

Low Temperature Metal – Plastic Overmould Technology

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- A blue-tinted photograph of a server room with rows of server racks and visible cables, positioned on the left side of the slide.
- 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

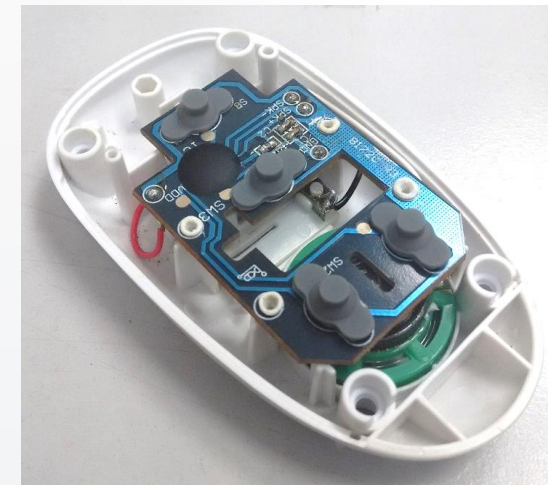
OR

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



Limitations

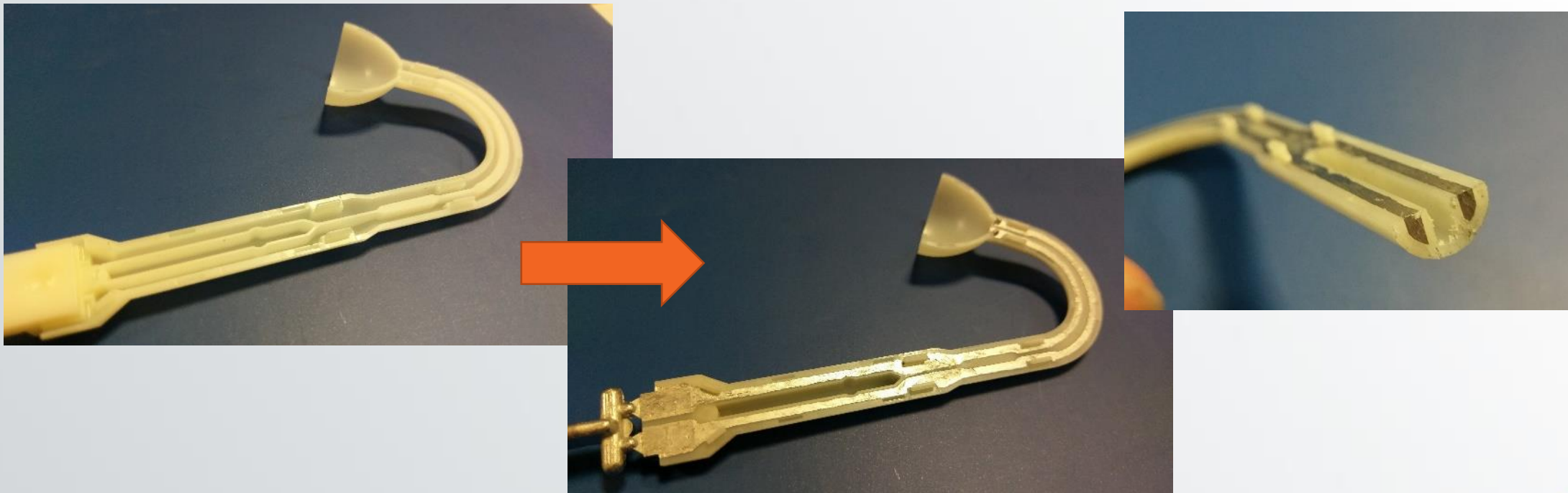
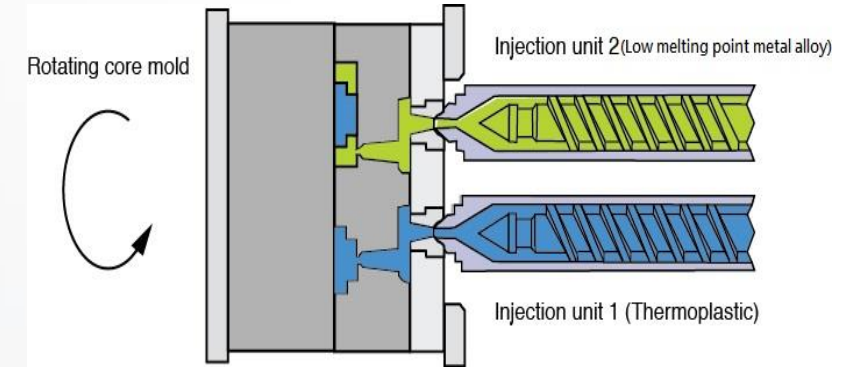
- Multiple steps of production
 - Machine investment, labour and logistic arrangement for in-process semi-finished parts
- Limitation of geometry for the pre-fabricated plastic and metal parts
 - Normal in simple 2D construction design
 - Restrict the flexibility in product design and functionality



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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

Our solution

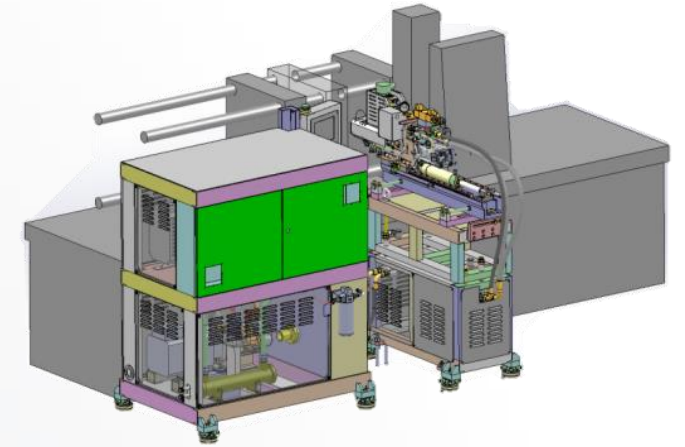
- The metal injection unit was retrofitted to the existing standard injection moulding machine

Hydraulic and
electrical cabinet



Metal injection unit

Existing plastic
injection
moulding machine



Overall configuration of the system

Low Temperature Metal – Plastic Overmould Technology

Our solution



Step 1 – injection of plastic preform in cavity 1



Step 2 – transfer of plastic preform

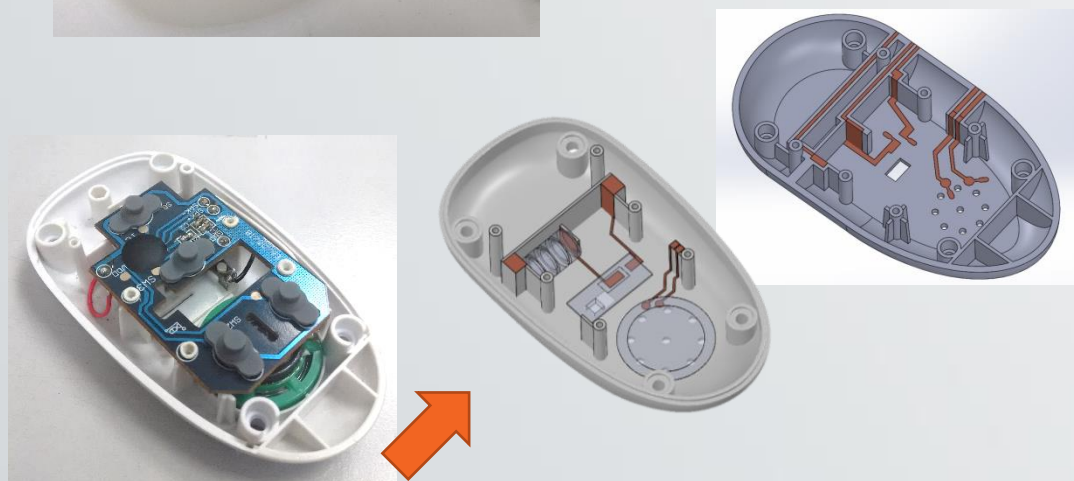
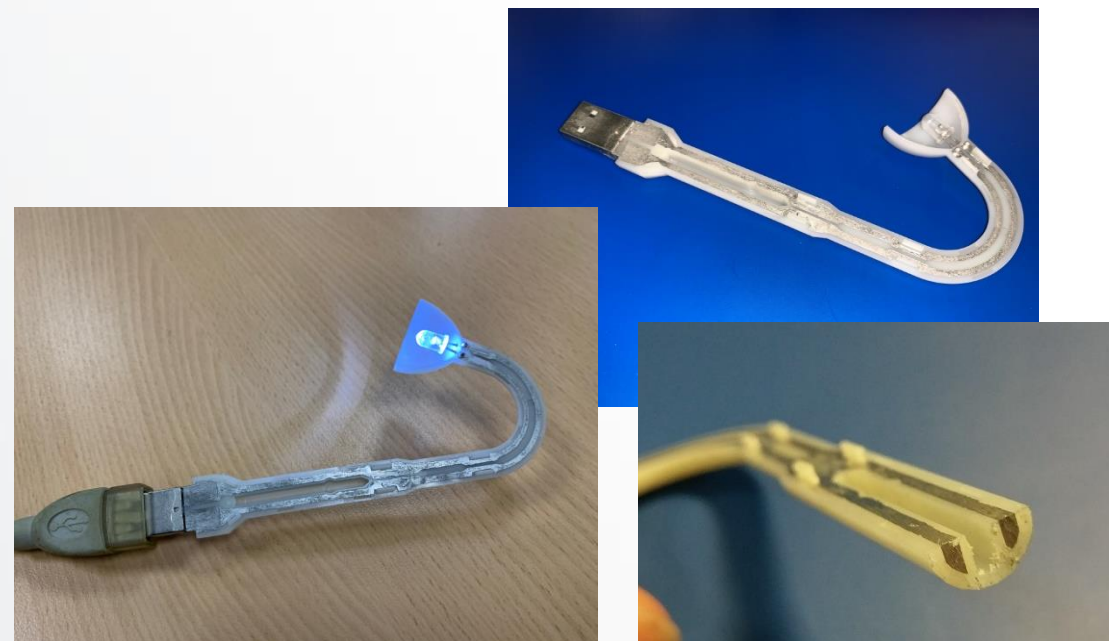


Step 3 – injection of metal layer

Processing steps

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Benefits



Replacement of wiring and soldering



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

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Comparison with Alternative Technologies

- Potential applications: Electric conductive path on plastic part



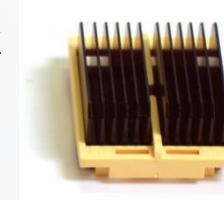
	Metal-plastic integrated technology	Molded Interconnect Device (Organo-metallic laser activation)
Production steps	1	3
Thickness of metal layer	> 1mm	5-15µm
Environmental friendly	Yes	No (Involves chemical metallization)
Facilities	Injection moulding	<ul style="list-style-type: none"> • Injection moulding • Laser equipment • Chemical Metallization facility (separated plant)
Raw material types	Market available standard plastic resin and low melting point alloy	Special grade (higher temperature grade plastic pre-blended with organo-metallic compound)
Cost saving in:		
1. Equipment setup	✓✓✓	✓
2. Production rate	✓✓✓	✓
3. In-process logistic arrangement	✓✓	✓
4. Raw material cost	✓✓✓	✓
Geometry of metal layer	3D solid	3D surface (Metal only deposit on laser activated surface)

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Comparison with Alternative Technologies

Potential applications:

Heat Sink



Decorative surface



	Metal-plastic integrated technology	Assembling / insert moulding	Plastic overmoulding + electroplating
Production step	1	3	2
Thickness of metal layer	> 1mm	> 1mm	5-15µm
Environmental friendly	Yes	Yes	No (electroplating)
Facilities	Injection moulding	<ul style="list-style-type: none"> Injection moulding Metal forming (CNC machining, die casting, etc) Assemble line 	<ul style="list-style-type: none"> Injection moulding Electroplating
Cost saving in:			
1. Equipment cost	✓✓	✓	✓
2. Production rate	✓✓✓	✓	✓
3. In-process logistic arrangement	✓✓	✓	✓
4. Raw material cost	✓✓	✓✓	✓
Geometry of metal layer	3D Solid (complicated)	3D Solid (simple)	3D surface (metal only be electroplated on surface)



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