Fitting Manual
Use with www.kerasoft.co.uk/training
The KeraSoft® IC Lens for Keratoconus and Other Irregular Corneas

The KeraSoft® IC is a front surface asphere or aspheric toric prism ballasted lens with balanced overall thickness and wavefront aberration control. The periphery can be manipulated independently of the base curve if necessary, up to 4 steps flatter or steeper. Also, up to two sectors of the periphery can be modified independently, the location of which is decided by the practitioner. The peripheries in these sectors can be flattened, steepened or remain standard.

KeraSoft® IC Lens with STD Periphery

Specifications

<table>
<thead>
<tr>
<th>Base curve</th>
<th>Diameter</th>
<th>Periphery</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.40mm to 9.40mm</td>
<td>14.50mm (0.50mm steps)</td>
<td>Front surface asphere or aspheric toric prism ballasted lens with balanced overall thickness and wavefront aberration control</td>
<td></td>
</tr>
<tr>
<td>Sphere: +30.00D to -30.00D</td>
<td>Cylinder: -0.50D to -15.00D (in 0.25D steps)</td>
<td>Axis: 1° to 180° (in 1° steps)</td>
<td></td>
</tr>
</tbody>
</table>

Material:
1 Filcon II 7, 77% Water, 12-month replacement
2 Efrofilcon A, 74% Water*, 3-month replacement
3 Definitive™

DK:
1 \(5.3 \times 10^{-11} \text{ cm}^2/\text{sec}[\text{mO}_2/(\text{ml x mmHg})]\)
2 \(6.0 \times 10^{-11} \text{ cm}^2/\text{sec}[\text{mO}_2/(\text{ml x mmHg})]\)

Standard Diagnostic Fitting Set

Used to determine the following information which should be provided to your laboratory when ordering KeraSoft® IC:
- Base Curve
- Diameter
- Periphery (STD, STP or FLT)
- Power of Diagnostic Lens
- Over-refraction
- Vertex Distance of all lenses (including all cyl lenses)
- Laser mark rotation and direction

Standard Fitting Set Parameters

<table>
<thead>
<tr>
<th>Base Curve</th>
<th>Diameter</th>
<th>Periphery</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.80mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.00mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.20mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.40mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.60mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.80mm</td>
<td>14.5mm</td>
<td>STD</td>
<td>Plano</td>
</tr>
<tr>
<td>8.20mm</td>
<td>14.5mm</td>
<td>FLT2</td>
<td>Plano</td>
</tr>
<tr>
<td>8.60mm</td>
<td>14.5mm</td>
<td>STP2</td>
<td>Plano</td>
</tr>
</tbody>
</table>
The Corneal Profile Chart, along with the following guidelines, will assist in selecting the initial diagnostic lens.

**Corneal Profile**

The corneal profile gives important information about the overall corneal shape in the vertical meridian, especially if topography is unavailable or difficult to interpret.

**Natural Ectasia**

The corneal shape in natural ectasias is influenced by the location of the thinnest area of the cornea. The Corneal Profile Chart shows the characteristic shapes found in central and decentered/low cones and Pellucid Marginal Degeneration.

**Post-Surgical**

Corneas that have undergone one or more surgical procedures no longer have a natural shape. Observing the corneal profile, however, is a very useful tool, especially in determining whether the cornea is a reverse geometry shape.

To Observe the Corneal Profile

**Topography**

Estimate with the classical means of topography or OCT.

**Slit Lamp Profile Method**

Move the slit lamp illumination system to the side, ask the patient to look straight ahead and open the beam to the widest setting. Observe the anterior cornea, in profile, from the same side as the illumination system, using the side of the patient’s nose as a background.

The Corneal Profile Chart assists in identifying the corneal shape being fitted. The table below suggests the diagnostic fitting lens to be used as the first choice for each corneal shape.

In natural ectasia, if there is limited information as to the corneal shape, begin with the 8.20mm base curve:

**Initial Lens Selection**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Topography</th>
<th>Corneal Profile</th>
<th>Mild</th>
<th>Moderate</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Keratoconus Steep Periphery</td>
<td>8.60mm: 14.50mm: STD</td>
<td>8.40mm: 14.50mm: STD</td>
<td>8.00mm: 14.50mm: STD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Keratoconus Flat Periphery</td>
<td>8.60mm: 14.50mm: STD</td>
<td>8.20mm: 14.50mm: FLT2</td>
<td>8.00mm: 14.50mm: FLT2 (Not in Fitting Set)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decentered/ Low Cone</td>
<td>8.60mm: 14.50mm: STD</td>
<td>8.40mm: 14.50mm: STD</td>
<td>8.20mm: 14.50mm: STD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pellucid Marginal Degeneration</td>
<td>8.60mm: 14.50mm: STD</td>
<td>8.40mm: 14.50mm: STD</td>
<td>May require Sector Mgmt. Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Surgical</td>
<td>8.60mm: 14.50mm: STD</td>
<td>8.60mm: 14.50mm: STD</td>
<td>In post-surgical cases, if there is limited information as to the corneal shape, begin with the 8.60mm: 14.50mm: STD lenses. This type of cornea may require STP peripheral fitting lenses with the appropriate base curves. Tilted grafts or post refractive surgery ectasias may require a Sector Management Control design. For more information view the Advanced Fitting - Post-Surgical online training module.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mild, moderate and advanced cases may all require FLT peripheral fitting lenses with the appropriate base curves. These can be ordered as required from your laboratory.

For more information view the Advanced Fitting - Natural Ectasia online training module.

Due to the corneal shape, stP1 peripheries may also be required in some cases.

Mild, moderate and advanced cases may all require FLT peripheral fitting lenses with the appropriate base curves. These can be ordered as required from your laboratory.

For more information view the Advanced Fitting - Natural Ectasia online training module.

In cases where all fitting lenses persist in dropping significantly, it may be necessary to use Sector Management Control, steepening lenses in the inferior sector only. For more information view the Advanced Fitting - Natural Ectasia online training module.

In advanced cases the Sector Management Control design that is applied will usually require a superior FLT sector and inferior STP sector to reflect that these corneas are rotationally non-symmetrical. For more information view the Advanced Fitting - Natural Ectasia online training module.

Note: In irregular corneas there is a tendency to fit steeper lenses. Be careful not to confuse a steeper tight fitting lens with the movement of a flat fit. Therefore, if fitting one step steeper results in a more mobile lens, try fitting flatter base curves.

Post-Surgical corneas are often flatter centrally and steeper peripherally but this is by no means a general rule.

Note: In irregular corneas there is a tendency to fit steeper lenses. Be careful not to confuse a steeper tight fitting lens with the movement of a flat fit. Therefore, if fitting one step steeper results in a more mobile lens, try fitting flatter base curves.
MoRoCCo VA
Introduction and Dynamic Assessment Routine

To successfully fit the KeraSoft® IC lens one must first observe the characteristics of the lens behavior on eye.

These characteristics can be remembered by using the acronym MoRoCCo VA, which represents Movement, Rotation, Centration and Comfort, all of which, when optimal, give the best Visual Acuity.

All of these characteristics are related to each other and have equal importance when assessing the fit of the lens on an irregular cornea.

If only two or three of the MoRoCCo VA characteristics are optimal, it will reduce the chance of the final ordered lens behaving as expected.

Optimal Lens Fit Characteristics

- **Up to 2mm movement**: These latex cut lenses naturally move more than disposable lenses and up to 2mm post blink movement is acceptable, as long as the patient is comfortable.
- **Vertical Laser mark**: Rotation of the KeraSoft® IC is a strong indicator that the fit is not correct, unlike normal soft toric lenses where rotation can easily be accounted for by changing the cylinder axis.
- **Central**: The centration of the lens can be easily determined by observing the Front Optic Zone and is a very useful indicator in assessing flat fits. An optimal fitting lens will be central.
- **Comfortable**: KeraSoft® IC lenses should be comfortable. General discomfort can indicate the lens is flat and discomfort in one position indicates the lens is tight at that point.
- **Stable**: Visual acuity should be assessed before and after the blink. If VA is clearer after blink, this indicates a tight fit and if VA is worse after blink, this indicates a flat fit.

Dynamic Assessment Routine

Observe the lens within 5 minutes of lens insertion.

- **Mo**: The Dynamic Assessment Routine uses the slit lamp to observe three of the MoRoCCo VA characteristics; Movement, Rotation and Centration.
- **Ro**: These three characteristics are observed in straight ahead and upward gaze.
- **C**: Lag is assessed on lateral excursions in the straight ahead position.
- **Co**: Movement is observed during the natural blink cycle. The push-up test is not used to assess movement.

Dynamic Assessment Routine

<table>
<thead>
<tr>
<th>Mo</th>
<th>Ro</th>
<th>C</th>
<th>Co</th>
<th>VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPTO 2.0mm</td>
<td>LESS THAN 0.50mm Conjunctival indentation</td>
<td>GREATER THAN 2.0mm Lens may flute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CENTRAL</td>
<td>CENTRAL</td>
<td>DECENTERED FOZ drops to or below limbus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMFORTABLE</td>
<td>COMFORTABLE INITIALLY gradually becomes uncomfortable in one area</td>
<td>UNCOMFORTABLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STABLE</td>
<td>CLEARER AFTER BLINK</td>
<td>WORSE AFTER BLINK</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hints and Tips

Lenses that fit very tightly can mimic a flat fit and vice versa. The KeraSoft® IC Online Training Module Dynamic Assessment Routine shows how to differentiate between these fits.

Up to 10 degrees rotation is acceptable, if no other fitting lens gives less rotation.

If an ordered lens does not behave like the diagnostic lens, it is an indication that the diagnostic fit was not optimal.
Procedure

- Select and insert initial fitting lens
- Assess within 5 minutes to determine which MoRoCCo fitting characteristics below are being achieved (GREEN, YELLOW, RED)
  - If any of the MoRoCCo characteristics are in the RED zone, remove lens, then select next fitting lens 1-2 base curves steeper or flatter
  - If any of the MoRoCCo characteristics are in the GREEN or YELLOW zone, begin over-refraction while the lens settles further
- If VA is in RED zone, remove and reconsider first lens choice
- If any of the MoRoCCo characteristics are in the GREEN or YELLOW, select initial fitting lens

Assess within 5 minutes to determine which MoRoCCo fitting characteristics below are being achieved

- Select and insert initial fitting lens

Periphery Options

In cases of irregular cornea where STD periphery lenses do not provide an optimal fit, the periphery of the KeraSoft IC can be steepened or flattened independently of the base curve.

It is important to remember that peripheral changes should not be used just to tighten or loosen a fit. Adjusting the fit should be done in the first instance by changing the base curve of the STD periphery lens.

How to calculate the periphery change

In some cases, one STD periphery fitting lens will give the best overall fit in terms of rotation and movement but a different one will give the best VA.

During the fitting process, record the fitting lens that gives the best fitting characteristics, Best Peripheral Fit (BPF).

Then record the fitting lens that gives the best possible VA, Best Central Fit (BCF).

The difference in base curves is then calculated: the Periphery Table indicates the periphery required.

Each periphery step is equivalent to a 0.20mm change in base curve.

Note: when a periphery change is made, it affects the diameter of the Posterior Fitting Zone. The Front Optic Zone is not affected.

When to use FLAT peripheries

If all STD lenses give stable rotation, this implies the periphery of the cornea is flat compared to the center, e.g., Nipple Cones.

When STD lenses show central bubbles, general poor vision or VA clearer after blink and flattening the base curve improves VA but gives flat fit characteristics.

When to use STEEP peripheries

When STD lenses show floating or unstable rotation and steepening the base curve improves the fit but gives VA clearer after blink. Such cases include:

- Post-refractive surgery
- Central keratoconus with steep periphery
- Post-graft corneas showing a reverse geometry corneal profile

**Peripheral Table**

<table>
<thead>
<tr>
<th>BPF-BCF</th>
<th>Periphery to order</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.80mm</td>
<td>STP4</td>
<td>1. The best possible VA is found using an 8.00mm fitting lens but shows tight fitting characteristics. This base curve is recorded as the Best Central Fit (BCF). The base curve giving optimal rotation and movement is found to be 8.20mm, however, the VA is now worse after blink. This base curve is recorded as the Best Peripheral Fit (BPF). BPF - BCF = 8.20mm - 8.00mm = +0.20mm which gives a periphery value of FLT1 from the table. This would be ordered as 8.00mm: FLT1</td>
</tr>
<tr>
<td>-0.60mm</td>
<td>STP3</td>
<td>2. The best possible VA is found using an 8.40mm fitting lens but shows flat fitting characteristics. This base curve is recorded as the Best Central Fit (BCF). The base curve giving optimal rotation and movement is found to be 7.80mm, however, the VA is now clearer after blink. This base curve is recorded as the Best Peripheral Fit (BPF). BPF - BCF = 7.80mm - 8.40mm = -0.60mm which gives a periphery value of STP3 from the table. The required lens would be ordered as 8.40mm: STP3</td>
</tr>
<tr>
<td>-0.40mm</td>
<td>STP2</td>
<td>-------</td>
</tr>
<tr>
<td>-0.20mm</td>
<td>STP1</td>
<td>-------</td>
</tr>
<tr>
<td>0.00mm</td>
<td>STD</td>
<td>-------</td>
</tr>
<tr>
<td>+0.20mm</td>
<td>FLT1</td>
<td>-------</td>
</tr>
<tr>
<td>+0.40mm</td>
<td>FLT2</td>
<td>-------</td>
</tr>
<tr>
<td>+0.60mm</td>
<td>FLT3</td>
<td>-------</td>
</tr>
<tr>
<td>+0.80mm</td>
<td>FLT4</td>
<td>-------</td>
</tr>
</tbody>
</table>

**Examples**

- **Example 1:**
  - When using FLAT peripheries, If all STD lenses give stable rotation, this implies the periphery of the cornea is flat compared to the center, e.g., Nipple Cones. When STD lenses show central bubbles, general poor vision or VA clearer after blink and flattening the base curve improves VA but gives flat fit characteristics.

- **Example 2:**
  - When using STEEP peripheries, When STD lenses show floating or unstable rotation and steepening the base curve improves the fit but gives VA clearer after blink. Such cases include:
    - Post-refractive surgery
    - Central keratoconus with steep periphery
    - Post-graft corneas showing a reverse geometry corneal profile

**Procedure Table**

<table>
<thead>
<tr>
<th>Movement</th>
<th>Re-assess Fit (Yellow)</th>
<th>Incorrect Fit (Red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0-2.0mm Vertical Post Blink</td>
<td>&lt;1.0 or &gt;2.0mm</td>
<td>Too Mobile OR Immobile Lens that Moves with Push-up</td>
</tr>
<tr>
<td>Up to 20mm acceptable if patient is comfortable</td>
<td>&lt;1.0mm - try one step flatter</td>
<td>If lens too flat - try 0.40mm base curve steeper</td>
</tr>
<tr>
<td>Laser Mark - Vertical Up to 10 degrees stable rotation is acceptable if fitting is 0.20mm base curve steeper or flatter does not reduce the angle</td>
<td>&gt;10 Degrees</td>
<td>If lens too tight - try 0.40mm base curve flatter</td>
</tr>
<tr>
<td>Rotation</td>
<td>Up to 10 Degrees</td>
<td>Erratic swing on blink - Flat fit</td>
</tr>
<tr>
<td>Decenters on Straight Ahead Gaze/ Front Optic Zone Drops to Limbus</td>
<td>Limited swing on blink - Tight fit</td>
<td></td>
</tr>
<tr>
<td>on Upward Gaze</td>
<td>Try lens at least 0.20mm base curve steeper</td>
<td></td>
</tr>
<tr>
<td>Centration</td>
<td>Central</td>
<td>Minimal decentration is acceptable if visual acuity is good</td>
</tr>
<tr>
<td>Comfort</td>
<td>Comfortable Consistently good comfort</td>
<td>General Discomfort</td>
</tr>
<tr>
<td>VA</td>
<td>No Fluctuation Visual acuity should not fluctuate on blink</td>
<td>Fluctuation with Blink</td>
</tr>
<tr>
<td>Visual acuity should not fluctuate on blink</td>
<td>Very Poor Vision Poor vision not improved by any over-refraction</td>
<td>Very Poor Vision</td>
</tr>
<tr>
<td>Movement</td>
<td>Rotation</td>
<td>Centration</td>
</tr>
</tbody>
</table>

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**Sector Management Control™ (SMC)**

If choosing this design, you may want to review the Advanced Fitting Module of the training video. For more irregular corneas, up to two sectors of the periphery can be modified independently of the base curve and customized to the specification of the practitioner (indicated in less than 10% of KeraSoft IC fits).

### How to define the SMC Sector Angles

Record angles counterclockwise around the lens circumference as A1, A2, A3 and A4. A1 and A2 define beginning and end of the first sector. A3 and A4 define beginning and end of the second sector. Each sector can be ordered as either STD, STP 1-4 or FLT 1-4. Blend areas are automatically set once sector angles are defined. There must be a minimum of 30 degrees between each sector.

### When to Use Sector Management Control™

Sector Management Control is typically used in cases where:

1. A good fit cannot be obtained with an STD lens or by changing the whole periphery. Such cases include:
   - Low cones and PMD
   - Very irregular post-graft cases
2. Lenses are otherwise a good fit, yet persistently decenter or drop significantly on upward gaze.
3. The optimal fitting STD periphery lens consistently results in ghosting or shadowing of images. Using SMC in these cases can significantly improve Visual Acuity.
4. Decentered cones where the resultant corneal shape consistently causes all lenses to decenter.

### Classic SMC Design Sector Angles

This design can be used for most corneas that have a natural ectasia.

- A1 = 30°  A2 = 150°
- A3 = 220°  A4 = 320°

For cases where tightening only in the inferior sector is required, keep the superior sector STD and steepen the inferior sector by STP1. Post-graft corneas may require a more customized design.

### Example 1: Classic SMC - Low Cone/PMD

This SMC would be ordered as:

- 8.40mm: 14.50mm: 
  - STD: A1 = 30°  A2 = 150°
  - STP1: A3 = 220°  A4 = 320°

Using the Classic SMC design.

### Example 2: Customized SMC - Fluting on Post-Graft Cornea: Image demonstrates edge lift at approximately 4 o’clock

If the lens requires tightening in the area between 20 and 290 degrees, the order would be written as:

- 8.60mm: 14.50mm: 
  - STD: A1 = 110°  A2 = 210°
  - STP2: A3 = 290°  A4 = 20°

For cases where tightening only in the inferior sector is required, keep the superior sector STD and steepen the inferior sector by STP1. Post-graft corneas may require a more customized design.