

ZnSe diffusive lens radii measurements

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General

The report summarizes the results obtained from scanning two ZnSe diffusive lenses obtained from Ophir Optics division.

The two identical lenses were marked as Sample#1 and Sample#2 respectively. The two surfaces of each individual lens has a different curvatures, Convex with nominal radius of 112 mm and an almost Plano surface with a nominal radius of 294mm.

The scans were performed using Optimet's ConoPoint-10 with 25mm lens using the laboratory demonstrator scanner as depicted in figure 1.

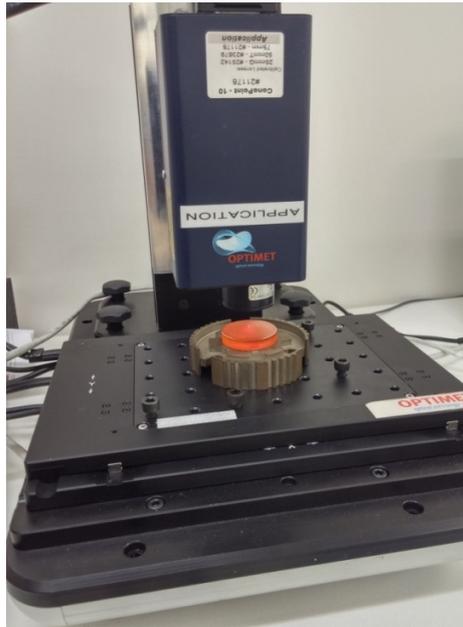


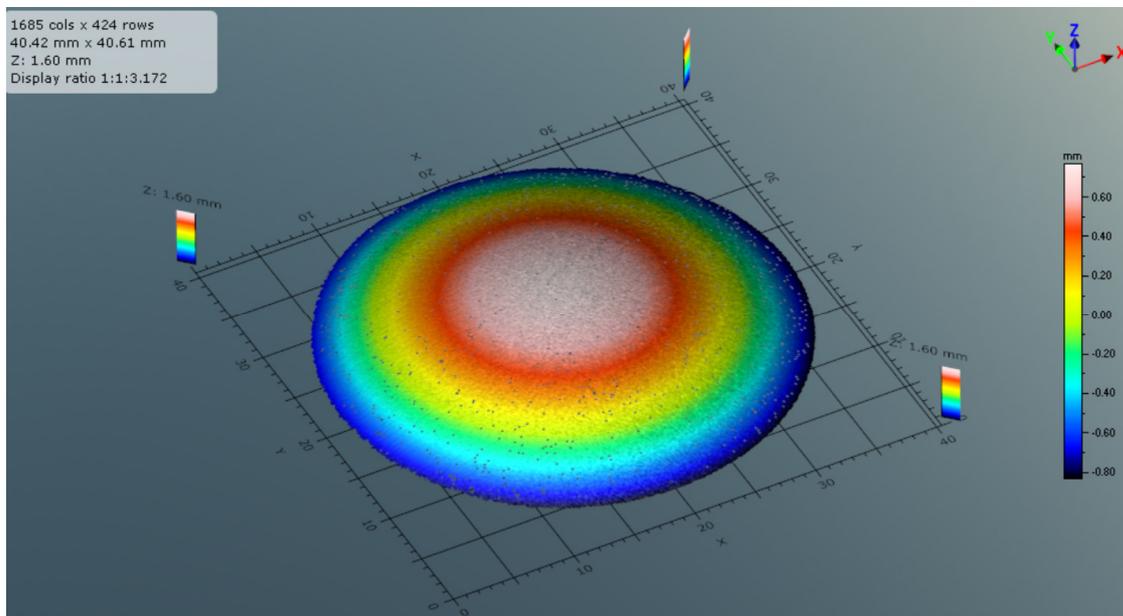
Figure 1; ConoPoint-10 with 25mm lens on the laboratory demonstrator

In order to ascertain the performance of Optimet's sensor in determining the curvature of a given lens we used a Talysurf (Taylor Hobson) touch sensor as a reference.

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Summary and Conclusions

1. Optimet's sensor was able to measure the radii with a fractional error of $<0.2\%$ for the convex surface (short radius) and 0.07% for the plano concave (long radius) surface when compared to the Talysurf results.
2. The STD of the radial error was $<2.5\ \mu\text{m}$ over the entire spherical surface, for all samples.
3. The main advantage of Optimet sensor over the Talysurf measurement touch sensor is the ability of measuring the entire lens at high speed obtaining a full 3D scan of the surface. The Talysurf measures only one profile at a time and it needs new setup adjustment for each individual scan
4. The setup time for the measurement using Optimet's sensor is significantly shorter requiring a short learning time and all at a fractional cost.



3D view of Optimet's scanning system

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Test Set Up

1. The scans were performed using Optimet's ConoPoint-10 with 25mm lens on the laboratory demonstrator scanner.
2. A 3D scan was performed on all 4 surfaces. Each scan covered the entire surface (around 400,000 Points each). The scanning resolution was 24um along the scanning direction (X profile) and 96um between the scanning lines (Y profile).

Measurement analysis

The Data points from the 3D scan was exported to GeoMagic SW program and analysed to obtain a best sphere fit with minimal radial error. The radius of the best fit sphere was compared to the radius received from the Talysurf scan .

Results and comparison.

The comparison results are summarized in the following tables

<u>Sample #1</u>	Optimet CP-10	Talysurf	Fractional Error (%)
Convex	(Sphere)	(Profile)	
Radius [mm]	112.5972	112.8319	0.2
Plano (concave)	(Sphere)	(Profile)	
Radius [mm]	294.0382	294.2612	0.07

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<u>Sample #2</u>	Optimet CP-10	Talysurf	Fractional Error (%)
Convex	(Sphere)	(profile)	
Radius [mm]	112.596	112.8453	0.22
Plano (concave)	(Sphere)	(profile)	
Radius [mm]	294.0196	294.1828	0..05

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Following is a screen shot depicting in color scale for the spherical fit. The irregularity of the lens is observed as well as the grinding lines.

