

## INTRAOCULAR LENS ANALYSIS

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### Summary

In this Report we measured the imaging quality of different lenses from different manufacturers by MTF and Strehl Ratio criteria with a wave front sensor system. The MBI lenses P302A and P302AC turned out to have the best imaging quality with a performance close to the optimum of diffraction limit.

Lens	Brand	Diopter
1	J&J (Abbott TECNIS)	21,00 (clear)
2	Alcon Acrysof	21,00 (clear)
3	Alcon Clareon	18,50 (clear)
4	HOYA iSert 250	21,00 (clear)
5	HOYA iSert 255	22,00 (yellow)
6	MBI P302A	21,00 (yellow)
7	MBI P302AC	23,00 (clear)

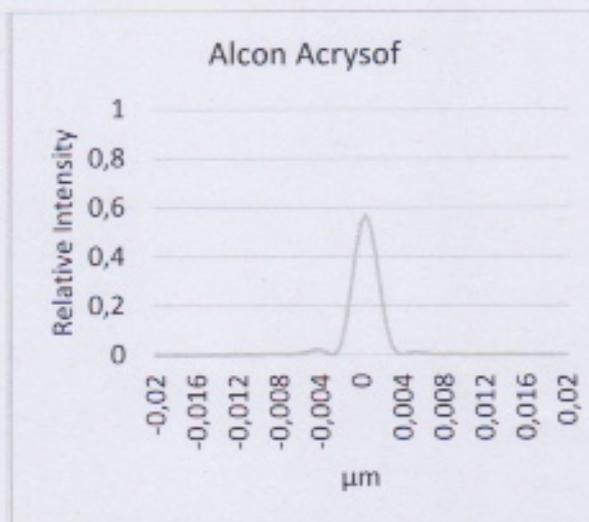
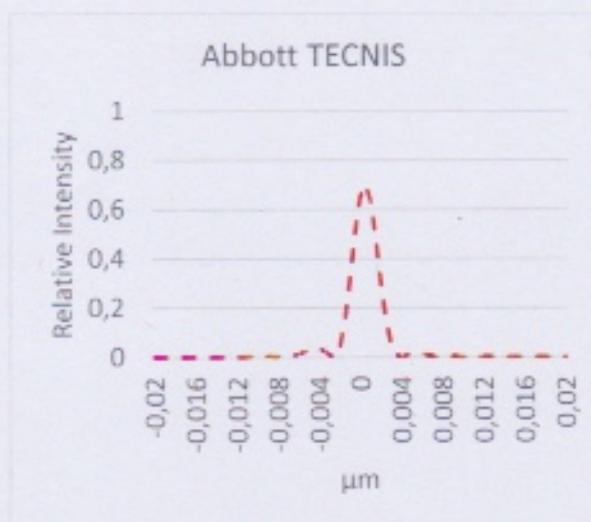
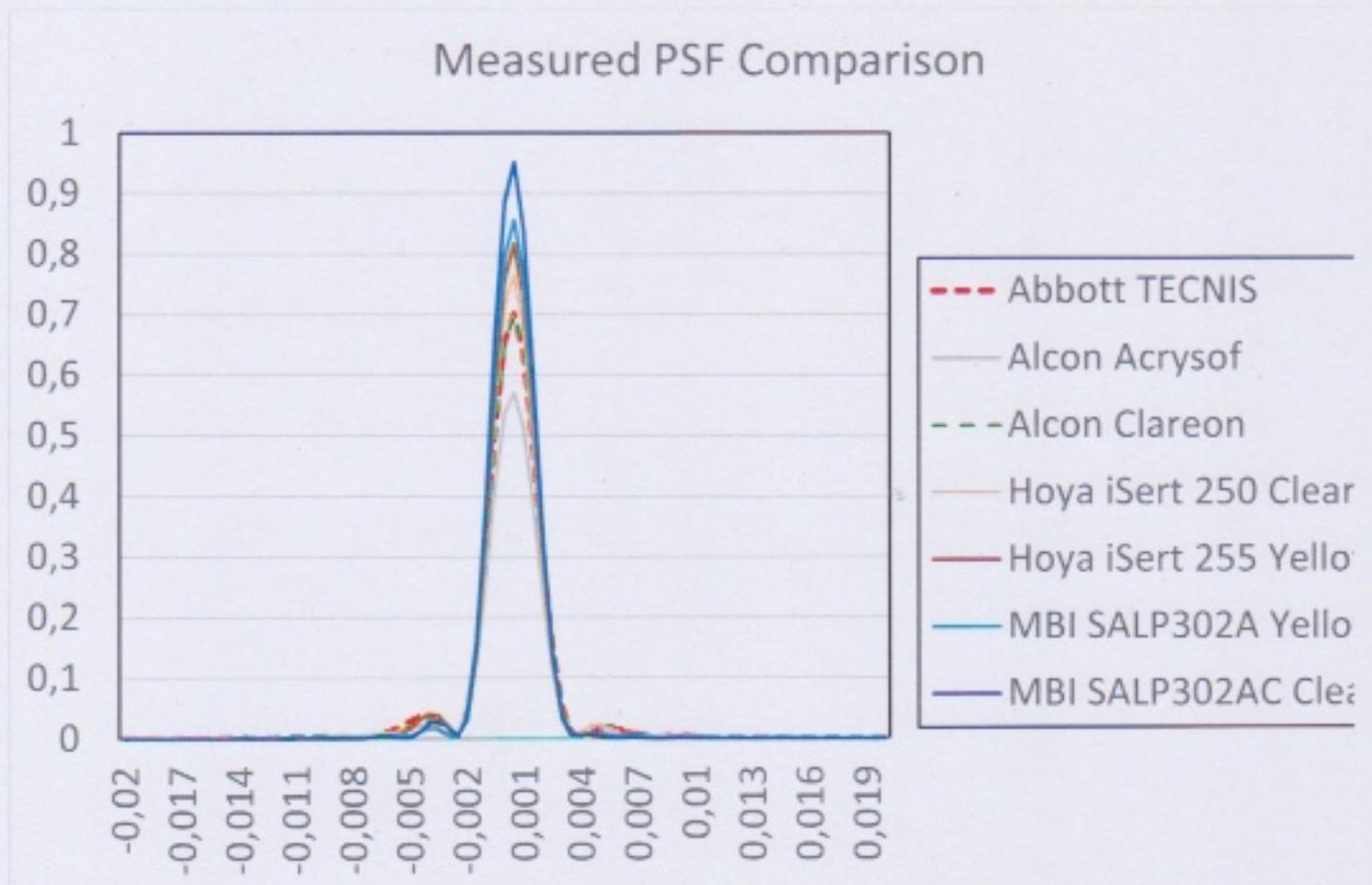
Each lens was measured under the Shack-Hartmann wavefront sensing machine from the company Optocraft. The measured quantities (point spread function, modulation transfer function and Strehl ratio for planar incoming wavefront) were recorded. The results were shown in Section I, II and III.

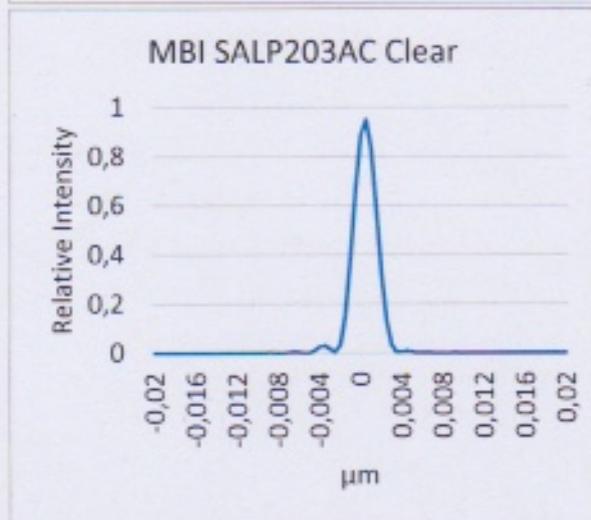
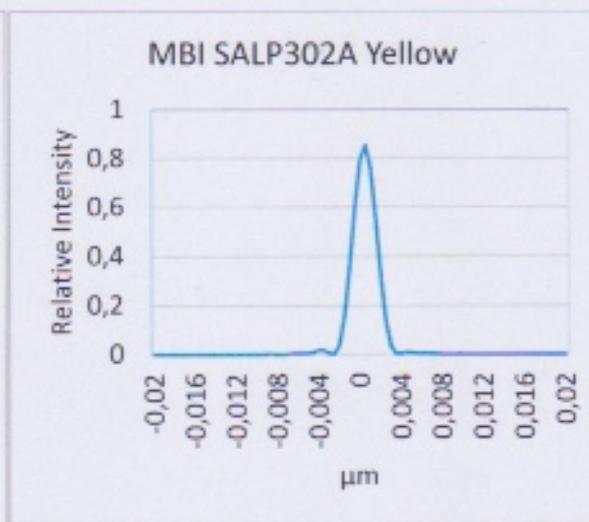
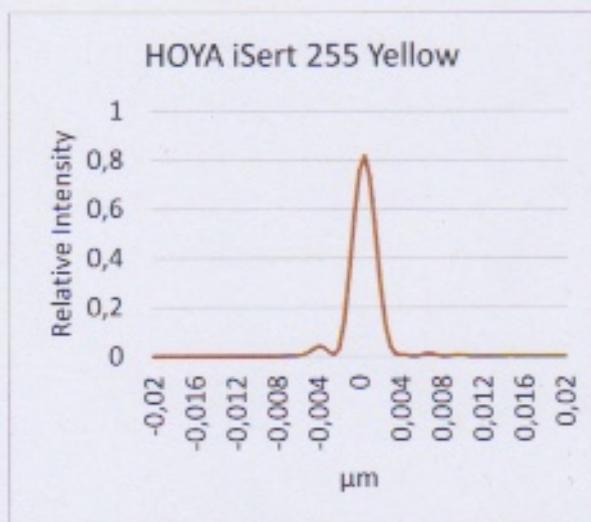
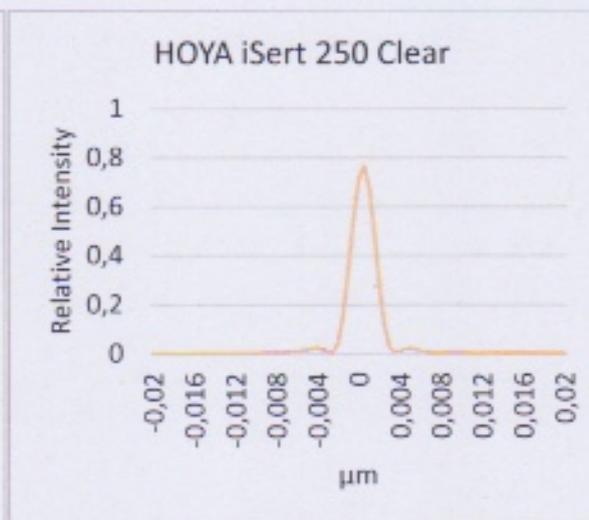
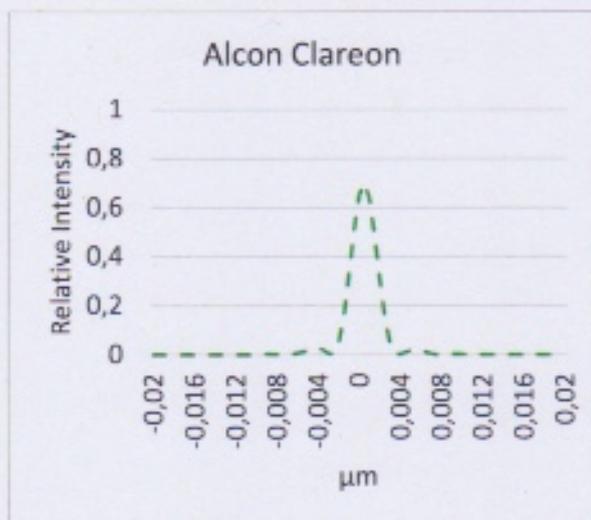
For each lens, the focal length and the first 36 Zernike coefficients were also recorded. The parameters were then inputted into Human Eye Model in the simulation program Zemax, in which an artificial lens of the same focal length and Zernike coefficients replaced the human crystalline lens. The Strehl ratio at the simulated retina were recorded and shown in Section IV.

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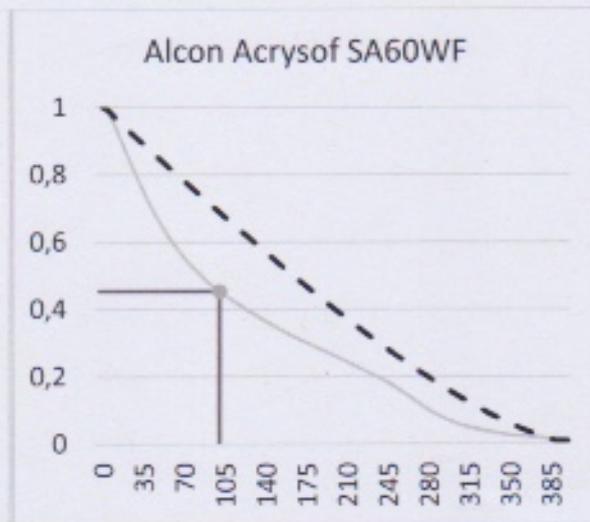
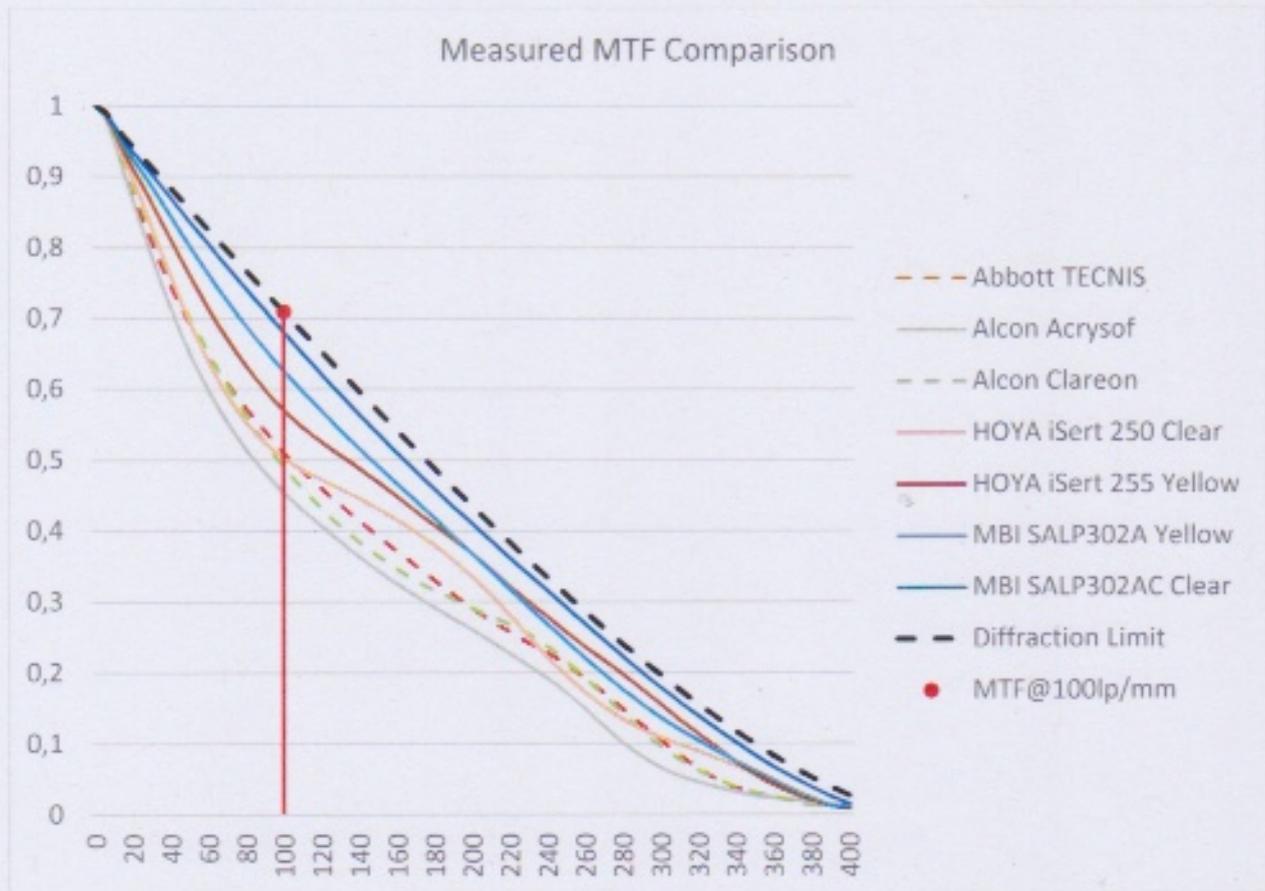
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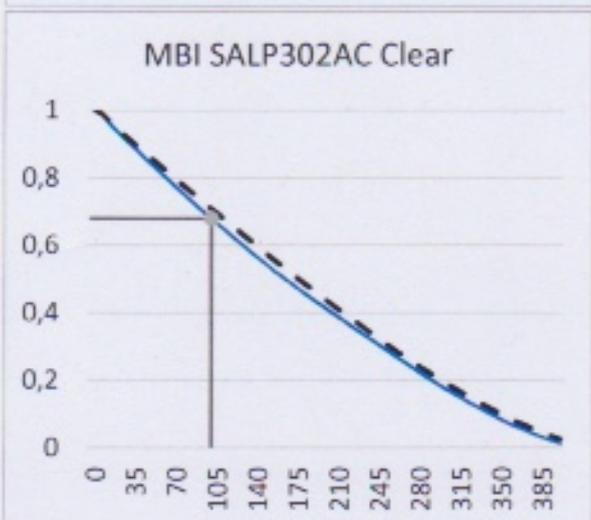
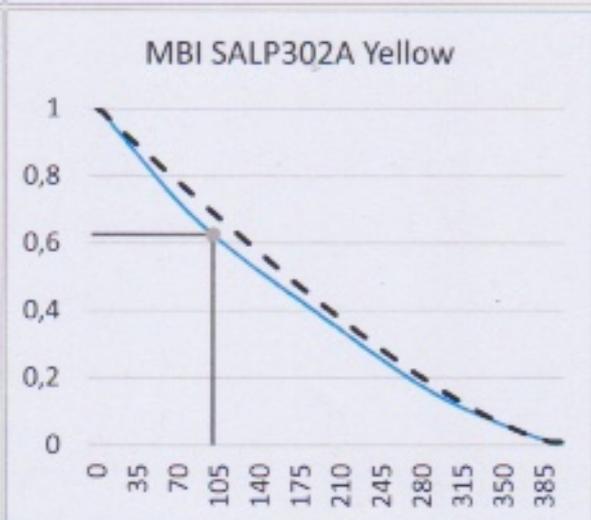
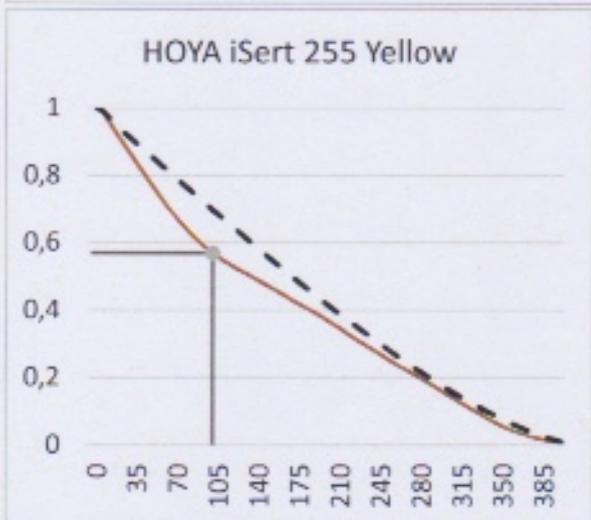
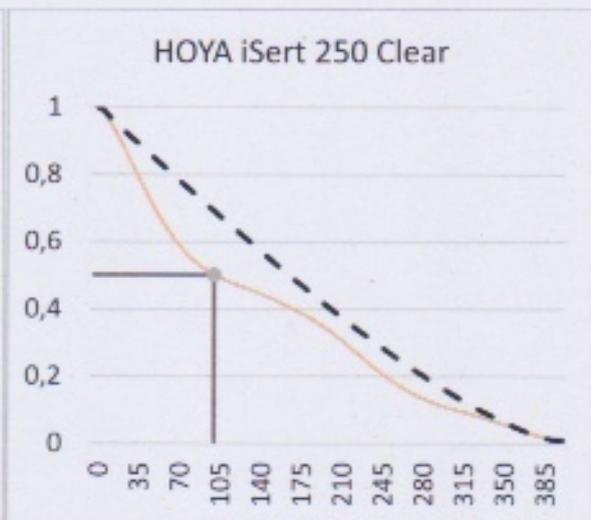
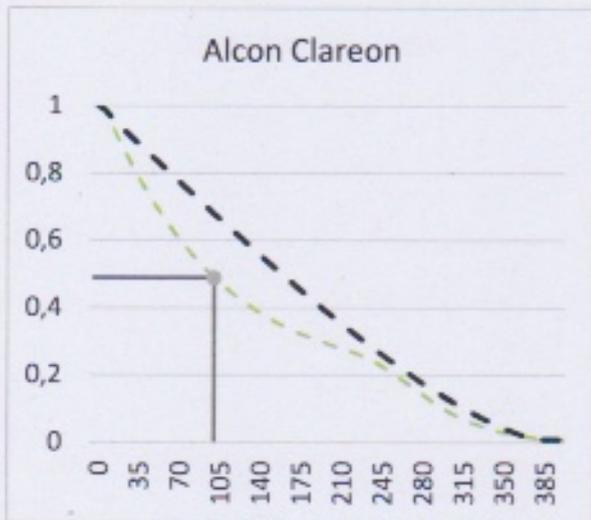
I. PSF for 3 mm aperture:





## II. MTF 3mm aperture:





### III. Measured Strehl Ratios:

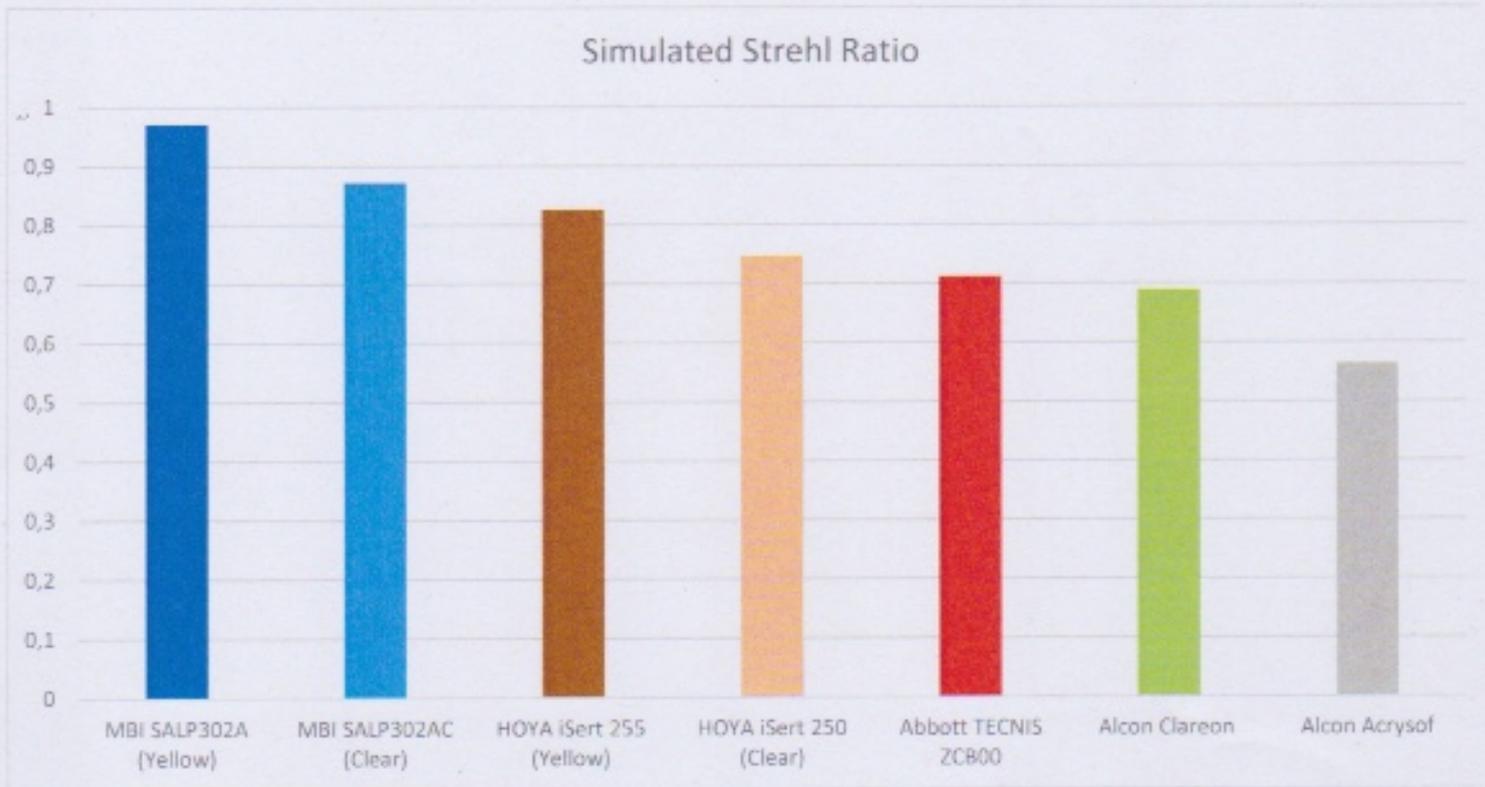
Lens	Average Strehl Ratio
MBI SALP302AC (Clear)	0.9240615
MBI SALP302A (Yellow)	0.905676
HOYA iSert 255 (Yellow)	0.7789315
Alcon Clareon	0.717455
HOYA iSert 250 (Clear)	0.689732
Abbott TECNIS ZCB00	0.646887
Alcon Acrysof	0.58358

Measured Strehl Ratio

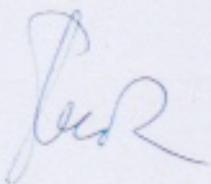


#### IV. Strehl Ratio obtained from the Simulated Human Eye:

Lens	Average Simulated Strehl Ratio
MBI SALP302A (Yellow)	0.9715
MBI SALP302AC (Clear)	0.873
HOYA iSert 255 (Yellow)	0.826
HOYA iSert 250 (Clear)	0.747
Abbott TECNIS ZCB00	0.712
Alcon Clareon	0.689
Alcon Acrysof	0.564



Karlsruhe, den 20.12.2020

A handwritten signature in blue ink, appearing to be 'Stork', written in a cursive style.

Prof. Wilhelm Stork