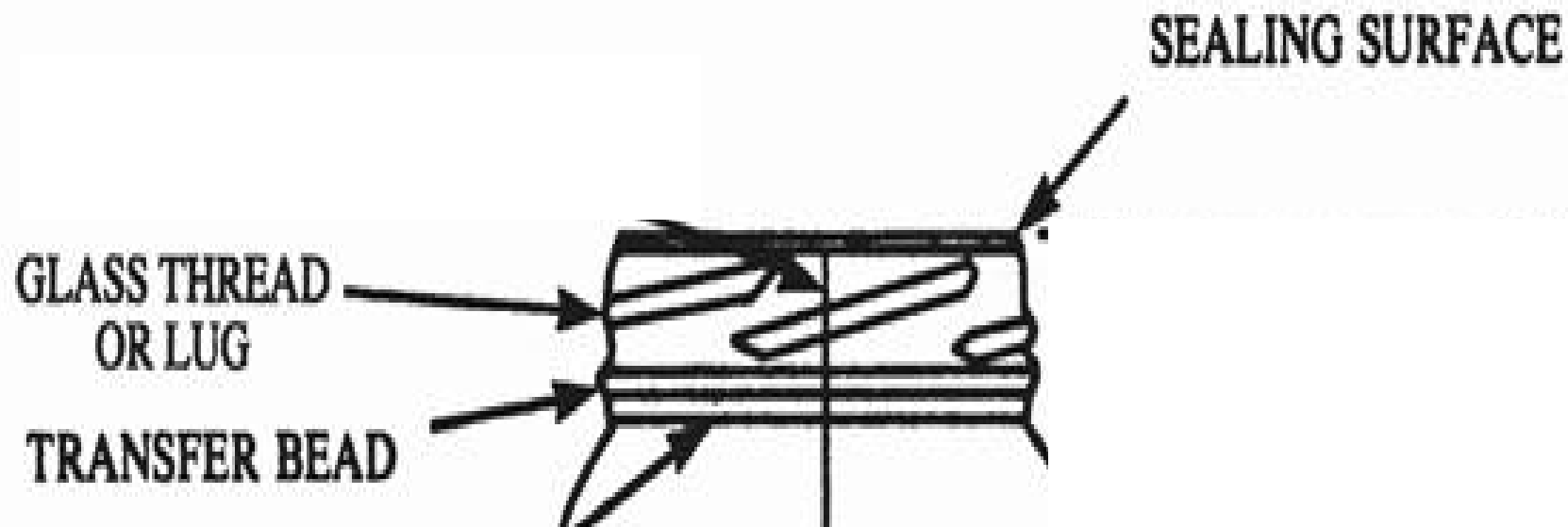


# The Finish



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- **Sealing Surface:** Contacts sealing gasket
- **Glass Thread or Lug:** Protruding ridges for fastening closure
- **Transfer Bead:** aids in transfer of container



## The Finish (2)

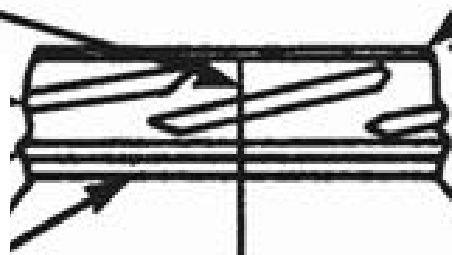


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- **Vertical Neck Ring Seam:** A line from matching the two parts of neck ring
- **Neck Ring Parting Line:** Horizontal line from matching neck ring parts with body-mold parts

VERTICAL NECK  
RING SEAM

NECK RING  
Parting Line

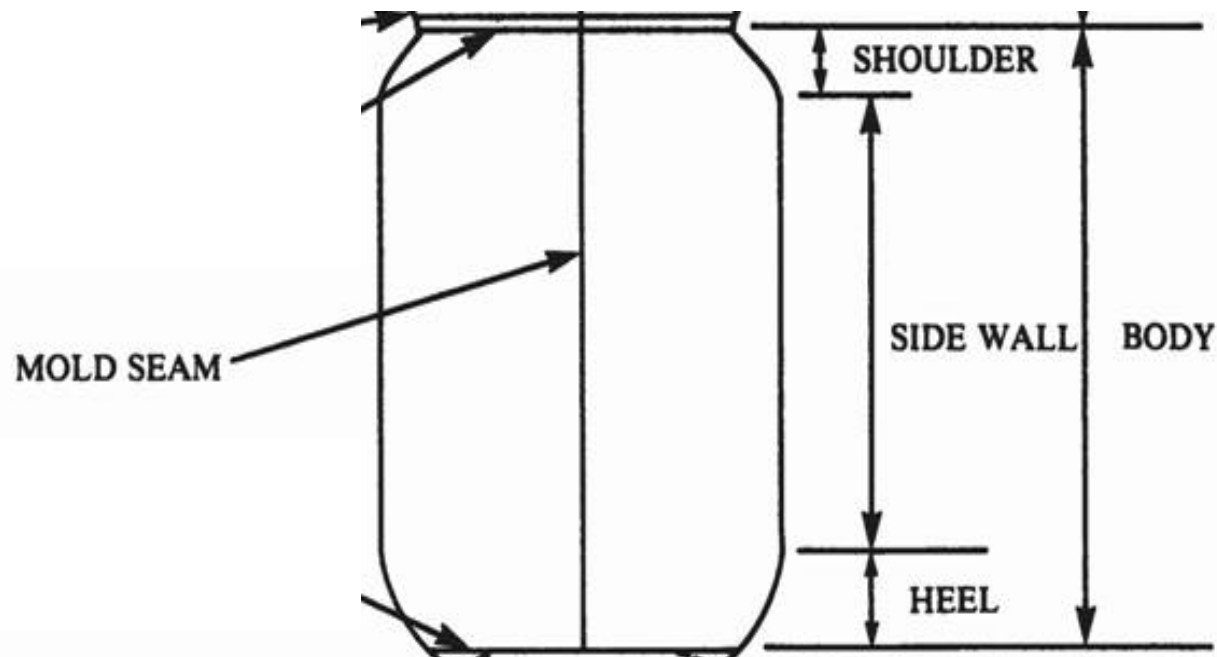


# The Body



## THERMAL PROCESSING TRAINING

- **Shoulder:** Top portion where diameter decreases
- **Side Wall:** Area between shoulder and heel
- **Heel:** Curved portion at bottom
- **Mold Seam:** Vertical line from matching two parts of body mold

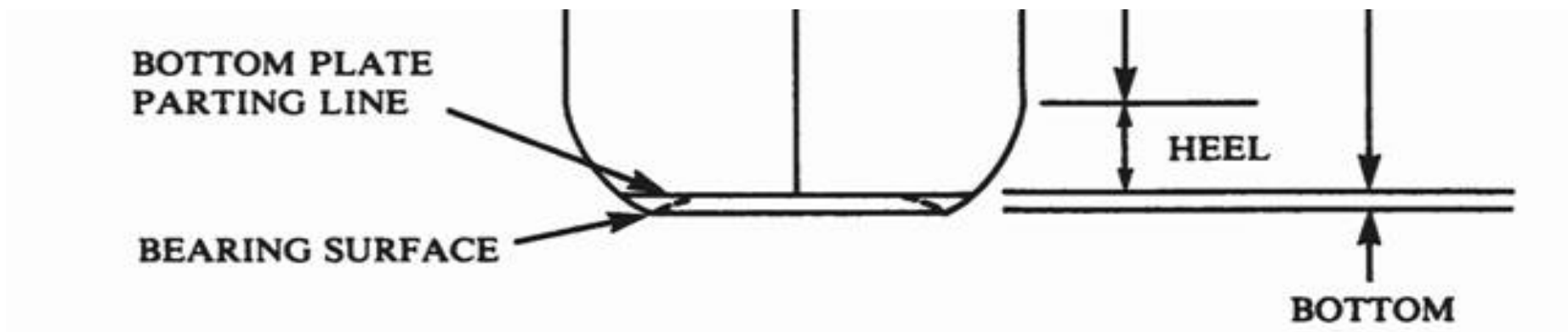


# The Bottom



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- **Bottom Plate Parting Line:** Horizontal line from matching body-mold parts with bottom plate
- **Bearing Surface:** Portion on which container rests



# Discussion of the Finish



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- Hundreds of different finishes
- Specific finishes are designed for specific closures
- Glass finishes are standardized



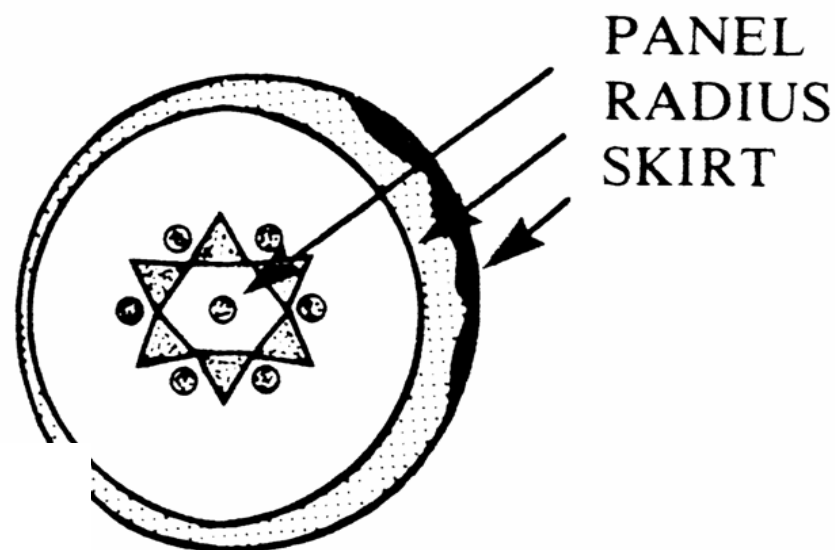


# Terms for Glass Closures



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- **Panel:** Flat center of cap top
- **Radius of Shoulder:** Connects panel and skirt
- **Skirt:** Side of cap that serves as gripping surface

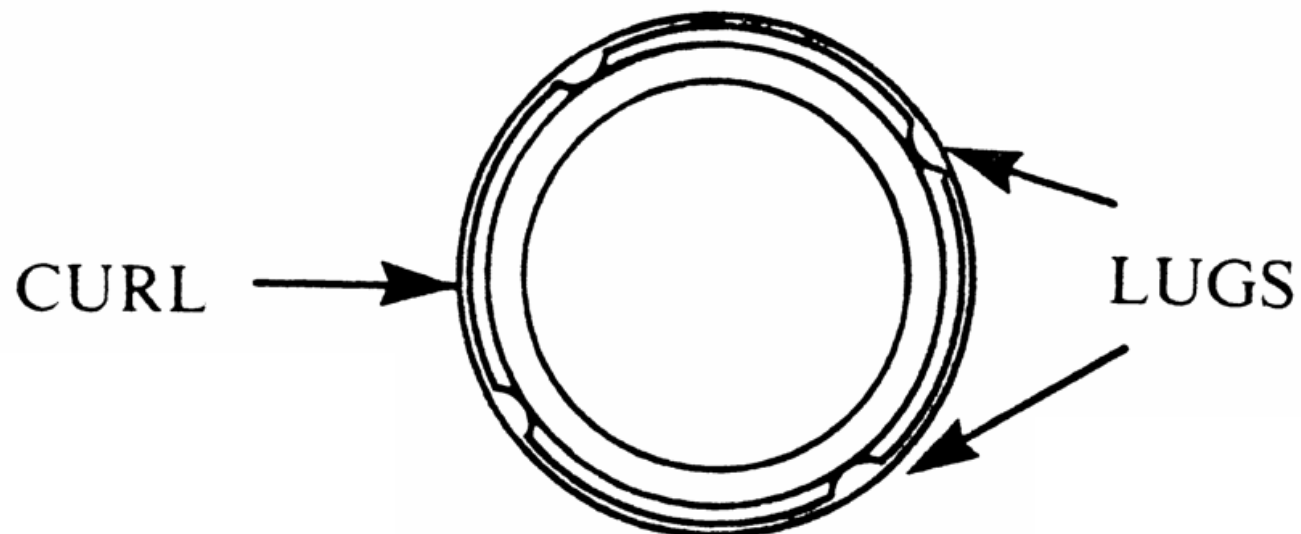


# Terms for Glass Closures



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- **Lug:** Protrusion from curl that holds cap in place
- **Thread:** Spiral groove on continuous thread closures



## Terms for Glass Closures (4)



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- **Coatings:** Protect cap metal, adhere gasket material and decorate closure
- **Gasket:** Sealing member of cap
- **Plastisols:** Gasket material
- **Safety Button or Flip Panel:** Raised, circular area in panel center used in dud detection and as an indicator to consumer



# Factors Affecting Vacuum Formation



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The vacuum within the container plays a vital role in forming and maintaining a good seal.

1. Headspace
2. Product sealing temperature
3. Air in product
4. Capper vacuum efficiency



## 3 Principal Vacuum Closure Types



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- Low-acid products:
  - Lug or twist cap
  - PT (Press-on Twist-off) cap
- Acidified products:
  - Lug or twist cap
  - PLCT (plastisol-lined continuous thread) closure



# Closure Evaluation



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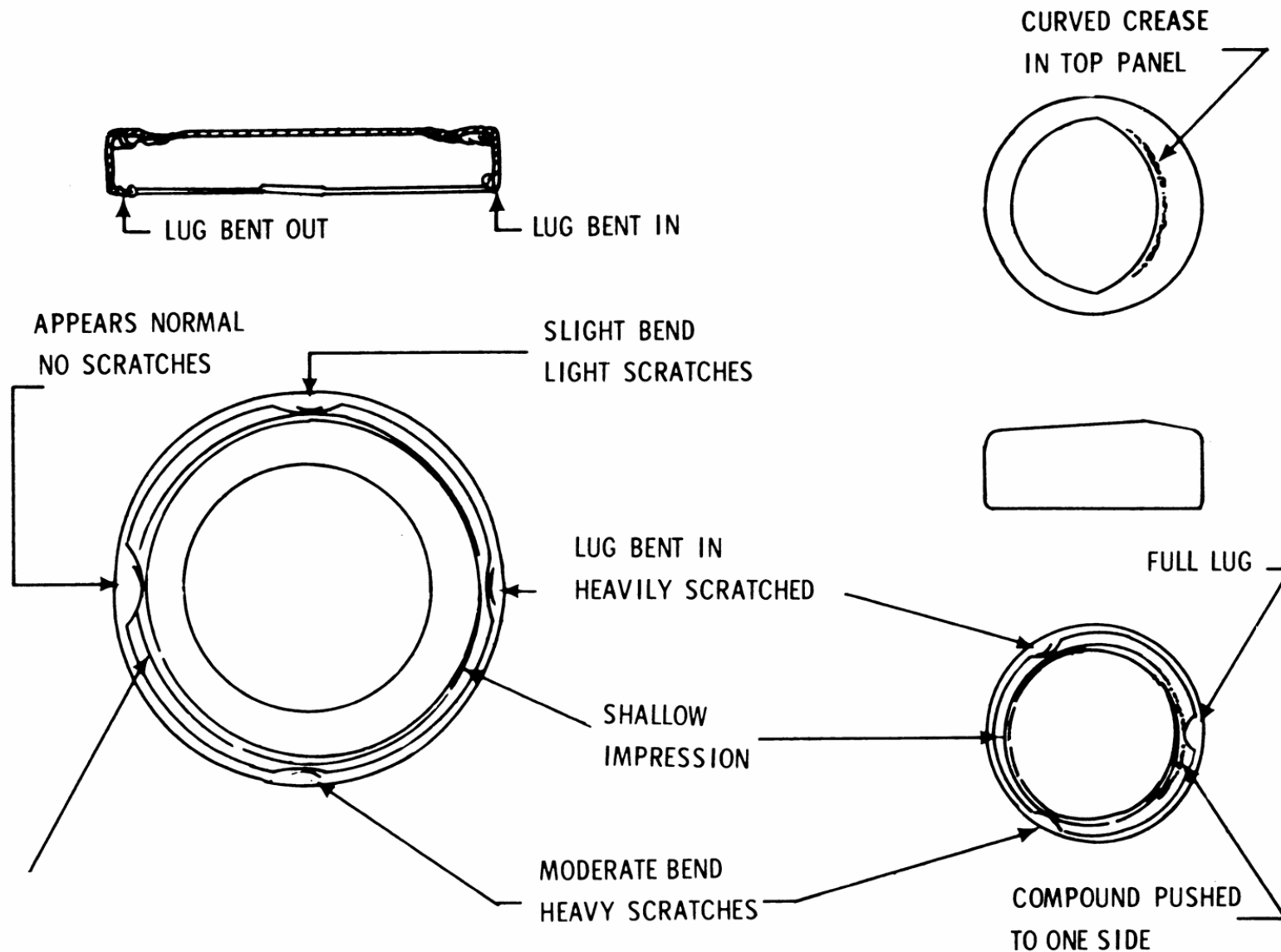
- Visual examinations (non-destructive)
- Closure examinations and tests (destructive)
  - These examinations must be made either before or after thermal processing
  - The establishment must have specification guidelines for closure integrity on file and available for review by Program employees



# Tests and Observations for Closure Application and Defects



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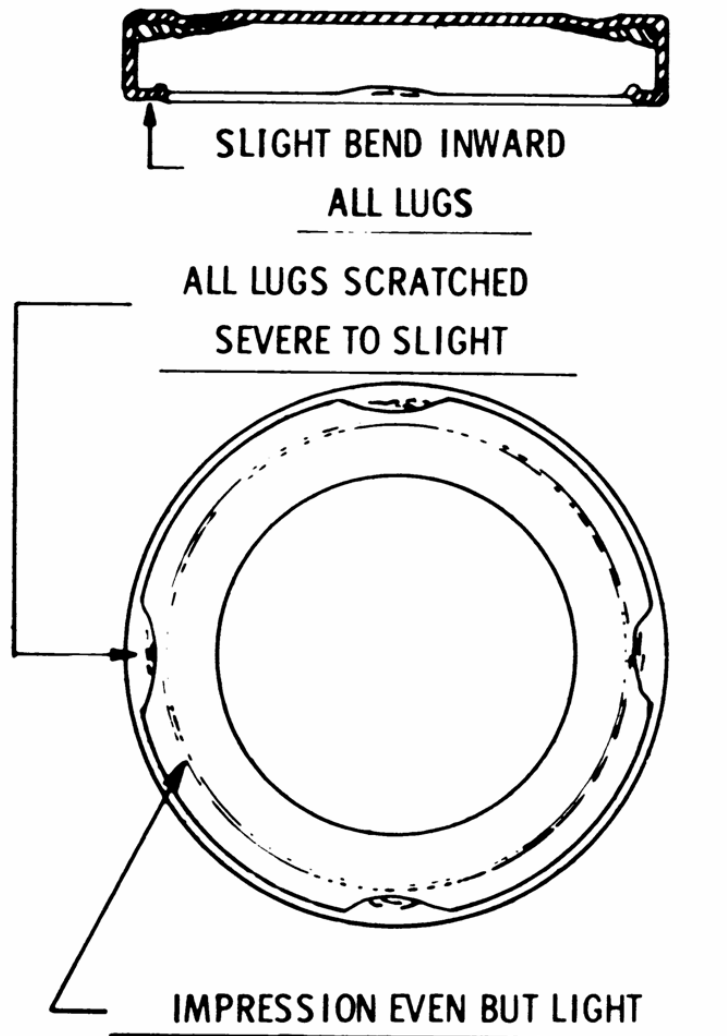


# Tests and Observations for Closure Application and Defects

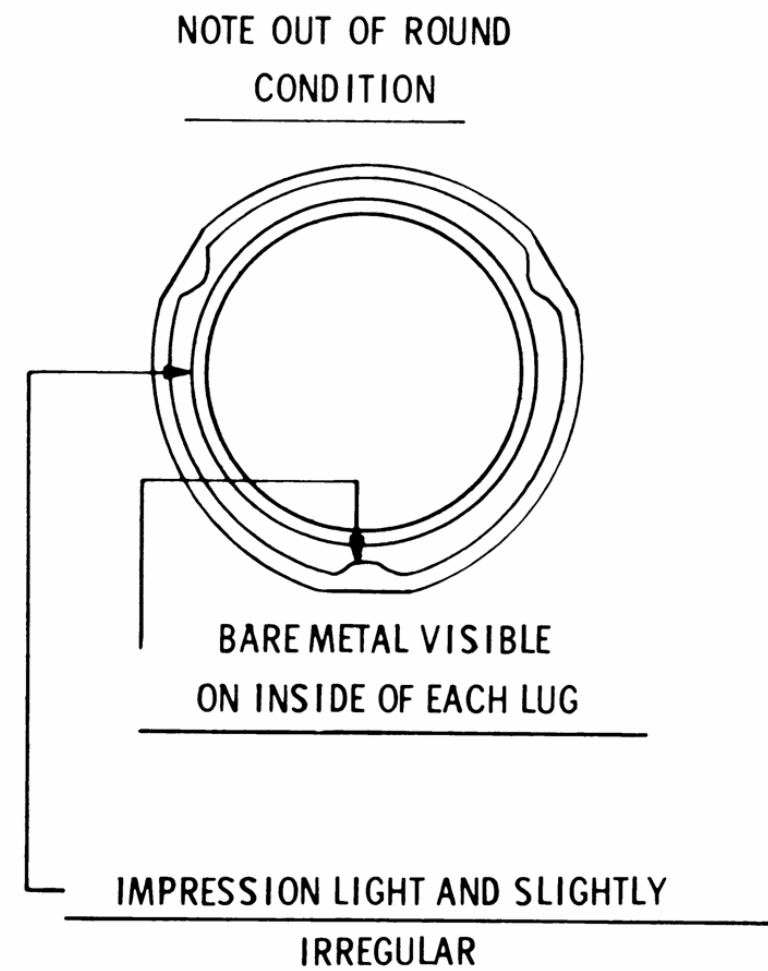


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## CRUSHED LUGS



## STRIPPED CAP





# Frequency of Inspection



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- **Must** be inspected by a trained technician at regular intervals to ensure satisfactory closures
- Includes both visual and destructive tests



# Visual Examinations



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- At least one container from each capper
- Include an examination for closure and container defects



# Visual Examinations



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- Defects **must** be recorded along with corrective actions
- Should examine every 30 minutes
- Must examine at start of production, after container jam, and after machine adjustment



# Cocked-Cap Detectors and Ejectors



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- Serve to eliminate problem containers at capper
- Signal that problem exists



# Dud Detectors



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If properly maintained and checked, will monitor seal quality and serve as useful tool.



# Physical Examinations



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- Must be conducted EITHER before OR after thermal processing
- Should be made at intervals not to exceed four hours of continuous closing machine operation
- Results along with any necessary corrective action must be promptly recorded



# Physical Examinations



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- Additional examinations should be made at start of production, after a container jam, and after machine adjustment



# Security



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- Most reliable measurement of proper lug cap application
- Security value ranges are specified by closure manufacturer





# Security Value Measurement



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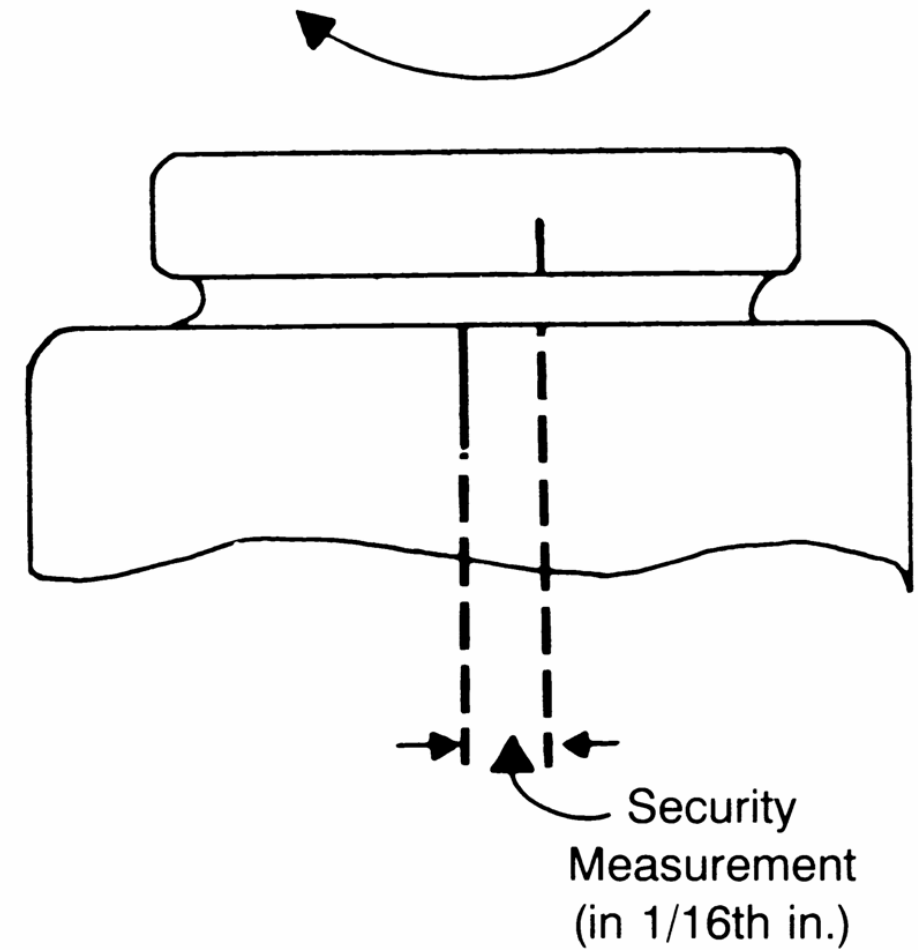
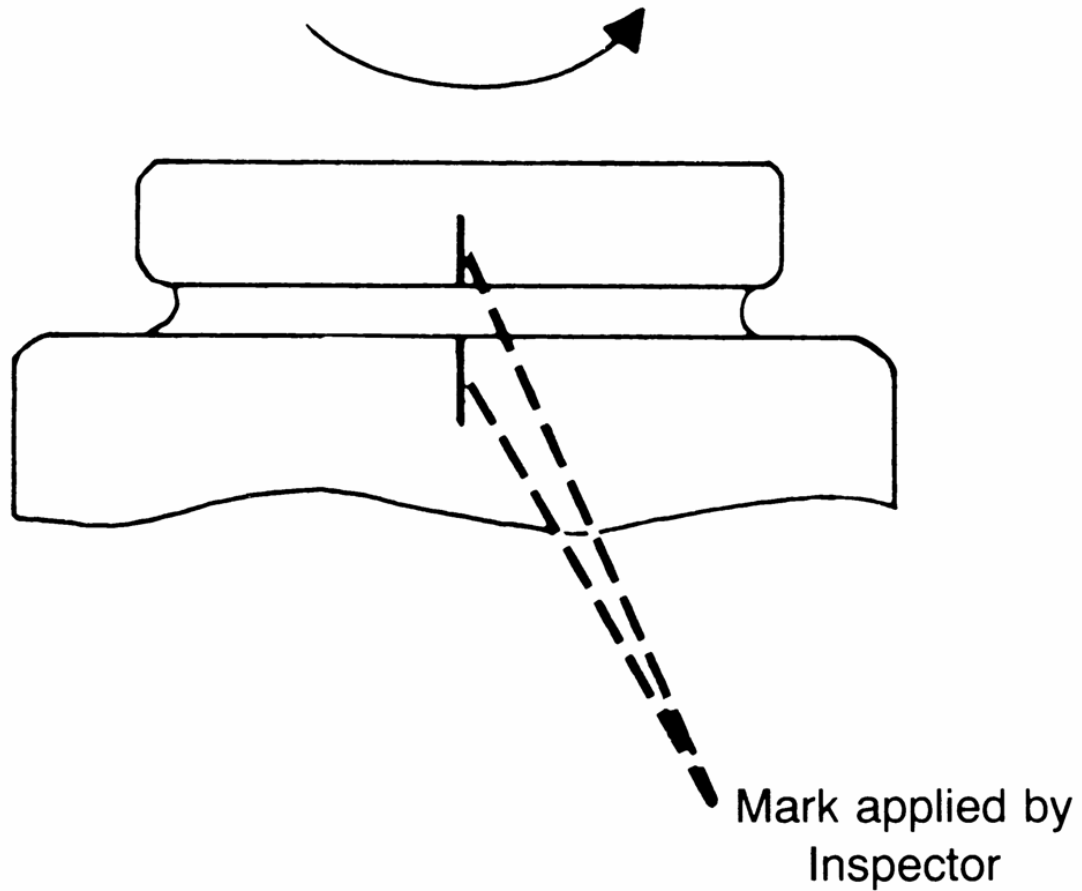
- Make vertical line on cap and jar
- Open cap until vacuum is broken and reapply until it is finger-tight
- Measure distance between vertical lines



# Security Value Measurement



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# Security Value Measurement



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After processing and cooling values will be lower.



## Key Notes



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- Headspace, product temperature, entrapped air in the product, and capper vacuum efficiency affect vacuum formation.
- Examinations of cap application should be done to assure that the cap is level and properly seated on the finish, vacuum is adequate and for gasket impression checked after processing.



## Key Notes (2)



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- Lug cap application should be evaluated for level cap, pull-up, security, adequate vacuum and gasket impression after processing.
- PT cap application should be evaluated for level cap, adequate vacuum and gasket impression after processing.
- Corrective action must be taken when readings outside of specifications exist or when caps are loose.



# Questions



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*Questions?*

