Low Temperature Metal – Plastic Overmould Technology

YC KO
Senior Consultant, Smart Manufacturing & Mainland Division
19 Dec 2019
1. Limitations of Traditional Technologies
2. Our solution
3. Benefits
4. Comparison with Alternative Technologies
Low Temperature Metal – Plastic Overmould Technology

Limitations of Traditional Technologies

- Metal – plastic integrated parts

- Production of metal component (metal wiring) and plastic component separately
- Post-assembling process is required

OR

- Production of metal component firstly
- Insert the metal component in the mould cavity and injection moulding plastic component

Limitations

- Multiple steps of production
  - Machine investment, labour and logistic arrangement for in-process semi-finished parts
- Limitation of geometry for the pre-fabricated plastic and metal parts
  - Normal in simple 2D construction design
  - Restrict the flexibility in product design and functionality
Low Temperature Metal – Plastic Overmould Technology

Our solution

- Low temperature metal – plastic integrated production technology

1. Injection moulding plastic part in first cavity
2. Transfer plastic pre-form to second cavity in same mould
3. Injection of low melting point metal alloy into mould cavity for overmoulding plastic pre-form
Low Temperature Metal – Plastic Overmould Technology

Benefits

Low temperature metal – plastic integrated production technology

Benefits of the technology

• Production of complicated conductive metal path on plastic part within single production cell
  ➢ Lower production cost, lower hardware setup cost and higher production rate

• Higher flexibility and functionality in product design with more complicated 3D conductive path
## Low Temperature Metal – Plastic Overmould Technology

### Comparison with Alternative Technologies

- **Potential applications:**
  - Heat Sink
  - Decorative surface

<table>
<thead>
<tr>
<th>Production step</th>
<th>Metal-plastic integrated technology</th>
<th>Assembling / insert moulding</th>
<th>Plastic overmoulding + electroplating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Thickness of metal layer</td>
<td>&gt; 1mm</td>
<td>&gt; 1mm</td>
<td>5-15μm</td>
</tr>
<tr>
<td>Environmental friendly</td>
<td>Yes</td>
<td>Yes</td>
<td>No (electroplating)</td>
</tr>
<tr>
<td>Facilities</td>
<td>Injection moulding</td>
<td>Injection moulding</td>
<td>Injection moulding</td>
</tr>
<tr>
<td></td>
<td>• Metal forming (CNC machining, die casting, etc)</td>
<td>• Metal forming (CNC machining, die casting, etc)</td>
<td>• Electroplating</td>
</tr>
<tr>
<td></td>
<td>• Assemble line</td>
<td>• Assemble line</td>
<td></td>
</tr>
<tr>
<td>Cost saving in:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Equipment cost</td>
<td>✓✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. Production rate</td>
<td>✓✓✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3. In-process logistic arrangement</td>
<td>✓✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4. Raw material cost</td>
<td>✓✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Geometry of metal layer</td>
<td>3D Solid (complicated)</td>
<td>3D Solid (simple)</td>
<td>3D surface (metal only be electroplated on surface)</td>
</tr>
</tbody>
</table>

- **Production cost savings:**
  - Equipment cost
  - Production rate
  - In-process logistic arrangement
  - Raw material cost

- **Geometry of metal layer:**
  - 3D Solid (complicated)
  - 3D Solid (simple)
  - 3D Surface (metal only be electroplated on surface)