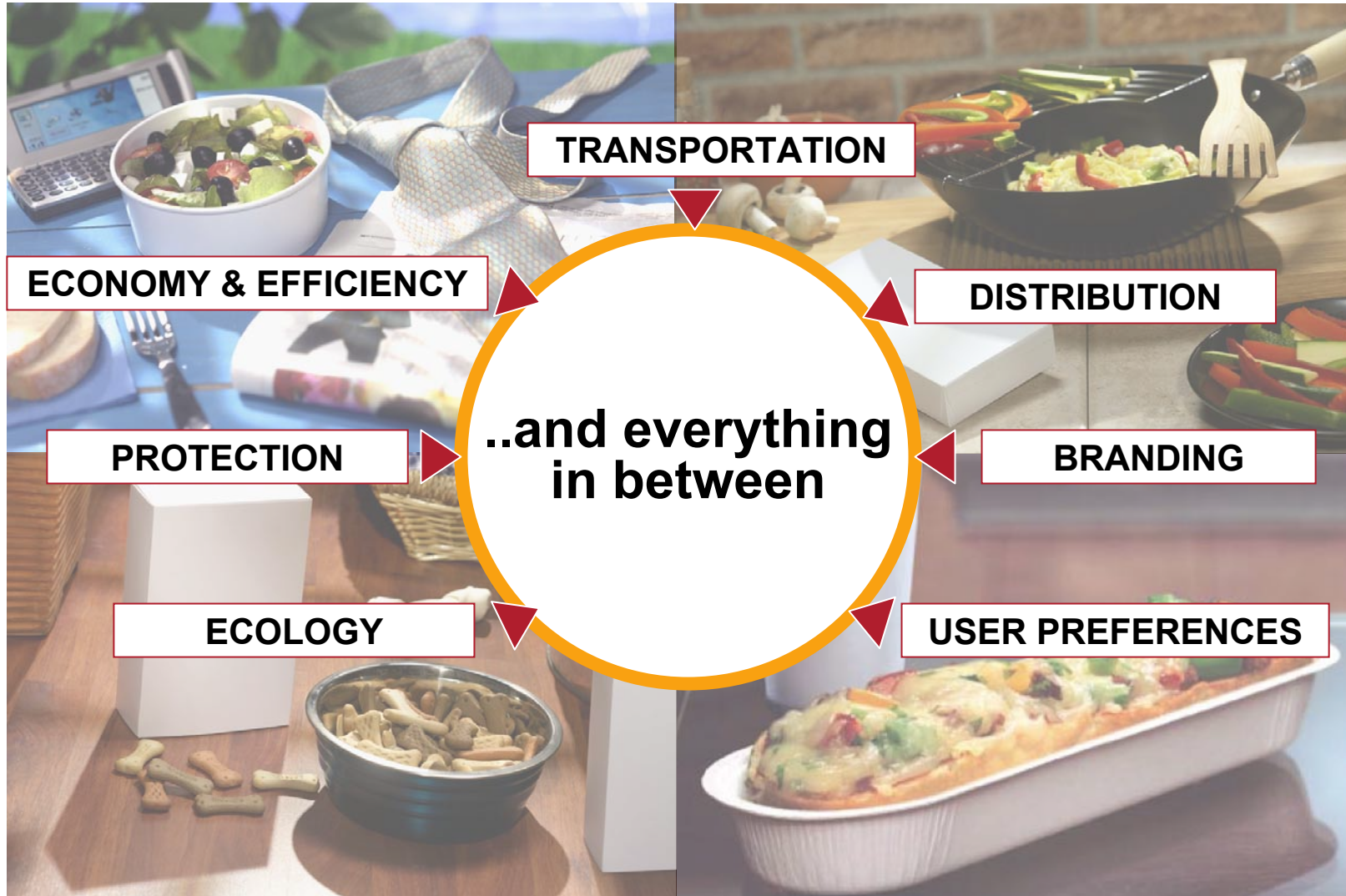


Advances in Airtight Paperboard Packaging

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Session + papernumber

Food Packaging Functions



An Airtight Paperboard Packaging

New customers,
new segments

Offers Excellent
Printing Surface

Sustainable
Packaging

*Airtight Paperboard
Packaging*



Fits On-the-Go

Dry Food Packaging
Knowledge

Polymer Coated
Barrier Material

Enhanced Side
Seam Protection

Protects Against
Contamination
(moisture, oxygen,
light, mechanical
damage)

No Aluminum →
Suitable for Metal
Detection

Dry food packaging knowledge

The critical factors for shelf life of dry food are

- ✓ changes in moisture content
- ✓ oxidation of fats

Often it is more difficult to eliminate moisture changes in the product itself than to prevent changes due to environment.

→ It is important to understand basic requirements of a product before designing a new packaging concept.

- ✓ heat treatment and salt content affecting water absorption properties of the product
- ✓ the critical moisture content etc.

Dry food packaging knowledge

Case: Nuts

Possible changes in quality	Effects	Packaging requirements
Oxidation of fats Nuts have high oil contents. → Lipid oxidation is the main type of deterioration.	Off-odours and -flavours	Oxygen barrier (vacuum packaging) (modified atmosphere packaging)
Loss of aroma	Staling	Oxygen barrier
Water absorption Typically nuts have low moisture content 1 – 5 % and water activity (a_w) around 0.2 to 0.4.	Loss of crispiness Staling Increase in moisture content increases susceptibility of nuts to microbial growth.	Moisture barrier

- For example, shelf life of roasted peanuts is usually 2 – 4 months.

Airtight Paperboard Packaging

Why Airtight Paperboard Packaging?

Water vapour barrier protects food against

- Caking
- Off-odour and off-taste
- Change in colour
- Loss of crispiness
- Mould growth



Airtight Paperboard Packaging

Why Airtight Paperboard Packaging?

Oxygen barrier protects food against

- Off-odour and off-taste (e.g. rancidity)
- Loss of vitamins
- Change in colour
- Growth of microbes



Airtight Cup Case

Polymer Coated Paperboard Material

- Uncoated or clay coated SBS board
- Multilayer high barrier coatings
- Barrier against:
 - Oxygen
 - Humidity
 - Aromas
 - Grease



Airtight Cup Case

Air tightness

Barrier properties of Airtight Cup =

- ✓ **barrier properties of a material**
- ✓ **raw edge protection**
- ✓ **tightness of the seams**

→ The better the gas barrier properties of a material, the more effect on tightness leakages have.

Airtight Cup Case

Raw edge protection

Effect of raw edges at tropical conditions (38 °C / 90 % RH) :

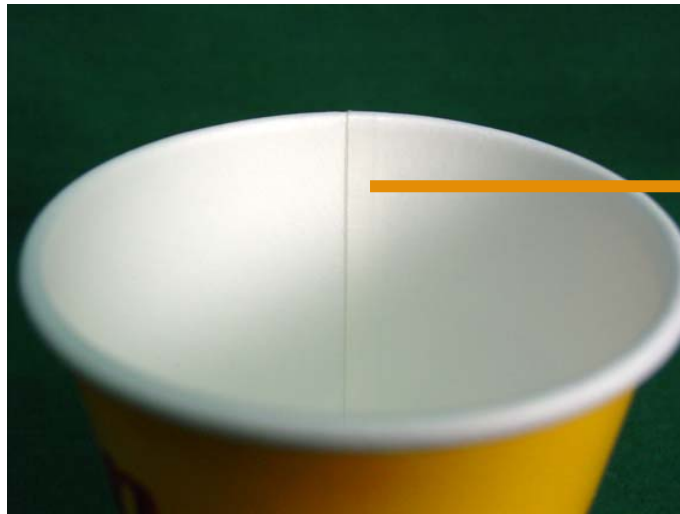
O_2TR	60 times bigger	[cc/(m ² day)]
WVTR	3 times bigger	[g/(m ² day)]

than with raw edge protection.

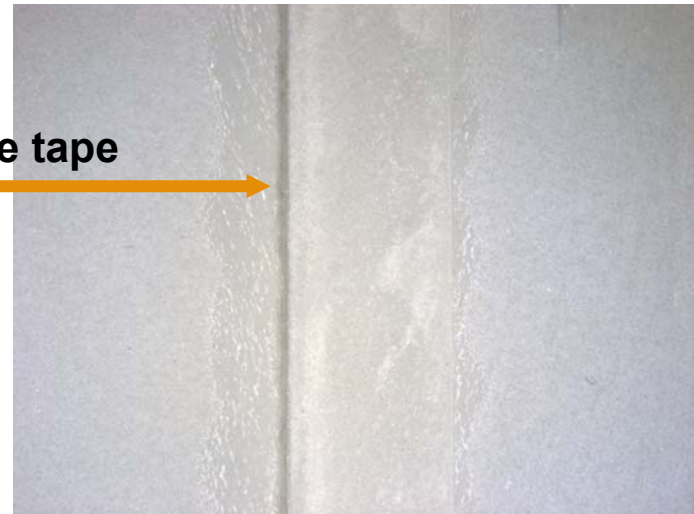
An Airtight Cup Case

Raw edge protection

- ✓ With raw edge tape
- ✓ With skiving



Raw edge tape



Airtight Cup Case

Tightness of the seams

It is important to optimize the sealing parameters to avoid leakages through

- ✓ package seams
- ✓ lid seam

→ There is no benefit to use high barrier coatings if tightness of the seams is not verified.

Airtight Cup Case Tightness Verification System



Airtight Cup Case- Stora Enso AT Master

Airtight Cup Tightness Verification

Locating the
leaking point

In-line &
semiautomatic
setups

Patented Testing
System

Approved by EU,
FDA pending

Non-destructive
Testing Method

Inexpensive
Safe, non-flammable
Odorless, tasteless

Hydrogen (H₂) as
tracer gas



Detected leaks stored
for Quality Control

Airtight Cup Case

Tightness Verification method

- The package is placed in a test cell
- Hydrogen (mixed with N₂, CO₂ or air) is fed into the package and the system immediately detects possible leakages
- Operator can manually locate the point of leakage



Airtight Cup Case

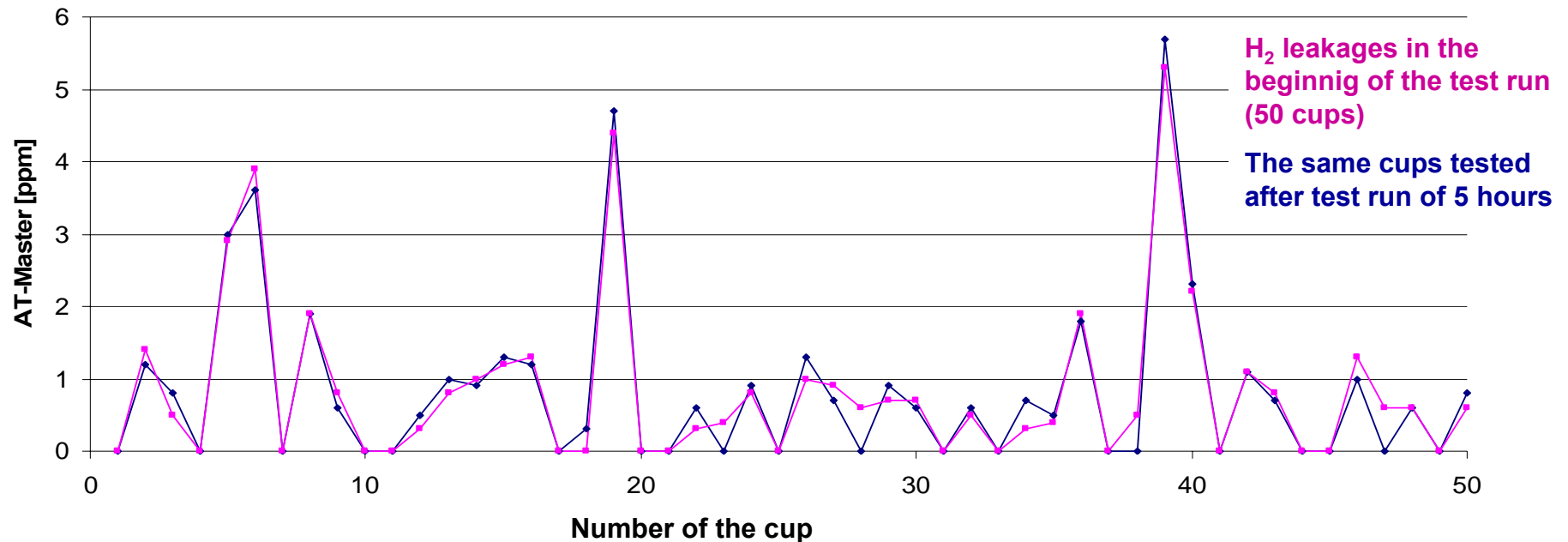
Tightness Verification Variables

- **Level of needed package tightness requirement**
 - Right detection limits
 - Correlation to ppm-values
- **Test gas accumulation time**
 - detection time length
- **Needed speed of for measuring**
 - Filling Machine Cycle time approximation



Airtight Cup Case

Tightness Verification / repeatability

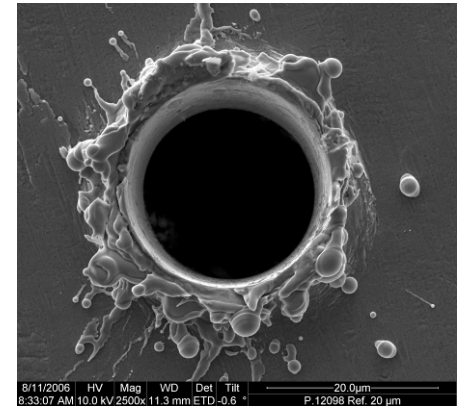


➔ **Repeatability with AT Master is good.**
Saturation effect is not noticed.

Airtight Cup Case

H₂ leakages in a steel plate / WVTR

Pinhole area μm ²	H ₂ leakage* ppm	WVTR* 23°C, 50% RH g/pkg/day	WVTR* 38°C, 85% RH g/pkg/day
~90	~110	~0,0007	~0,0008
~330	~300	~0,0008	~0,0009
~1880	~960	~0,008	~0,03
~7190	~2560	~0,06	~0,2



Airtight Cup Case Tightness Verification Results

- **Enables very sensitive leak detection**
 - leakage through 1 μm (diameter) within a few seconds
 - repeatable results.
- **Accurate leak point detection**
 - Hydrogen is the lightest and the smallest of all gases
- **Fast detecting method for filled package WVTR and O₂TR leakages**
 - Earlier days, now minutes
 - Possible for online testing



Airtight Paperboard Packaging Summary

TOTAL PACKAGING CONCEPT

► customized applications

- market and application know-how
- packaging materials
- package forming, filling and closing machinery
- tightness verification systems



Thank You

PRESENTED BY

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