Delivering Value in Thermoforming
with LEAN MANUFACTURING principles and practices

The Details

The Project

Increase of efficiency on thermoforming applications with low volume runs and multiple parts to maximize customer value

- Complex multi-part designs
- Multiple toolings changeovers
- Time critical project deadlines

Process improvements were required on low volume/multi-part projects to provide the customer with desired value

The Goals

Maximize Customer Value

- Highest Quality
- Reduce Cost
- Fastest Lead Time

Creating the Solution

Lean manufacturing practices such as, value stream mapping, Kaizen events, and Gimba walks were utilized to evaluate the current process for waste (non-value adding activities). Once identified, these non-value adding functions were eliminated or mitigated with numerous changes and process improvements. Chief among these were adjustments to the cell based manufacturing structure, evolution of existing standard operating procedures, and the adjustment of work flow.

What is LEAN?
(the very basics)

Every process must add value

Waste
- Overprocessing
- Waiting
- Rework
- Defects

If no value added, eliminate it (Waste)

Ongoing Evaluation & Improvement
The case study above demonstrates Productive Plastics’ commitment to being a Lean Enterprise that incorporates the practices of continuous improvement and reducing waste (resources or time spend on non-value added activities) in every facet of the business. Customers get maximum value through unparalleled quality, expedient lead times, and cost effective thermoforming solutions.

Visit www.ProductivePlastics.com for more information on how Productive Plastics can provide leading solutions for thermoforming projects.

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<table>
<thead>
<tr>
<th>Before LEAN</th>
<th>LEAN Process Improvements</th>
<th>After LEAN</th>
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<tbody>
<tr>
<td>Changeover time 3.3 hrs (setup)</td>
<td>Cell manufacturing process streamlined</td>
<td>Defects ↓ 75%</td>
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<tr>
<td></td>
<td>Tool temperature management procedures update</td>
<td>Setup techs no longer required - labor reduction</td>
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<tr>
<td></td>
<td>Standardized vacuum system components and procedures</td>
<td>Changeover time 1 hour (setup)</td>
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<td>Tool setup frame and stop installed for consistent placement</td>
<td>Changeovers now have a predictable result every time</td>
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<td>Thermal camera used to troubleshoot oven &quot;cold&quot; spots</td>
<td>Work in Progress and Finished Goods inventory ↓ 30%</td>
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<td></td>
<td>Baffles and insulation perimeter installed to maintain consistent temperature environment</td>
<td>Manufacturing cell workflow</td>
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<tr>
<td></td>
<td>Standard operating procedures and quality controls updated for all process functions</td>
<td>25-35 steps per finished product</td>
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Summary

The data below is the cumulative result of lean manufacturing techniques applied to multiple projects and processes.