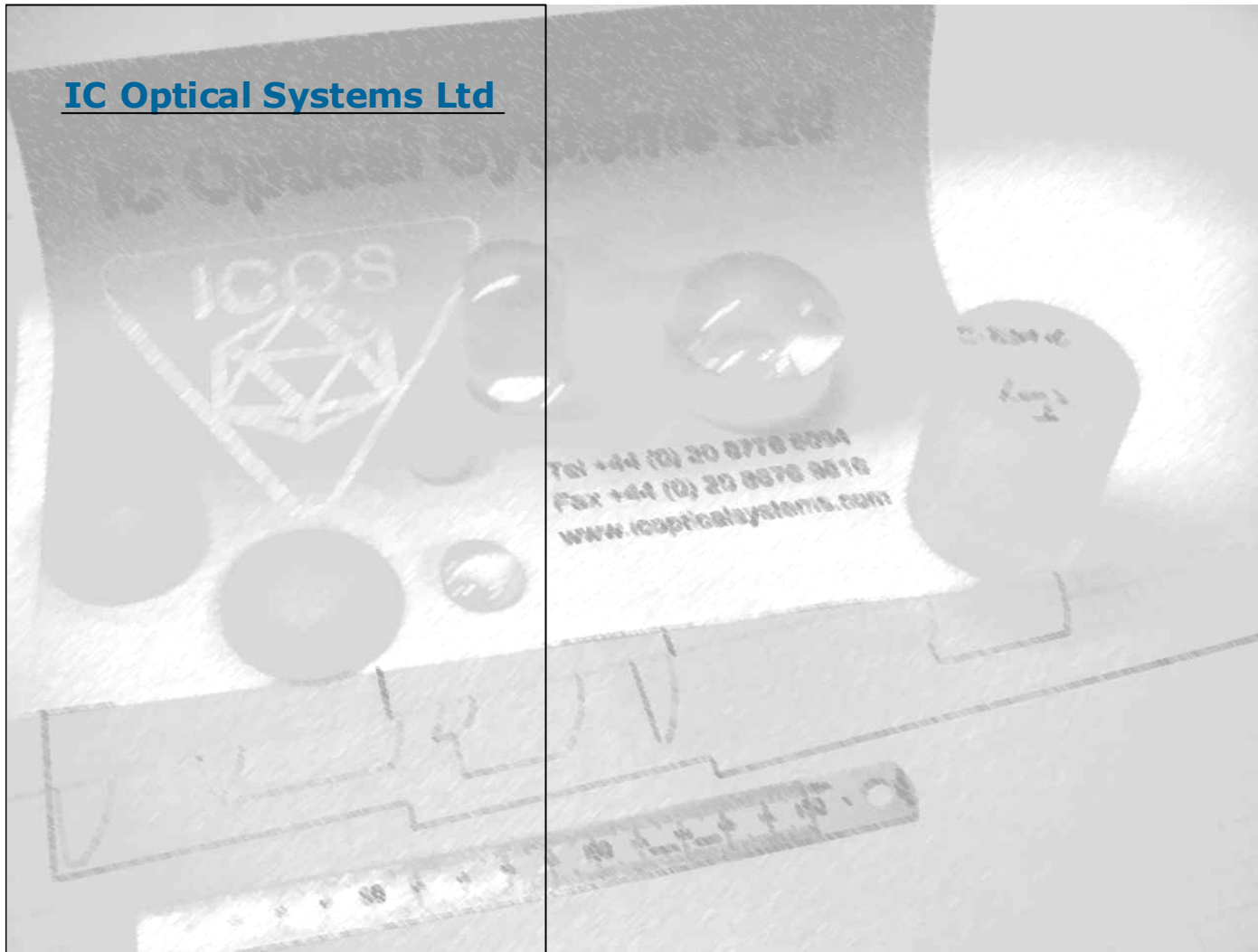


## **IC Optical Systems Ltd**



IC Optical Systems Ltd manufactures all forms of optical components and systems to very precise and demanding specifications and tolerances in a wide range of optical substrate materials.

We can make single components or project manage complicated assemblies or systems.

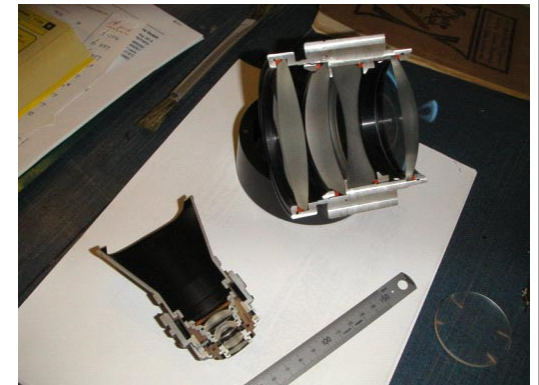
## **IC Optical Systems Ltd**

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**IC Optical Systems Ltd**

## **Optics and Systems**



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# Flats, Lenses, Prisms and Optical Systems

## What Products Does ICOS Make?

We at IC Optical Systems Ltd make flats, lenses, prisms and systems or assemblies which comprise these building blocks. Extensive use of optical contacting and precision machining is used in the manufacture and construction of these products; this allows highly specified systems to be turned into reality from customers ideas.

## Flats and Fabry-Perot Etalons

Optical flats (diameters  $>30\text{cm}$ ) and etalons of aperture  $>150\text{mm}$  can be made with an absolute flatness of better than  $\lambda/100$  or matched flatness of  $<\lambda/200$ . Highly reflective mirrors used as fixed gap air-spaced etalons can be assembled with spacers parallel to  $\lambda/50$ . Piezo driven closed loop etalons, ET-Series and CS100 Controllers are also available.

## Solid Fabry-Perot Etalons

Solid etalons made of Fused Silica or diameter  $>100\text{mm}$  and mechanical thickness  $>100\text{mm}$  can be made to an optical path difference of much better than  $\lambda/100$ .

## Spherical Surfaces

Spherical surfaces, usually in the form of a lens, can be made and specified with apertures of  $300\text{mm}$  and custom radii of curvature or selected from our extensive tool library. A departure from spherical can be specified up to  $\lambda/20$  and for lenses the centre thickness can be made to within  $0.01\text{mm}$  if required by the design.

## Lens Assemblies

Multiple element lens systems such as camera and collimator optics to the customer's design comprising the polishing and coating of lenses, machining of the mount and critical assembly can be made in our facility. The positioning of elements in the final assembly can be done to within a few microns or better if required.

## Prisms, Cubes and Tight Angles

ICOS make optics that rely on precise angles for their operation to customer specifications and designs. It is essential to have very flat adjoining surfaces in order to make the angle between them to better than  $1\mu\text{radian}$ , i.e. sub-arc-second.

## Other Optics and Assemblies

Minimal wavefront distortion in windows, filters, wave plates, polarization optics and prisms is often required. By sourcing the best available material ICOS can make most shapes or sizes of optical component and mount them either in a precision mechanical mount or with optical contacting on a flat optical surface to achieve integrated, monolithic systems.

## Coated Optics

Most optical elements require either an anti-reflection coating or specific reflector over a given wavelength band. Working with our coating partners we can provide the most demanding coating specifications that can be made.

## Other Devices with Optical Precision

We manufacture custom optical components for interferometers; wafer-stepper chucks; multi-wavelength filters; neutral density filters; relay lens systems; custom hostile environment enclosures for lenses; steel reference flats; telescopes; reference angle blocks; beam splitters; precision cylinders; viewing domes; X-ray mirrors; axicons; image-slicers, natural quartz optics; achromats; vacuum corrector plates; precision rods; stick mirrors; confocal etalons; laser mirrors; etc.

## Contact ICOS

Contact ICOS with your requirements on the contact details overleaf. We welcome a challenge and will consider most requests for demanding optics.

## Summary Specifications

### Flats and Air-spaced Fabry-Perot Etalons

Flatness	$\lambda/100$ or better after coating
Optical Parallelism	$\lambda/50$ or better
Mechanical Gap	$150\text{mm}$ to $\pm 1\mu\text{m}$
Plate Wedge	Zero or as specified

### Solid Fabry-Perot Etalons

Thickness	$100\text{mm}$ or more
Optical Path Difference	$\lambda/20$ or better

### Spherical Surfaces

Sphericity	$\lambda/20$ departure from test plate
Radii of curvature	Library of 420 curved tools

### Common Specifications

Diameter	Up to $300\text{mm}$
Dimensional tolerances	Diameters $+0.0-0.15\text{mm}$
Angular tolerances	$=1\mu\text{radian}$ , i.e. sub-arc-second.
Surface quality	10:5
Surface smoothness	$<1\text{nm rms}$



*Back illuminated optical contact on a stepped etalon*