



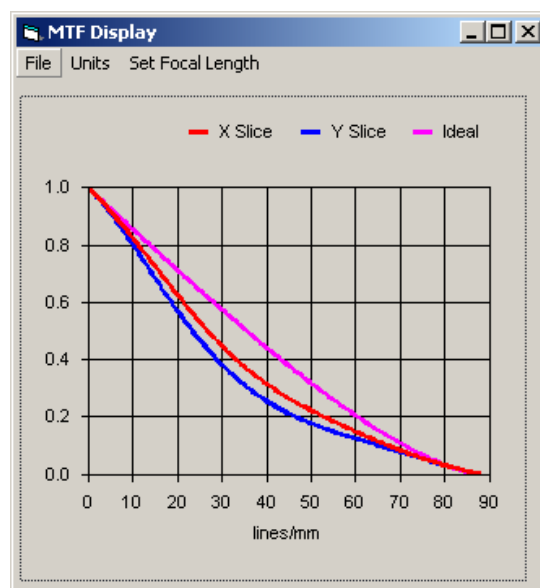
AMO WaveFront Sciences offers CrystalWave™ for wet and dry testing of intra-ocular lenses. Focal length, wavefront, and MTF measurements are combined in a single instrument using a Shack-Hartmann wavefront sensor.

For normal software operations, a simple user interface guides the alignment of the IOL and the measurements. Researchers can access the CLAS-2D™ software for advanced data analysis, including Zernike polynomials, coma, and spherical aberration.

CrystalWave™ also supports production line installations and is insensitive to vibrations. The measurement zone accepts a single IOL or multiple IOLs in a carousel. The optional CrystalServer™ software allows user written programs to control CrystalWave™ in coordination with robotic equipment.

The combined measurement of power, wavefront, and MTF measurements in one instrument minimizes part handling. Older technologies required separate instruments for power and MTF and required subjective judgments by technicians. Now wavefront technology provides objective measurements that are repeatable for process control.

A unique algorithm removes the usual dependence of measured power on the axial location of the IOL. This algorithm eliminates the need for mechanical restraints on the IOL and eliminates the resulting distortion of soft materials. CrystalWave™ also includes an inspection camera with back illumination of the IOL for monitoring scratches, tears, irregular edges, debris, and haptics orientation.



Specifications:

Standard Wavefront Sensor:

101x101 lenslet array grid
Field of View: 7.4 x 7.4 mm
Spatial Resolution: 0.072 mm
Spherical Range: 7 to 80 diopters (wet/dry version)
Cylinder Range: 6 diopters for 6 mm analysis diameter
XY translation stages for adjustment of IOL

Standard Equipment:

Inspection Camera: NTSC video on separate monitor
Software controlled automatic light level adjustment
Wavelength: Green 525 nm
(optional 546 nm with reduced accuracy)
Temperature: thin wire type K thermocouple probe
One fused silica cuvette - lambda/20 RMS
Mount for IOL that has monofilament haptics
Dell computer with 17" monitor

Mechanical:

Height, width, length: 6 x 8 x 33 inches
CrystalWave™ may be used vertically or horizontally

Accuracy and Repeatability:

Power Accuracy: 0.15 Diopters Sphere and Cylinder
(Range 6-40D)
Power Repeatability: 0.05 Diopters Sphere and Cylinder
Spherical Aberration Accuracy: 0.004 microns (Z42)
Spherical Aberration Repeatability: 0.002 microns (Z42)

Options:

Negative power IOL measurement (-10 to +30D)
Tip/Tilt mount for IOL, gimballed about center of IOL
(works with standard XY stage)
Dry only version
(sphere range 7 to 120 Diopters, no cuvette)
Multifocal analysis with annular software masks
ISO model eye
(calibrated flip-in lens with automatic position sensing)
Temperature control for IOL in water
Optional Wavefront Sensor: cylinder 10 diopters and spatial resolution 0.108 mm
CrystalServer™ Active-X automation DLL callable from Labview, Visual Basic, etc.
Firewire inspection camera under development
Toric IOL measurement under development
Accommodative IOL version with light source projected into user made apparatus. Includes dynamic data recording to monitor IOL changes as zonular tension on IOL is varied.

Specifications are subject to change without notice.
CLAS-2D, COAS, ClearWave, and CrystalWave are trademarks of AMO WaveFront Sciences, LLC.

The screenshot shows the CrystalWave software interface, version 1.74.22. The window title is "CrystalWave Version 1.74.22". The menu bar includes "File", "Option", and "Units". The interface is divided into several sections:

- Buttons:** "Reset Form", "Setup Part", "Collimate", "Align X/Y", "Measure Wavefront", "Measure power", "Save File", "Print Report", and "MTF".
- Input Fields:** "Lot #", "Lens ID #", "Operator", "Date / Time", "Analysis Diameter", "PV WFE", "Spherical Aberration", "Power", "Cuvette Temperature", and "Mount Temperature".
- Measurement Data:** "Collimation Error" (-0.037 Dpt), "Astigmatism" (0.056 Dpt), "XAng" (-10.148 mr), "YAng" (-4.394 mr), "Z22" (0.03), "Z31" (0.04), and "Z32" (0.01).
- File Name:** "QA7H9_12_102020041520270011".
- Temperature:** "Cuvette Temperature" (NA C) and "Mount Temperature" (NA C).

Data Outputs:

Sphere/Cylinder/Axis
Focal Length
Spherical Aberration
MTF of IOL itself (calculated from wavefront)
MTF of IOL installed in ISO model eye (optional)
(calculated from wavefront)
Zernike Polynomials
Zonal Wavefront Map
Point Spread Function
Power Map