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    Peel test
Dye test     Electro-conductivity test
Residual gas

Non-destructive Examination
Visual test     Squeeze test
Pressure differential 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)]