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LAMINATOR FOR THE RETORT PACKAGING

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Business Unit Director Lamination
LAMINATOR FOR THE RETORT PACKAGING

INDEX

- Brief introduction of COMEXI
- Retort packaging: why is it growing so fast?
- Retort packaging structures
- Adhesives & particularities
- Key elements in a laminator to success into the retort packaging
YOUR PARTNER FOR FLEXIBLE PACKAGING CONVERTING SOLUTIONS
500 Employees

142 Million euros

2% R+D

+100 Countries

+2000 Customers

+4500 Machinery installed
Retort Pouch
RETORT POUCH: A flexible package in which prepared food is hermetically sealed for long-term unrefrigerated storage

The retort pouch was invented by the United States Army in the 50’s, developed by Reynolds Metals Company and Continental Flexible Packaging. Both received the Food Technology Industrial Achievement Award for this invention in 1978.

The retort pouch is normally formed by an external PET or Polyamide film for printing which adds stiffness and protection, an intermediate layer of aluminium forming the main barrier against oxygen and water vapour and a film with inert, sealing properties with the packaging content (PP, PE).

Aaron Brody, Dept of Food Science and Technology, Georgia University.
Retort Pouches and Cans

- Better cooking conditions of retort packages (less overcooking, which leads to an improvement in taste)
- Reduction in cooking time (30-50% less)
- Packaging is much lighter, less material used
- Storage costs much lower compared to cans (<96%)
- Transport costs much lower (1 truck with printed reels = 25 trucks with cans, or 200,000 cans occupy the same as 2.3 million retort pouches)
- Permits a higher quality design (different shapes and effects that attract the attention of consumers)
- Possibility of zippers, pour spouts, slider closures, venting valves and easy openings – tear notch-
- Regular waste disposal
- Improvement in machinery speeds
- Still certain reluctance to be used by consumers, less evident in young people.
Retort Pouch
Region Consumption

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>Western Europe</td>
<td>45.7</td>
<td>46.4</td>
<td>47.4</td>
<td>48.0</td>
<td>49.2</td>
<td>50.6</td>
<td>2.1</td>
<td>56.0</td>
<td>2.0</td>
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<td>Eastern Europe</td>
<td>10.8</td>
<td>11.4</td>
<td>11.6</td>
<td>12.6</td>
<td>14.0</td>
<td>15.1</td>
<td>6.8</td>
<td>18.9</td>
<td>4.7</td>
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<td>North America</td>
<td>94.1</td>
<td>97.1</td>
<td>97.4</td>
<td>99.8</td>
<td>101.6</td>
<td>103.0</td>
<td>1.8</td>
<td>108.8</td>
<td>1.1</td>
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<tr>
<td>South &amp; Central America</td>
<td>13.5</td>
<td>14.2</td>
<td>14.9</td>
<td>14.8</td>
<td>14.8</td>
<td>14.1</td>
<td>0.9</td>
<td>16.8</td>
<td>3.6</td>
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<tr>
<td>Asia-Pacific</td>
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<td>132.1</td>
<td>143.0</td>
<td>153.7</td>
<td>164.0</td>
<td>174.5</td>
<td>7.0</td>
<td>228.7</td>
<td>5.6</td>
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<tr>
<td>Middle East &amp; Africa</td>
<td>23.5</td>
<td>23.5</td>
<td>24.6</td>
<td>25.9</td>
<td>27.4</td>
<td>28.9</td>
<td>4.2</td>
<td>36.6</td>
<td>4.9</td>
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<tr>
<td>Total</td>
<td>312.1</td>
<td>324.7</td>
<td>339.0</td>
<td>354.7</td>
<td>370.9</td>
<td>386.1</td>
<td>4.3</td>
<td>465.8</td>
<td>3.8</td>
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</table>

Note: totals may not add up precisely due to rounding, p=projected, f=forecast
Source: Smithers Pira

- **WESTERN EU**
- **USA**
- **ASIA-PACIFIC**

Represent 85% of total consumption
165 billion of units consumed worldwide... what does it really mean?

- 51 units / capita in US
- 41 units / capita in EU
- 22 units / capita in Latin A.
- 8 units / capita in Africa
Structure of a Retort Pouch
Retort Pouch

Main objective: this packaging needs to withstand sterilisation process

Films:

<table>
<thead>
<tr>
<th>PET 12 µ</th>
<th>PET 12 µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inks (special for retort)</td>
<td>Inks (special for retort)</td>
</tr>
<tr>
<td>Adhesives (special for retort)</td>
<td>Adhesives (special for retort)</td>
</tr>
<tr>
<td>Aluminium 7 µ</td>
<td>Aluminium 7 µ</td>
</tr>
<tr>
<td>Adhesives (special for retort)</td>
<td>Adhesives (special for retort)</td>
</tr>
<tr>
<td>CastPP 70 µ</td>
<td>CastPP 70 µ</td>
</tr>
</tbody>
</table>

**PET:** Mechanical protection, high gloss and gas barrier properties

**Aluminium:** Light, aroma and gas high barrier properties

**CPP:** Welding properties, stability in sterilisation processes, protection against aluminium pinholes.

Typical applications comprise pre-cooked rice, soups, sauces, microwaveable retort ready-meals, meat and fish.
## Retort pouch

### Other common structures (4-layers)

<table>
<thead>
<tr>
<th>Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET 12 (\mu)</td>
</tr>
<tr>
<td>Adhesives (special for retort)</td>
</tr>
<tr>
<td>CastPP 70 (\mu)</td>
</tr>
<tr>
<td>BOPA 15 (\mu)</td>
</tr>
<tr>
<td>Adhesives (special for retort)</td>
</tr>
<tr>
<td>Aluminium 7 (\mu)</td>
</tr>
<tr>
<td>BOPA 25 (\mu)</td>
</tr>
<tr>
<td>Adhesives (special for retort)</td>
</tr>
<tr>
<td>CastPP 100 (\mu)</td>
</tr>
</tbody>
</table>
What do we need to ensure in the package...

- A very low gas permeability (oxygen)
- A very low water permeability (moisture)
- Heat sealable
- Withstand sterilization
- High resistance to stretch and puncture
- Non permeability of oils, fats and others
- No solvent retention (ethyl acetate, ethanol, MEK...)
- High bond strength in the complete Package, specially on sealable areas
- Generally, UV light barrier.
Temperature range: 120 – 135 °C
Pressure: 0.18 – 0.50 Mpa
Time: 20 – 90 min

Types of Retort Processes

- Water Spray Retort
- Steam / air retort
- Microwave retort

Burst / tensile tester
Adhesives
Adhesives

Type of adhesive: aliphatic (no PAA formation)
- PAA- Primary Aromatic Amines

Mainly solvent based adhesives
Solventless adhesives still not highly used

Essential:
- High coating weight (4.0 to 4.5 gr/sqm)
- Wettability on all substrates
- Curing time (10 - 14 days)
- High room temperature
- Very good bond strength in all kind of materials
  - Excellent adhesion on ALU – cPP and ALU-PE
  - Excellent adhesion on SiOX and AlOx films
Laminator
Key Elements of the Laminator
Key Elements of the Laminator

DRYING SECTION

COATING  1ST UNWINDER  REWINDER  NIP  2ND UNWINDER
Coating Station
Coating Station

HIGH CAPACITY EXHAUSTION SYSTEM

• **Full exhaustion** of solvents from different points (top, bottom and both sides) to ensure a fully solvent clean area (due to the high amount of solvents used).

• **Fast and easy** filter removing.
Semiflexo Coating trolley

• **Direct or reverse** coating for achieving a wide range of coating weights.

• **Different relative speed** of rollers and **adjustable gap** in between for adjusting the coating weight.
Drying Section
Drying Section

Modular concept of drying units
Tool-less pull out of each nozzle

Recirculation controlled by I.R. LEL in every module

Good accessibility
### Drying tunnel - Solvent retention performance

<table>
<thead>
<tr>
<th>Machine</th>
<th>3 Drying sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unwinder 1 film</td>
<td>PET clear 12 µ</td>
</tr>
<tr>
<td>Unwinder 2 film</td>
<td>Alufoil 7 microns</td>
</tr>
<tr>
<td>Adhesive</td>
<td>Aliphatic PU adhesive (courtesy Morchem)</td>
</tr>
<tr>
<td>Roller</td>
<td>38 lines/cm</td>
</tr>
<tr>
<td>Dry Weight</td>
<td>4,7 gr/m²</td>
</tr>
<tr>
<td>% Solids and viscosity</td>
<td>35% - 17&quot; Cup Ford 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speed (m/min)</th>
<th>T (°C) first section</th>
<th>T (°C) second section</th>
<th>T (°C) third section</th>
<th>Solvent retention (mg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>90</td>
<td>110</td>
<td>100</td>
<td>0,7</td>
</tr>
<tr>
<td>250</td>
<td>90</td>
<td>110</td>
<td>100</td>
<td>1,1</td>
</tr>
<tr>
<td>350</td>
<td>90</td>
<td>110</td>
<td>100</td>
<td>2,3</td>
</tr>
<tr>
<td>450</td>
<td>90</td>
<td>110</td>
<td>100</td>
<td>5,4</td>
</tr>
</tbody>
</table>

**BELOW** 10 mg/m² **is required**
Nip Point
3 rollers lamination NIP

- Curling with thin and stretchable films
- Bad optics in the center
- Irregular bond strength along the web

- No curling with thin or stretchable films
- Good optics across the web
- Evenness of bond strength across the web
Adapted for Lamination with Alufoil
Coating evenness control
- Perfect gap control between alufoil and coating roller

Hard anodized rollers in all the machine
- High scratch and abrasion resistance

Winders fully adapted for foil
- Anodized rollers
- Shifting system
- Horizontal cut

Preconditioning calender
- Preheats the foil prior entering the NIP to avoid thermal shock
Full Traceability of Orders
**PRODAT System**

**FULL IN-LINE CONTROL**
Measurement in-line of the coating weight on real printed jobs.

**PRODAT CONNECTION**
See all data from your computer and get endless types of reports (productivity, waste, working hours,…)

**PRODAT FULL MAINTENANCE**
Scheduled warnings appear on the screen when preventive maintenance is required on the machine.

**PRODAT FULL INTEGRATION**
All external equipments (Corona Treater, Mixer) are integrated for:
- Saving and uploading all settings, avoiding human errors
- Ruling all equipments from just one screen.

**PRODAT FULL TRACEABILITY**
Full control of every single meter produced:
- Print quality reports for your customers
- Take preventive actions before any claim
THANK YOU VERY MUCH FOR YOUR KIND ATTENTION