

Replication

Micro and Nano Imprinting

Cardiff University, United Kingdom



Contact:	Franck Lacan Email lacan@cardiff.ac.uk • Phone +44(29)2087-6266 • Fax +44(29)2087-4880							
Material class:	Silicon	Polymer X	Metal X	Ceramic X	Glass	Organic	Other	
Short technology description:	Step and Flash® Nano Imprint Lithography system, Imprio® 55 – produce for replication required micro- and nano-patterned masters – relevant manufacturing technologies: laser milling, micro milling, micro EDM, Focused Ion Beam Thermal imprinting system, Mikrotechnik HEX03, Hot Embossing – for replicating surface structures in polymers – 5 mn typical cycle time, 250 kN max. press force, temperature up to 320°C – max. substrate size Ø 180 mm, max. embossing size Ø 150 mm, max. part thickness 20 mm Micro injection-moulding system, Microsystem 50 – for polymer materials – max. shot size 1 cm ³ , theoretical shot volume 1,1cm ³ – specific injection pressure limited to 2500 bar, 25cm ³ /s injection rate into air – clamp force 50 kN, opening force 10 kN – max. mould size 196x156 mm, min. mould height 100 mm – ejector force 1.2 kN, ejector stroke 30 mm Electroforming system, SA/1 – a nickel sulfamate plating bath is used to deposit elementary nickel on the master – wafer master size 100 mm (4 in), resolution 3-5 nm, aspect ration up to 100, thickness 3mm (4 in), hardness of the replicated parts 280 to 330 Hv							
Typical structures and designs:					Electroforming: Stainless steel master and Replicated structure in Nickel			
					Electroforming: 30 nm grooves replicated in Nickel and 100 nm diameter holes in Nickel			
								Fused-silica template for NIL replication
								Lenses replicated by NIL