Properties of LIGA Structures as Moulds

Patterned plate of electroplated NiCo alloy. Structure height: 600µm; smallest slit width: 10µm

SEM view of a detail

Material
Nickel or Nickel-Cobalt(80/20)

Precision of lateral dimensions
+1µm (3σ)

Range of Thicknesses
100µm to 2300µm

Thickness tolerance
+10µm, lower values upon request

Structure details
Less than 1µm possible

Smallest hole dimensions
One twentieth of the structure height as a safe guideline, one fiftieth is usually possible by implementing specific layout rules

Roughness of the sidewall
Less than 50nm

Verticality of the pattern
Less than 0.6µm per 100µm of height

Hardness
Ni >250Hv0.1 NiCo >450Hv0.2

Elastic limit Rp 0.2
NiCo > 750 N/mm²

Tensile strength Rm
NiCo 1.200 – 1.800 N/mm²

Strain at failure A 5
NiCo > 3.5 %

Young’s Modulus
Ni and NiCo 130 – 180 GPa

Examples – Application Areas:

- Moulds for hot embossing and injection moulding (MIM, CIM or polymers)
- Precise hole geometries
- Very small gear trains

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