

Student Handout- Module Number Eighteen (18) - Flexible/Semi-Rigid Containers

Flexible/Semi-Rigid Containers

- Not significantly affected by enclosed product at atmospheric temperature/pressure but can be deformed by external pressure less than 10 psig

Semi-Rigid Plastic

- Co-extruded, multi-layer body
- Multi-layer laminated lid fusion sealed to body flange
- Metal lid double seamed to a co-extruded, multi-layer body
- Retortable or aseptic filled

Flexible

- Pouches

Package Terminology

Retortable/microwaveable bowl: Semi-rigid container made of plastic and adhesive blends

Height: Distance from base of bowl to body flange

Width: Diameter of opening

EZO end: Scored metal end with pull-tab

Stacking ring: Curved area below body flange

Double seam: Interlocking and compression of end curl and body flange

Critical Defects – Plastic Containers with Double Seamed Metal Ends

Cuts
Damaged flanges
Short height
Swollen package

Major and Minor Defects – Plastic Containers with Double Seamed Metal Ends

Major

Abrasion
Foreign matter inclusion
Load damage
Malformed

Minor

Abrasion
Delamination
Foreign matter inclusion
Gels
Malformed

Frequency of Testing: Inspections must be conducted at frequencies sufficient to ensure proper closure. Recommend every 30 minutes for visual inspections.
Recommend every 4 hours for tear down examinations.

Paperboard Cartons/Flexible Container/Retortable Plastic Tray/Aseptic Cups, Bowls, and Bottles

- Container body comprised of oxygen barrier sandwiched between polypropylene layers
- Flexible container lids comprised of oxygen layer sandwiched between polypropylene and/or other layers of polymer materials

Container Forming Methods

- Thermoforming - Pressing plastic rollstock into die molds
- Blow Molding - Molten plastic air blown into mold to shape of container

Critical Defects - Semi-Rigid Containers with Heat Sealed Lid

Channel leaker
Cut
Fracture
Incomplete seal
Swollen package
Puncture

Major Defects – Semi-Rigid Containers with Heat Sealed Lids

Contaminated seal
Abrasion
Crushed
Seal width variation
Uneven seal impression

Minor Defects - Semi-Rigid Containers with Heat Sealed Lids

Foreign matter inclusion	Gels
Label foldover	Malformed
Wrinkle	Abrasion
Burnt seal	Crushed
Delamination	Flex cracks

Critical Defects – Flexible Containers with Heat Sealed Lids

Channel leaker	Cut
Fracture	Incomplete seal
Swollen package	Puncture

Destructive Tests

Burst test
Dye test
Residual gas

Peel test
Electro-conductivity test

Non-destructive Examination

Visual test
Pressure differential test

Squeeze test
Vacuum (bubble) test

Frequency of Testing

- **Visual Examinations:**
 - Seals must be examined from each sealing machine
 - Necessary corrective actions must be taken and recorded
 - The entire container must be examined
 - Must be performed before and after the thermal process operations
 - Must be done at sufficient frequency
 - Should be based on a statistical sampling plan

- **Physical Tests:**
 - Must be conducted with sufficient frequency
 - Must be performed after the thermal process and should be made at least every 2 hours of continuous production
 - Guidelines for test procedures must be on file and made available to the CSI
 - Results and corrective actions must be recorded.

Link to Flexible Container Defect Guide:

[Flexible Pouch Summary | Institute for Food Safety and Health \(IFSH\) | Illinois Institute of Technology \(iit.edu\)](#)

[COCE \(usda.gov\)](#)