

# PhaseCam™

Model 7000

High performance  
Dynamic  
Twyman Green  
Interferometer

## Breakthrough Technology

The PhaseCam 7000 Twyman-Green interferometer was designed specifically to measure parallel glass surfaces such as windows, wave plates, prisms, and display glass. Its proprietary short-coherence laser source enables the measurement of substrates as thin as 300 microns. The PhaseCam can measure surface shape of both the front and back sides, defects, homogeneity, and glass thickness, all from a single measurement setup. The compact size of the interferometer makes it very portable and easily integrated into existing manufacturing equipment. 4D Technology's state-of-the-art phase sensor technology enables data acquisition times of only 3 microseconds, allowing the PhaseCam to be employed *in situ* for demanding manufacturing applications.

## The System

The PhaseCam 7000 is a turnkey instrument that includes the interferometer, 4Sight™ advanced wavefront analysis software, and the latest generation, high-speed computer system. Samples with any reflectivity from 0.5% to 100% can be measured with a simple adjustment. The PhaseCam 7000 is easy to use and eliminates tedious re-testing due to inaccurate data acquisition. This system is fast, robust, reliable, and accurate.

## 4Sight™ Software

The next generation wavefront analysis software package, 4Sight™ features a user-friendly intuitive interface that is unmatched for simplicity, ease of use, and graphical display. The Measurement Console display aids alignment and the execution of single, averaged, burst or continuous data acquisition. Visualize the entire measurement data flow, from raw interferogram acquisition, through masking, reference subtraction, and terms removal to phase data using a single interactive display. Perform Zernike and Seidel, geometric

and diffraction analyses; save, print and export data or cut and paste results with unrivaled flexibility. The unique data stack facilitates complex manipulations and comparisons of phase maps. Comprehensive data sharing capabilities let you read and write most file types, including IDL®, MatLab®, Opticode®, Vision®, HDF5 and CodeV®. Remote measurement capability simplifies integration for in-line applications.

## Accessory Optics

A wide variety of precision accessory optics are available for the PhaseCam 7000, including beam expanders to increase the field of view up to 45mm.



PhaseCam 7000 in vertical orientation.

## Features

- Vibration Insensitive Dynamic Operation
- Instantaneous Single Camera Optical Phase Sensor
- Compact and Extremely Portable
- Integrates Easily with Existing Equipment
- Acquisition Time of Several Microseconds

## Applications

- Parallel Glass Surfaces
- Windows, Wave Plates, Prisms, etc
- Surface Quality, Thickness, Defects and Homogeneity
- Production and Lab Measurement



IDL, MatLab, Opticode, Vision, HDF5, CodeV and Windows are registered trademarks of their respective owners

For a demonstration of this and other products, call Sales at 800-261-6640

# PhaseCam™

## Specifications

Configuration	Model 7000
Description	Turnkey vibration insensitive dynamic Twyman-Green interferometer
Acquisition Mode	Instantaneous phase-shifting single frame phase sensor
Laser Source	660nm class 3b laser diode
Coherence Length	300 $\mu\text{m}$ (150 $\mu\text{m}$ in reflection)
Field of View	>4.5 mm collimated, optional 46 mm collimated
Spatial Frequency Range	2 - 440 $\text{cm}^{-1}$
Beam Quality	Min. $\lambda/10$ wave (uncalibrated) over 90% clear aperture
Polarization	Circular
Pupil Focus	Fixed, 60mm in front of instrument (100mm in front of instrument with optional 45 mm FOV)
Path Matching	Fixed at pupil focus
Camera	1K x 1K, 10-bit, progressive scan with CameraLink™
Data Array	User Selectable Full, Half, Quarter data arrays
Acquisition Rate	>14 frames/sec display; >25 frames/sec burst acquisition
Minimum Exposure	3 $\mu\text{s}$ for 4 -100% reflectivity
Cables	Power supply, camera and power cables
Computer System	Minimum Configuration: Pentium IV, 3 GHz, 1 GByte RAM, 160 GByte Hard Drive, CDRW/DVD, 19" LCD, mouse, keyboard
Operating System	Windows XP®
System Software	4Sight™ Version 1.6 or later Instantaneous Phase Shifting data acquisition Fringe display / Exposure control On-the-fly data processing with terms / reference removal Reference generation, subtraction, data averaging, masking 2D and 3D surface maps Zernike / Seidel / Slope / Geometric / Fourier Analysis Fiducial aided data set mapping HDF4 / HDF5 data format standard, others supported Optional analyses Upgrades – free during warranty period User Manual
Physical Envelope	< 8 x 16 x 43 cm
Weight	< 4 Kg
Power consumption	< 750 Watts
Temperature Range	Operational: 60–80 °F, non-condensing Storage: 30–100 °F, non-condensing

**Warranty** One Year, limited, on-site system installation and operator training

### Options

Beam Expanders Up to 45 mm diameter FOV

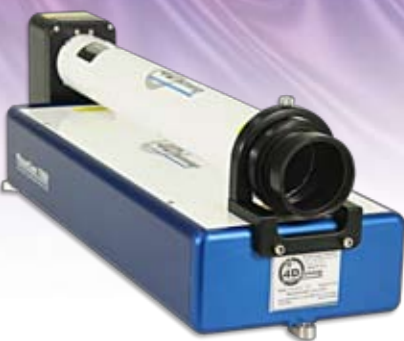
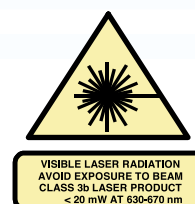
### Performance

Sample Reflectivity 0.5 to 100%  
RMS Repeatability < 0.001 wave\*  
RMS Precision < 0.002 wave\*\*

\* One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 16 measurements.

\*\*Average RMS of the difference of 10 data sets between measured surface and the calibrated surface. Each data set being an average of 16 measurements. Calibrated surface is the pixel by pixel average of 10 measurements of calibration mirror.

All specifications subject to change without notice.



PhaseCam 7000 with beam expander.

