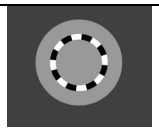
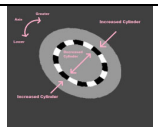
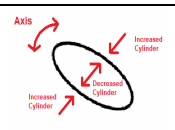
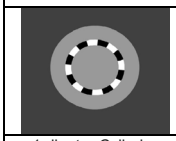
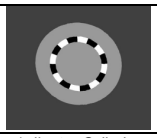
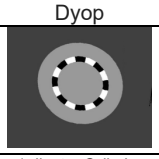
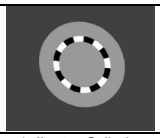
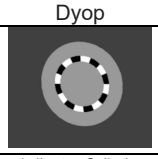
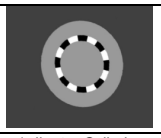
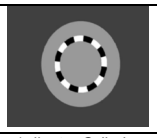
# Measuring Visual Cylinder and Axis with a Dyop
# 2022-04-08

Circular Dyops allow you to determine the acuity and refraction endpoint as the smallest arc width Dyop where the direction of the Dyop spinning can be detected using optometric lenses for sphere, axis, and cylinder.
See: https://www.dyop.info/documents/Dyop_Refraction_Procedure.pdf
An Adjustable Oval Dyop (**Keystroke "S"**) allow you to modify the orientation and oval shape of a Dyop to determine Visual Axis and Visual Cylinder by adjusting the axis and shape of the oval without the need for an autorefractor or Trial Lens Frame Kit. Adjusting the axis of the oval to appear horizontal gives the Axis value. The adjustment for the oval to appear circular is the Cylinder value.

**Experimental Methodology:**

With un-aided vision (no glasses or contact lenses) note the shape of the Dyop as to how oval it appears. Use the Axis adjustment (**Keystroke "V" and "G" or shift-V and shift-G**) so that the Dyop OVAL appears as horizontal as possible. Then use the Cylinder adjustment (**Keystroke "N" and "J" or shift-N and shift-J**) to make the apparent Dyop OVAL appear as circular as possible. It may be necessary to increase the Dyop diameter to verify that it looks circular. Then, reduce what appears to be a circular Dyop diameter to the smallest arc width where spinning can still be detected. The adjustments for Axis, Cylinder, and the corresponding acuity endpoint for Sphere are the corresponding refraction variables.
Preliminary trials indicate that each incremental increase of distortion by 10% is equivalent to 0.50 diopters of added cylinder with each 10% increase equivalent to an increase of 0.50 diopters of Visual Cylinder.

| % Distortion from Circular vs. Diopters of cylinder | 110% = 1.50 D<br>120% = 2.00 D<br>130% = 2.50 D<br>140% = 3.00 D<br>150% = 3.50 D |  | |  |  | |
|---|---|---|---|---|---|---|
| | | Circular Dyop | 01 diopters Cylinder – 0 degrees Axis | Adjustable Dyop | | |
|  |  |  |  |  |  |  |
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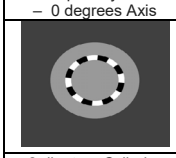
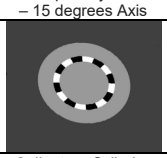
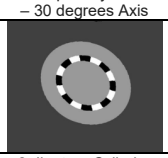
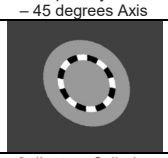
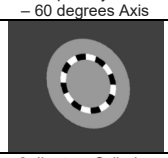
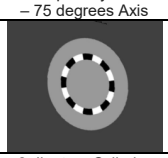
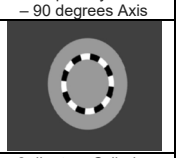
|  |  |  |  |  |  |  |
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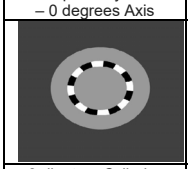
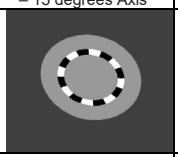
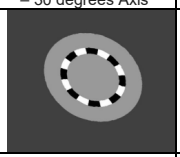
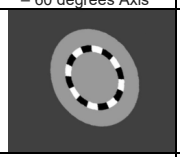
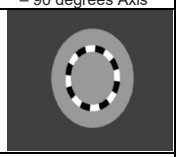
|  |  |  |  |  |  |  |
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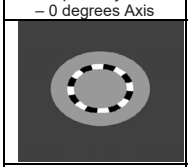
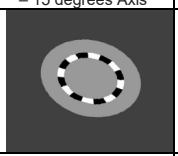
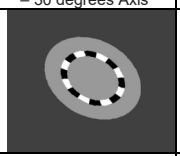
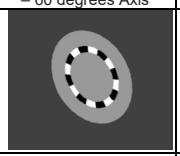
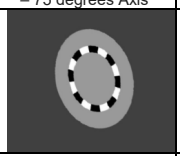
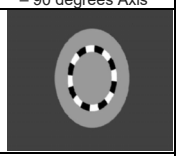
|  |  |  |  |  |  |  |
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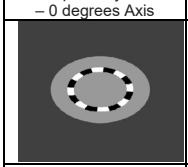
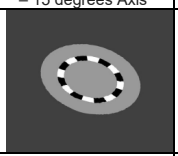
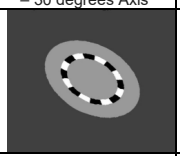
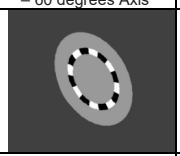
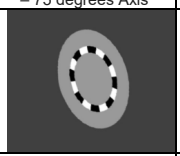
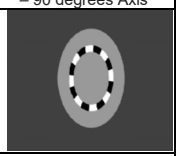
|  |  |  |  |  |  |  |
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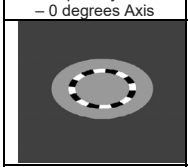
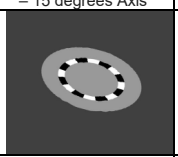
|  |  |  |  |  |  |  |
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