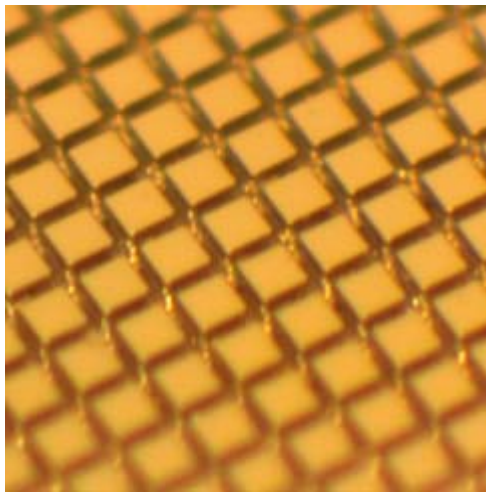


## Three-Dimensional Electroformed Micro-Structure Capability

The Metrigraphics Division of Dynamics Research Corporation has developed a process capability for the manufacture of high aspect ratio three-dimensional microstructures. These microstructures are intended for applications such as:

- **Microembossing Molds** (for microfluidics and LCD flat panel arrays)
- **Monofilament Supports** (mechanical retainers for fiber or lenses in optical networks)
- **Micro Springs** (for electrical contacts and circuit testers)

The microstructures can be free-standing or permanently bonded to silicon wafers or any relatively smooth substrate. To date, we have built microstructures with features as small as 0.002mm and aspect ratios as high as 20:1. (See chart below for aspect ratio guidelines.) This capability relies on a variety of commercially available photoresists and Metrigraphics' considerable experience in photolithography, thin-film deposition, electroplating and recently developed proprietary processes for these microstructures.



**Microembosser**



**Fiber Optic Clip**

### Photoresist Aspect Ratio Guidelines

Photoresist	Plated Metals	Minimum Feature	Maximum Aspect Ratio *
AZ1500, AZ9200	NiCo, Ni, Cu, Au	1-12 microns	1:1
AZ9200, NR-9, NR-5, SU-8	NiCo, Ni, Cu, Au	12-50 microns	2:1, 5:1 (BE)
NR-9, SU-8	NiCo, Ni, Cu	50-100 microns	2:1, 10:1 (BE)
SU-8	NiCo, Ni, Cu	100-200 microns	15:1 (BE)
SU-8	NiCo, Ni, Cu	200-500 microns	10:1 (BE)
SU-8	NiCo, Ni, Cu	500-1, 1,000 Microns	5:1 (BE)

*\* Maximum aspect ratio is pattern dependent, i.e., uniform opaque and transparent features.*