

Fresh-cut products: Maintaining Quality and Safety

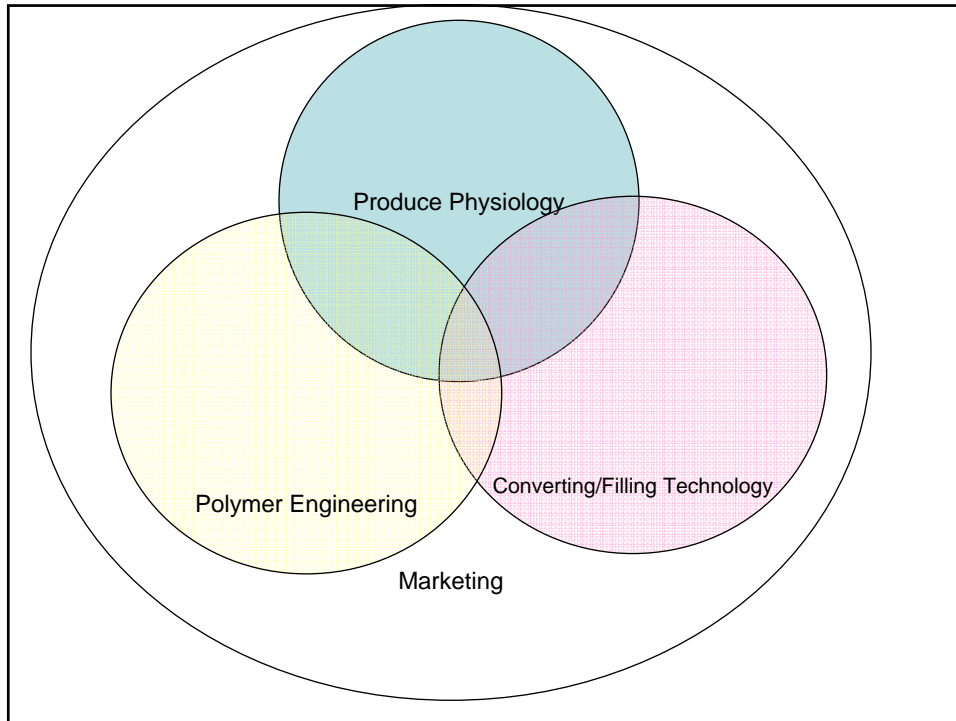
Packaging Film Technology and Selection
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Presented by:
The JSB Group,
LLC

Packaging for Fresh-cut Produce

- Introduction
- History
- Possibilities
- Challenges
 - Interdisciplinary Design
 - Separate Industries
 - Different Languages





Packaging Calculations

$$OTR = RR_{O_2} \cdot t \cdot W/A \cdot (O_{2atm} - O_{2pkg})$$

Where:

*OTR=Film O₂ Permeability (Oxygen Transmission Rate) per mil

RR=Respiration Rate (O₂ Consumption)

t = Film Thickness (mils)

W = Product Weight (Kgs)

A = Film Surface Area (cm²)

O_{2pk} =Desired O₂ Concentration In the Package (O₂ Target Atmosphere)

The calculated OTR is the per mil transmission rate for the given thickness of film used in the calculation.

In other words if you plug in 2 mils the resulting OTR is the per mil transmission rate of that 2mil film

To convert OTR (CC/mil/cm²/Hr) to OTR (cc/100 in²/day) multiply by 15483.84

Packaging Calculations Con't

$$\text{OTR} = \frac{1}{\frac{t_1}{\text{OTR}_1} + \frac{t_2}{\text{OTR}_2} + \frac{t_3}{\text{OTR}_3}}$$

Converting Requirements

- Dimensions
- Construction Type
- Seal Type
- Graphics
- Stiffness
- Desired OTR

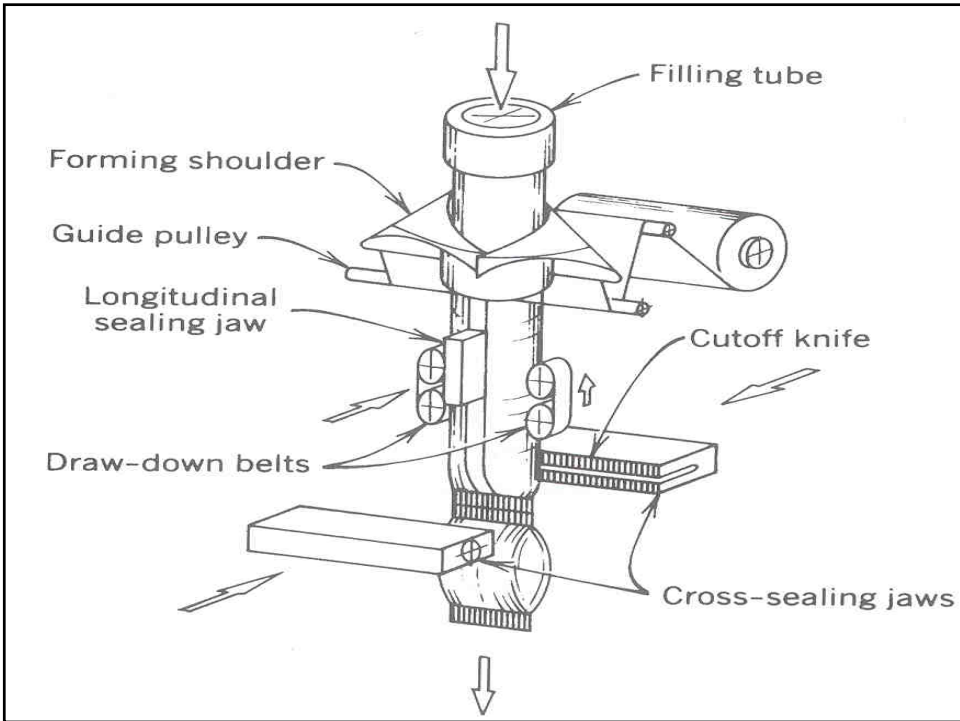
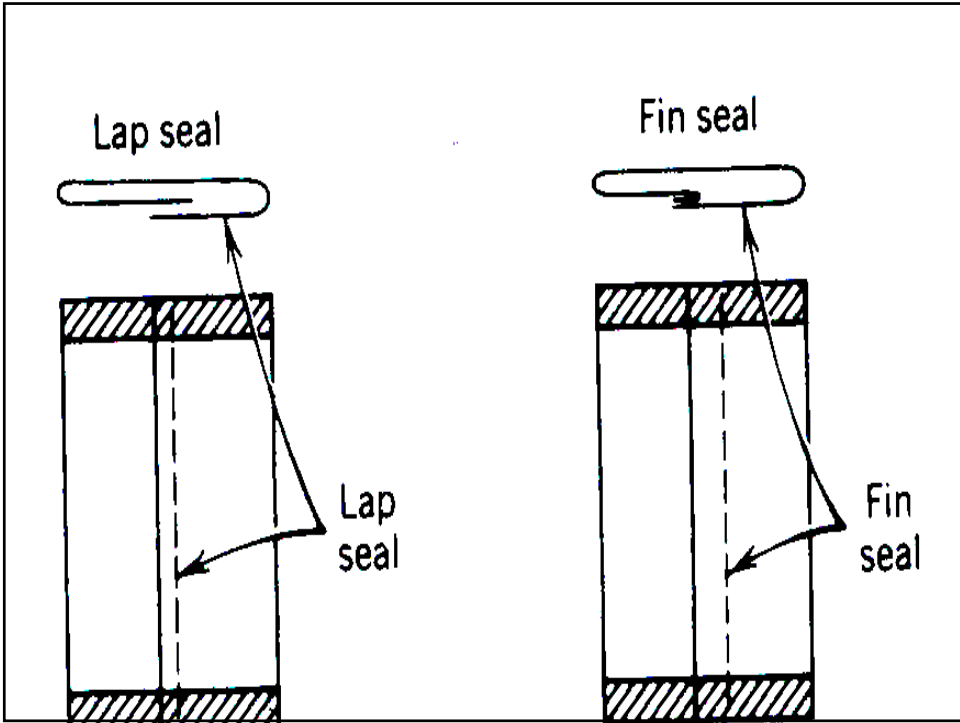
Converting Requirements Con't

- COF
- Beta Value
- Antifog Requirements
- Re-seal Requirements
- Microwave Requirements



Filling Machine Requirements

- Seal Type
- Filling Speed
- Sealing Conditions
- Differential COF
- Heat Resistance Differential
- Re-seal Attachment
- Antifog



Marketing Requirements

- Appearance
- Construction
- Graphics
- Stiffness
- Economics

On-going Quality and Testing Requirements

- OTR Specification and Range
- COF Specification and Range
- Antifog Performance



Packaging Misconceptions

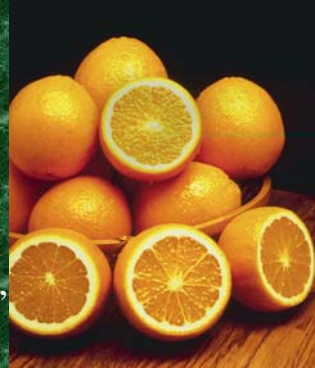
- Temperature Control
- Incoming Product Quality
- Post Harvest Technology
- Leakers
- Gas Flushing
- Static Environment
- Cold Chain Management
- One Product Fits All

Structures

- Hermetically Sealed Pouch
 - Pre-made
 - Roll Stock
- Stand Up Pouch
- Macroperforation
- Microperforation

Structures Con't

- Patch Technology
- Rigid Containers
 - Natural Aspiration
 - Peelable Lidding
 - “Breathable Rigid Containers”



Perforated Materials

- Macroperf
- Microperf
 - Laser Technology
 - Spark Technology
- Patch Technology
- Advantages/Challenges

Polymers

- Polyolefins
 - Low Density PE
 - Hi Density PE
 - Medium Density PE
- Metallocenes
 - Linears
 - Plastomers
- EVA
 - %



Polymers Con't

- K-Resin
- PET
 - APET
 - CPET
 - RPET
- PP
- PVC
- PLA

Films

- Polyolefins
- OPP
- Mono Blends
- Coextrusions
- Peelable Structures
- Clarity
- Stiffness

Antifog Requirements/Properties

- Coated
- Impregnated
- Performance
- Sealing properties
- Microwaveable



Microwave Requirements/Properties

- Applicable CFR's

Although there is no specific code, which applies Microwave applications, the following CFR's may be applicable when dealing with Antifog's in Microwave Applications.

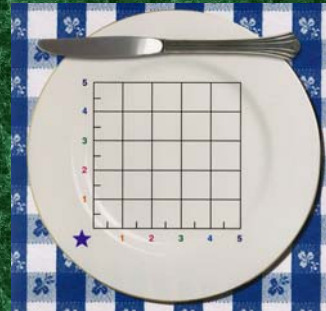
21CFR Chapter 1 177.1520

21CFR Chapter 1 177.1350

21CFR Chapter 1 177.1390

21CFR Chapter 1 177.1395

- Structure
- Antifog
- Additives



Putting It All Together/ Conclusions

- Thorough Understanding of Requirements and Desired Results
- Matching Requirements to Properties
- Understand the Language
- Selecting the Proper Package
- Designing the Proper Package
- On-going Quality and Testing



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