What is Nickel Electro Forming

Nickel electroforming is the fabrication of products by means of electroplating process where a thick metal deposited onto a mandrel (master) which is subsequently separated from the deposit. Extremely fine mould and dies can be reproduced using electroforming processes. The virtually perfect surface reliability offered by electroforming processes make these processes ideal for such dimensionally critical applications as lens mould, embossing plate, fine printing plates etc..

Basic Steps in Electroforming:
1. A suitable mandrel is obtained and prepared for electroplating.
2. The mandrel is placed in the appropriate electroplating solution and metal is deposited upon the mandrel by electrolysis.
3. When the required thickness of metal has been applied, the metal covered mandrel is removed from the solution.
4. The mandrel is separated from the electrodeposited metal. The electroform is a separate, free standing entity composed essentially of electro deposited metal.

What is a Mandrel (Master) 

A mandrel or master is the original from which a replica is electroformed. Mandrels are either permanent or expendable. Permanent mandrels are reusable to reproduce many electroformed parts. A permanent mandrel is usually machined, cast or electroformed. Common substrates for mandrels are brass, copper, stainless steel or nickel. Expendable mandrels are destroyed during separation from the electroform. Expendable mandrels are used when the mandrel have features that preventing it from being mechanically separated from the electroform. Expendable mandrel are often made of soluble metals such as aluminium, plastic, fusible metals, waxes.

When to Specify Electroforming

Duplication of complex surface finishes, bright, semi-bright, matte, smooth, brushed, roughened surfaces and combinations of these can be reproduced without the need for machining or polishing individual components after fabrication.

Multiple, identical electroforms from a single mandrel can be reproduced with very high order of dimensional accuracy.

Nickel Cobalt Alloy Electroform

A new process of electro deposit of Nickel with Cobalt Alloy on mandrel. Nickel Cobalt Alloy electroform possesses a higher tensile strength, surface hardness and better wear and corrosion resistance than pure Nickel electroform. Please see the table for a comparison of properties of different materials.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Tensile Strength N/mm²</th>
<th>Hardness Vickers (HV)</th>
<th>Rockwell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>&lt; 270</td>
<td>60 - 80</td>
<td>-</td>
</tr>
<tr>
<td>Brass</td>
<td>330 - 450</td>
<td>130 - 150</td>
<td>-</td>
</tr>
<tr>
<td>*Nickel</td>
<td>540 - 740</td>
<td>170 - 230</td>
<td>&lt; 21</td>
</tr>
<tr>
<td>*Nickel Cobalt Alloy</td>
<td>1200 - 1450</td>
<td>380 - 450</td>
<td>40 - 48</td>
</tr>
<tr>
<td>Plastic Mould Steel</td>
<td>950 - 1100</td>
<td>280 - 325</td>
<td>29 - 35</td>
</tr>
</tbody>
</table>

Other Quality Products From Swift Silicone: Custom Built Hot Stamping Machines. Hot Stamping Silicone Rubber Dies (Flat/Curved), Silicone Rubber Rollers (Plain/Profiled), Silicone Rubber Sheets, Engraved Metal Dies (Flat/ Lined), Pressure Engraving services, Nickel electro forming services, etc.

SWIFT SILICONE PTE LTD 30 Loyang Way #03-01/02, Loyang Industrial Estate, Singapore 508769
Tel: (65) 6546 0400 Fax: (65) 6546 0500 • Email: swift@swiftsilicone.com • Website: www.swiftsilicone.com

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Mandrel
Cathode
Electroformed Layer on Mandrel
Separation from Mandrel
1 - Copper Backing

Nickel Electro Forming Services

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