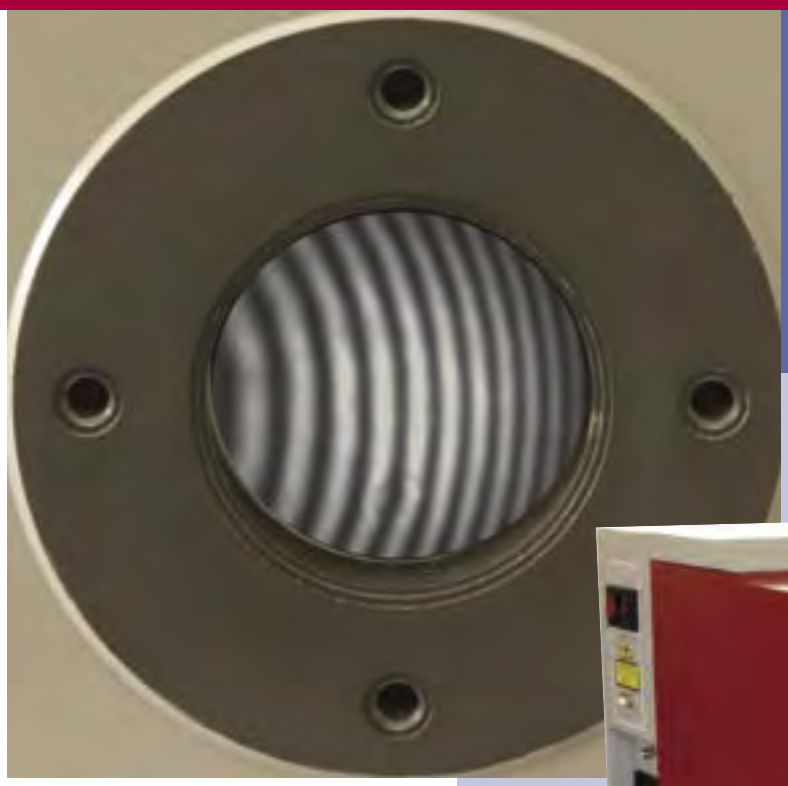
Infra-red interferometers

for performance testing of infra-red materials and optical systems



PRECISION-OPTICAL ENGINEERING

MBDA PRECISION SOLUTIONS

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INTERFIRE II FAMILY OF INTERFEROMETERS

To meet the increasing demands for the accurate optical testing of infra-red (IR) materials and lens systems, Precision-Optical Engineering has designed, developed and now manufacture the INTERFIRE II family of IR interferometers that cover the testing of systems in the **Mid** (3-5 micron) and **Far** (8-12 micron) **IR wavebands**. Additional interferometers can be supplied between 850nm and 1.55 microns

the INTERFIRE II family, 10.6 shown above and the 3-5 below.

DESIGNED FOR THE USER

The two interferometers have been designed to be rugged, easy-to-use instruments that can be used for production, quality control or research applications and are fully supported with a comprehensive range of optical and mechanical accessories and static and phase-measuring fringe analysis software options.

WIDE RANGE OF APPLICATION

As precision non-contact instruments, the INTERFIRE II interferometers provide rapid and accurate measurement of wavefront distortion through IR systems and components. Their operating wavelengths allow for the evaluation of high specification IR lens assemblies, producing interference fringes that indicate the degree of aberrated performance. Their associated fringe analysis software enables detailed performance analysis of even the most complex of lenses.

The INTERFIRE II family comes with an impressive pedigree based on an established history of proven reliability. This technical excellence is also reflected in Precision-Optical Engineering's position as a leading supplier in the provision of optical design services, optical testing, diamond machining and sub-assembly manufacturing. Each instrument comes with a comprehensive operating manual and is backed by a one year guarantee plus a choice of technical field service and support packages.

INTERFIRE II SYSTEMS

Both of the INTERFIRE II interferometer systems are configured in a Twyman Green optical configuration and have an integral co-linear visible HeNe laser included that provides the user with a rapid and accurate alignment system.

The INTERFIRE II 10.6 system has a stabilised CO_2 waveguide laser source operating at 10.6 microns whilst the INTERFIRE II 3-5 system uses a HeNe laser source operating at 3.39 microns; both systems are designed to provide versatile testing capabilities.

To meet testing requirements at other IR wavelengths both of the INTERFIRE II interferometers can have their lasers replaced with lasers of an appropriate wavelength.

FRINGE ANALYSIS

Both INTERFIRE II systems can be used with static or phase-shifting fringe analysis software packages. These packages run on a standard PC with a framegrabber board, enabling both simple routine tests and advanced system studies. The phase-shifting technique employed allows the highest degree of precision and enables full use of standard accessories.

Static Package provides:

1. Pass/fail criteria; irregularity, power, PV, rms.
2. Low cost analysis of open or closed fringes.
3. Full wavefront analysis including MTF, PSF, slope error.
4. Zernike analysis up to 49 terms.
5. Reference subtract.

Phase-shift Package provides:

1. Software operates within Windows™.
2. Capability to evaluate both components and systems.
3. Full analysis of circular, multiple, low-contrast and null fringes.
4. Macro programming facility allows repetitive testing routines to be set up.
5. Reference subtract.

KEY BENEFITS

Both systems are:

- **Portable and compact**
- **Easy to set up and operate**
- **Provide remote control operation**
- **Non-contact and precise**
- **Transmitted wavefront measurement for IR materials/systems**
- **Compatible with a wide range of standard accessories**
- **Practical, versatile and affordable**

STANDARD ACCESSORIES

- Aperture converters to increase the 35mm output beam diameter
- Reference flats (λ/20)
- Transmission spheres (λ/10)
- Reference spheres (λ/20)
- Collimating lenses
- Off-axis parabolas
- Attenuators
- Precision mounts
- Vertical configurations
- Upward/downward looking options
- Static and phase measuring fringe analysis systems

SPECIFICATIONS

	INTERFIRE II 3-5	INTERFIRE II 10.6
Type:	Twyman-Green Unequal Path Interferometer	
Wavelength:	3-5µm	10.6µm (others available)
Dimensions:	675mm (l) x 260mm (w) x 280 (h)	
Weight:	30kg approx.	35kg approx.
Laser Source	Type: Externally coupled HeNe (operating at 3.39µm)	Water-cooled waveguide CO_2 others available)
Head dimensions	1100mm (l) x 160mm (w) x 130mm (h)	
Head weight	20kg approx.	
Clear aperture:	Nominally 35mm (greater than 31.5mm guaranteed). Expandable with accessories	
Fringe detection:	Focal plane array with fringe contrast adjustments	
Display:	CCIR compatible or as specific user requirements	
Alignment:	Integral co-linear visible HeNe laser	
Optical zoom:	Continuously variable x 1 - x 3	
Remote control:	Full control of reference mirror tilt/tip	
	Main/alignment, aperture focusing, optical zoom	CO_2 and HeNe lasers – on/off, standby, aperture focusing, optical zoom.
Accuracy (PV):	STATIC: $\lambda/20$	PHASE: $\lambda/50$
Repeatability (PV):	STATIC: $\lambda/50$	PHASE: $\lambda/100$
Data acquisition time:	STATIC: 0.04 sec PHASE: 0.167 – 1.33 sec	
Min. hardware:	Pentium© computer with maths processor, vacant expansion slot for framegrabber board	

For further information about Infra-red interferometers and their applications please contact our sales department

PRECISION-OPTICAL ENGINEERING

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