Packaging Total System Cost Calculation Model

Marc Bandman, Market Application Development Manager
Eric Schmohl, Customer & Application Support Manager
Nicole Kaller, Packaging Engineer Tyvek®
Content overview

1. Why do a Total System Cost Calculation

2. How can a result look like and what does it take.

3. Two calculated comparison cases

4. Conclusions
Developing or Changing Packaging raises Questions,…

How will **switching packaging configurations** impact my total cost?

How does **material cost** impact my total cost?

How will **reducing packaging failure** impact my total cost?

…
How can you find the answers?

Analyze and find out...

… through a Total System Cost Calculation
Why a Total System Cost calculation?

→ TO get a picture of total cost to use of a packaging solution

→ TO break down the different cost elements

→ TO compare total cost between packaging options

→ TO get facts for an improved packaging strategy

→ BECAUSE it shows YOU the data to ensure the most Cost Effective Solution
The total system costs complete it.
What are the Total Packaging System Costs?

- Packaging Material:
  - Top Web Cost
  - Bottom Web/Tray Cost

- Package Base Factors:
  - Device Type, Weight, and Price
  - Package Type
  - Package Size
  - # of Packages
  - Packaging Materials

- Device Packing:
  - Transportation Cost
  - Material Losses from QC/Process Yield
  - Packaging Cycles per minute
  - # of Operators
  - Labor Rate
  - # of Shifts
  - # of Sealing Machines
  - Fixed Cost of Packaging
  - Transportation Cost to Sterilizer

- Sterilization:
  - Annual Packaging Revalidation Costs
  - Package Labeling & Printing Costs
  - Packages per Shelf Carton
  - Boxes per Pallet
  - “Instruction for Use” Cost
  - Shelf Carton Cost
  - Box Cost
  - Pallet & Stretch-wrap Cost

- Distribution & Transportation:
  - Transportation Costs
  - Inventory & Logistics
  - Transportation Costs

- Product Returns:
  - Yield Losses From Damaged Packaging
  - % of Returned Devices Repackaged
  - Recall Costs

- Depreciation Costs:
  - Depreciation Time
  - Machine Costs

- Package Qualification:
  - Initial Validation Costs
  - Payback Period
  - % of Validation Costs Allocated to Package
## Case study 1 – Rigid blister vs. Pouch

<table>
<thead>
<tr>
<th></th>
<th>Rigid Tray</th>
<th>Pouch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Units</strong></td>
<td>100,000 Implants/year</td>
<td></td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>EUR 560 EUR/piece</td>
<td></td>
</tr>
<tr>
<td><strong>Package Type:</strong></td>
<td>Rigid Tray vs. Pouch</td>
<td></td>
</tr>
<tr>
<td><strong>Top web material:</strong></td>
<td>Tyvek® 1073B – Coated</td>
<td></td>
</tr>
<tr>
<td><strong>Bottom web:</strong></td>
<td>PETG vs. PET/PE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Total Packaging Cost € / YEAR)</th>
<th>Rigid Tray</th>
<th>Pouch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Packaging Material</strong></td>
<td>40,000</td>
<td>18,000</td>
</tr>
<tr>
<td><strong>Device Packing</strong></td>
<td>62,743</td>
<td>83,938</td>
</tr>
<tr>
<td><strong>Sterilization</strong></td>
<td>34,322</td>
<td>52,852</td>
</tr>
<tr>
<td><strong>Distribution &amp; Transportation</strong></td>
<td>10,692</td>
<td>15,500</td>
</tr>
<tr>
<td><strong>Product Returns (Return rate %)</strong></td>
<td>30 (0.02%)</td>
<td>50 (0.03%)</td>
</tr>
<tr>
<td><strong>Package Qualification</strong></td>
<td>20,000</td>
<td>18,000</td>
</tr>
<tr>
<td><strong>Machine Depreciation Costs</strong></td>
<td>4,000</td>
<td>1,800</td>
</tr>
<tr>
<td><strong>Total Annual Cost</strong></td>
<td>171,787</td>
<td>190,141</td>
</tr>
</tbody>
</table>
Case study 1 – Material Cost versus Total Cost

Packaging 1: Tyvek® 1073B – Coated, Rigid Tray
Packaging 2: Tyvek® 1073B – Coated, Pouch

A Rigid Tray Increases Material Costs 22,000 EUR/year...

... but Saves 18,354 EUR/year by
• a better production rate,
• consuming less space in a transport box
→ reduced transport and sterilization costs/pallet
Transport and Distribution – Source of risk

Will your packaging survive?
Case study 2 – Form-Fill-Seal blister Paper vs. Tyvek®

<table>
<thead>
<tr>
<th>Units</th>
<th>1,000,000 Injection devices/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling Price</td>
<td>EUR 10/piece</td>
</tr>
<tr>
<td>Package Type:</td>
<td>Form Fill Seal package</td>
</tr>
<tr>
<td>Incumbent Material:</td>
<td>60g/m² Paper/11g/m² grid lacquer</td>
</tr>
<tr>
<td>New Material:</td>
<td>Tyvek® 2FS – Uncoated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Total packaging cost € / YEAR)</th>
<th>60g/m² Paper</th>
<th>Tyvek® 2FS™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging Material</td>
<td>26,892</td>
<td>34,365</td>
</tr>
<tr>
<td>Device Packing</td>
<td>264,225</td>
<td>264,748</td>
</tr>
<tr>
<td>Sterilization</td>
<td>156,152</td>
<td>156,152</td>
</tr>
<tr>
<td>Distribution &amp; Transportation</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Product Returns</td>
<td><strong>153,000</strong> (1%)</td>
<td><strong>25,500</strong> (0.3%)</td>
</tr>
<tr>
<td>Total Annual Cost</td>
<td>592,269</td>
<td><strong>540,765</strong></td>
</tr>
<tr>
<td>Delta</td>
<td>-</td>
<td><strong>- 51,504</strong></td>
</tr>
<tr>
<td>Package Qualification Cost</td>
<td>0</td>
<td>50,000</td>
</tr>
</tbody>
</table>
Case study 2 – Break-even Analysis of Return Cost*

Incumbent Material product return: Paper/60g/sqm 11g/sqm grid lacquer coated
New Material: Tyvek® 2FS™ – Uncoated, constant at 0.3%

Total Cost Euro/year as a function of % Return
(Break-even calculation)

→ Low performing packaging drives costs up as of an 0.5% recall rate

Requalification cost is excluded from this chart

Material costs:
2FS and APET/PE peel: €0.034/pkg
60g Paper and APET/PE: €0.027/pkg

*simulation case
What does the DuPont analysis tool look like?

- A Microsoft® Excel-based model
- User input with drop-down choices
- The model provides suggested data based on
  - Region
  - Package type
  - Package material
Influence factors for Return Costs:

• Device Costs to Sell
• Total % of returns
• Product wasted or reprocessed?
• Transport/Customs in the case of export
Not every VALUE can be calculated…

- Packaging Material

- Less risk of failure
- Performance data package
- Regulatory compliance
- Technical support
- Meets pharma requirements
- Versatility
- Market trust
- Particle free handling/opening
- Processing flexibility
- Long Shelf life
- Branded material elevates quality
What comes next?

1. Check if your current cost calculation model is taking all necessary cost elements into account

2. Review if a new total cost calculation for an existing or new packaging product line is needed.

3. Consider a packaging strategy for a better cost control, quality and compliance

Contact us if you need to improve your products
To fix an appointment please contact:

DuPont de Nemours, Luxembourg
+352 3666 – ext.
Eric Schmohl: 5890
Nicole Kaller: 7032
Disclaimer

This information corresponds to our current knowledge on the subject and may be subject to revision as new knowledge becomes available.

It is your responsibility to investigate other sources of information on this issue that more appropriately addresses your product and its intended use. This information is not intended for use by you or others in advertising, promotion, publication or any other commercial use. DUPONT MAKES NO WARRANTIES OF ANY KIND REGARDING THIS INFORMATION AND ASSUMES NO LIABILITY WHATSOEVER IN CONNECTION WITH ANY USE OF THIS INFORMATION. This information is not a license to operate under, or intended to suggest infringement of, any existing trademarks or patents.

© 2012 DuPont. All rights reserved. The DuPont Oval Logo, The miracles of science™, and Tyvek® are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates.