TRADITIONAL GP SPHERICAL FITTING GUIDE

Traditionally, GP Lenses have to be fit using the technique of on-eye observation of diagnostic lenses. Diagnostic fitting requires the insertion of lenses of known material and parameters followed by careful slit lamp observation of lens movement and position. Once the appropriate fitting relationship has been established, an over refraction is performed to determine final lens power. Diagnostic lens fitting allows the practitioner to observe the actual lens parameters.

The Base Curve

The primary curve on the posterior surface of a GP Lens is the base curve. This single curve will determine the amount of lens bearing and lens clearance in the area of the mid-peripheral cornea. Clinical experience has taught us that optimum lens performance is achieved with a base curve that provides:

An area of lens bearing or "contact point" mid-peripherally along the horizontal meridian approximately 3.0 to 4.0mm from the center of the cornea & Unobstructed movement of the lens along the vertical meridian.

The areas of lens bearing at 3 and 9 o'clock keep the lens into position along the horizontal meridian to restrict lateral movement allowing the lens to remain centered on the cornea. Once this is accomplished, the same base curve should permit unobstructed movement of the lens along the vertical meridian with the blink. Based on these criteria, it is easy to see why individuals with 1.00 to 2.00 of with-the-rule astigmatism, are often ideal candidates for spherical GP Lenses.

Base Curve Selection

#1 Measure the central corneal curvature and identify the Flat K
Example:

K's = 43.00 @180 / 44.75 @ 90 Flat K = 43.00 D

#2 Calculate the amount of corneal astigmatism (difference between the flat and steep keratometric readings)
Example:
K's = 43.00 @ 180 / 44.75 @ 90 Corneal Astigmatism = 1.75D

#3 Select the base curve based on the amount of corneal cylinder and Flat K:

Corneal Cylinder	Base Curve
0.00 to 0.75D	**0.25D Steeper than Flat K**
0.87 to 1.50	**0.50D Steeper**
1.62 to 2.25	**0.75D Steeper**
2.37 to 3.00	**1.00D Steeper**
3.12 & greater	**Toric design**

Base Curve Diagnostic Lens Evaluation

HORIZONTAL RELATIONSHIP
The ideal base curve relationship on a cornea with the "with-the-rule" corneal astigmatism should exhibit alignment or slight apical clearance across the horizontal meridian. This optimum fitting relationship is most often accomplished with a base curve that is fit using the previous Corneal Cylinder nomogram.

VERTICAL RELATIONSHIP
The vertical meridian should exhibit slight pooling of fluorescein at 12 and 6 o'clock thereby accomplishing the second fitting objective of unobstructed lens movement along the vertical meridian.

LENS PERIPHERY
The fluorescein pattern should exhibit 360 degrees of peripheral clearance. The sole function of the

flatter spherical or aspheric periphery is to provide clearance of the lens as it makes its excursion across the flatter portions of the cornea with lateral gaze and blinking.

Rule

In the fitting of GP Lenses, it is helpful to remember two rules as they apply to lens position and movement.

RULE 1A
Spherical lens which aligns or vaults the central cornea, will bear upon the flattest portion of the mid-peripheral cornea. Or simply stated, the lens will be "Tightest" where the cornea is the "Flattest".

RULE 2A
GP Lens will always move in the direction of least mechanical resistance, i.e., along the steeper meridian. Or simply stated, the lens will be "Loosest" where the cornea is the "Steepest".

Low to Moderate Against-the-Rule Astigmatism

As previously outlined, optimum lens performance is best achieved when a bearing zone is present mid-peripherally along the horizontal meridian and the lens is allowed unobstructed movement along the vertical meridian. In the case of against-the-rule astigmatism, a lens fitted with central alignment, i.e., on Flat K, will result in an area of maximum lens bearing at 12 and 6 o'clock. This fitting relationship results in obstructed lens movement along the flatter vertical meridian. The same base curve relationship along the steeper horizontal meridian does not permit an adequate bearing relationship at 3 and 9 o'clock. This results in lens rocking along the horizontal meridian as well as nasal or temporal lens decentration.

Some patients, with minimal degrees of against-the-rule astigmatism, can be successfully fitted with GP Lenses, by selecting a base curve radius that is flat enough to permit some vertical lens movement. Horizontal lens position may occasionally be accomplished by the strength of the upper lid interaction, which can override the lens tendency to displace nasal or emporal. Therefore, the anatomical structure of the low to moderate against-the rule cornea (2.50D or less) may not be amenable to the fitting of a spherical GP Lens Lens. In most cases, these individuals would be better served with toric GP Lenses.

Power Calculation by Over refraction

Perform a spherical refraction over the diagnostic lens to determine the resultant lens power.

Example:

Diagnostic lens power	-2.00D
Over refraction	-1.00 sphere
Final lens power	-3.00D

Power Calculation by Empirical Formula

Perform a spectacle refraction and place the prescription in minus cylinder form.

Example:

Spectacle Rx plus cylinder	-7.75 +1.75 x 90
Spectacle Rx in minus cylinder	-6.00 -1.75 x 180

If the spherical component of the minus cylinder Rx is greater than +/- 4.00D, correct for vertex distance.

Example:

-6.00D. spectacle power is = -5.50D. at the corneal plane

Add together the spherical component of the vertex corrected spectacle Rx and the amount of power derived from the corneal cylinder/base curve nomogram to obtain the final contact lens prescription.

If the base curve of the lens is fitted Steeper than Flat K, increase the minus power of the contact lens by the same amount as the tear lens power. "SAM" (STEEPER ADD MINUS).

If the base curve of the lens is fitted Flatter than Flat K, decrease the minus power of the contact lens by the same amount as the tear lens power. "FAP" (FLATTER ADD PLUS).

Example:

Vertexed Spectacle Rx	-5.5 0D
Base Curve Steepened By	-0.5 0D
Final lens Power (SAM)	**-6.0 0D**

Determining Overall Lens Diameter

In the fitting of GP Lenses, the parameter most frequently overlooked by practitioners is the appropriate selection of overall lens diameter. The optimum lens diameter should be based on the size of the cornea on which it rests, in that larger diameter corneas, 12.4mm, will require a larger lens diameter and smaller diameter corneas, 11.2mm, will require a smaller lens diameter. Corneal diameter can be measured through a variety of techniques such as a slit lamp measuring ridicule or a hand held millimeter ruler. In selecting the appropriate lens diameter, a simple rule of thumb to follow is that the lens diameter should be 2.5mm smaller than the horizontal visible iris diameter.

If you prefer a quicker method of diameter selection, use the nomorgram below:

Base Curve	Recommended Diameter
39.00 to 43.87	9.6 Diameter
44.00 to 45.87	9.3
46.00 to 48.37	9.0
48.50 to 50.00	8.7