Soft Gasket Thickness Case Study

### Distributions

#### Initial Thickness

![Bar chart showing distribution of gasket thickness with specification limits and count for each value]

#### Moments

- **Mean**: 0.0448722
- **Std Dev**: 0.0014351
- **Std Err Mean**: 0.0001691
- **Upper 95% Mean**: 0.0452095
- **Lower 95% Mean**: 0.044535
- **N**: 72

### Capability Analysis

#### Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
<th>Portion</th>
<th>% Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Spec Limit</td>
<td>0.043</td>
<td>Below LSL</td>
<td>15.2778</td>
</tr>
<tr>
<td>Spec Target</td>
<td>0.045</td>
<td>Above USL</td>
<td>11.1111</td>
</tr>
<tr>
<td>Upper Spec Limit</td>
<td>0.047</td>
<td>Total Outside</td>
<td>26.3889</td>
</tr>
</tbody>
</table>

#### Long Term Sigma

- **Sigma**: 0.00144

#### Capability

<table>
<thead>
<tr>
<th>Capability</th>
<th>Index</th>
<th>Lower CI</th>
<th>Upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP</td>
<td>0.465</td>
<td>0.388</td>
<td>0.541</td>
</tr>
<tr>
<td>CPK</td>
<td>0.435</td>
<td>0.330</td>
<td>0.540</td>
</tr>
<tr>
<td>CPM</td>
<td>0.463</td>
<td>0.390</td>
<td>0.542</td>
</tr>
<tr>
<td>CPL</td>
<td>0.435</td>
<td>0.329</td>
<td>0.539</td>
</tr>
<tr>
<td>CPU</td>
<td>0.494</td>
<td>0.382</td>
<td>0.605</td>
</tr>
</tbody>
</table>

#### Sigma Quality

<table>
<thead>
<tr>
<th>Portion</th>
<th>Percent</th>
<th>PPM</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below LSL</td>
<td>9.6015</td>
<td>96014.950</td>
<td>2.805</td>
</tr>
<tr>
<td>Above USL</td>
<td>6.9081</td>
<td>69080.622</td>
<td>2.983</td>
</tr>
<tr>
<td>Total Outside</td>
<td>16.5096</td>
<td>165095.57</td>
<td>2.474</td>
</tr>
</tbody>
</table>
### Variables Control Chart

#### XBar of Initial Thickness

![Control Chart for Mean of Initial Thickness](chart.png)

- **UCL** = 0.046731
- **Avg** = 0.044872
- **LCL** = 0.043013

**Note:** The sigma was calculated using the range.

#### R of Initial Thickness

![Control Chart for Range of Initial Thickness](chart.png)

- **UCL** = 0.004677
- **Avg** = 0.001817
- **LCL** = 0.000000

### Variables Control Chart

#### XBar of Initial Thickness

![Control Chart for Mean of Initial Thickness](chart.png)

Note: The sigma was calculated using the range.
Variables Control Chart

XBar of Initial Thickness

Note: The sigma was calculated using the range.
Variables Control Chart

**R of Thickness, SPC**

![R of Thickness Chart](chart1.png)

- **UCL** = 0.004322
- **Avg** = 0.001679
- **LCL** = 0.000000

Variables Control Chart

**XBar of Thickness, SPC**

![XBar of Thickness Chart](chart2.png)

- **UCL** = 0.046761
- **Avg** = 0.045043
- **LCL** = 0.043325

Note: The sigma was calculated using the range.
Distributions

**Thicknes, SPC**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
<th>Portion</th>
<th>% Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Spec Limit</td>
<td>0.043</td>
<td>Below LSL</td>
<td>1.1905</td>
</tr>
<tr>
<td>Spec Target</td>
<td>0.045</td>
<td>Above USL</td>
<td>3.5714</td>
</tr>
<tr>
<td>Upper Spec Limit</td>
<td>0.047</td>
<td>Total Outside</td>
<td>4.7619</td>
</tr>
</tbody>
</table>

**Long Term Sigma**

- CP: 0.707  | Lower CI: 0.600  | Upper CI: 0.814
- CPK: 0.692 | Lower CI: 0.565  | Upper CI: 0.819
- CPM: 0.706 | Lower CI: 0.603  | Upper CI: 0.818
- CPL: 0.722 | Lower CI: 0.591  | Upper CI: 0.852
- CPU: 0.692 | Lower CI: 0.564  | Upper CI: 0.818

Sigma = 0.00094
Variables Control Chart

**R of Thickness, weighing**

- UCL = 0.002317
- Avg = 0.000900
- LCL = 0.000000

Variables Control Chart

**XBar of Thickness, weighing**

- UCL = 0.045821
- Avg = 0.044900
- LCL = 0.043979

Note: The sigma was calculated using the range.
### Thickness, weighing

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
<th>Portion</th>
<th>% Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Spec Limit</td>
<td>0.043</td>
<td>Below LSL</td>
<td>0.0000</td>
</tr>
<tr>
<td>Spec Target</td>
<td>0.045</td>
<td>Above USL</td>
<td>0.0000</td>
</tr>
<tr>
<td>Upper Spec Limit</td>
<td>0.047</td>
<td>Total Outside</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

### Specified Sigma

Sigma = 0.00053

### Moments

- **Mean**: 0.0449
- **Std Dev**: 0.0004933
- **Std Err Mean**: 0.000052
- **Upper 95% Mean**: 0.0450033
- **Lower 95% Mean**: 0.0447967
- **N**: 90