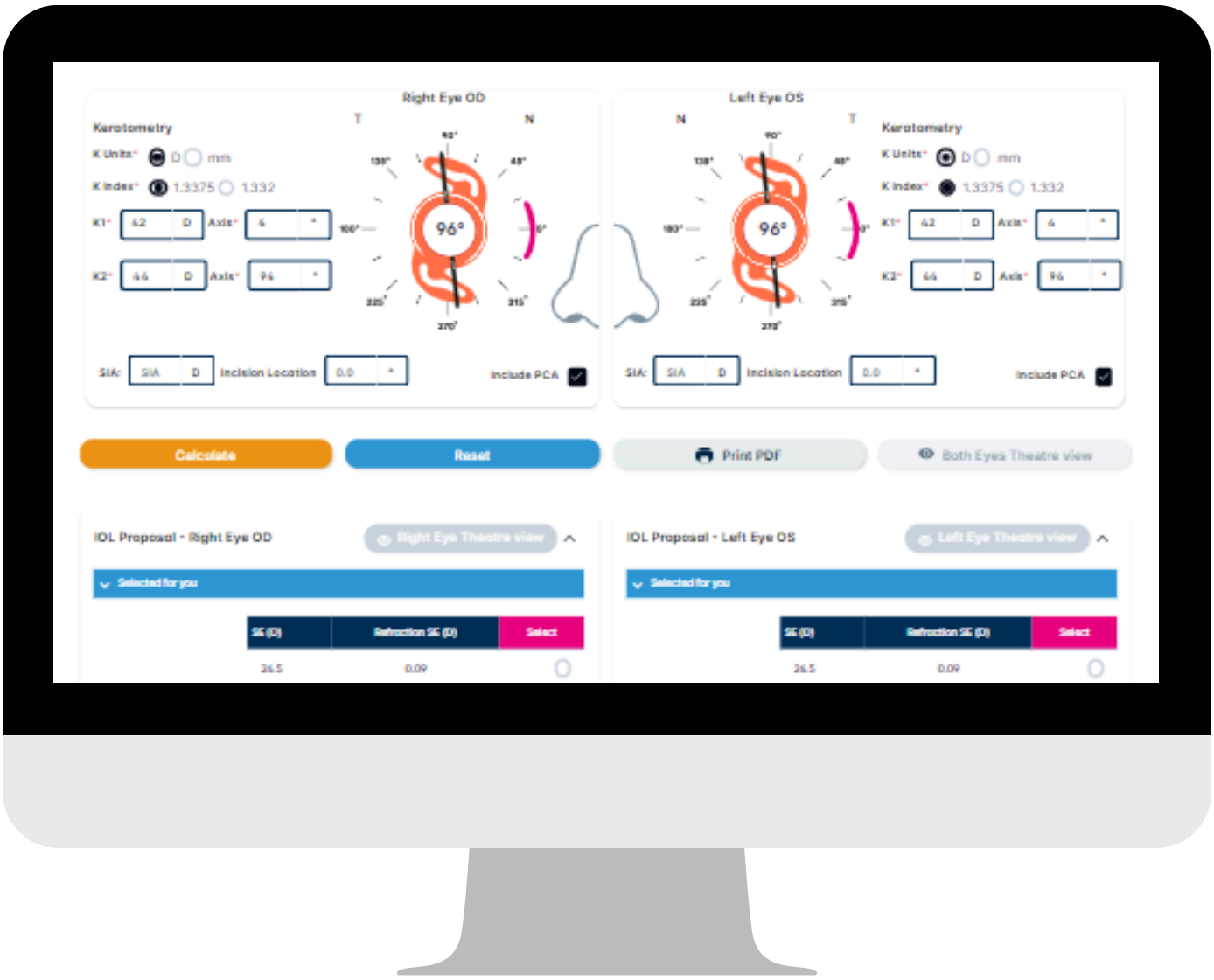
RayTrace

RayTrace version 4.0 User guide



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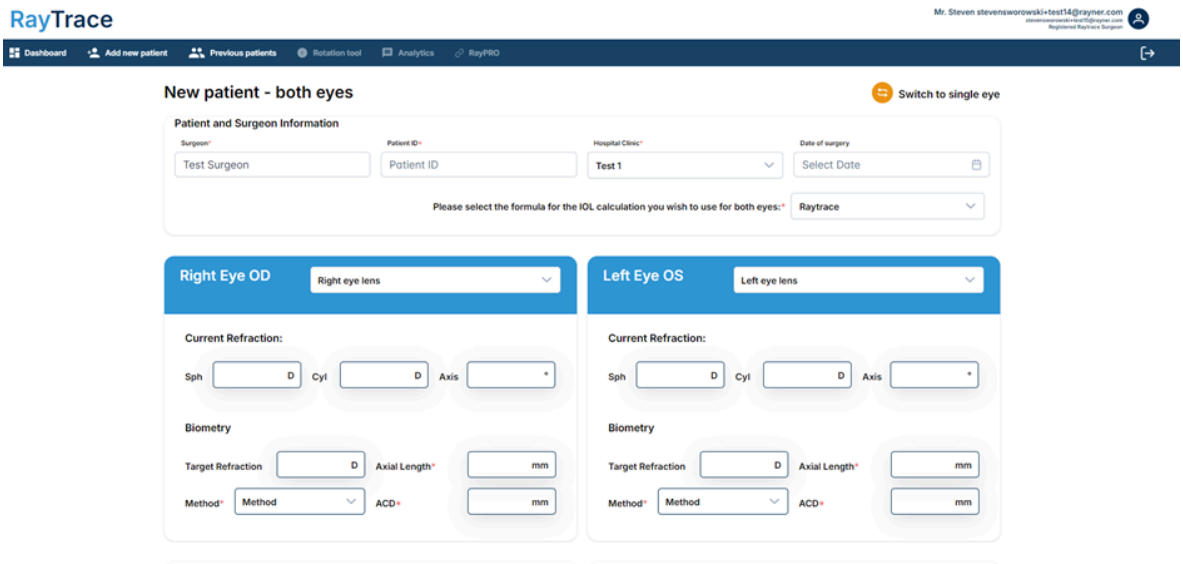
INTRODUCTION TO Raytrace

Raytrace is Rayner's proprietary online calculator for premium IOLs. It is particularly useful as a toric IOL calculator and has been used worldwide since 2008. Raytrace was one of the first online calculation tools and is trusted by surgeons all over the world for the accuracy of its premium IOL (toric, multifocal and supplementary) calculations. Raytrace offers surgeons an online IOL power calculator which is quick and easy to use, providing clear and accurate power recommendations for Rayner's complete range of premium IOLs.

Raytrace version 4.0 provides a fresh new design, access to the PEARL formula, and ability to calculate both eyes on one page, as well as many other new features.



ACCESSING Raytrace

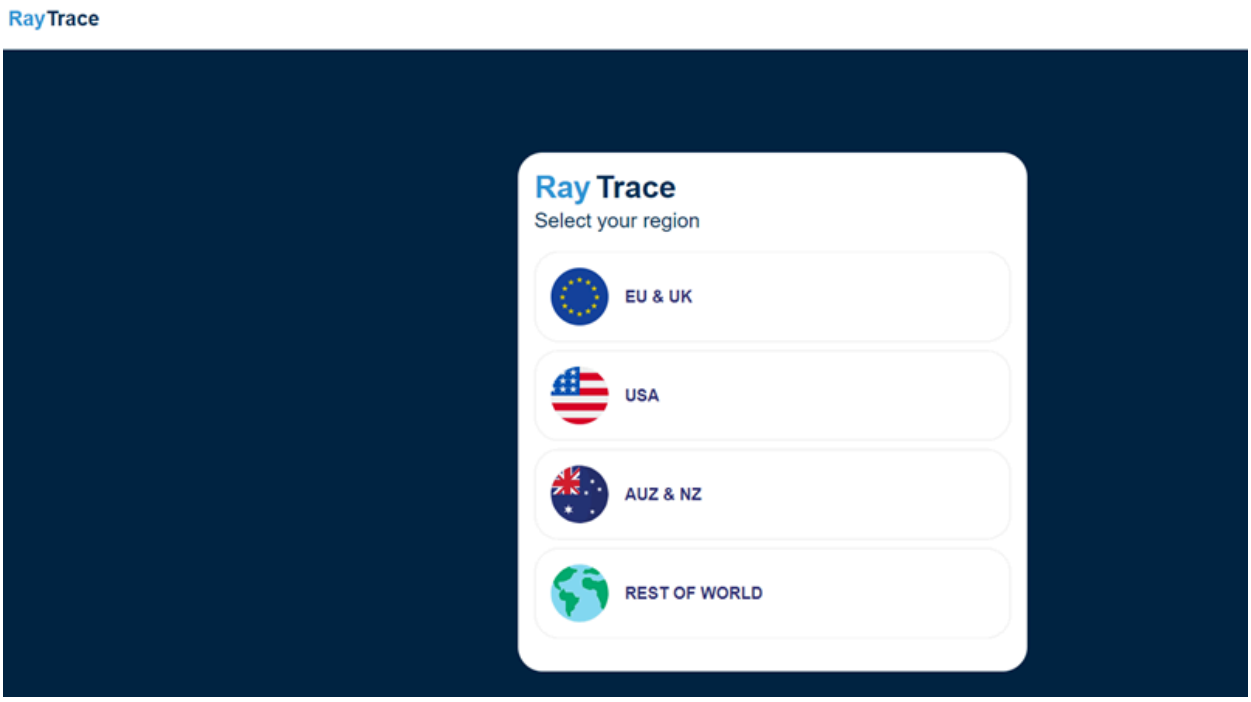
RayTrace can be accessed via ***www.raytracev4.rayner.com.***

Exclusive/Limited access from October-December 2024. Details should not be shared outside of approved users during this time.

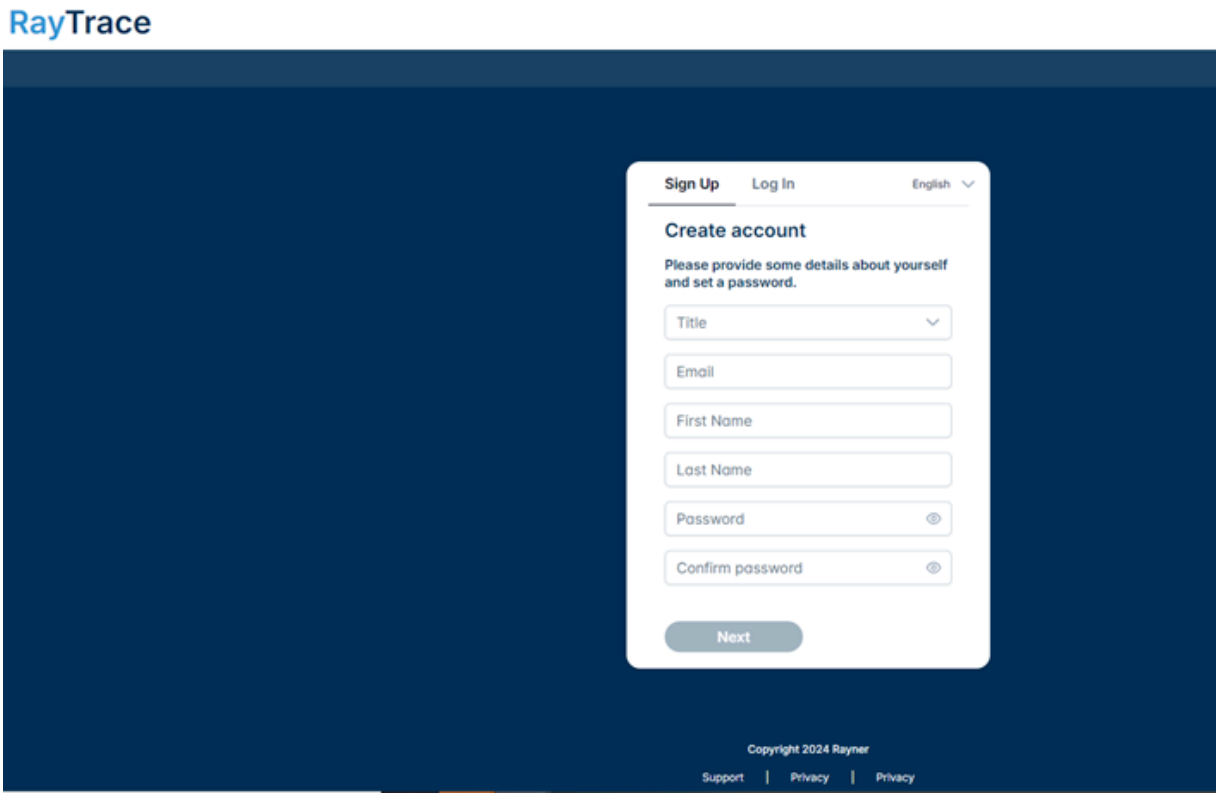
Raytrace is supported by the following web browsers:
- Google Chrome (PC/MAC)
- Mozilla Firefox (PC/MAC)
- Apple Safari
- Microsoft Edge

NEW USER REGISTRATION

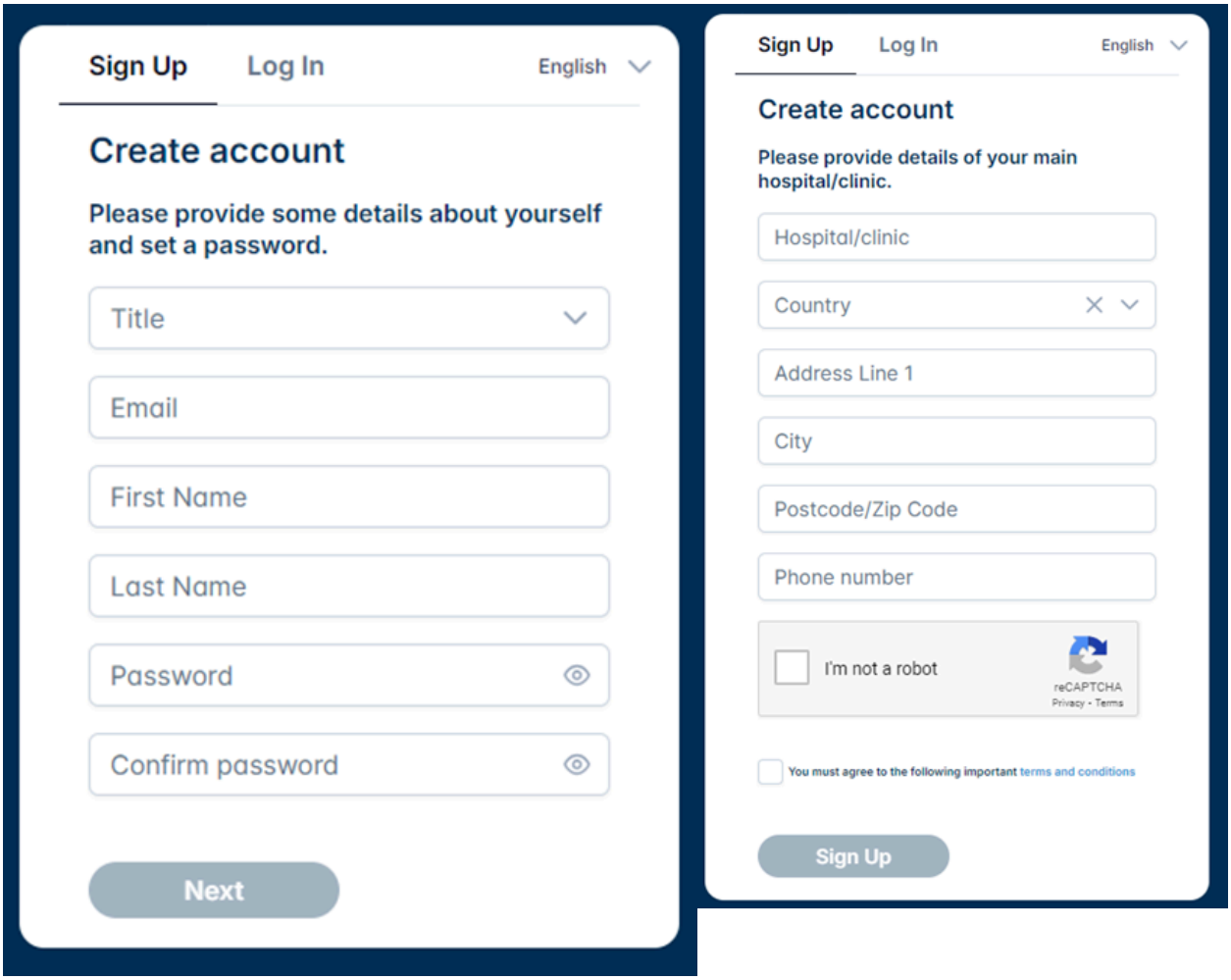
New users can visit www.raytracev4.rayner.com and select their location:



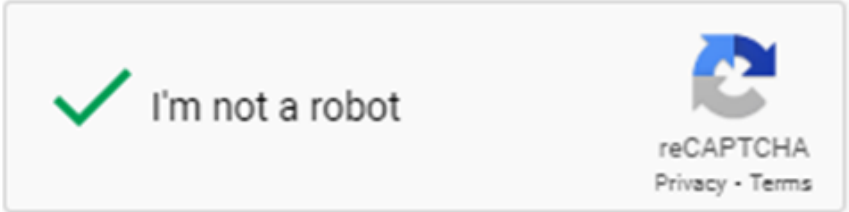
Then click Sign Up:



New users should complete the registration form, providing personal and hospital/clinic details and language preference. RayTrace is available in multiple languages (English, German, French, Spanish and Portuguese) and this can be amended by changing the language during Sign up or in the Settings page after Sign up.

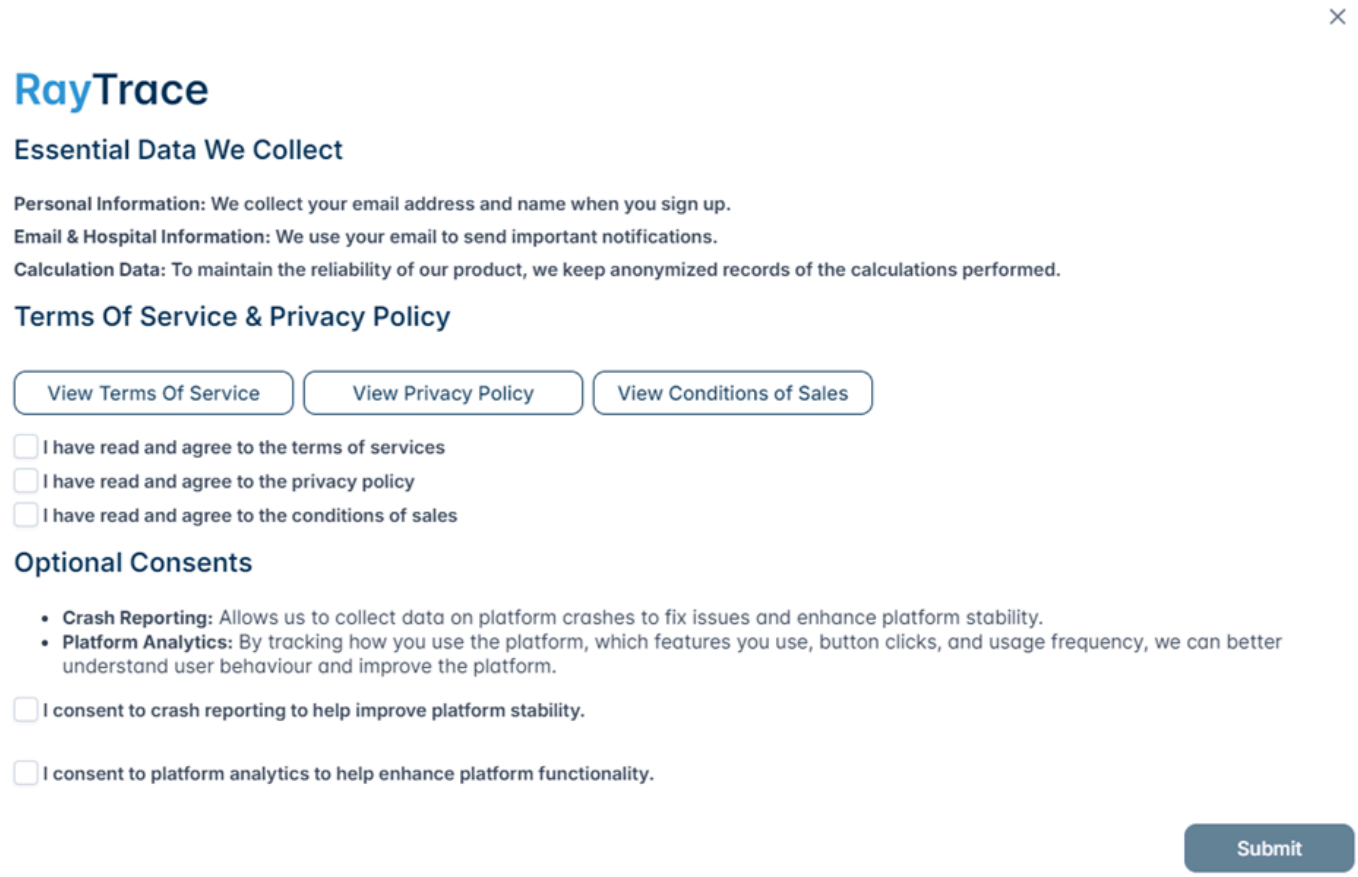


On the Sign Up Form, the user must select 'I am not a robot' in the reCAPTCHA checkbox and the green tick should appear.

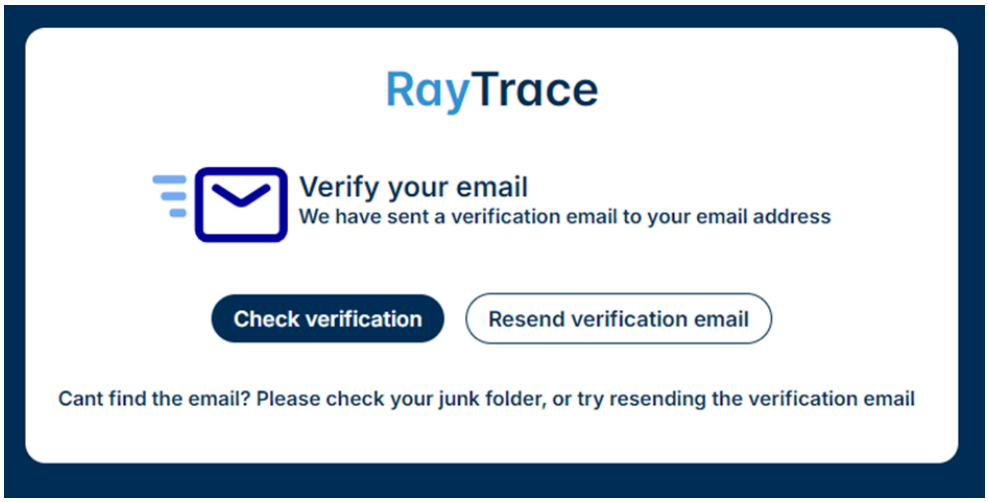


Then, after accepting the terms and conditions, the user can select ‘Sign Up’.

The user is then presented with details on the data we collect, the Terms of Service, Privacy Policy and Conditions of Sale. The mandatory agreements to use RayTrace are the ‘terms of service’, ‘privacy policy’ and ‘conditions of sale’. Crash Reporting and platform analytics are optional to accept.



After this, the user will receive an email to confirm their email address by clicking on the verification link.



Verify your email for raytrace-d04a5

ND noreply@raytrace-d04a5.firebaseapp.com
To stevensworowski+test15@rayner.com

Reply | Reply All | Forward

Wed 18/09/2024 17:27

Hello,

Follow this link to verify your email address.

https://raytrace-d04a5.firebaseapp.com/__/auth/action?mode=verifyEmail&oobCode=B2Y4xNth3uABh35bgAk4Jmuub1XpbT_pVwwaubIO1GkAAAGSBfVIzQ&apiKey=AIza-SyBMl4jxCrQS_uvppFWtzBO-V4WozAY8_k8&lang=en

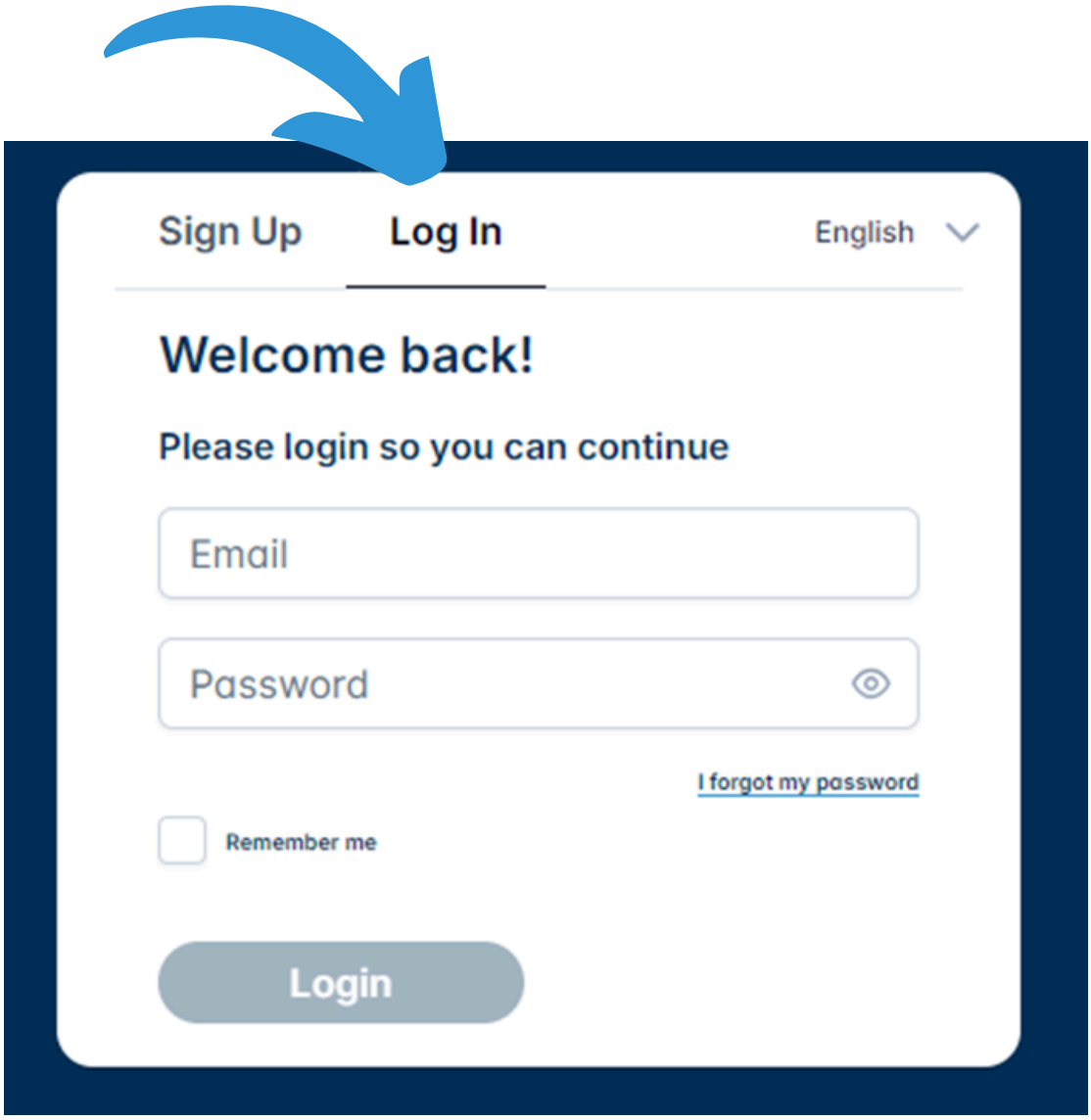
If you didn't ask to verify this address, you can ignore this email.

Thanks,

Your raytrace-d04a5 team

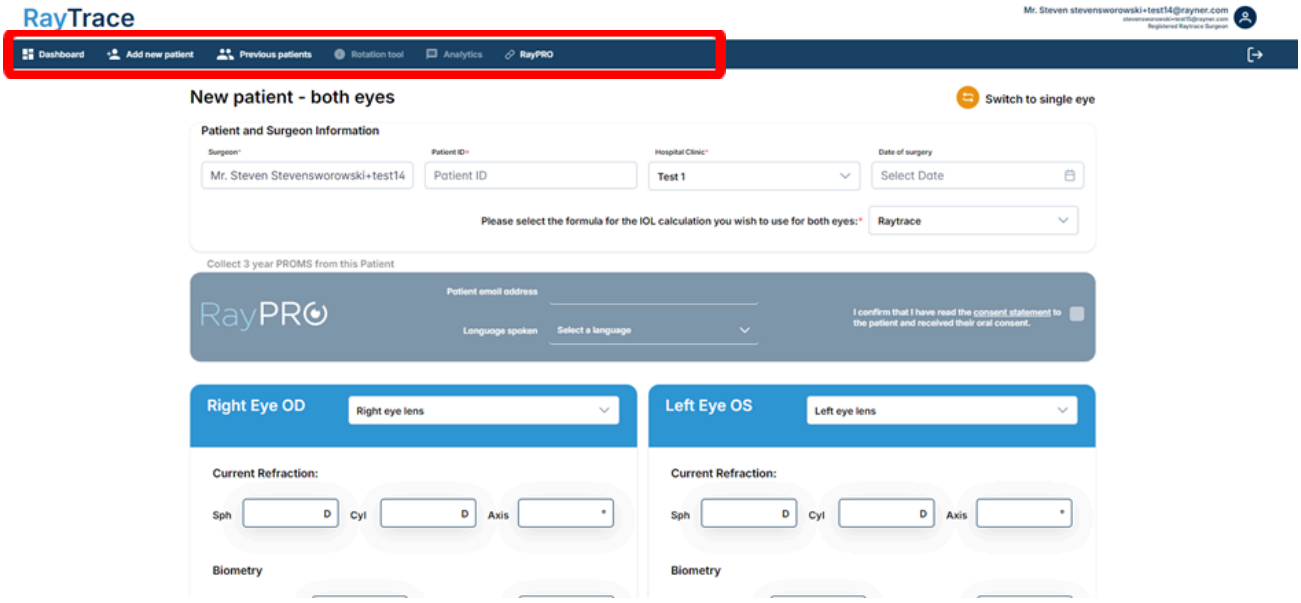
EXISTING USERS

Existing users can log in using the ‘Log in' button on the ‘Sign Up’ page. The users will be prompted to enter their Raytrace email and password:



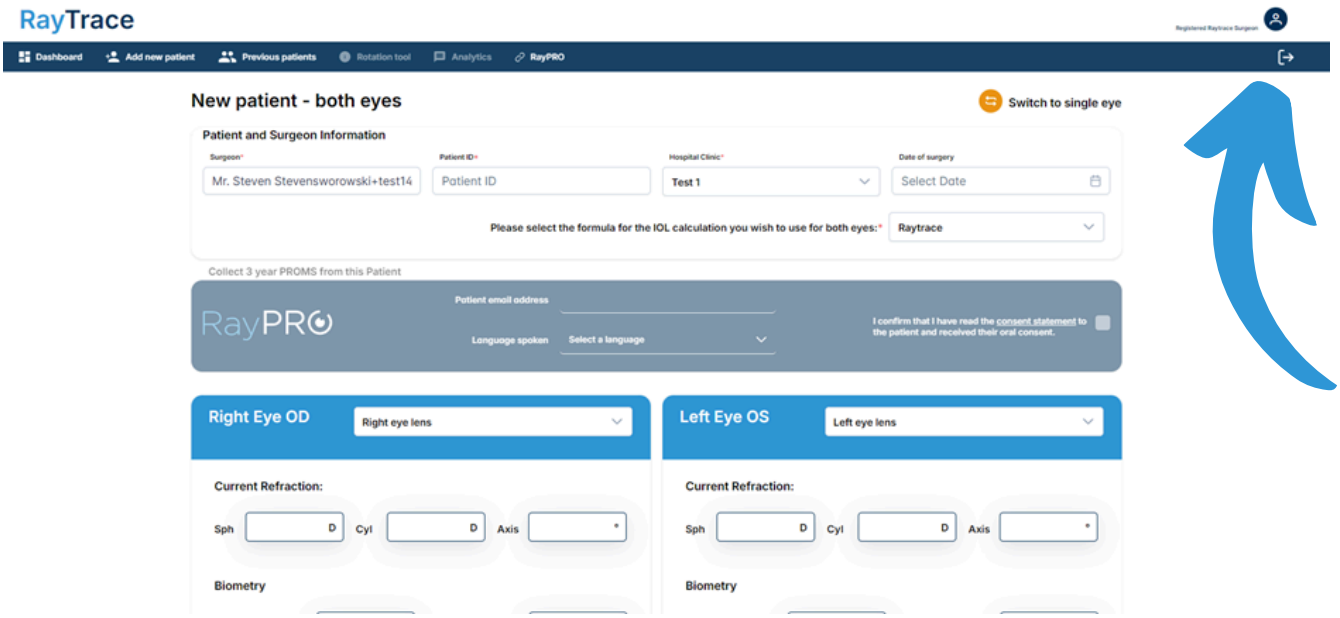
Upon successful sign in/registration, the user shall see the initial lens selection menu with the following options:

- Dashboard/Add a new patient
- View previous patient calculations
- RayPRO
- Manage account settings (change password, add new hospital)



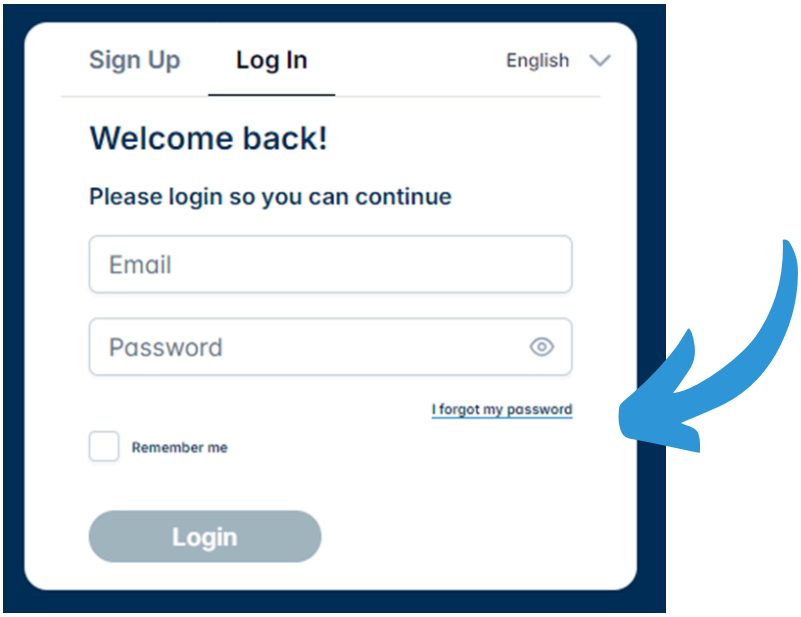
SIGN OUT

At the end of the session, the user can sign out of Raytrace by selecting the menu in the top right-hand corner and selecting the exit button.



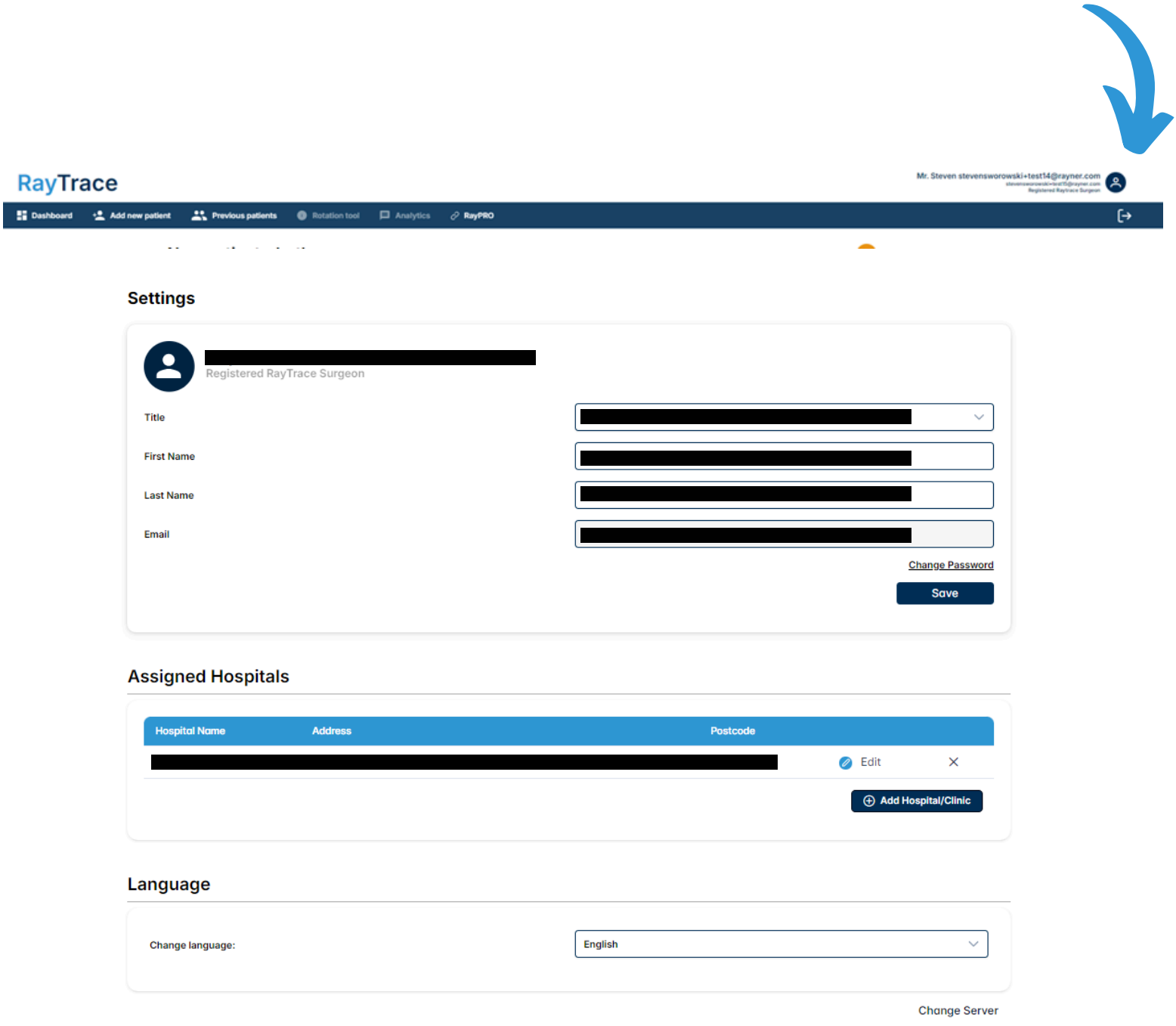
FORGOTTEN PASSWORDS

If the password is forgotten, select 'Forgot My Password'. An email will then be received for the user to follow the steps on the page that appears.



SETTINGS

The settings page can be accessed by clicking on the account, in the top right:



On the settings page, the user has the following options:

- Change the name on the account
- Edit and Add Hospitals
- Change Languages

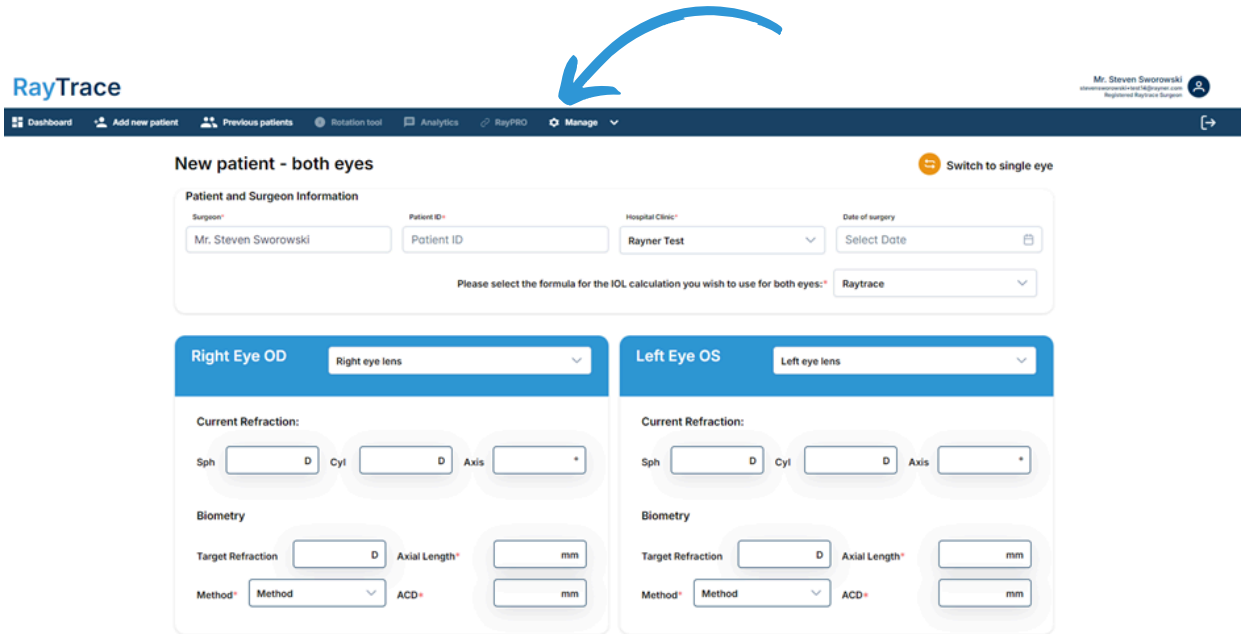
DISTRIBUTER ACCOUNT

The Rayner Digital Health department continue to monitor new Raytrace user registrations and all new surgeons in our distributor markets can be assigned to their relevant distributor. Therefore, if your account requires distributor privileges, please contact your Rayner representative, or alternatively email ***digitalhealth@rayner.com*** for support.

Upon successful sign in/registration, a distributor shall see the initial lens selection menu where:

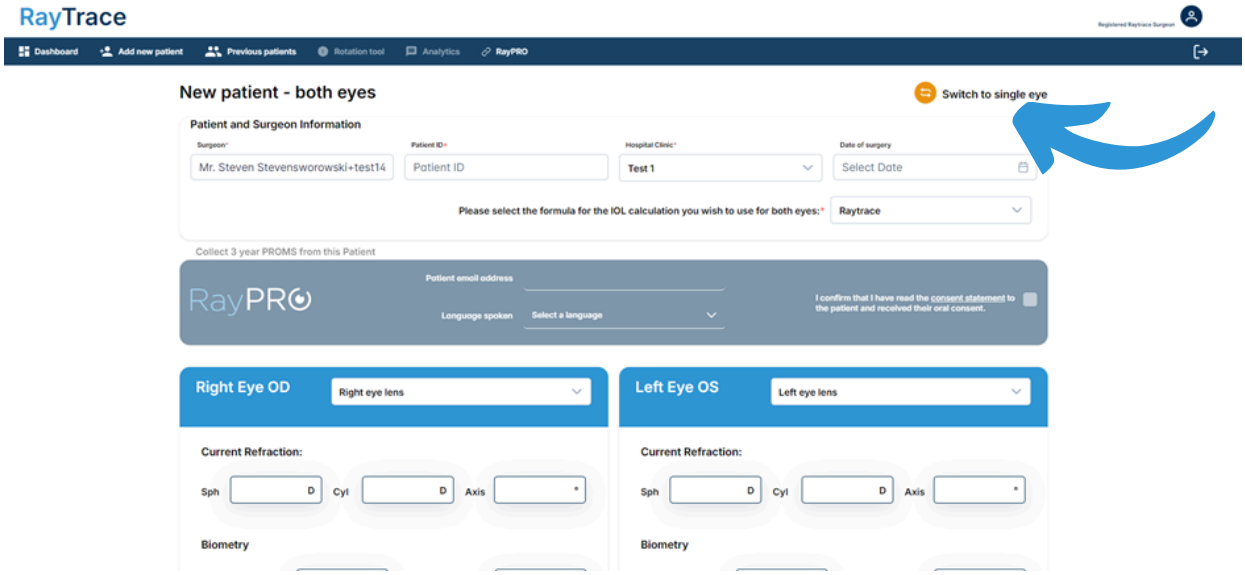
- Calculation for a new patient can be added
- Previous calculations can be viewed
- Manage selections (note, this is the only difference between Surgeon and Distributor account)
- Manage Account Settings (changing password, add new hospitals)

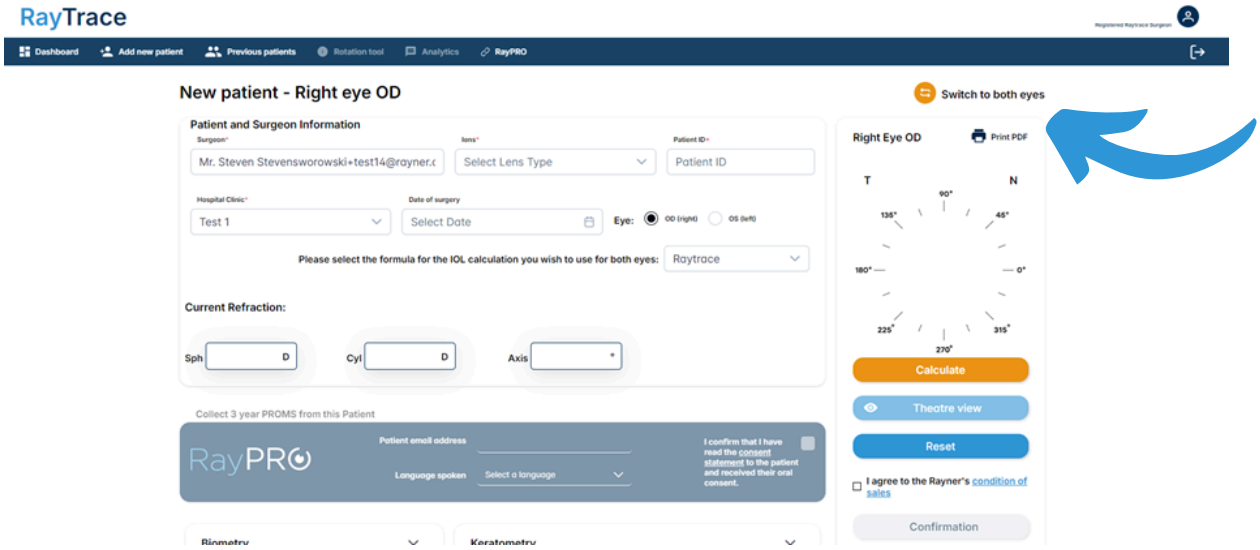
Distributor accounts can view the calculations and confirmed calculations that were performed by the surgeons via the hospital that is assigned under the representative distributor account, under 'Manage Selections'.



BOTH EYES OR SINGLE EYE CALCULATION

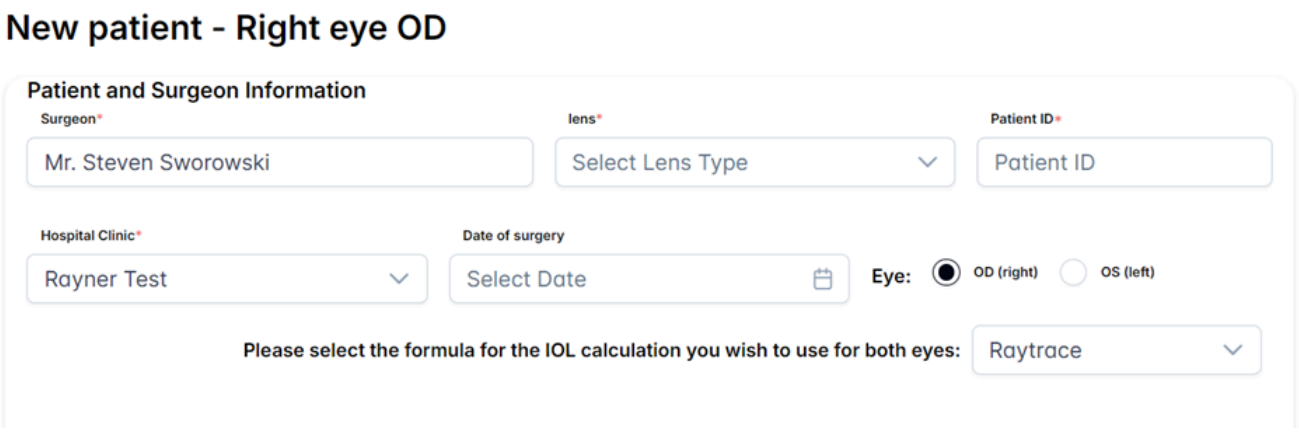
On the calculation page, the user has the option to calculate both eyes or a single eye. This is done by clicking the ‘Switch to single eye’ or ‘Switch to both eyes’, as shown on the images below.





DATA ENTRY: PATIENT AND SURGEON INFORMATION

The first step of the IOL calculation is to enter the patient and Surgeon information in order to identify the calculation against the correct patient:



Surgeon name: is auto populated with the User's name.

Lens: Rayner lens options, the options are between RayOne and Supplementary lenses (RayOne Galaxy & Galaxy Toric, RayOne EMV & EMV Toric, RayOne Toric, RayOne Trifocal & Trifocal Toric, Sulcoflex Toric, Sulcoflex Trifocal, Sulcoflex Aspheric).

Patient ID: Users should always anonymise their patient identification. Due to GDPR legislation, Raytrace only allows for Patient ID details to be used in order to anonymise a patient. The Patient ID should NOT be the patient's name. Use of a patient's name is a breach of the Raytrace terms of use and the user shall bear full responsibility. Patient ID should be a reference with **NO SPACES** that allows you to identify the patient in conjunction with the the user's records.

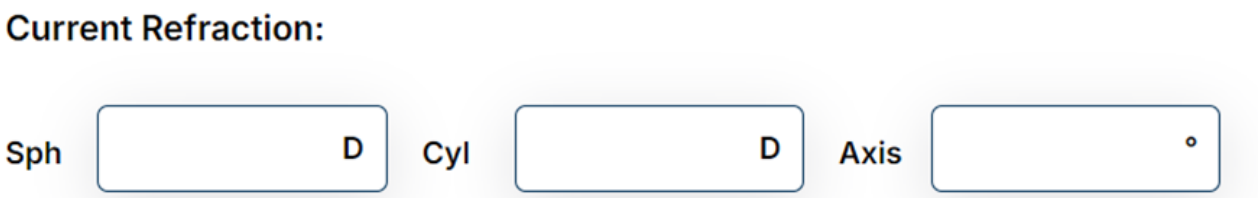
Hospital/Clinic registered at the time of creating the account will appear here. It is a mandatory field. New or multiple clinics and hospitals can be entered by adding them in Settings, where a new clinic or hospital can be added using the ADD CLINIC tab.

Date of Surgery: This entry is optional but can help with surgery planning.
Subject Eye: This is the patient's eye that is being operated on. Please select OD for right eye or OS for left eye. Please note that this option is only available on Single Eye calculation page.

Formula: This is the formula used for the calculation between RayTrace and PEARL-DGS formula. For note, the PEARL formula is only available for RayOne lenses that are non-toric and will only display non-toric options. Toric functionality will be added in the future.

DATA ENTRY: CURRENT REFRACTION

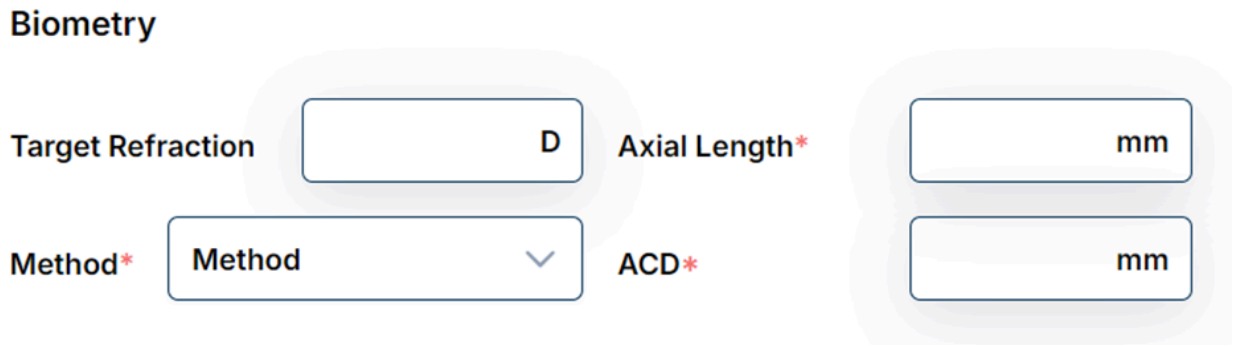
Current refraction in sphere, cylinder and axis is mandatory only for calculation of Sulcoflex supplementary lenses. Value range accepted for Sphere and Cylinder is -30 to +30 and axis 0 to 180.



DATA ENTRY: BIOMETRY

Biometry details contain target refraction, axial length, method, and anterior chamber depth (ACD). For calculation of primary capsular bag IOLs, these fields are mandatory:

- Axial length
- Method of biometry (optical/contact ultrasound/immersion ultrasound)
- Anterior chamber depth



Axial Length is measured from the epithelium to the retina and accept values within range from 15.00 to 40.00.

Target Refraction: Planned target refraction post implantation. For emmetropia enter 0. However, RayTrace will also accept values within the range of -10.0D to 10.0D.

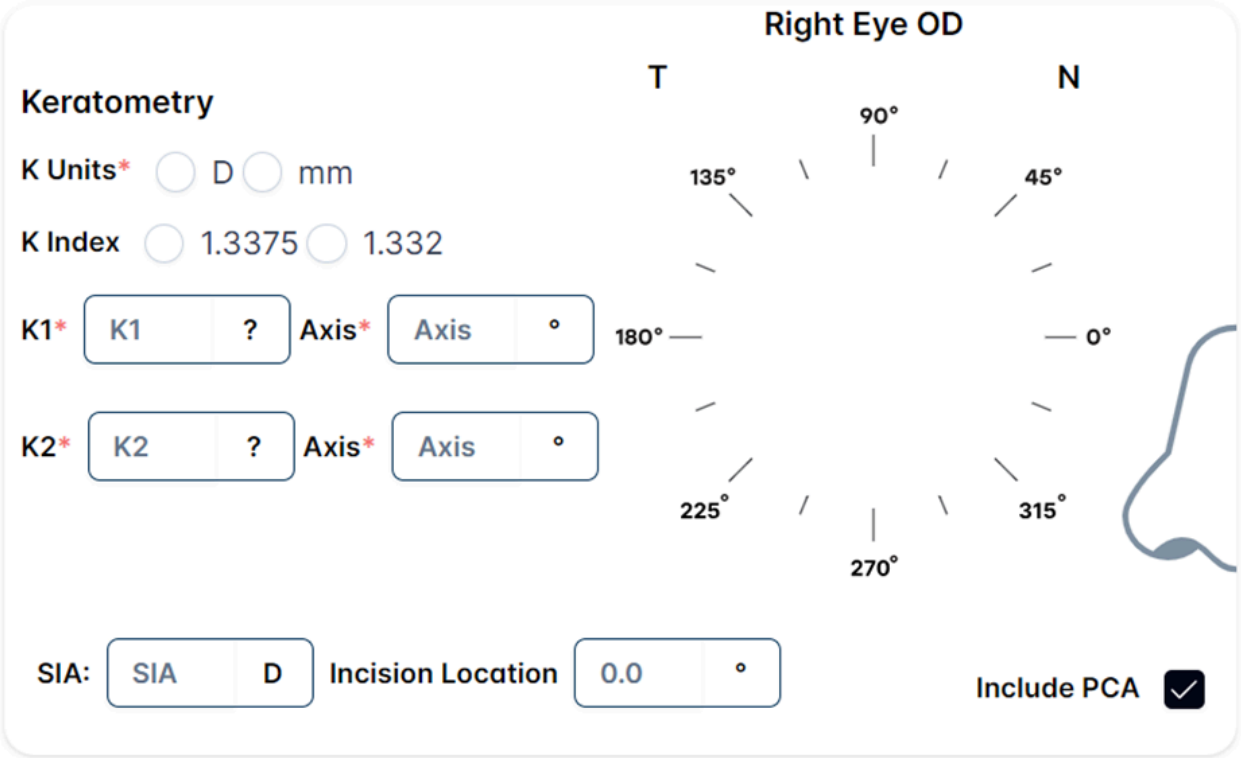
Method of biometry measurement is essential as the system will calculate the IOL using a different A-constant according to whether the data has been derived from ultrasound or optical methods. There are three different methods available:

- Optical
- Contact Ultrasound
- Immersion Ultrasound

Anterior chamber depth is measured from the epithelium to anterior crystalline lens surface and value range is from 1.50 to 6.00.

DATA ENTRY: KERATOMETRY

Keratometry details contain values for the corneal curvature (K1/K2) and axes (Degrees), surgically induced astigmatism (SIA), incision location and posterior corneal astigmatism (PCA).



Keratometry (corneal) curvature, where the user has the choice of calculating for the IOL either in mm or in dioptric power (D). This must be selected by the user. The keratometry index (1.3375 or 1.3320) must also be selected, where the keratometry index is the nominal value of the refractive index used by the biometry system to convert measured radii to Dioptres. Users will input the K values from the optical biometry report and the degrees for the K1 and K2 axes.

Surgically induced astigmatism (SIA) is an optional input for the change in corneal astigmatism induced during the surgery. The dioptre value entered for SIA represents the total change across both axes; e.g. a value of 0.5 D equals a decrease in corneal power of 0.25 D along the incision meridian and an increase of 0.25 D along the axes orthogonal to the incision. The entered SIA value can range from Oto 1.5. Users must also indicate where the primary incision is planned. On-axis incisions can reduce the cylinder required on the IOL.

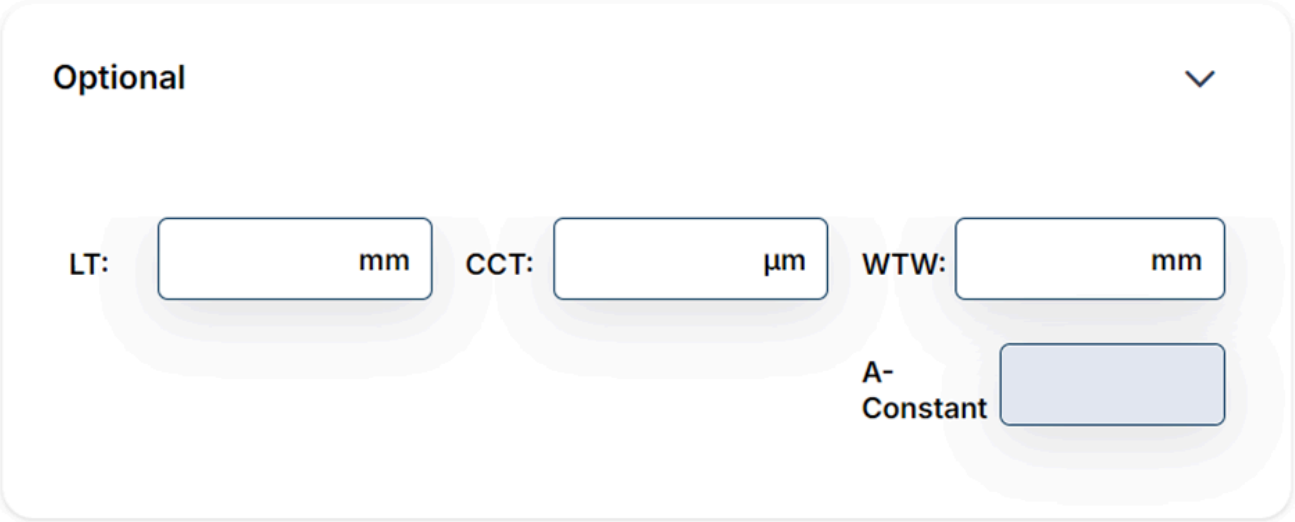
Incision Location is used for the position of the incision location for placing IOL. The range is from O to 360 degrees.

Allow for PCA is optional to include Posterior Corneal Astigmatism. If the user enters standard anterior 'K' values, this box shall be selected for an average amount of PCA. The PCA option is ticked by default. If the box is unticked, the calculation is not changed from the previous version of Raytrace and it does not consider PCA.

The PCA option is only included for calculation of the following lenses:
• RayOne Galaxy & Galaxy Toric
• RayOne Toric
• RayOne Trifocal & Trifocal Toric
• RayOne EMV & EMV Toric

DATA ENTRY: OPTIONAL

Optional inputs contain: Lens Thickness (LT), Central Corneal Thickness (CCT), White-to-White (WTW) and A-constant.



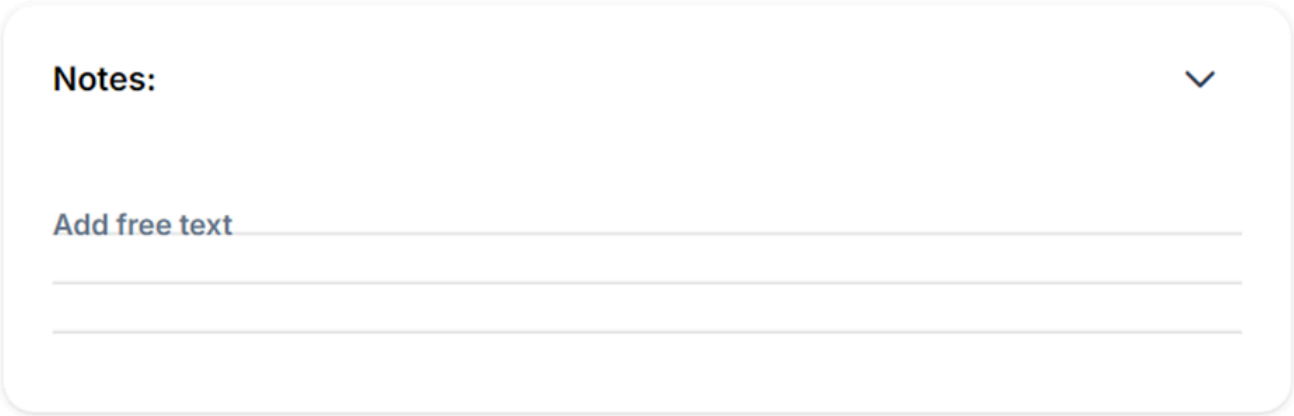
Lens Thickness (LT): This refers to the thickness of the eye's natural lens and value range is from 2.50 to 8.00.

Central Corneal Thickness (CCT): The thickness of the cornea at its center and value range is from 350 to 700.

White-to-White (WTW): This is the horizontal diameter of the cornea, measuring the distance between the limbus (the junction between the cornea and the sclera) from one side to the other. Values range from 8.00 to 14.00.

A-constant: A parameter used in the calculation of intraocular lens (IOL) power during cataract surgery. It accounts for the position of the lens within the eye and is unique to each type of IOL and value ranges from 116.50 to 121.00. This input is only allowed for PEARL-DGS formula calculations.

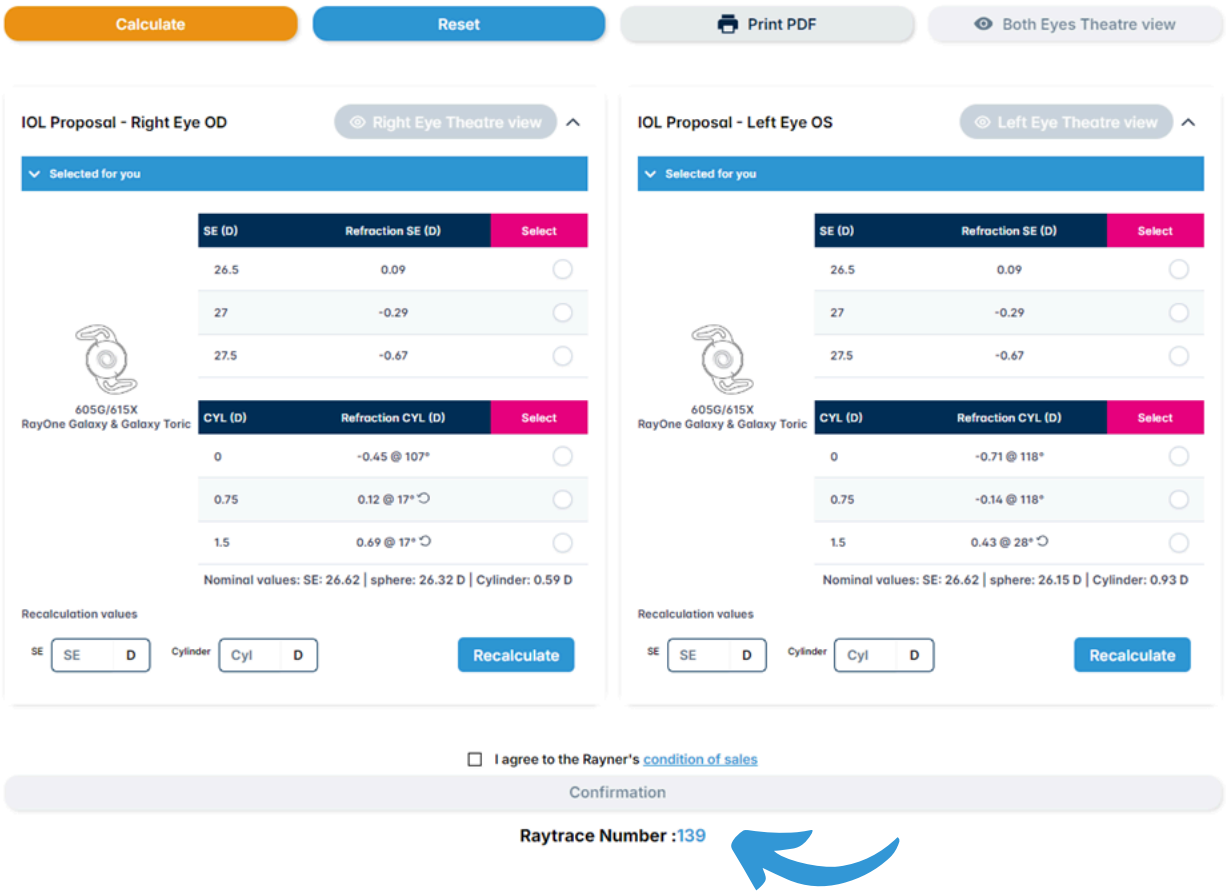
At the end of the page there is a notes section, for notes about the eye surgery or calculation:



CALCULATE RESULTS

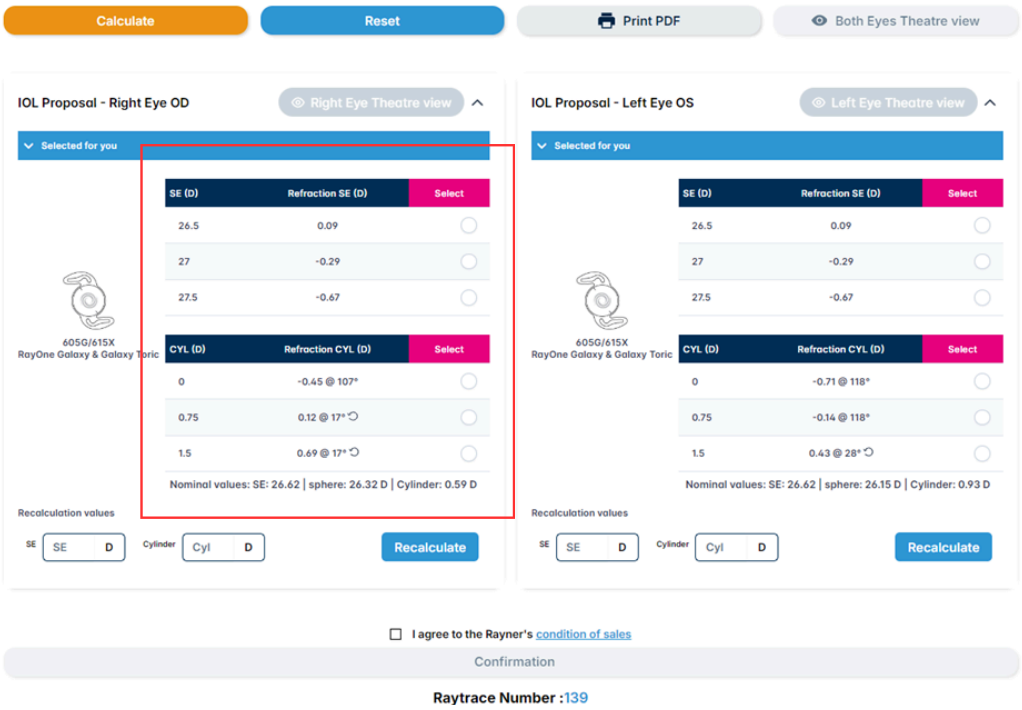
Once the user has entered all IOL data and ticked to include/exclude PCA in the calculation, the user can calculate the outcome for the required IOL lens by selecting '**Calculate**'.

A unique **Raytrace number** is generated when the calculation is completed. The Raytrace number is essential for the tracking and monitoring of the confirmed IOL calculation.

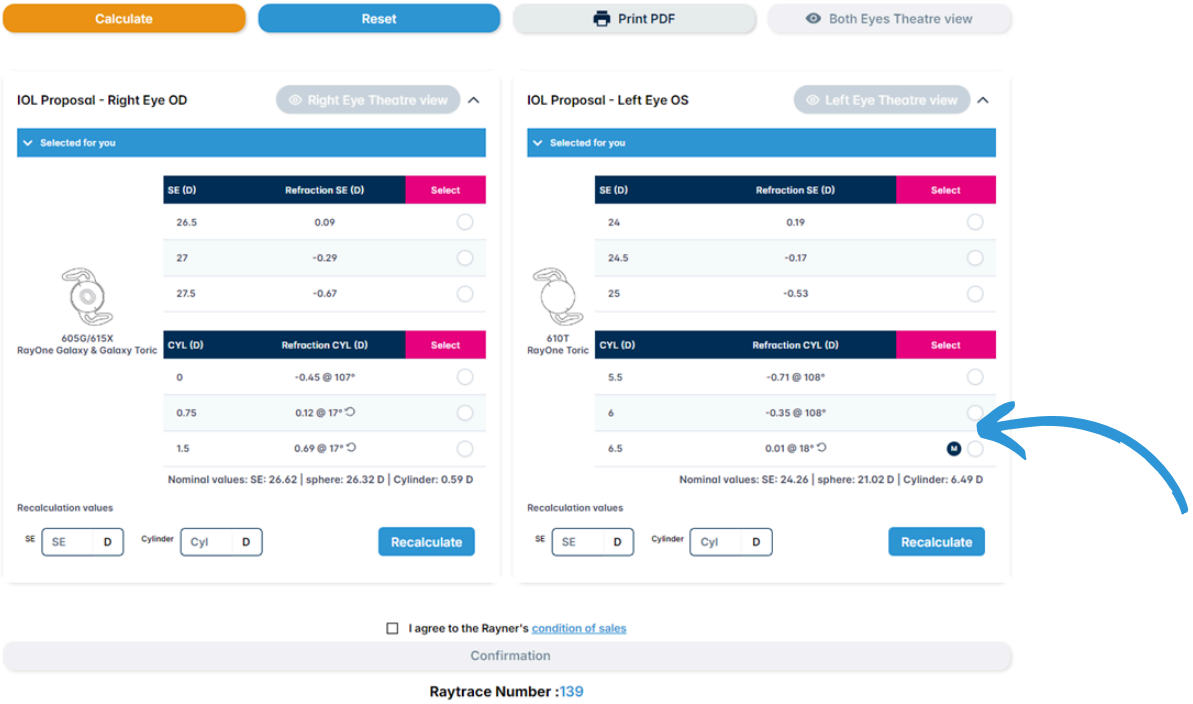


Raytrace generates a selection of IOL options based on their sphere, spherical equivalent (SE) and cylinder combinations that come as close as possible to the target refraction that the user indicated.

IOLs are listed in two tables, one for SE and one for Cylinder. Each table shows the representative expected refraction.



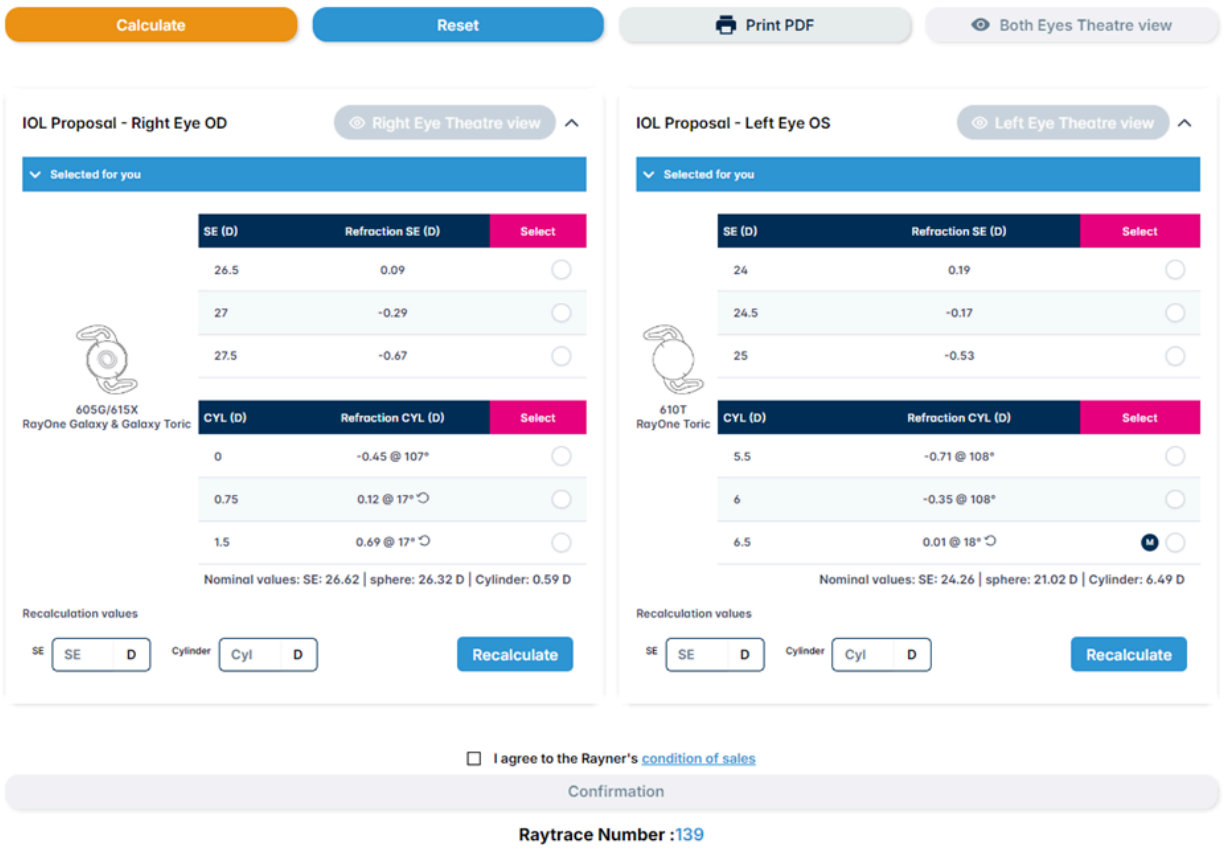
Lenses that are Made to Order are identified with the blue circle with a ‘M’ within. All other lenses without this identifier are Standard. Standard lenses should be available in stock, whereas Made to Order lenses are normally subject to a longer delivery time (which can be provided by Customer Services as these are manufactured outside of the standard range availability) and additional cost. The distinction between made to order and standard is dictated by the Spherical Equivalent combination power i.e. the sphere+ half the cylinder power. Further details can be found on ***www.rayner.com.***



RECALCULATION AND NOMINAL VALUES

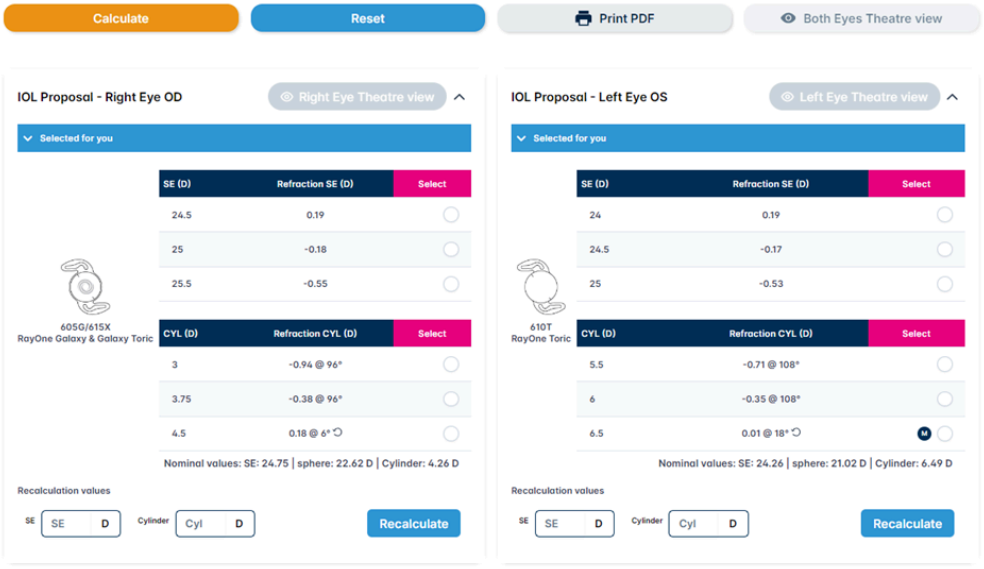
Two features located at the end of the Results section, and these are used for:

- Recalculation based on IOL availability
- Nominal Values for Spherical Equivalent, Sphere and Cylinder.

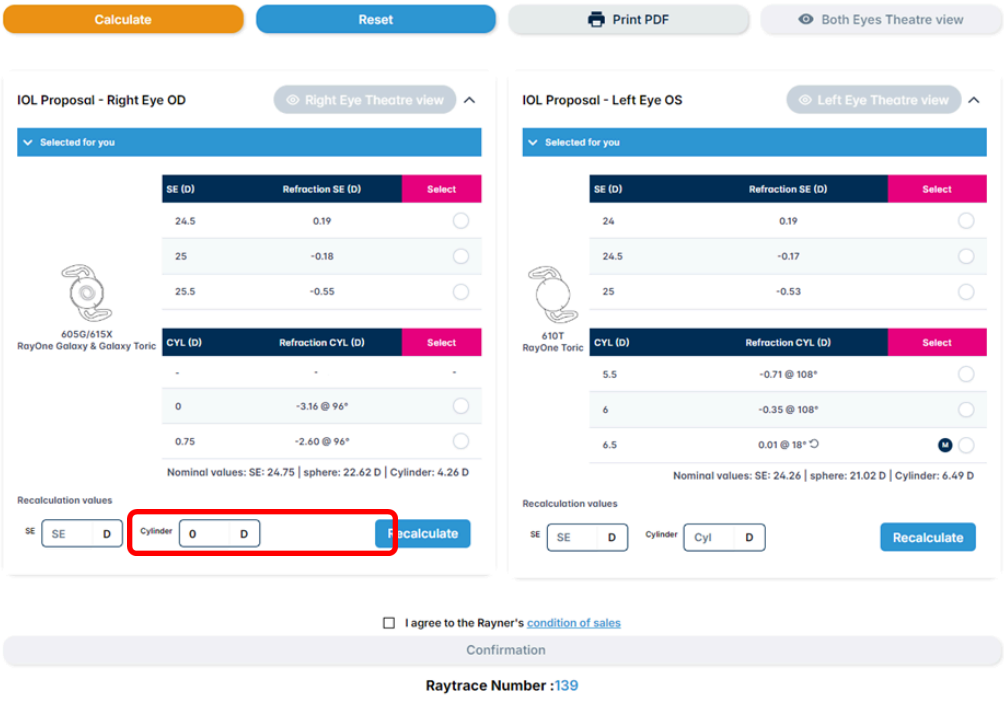


The Image on the next page shows an example of the recalculation function. It can be used to display non-toric options; by entering a Cylinder value of 0D on the relevant eye and clicking ‘Recalculate’, the tables will then update with non-Toric options if available. The images on the following page demonstrate this.

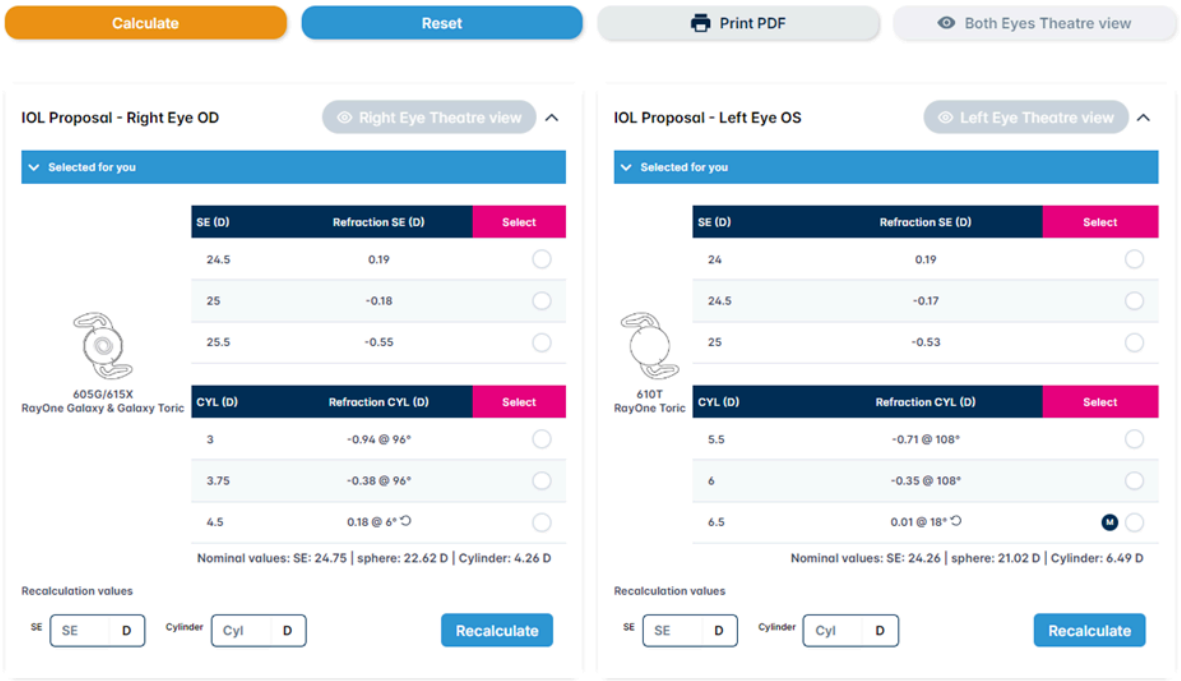
Before Recalculating the Right Eye:



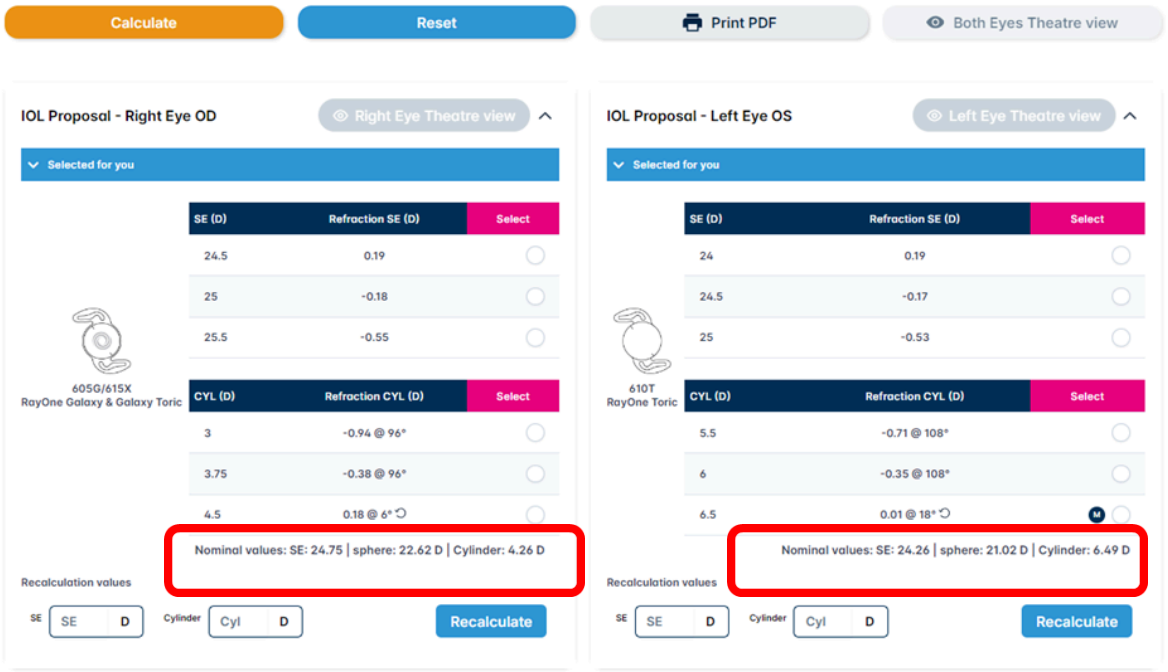
After Recalculating with a Cylinder of 0D:



If you wish to view the toric options again, all you need to do is delete the 0D from the Recalculate Cylinder box and click the ‘Recalculate’ button again, and the table will return to the results before recalculation:



Nominal values located under the IOL proposal table display the values for Spherical Equivalent (SE), Sphere, and Cylinder that would achieve the target refraction entered.



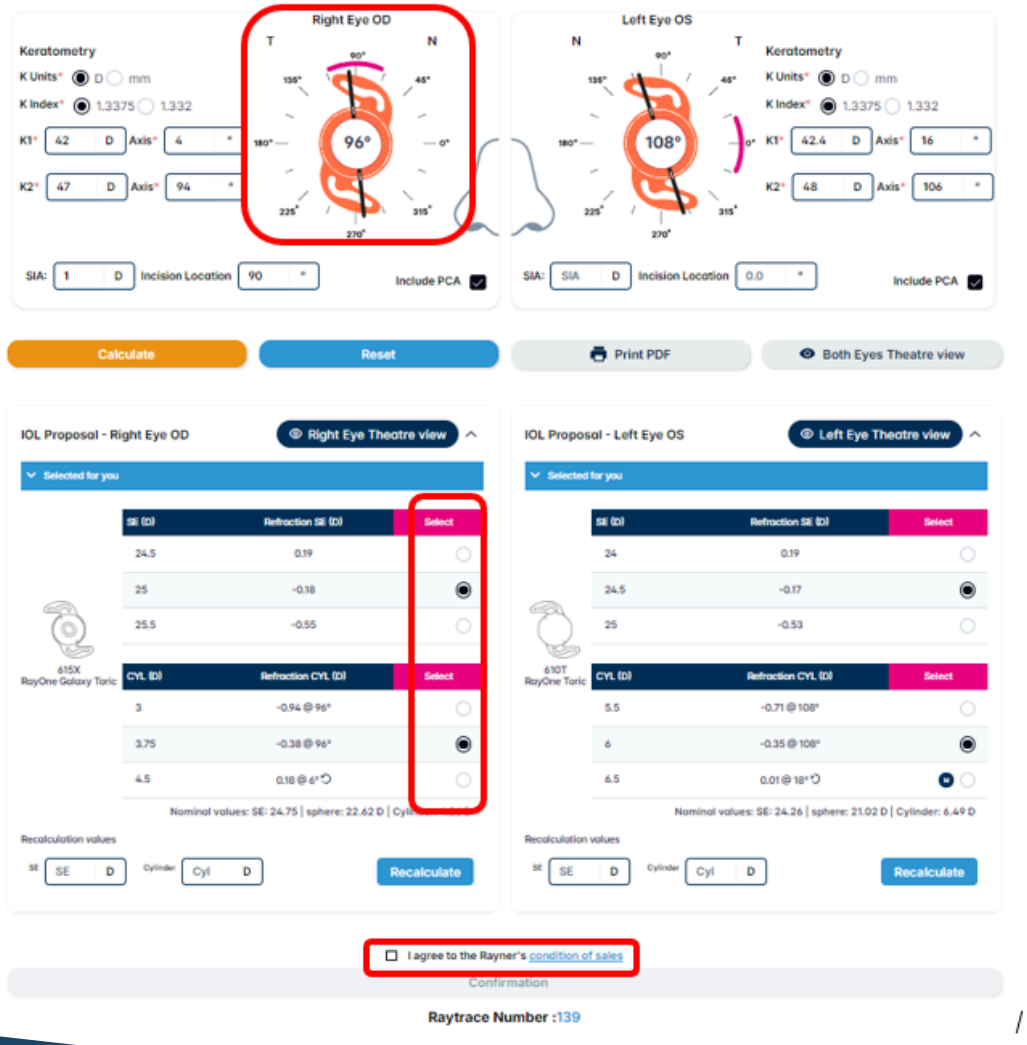
IOL LENS SELECTION

It is important for a user to use their best clinical judgment when making their IOL selection and ensure that complete and accurate biometry measurements are taken, especially when implanting premium IOLs.

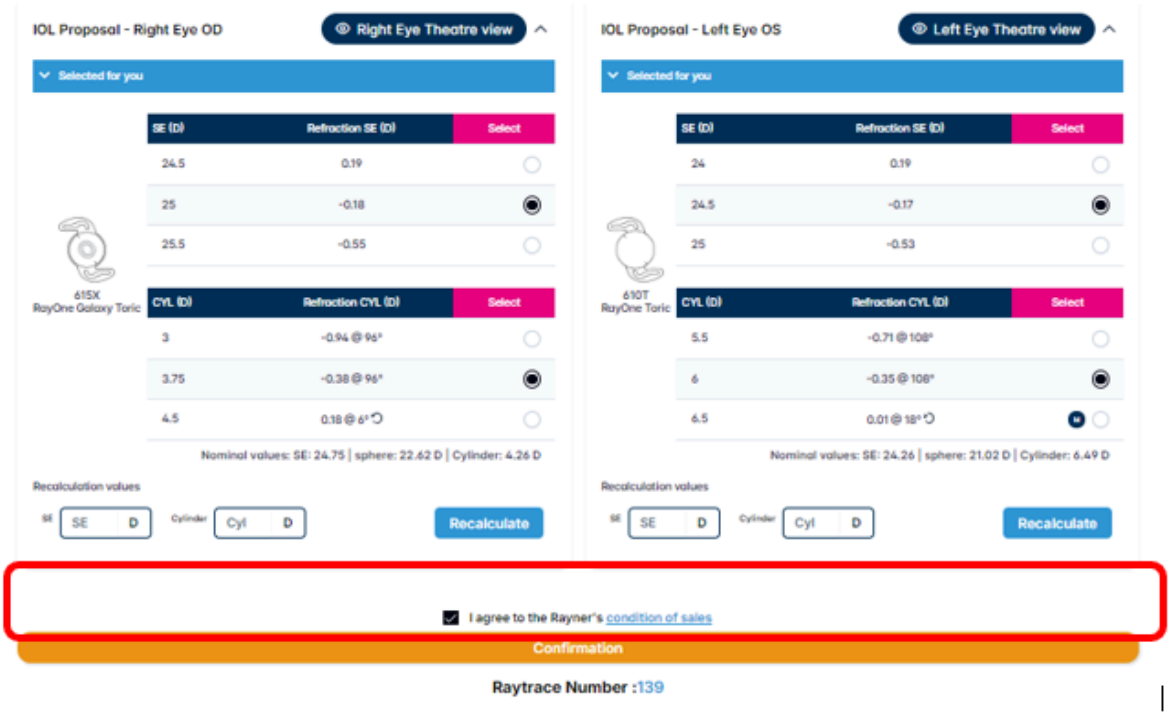
Once a user has selected their desired IOL in the Selection panel, Rayner's Conditions of Sale must be agreed to (by ticking the box shown below) prior to the calculation placement. Conditions of Sale can be accessed by selecting this and the user will be redirected to a separate browser window with the Raytrace Conditions of Sale.

The image below shows the alignment of toric IOLs in the eye with the degree of alignment and the incision location clearly marked with the pink curve.

At this point the user can print the calculation via the ‘Print PDF' option or view this IOL option on the 'Both Eyes Theatre view' screen or individually on the Right or Left Eye Theatre View. In this example, the RayOne Galaxy Toric of lens power: SE 25D and *Cylinder 3.75D*, was selected.



Once a user has selected 'I agree to Rayner's Conditions of Sale', the Confirmation option becomes available (under 'I agree to Rayner's Conditions of Sale) and the user can now submit the IOL selection.

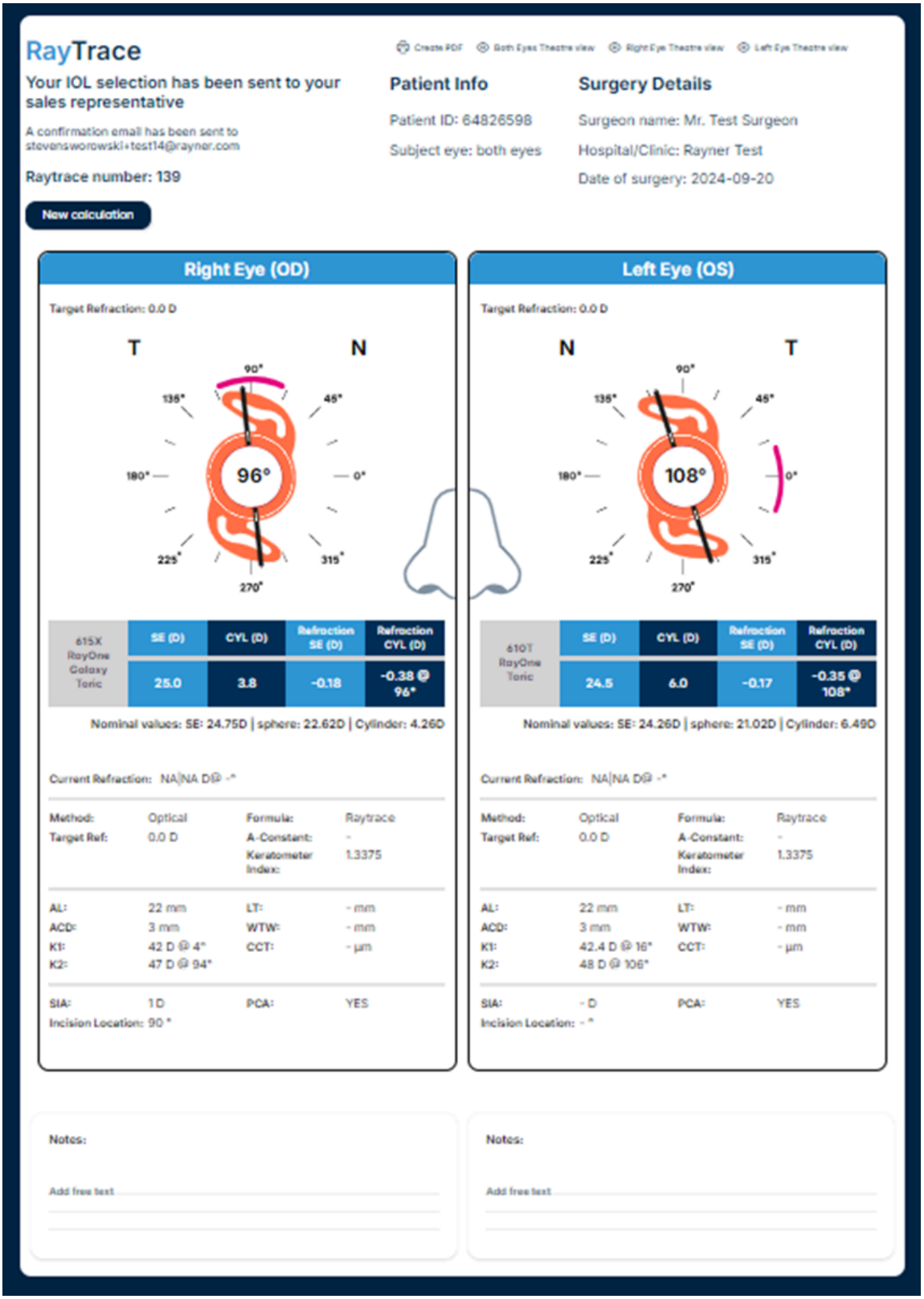


UK and Ireland Customers:
For Rayner to process your request please provide us with a Purchase Order from your hospital or clinic. The Purchase Order must include the unique Raytrace Number for this calculation. Rayner is unable to initiate the order process without a valid Purchase Order and Raytrace Number.

Overseas Customers:
An email with details of your Raytrace calculation and IOL selection has been sent to your local Rayner distributor. Please contact them directly, quoting the Raytrace number, for all order and delivery information.

SUMMARY OF IOL CALCULATION

In the next step, the selected IOL lens is displayed in the summary page with all information (data entries) for the selected patient:

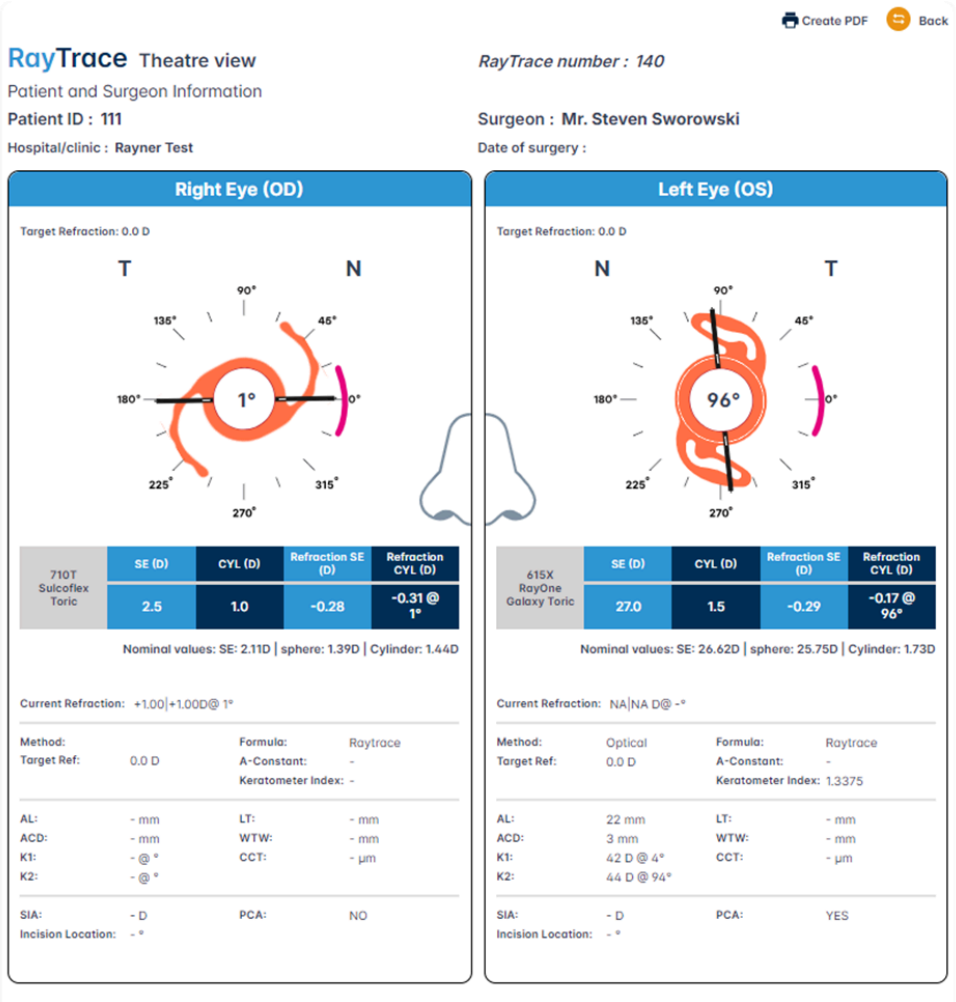


The user will receive a confirmation email with details of their IOL selection. The user must quote the Raytrace number when requesting any further information related to their selection. The user can then:

- Commence a new calculation by selecting the 'New calculation' option
- 'Create PDF' of the current screen
- Select and view the 'Theatre view' for the selected IOL lens for both or single eyes

Distributor Accounts
Distributors will also receive an emailed copy of the IOL selection confirmation and they are able to view the calculations on their distributor's account, under the 'Manage Orders' option.

<u>Theatre View</u>
Theatre View, all the data that the user would need or be reminded of before implantation, is contained on the Theatre view screen. This can be printed for use in the Theatre as an aide-memoire or for the patient's records or departmental records.



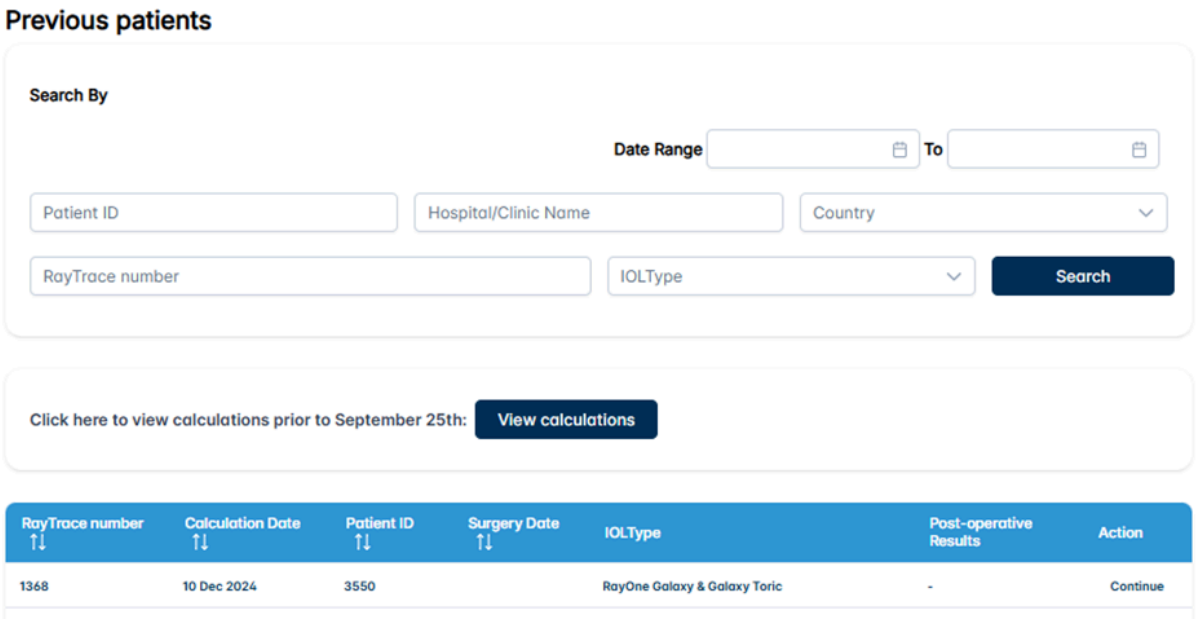
CALCULATION RECORDS

Users can access information on all IOL calculations that were performed with their account under the 'Previous Patients' option. Users can revisit and recalculate lenses for the same patient, when selecting '**Continue**'.

Users can revisit and view the lens that was submitted by selecting '**View**'.

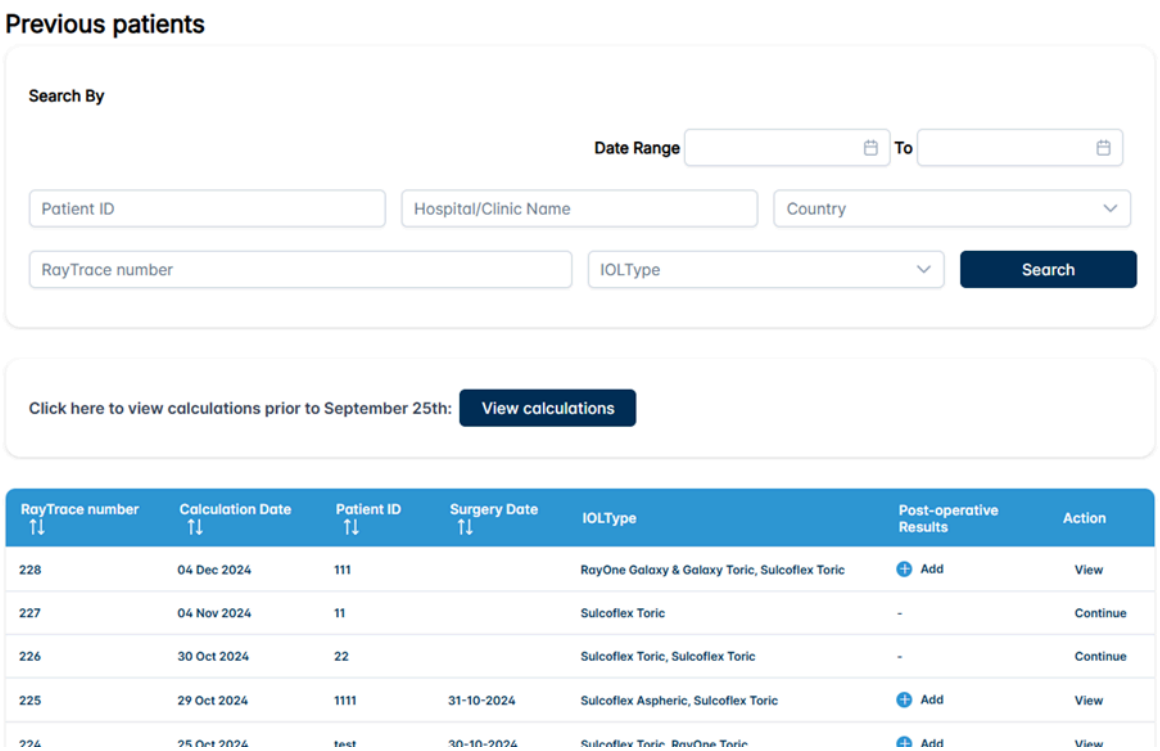
It is possible to search for the required calculation based on the:

- Raytrace reference number
- IOL Type
- Date Range
- Patient ID
- Hospital/Clinic Name
- Country

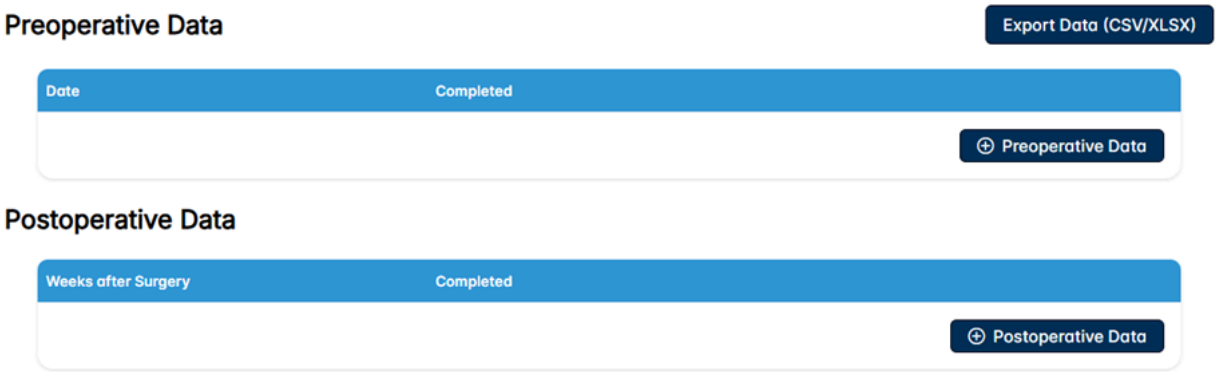


ADD PRE & POST-OPERATIVE RESULTS

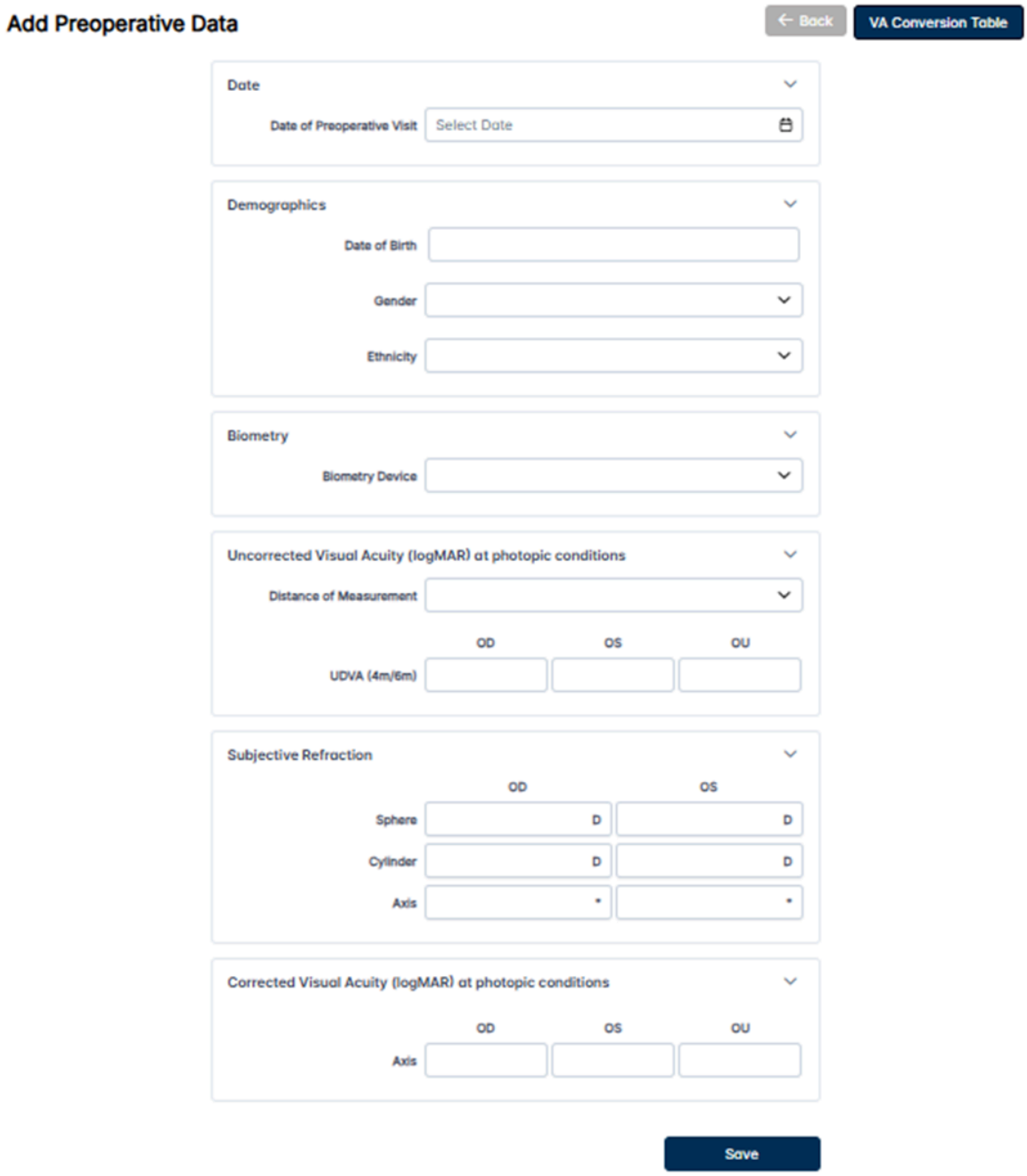
If a lens was selected during a previous calculation, an option will appear on the Previous Patients page to enter post-operative results.



When the Add post-opearive results button is clicked, a new page opens, allowing you to input both preoperative and postoperative data.



Clicking the **Preoperative Data** button opens a form where you can optionally enter relevant preoperative details. All fields are optional.



Clicking the **Postoperative Data** button opens a similar form for postoperative details. Again, all fields are optional.

Add Post-operative Results

← Back | VA Conversion Table

Time After Surgery

Weeks After Surgery: Select...

Uncorrected Visual Acuity (logMAR) at photopic conditions

Distance of Measurement:

	OD	OS	OU
UDVA (4m/6m)			
UIVA (66 cm)			
UNVA (40 cm)			

Objective Refraction Measurements

	OD	OS
Sphere	D	D
Cylinder	D	D
Axis	°	°

Subjective Refraction

	OD	OS
Sphere	D	D
Cylinder	D	D
Axis	°	°

Corrected Visual Acuity (logMAR) at photopic conditions

	OD	OS	OU
CDVA (4m/6m)			
DCIVA (66 cm)			
DCNVA (40 cm)			

Defocus Curve (logMAR) at Photopic Conditions

	OD	OS	OU
+1.00D:			
+0.50D:			
+0.25D:			
0.00D:			
-0.25D:			
-0.50D:			
-1.00D:			
-1.50D:			
-2.00D:			
-2.50D:			
-3.00D:			
-3.50D:			
-4.00D:			

Slit lamp evaluation with dilated pupil

	OD		OS	
PCO? (Posterior Capsule Opacification)	Sele...	Please speci	Sele...	Please speci
IOL centration?	Select...		Select...	
IOL tilt?	Sele...	Please speci	Sele...	Please speci
IOL glistening?	Sele...	Please speci	Sele...	Please speci
IOL Rotation?	Sele...	Please speci	Sele...	Please speci

Comments

Add free text

Save

RAYTRACE FORMULA

Raytrace utilises a a proprietary calculation system and a combination of regression formulas and applies the recommended formula based on the patient's biometry input.

RAYTRACE DATA ENTRY VALUE RANGES

The following table shows the defined ranges for the input values of the biometric data. Only values that are in the defined range can be entered on Raytrace.

Input field	Unit	Lower Limit	Upper Limit
Target Refraction	Dioptre	-10.00	10.00
Current Refraction Sphere	Dioptre	-30	30
Current Refraction Cylinder	Dioptre	-30	30
Current Refraction Axis	Degrees	0	180
Anterior Chamber Depth (ACD)	mm	1.50	6.00
Axial Length (AL)	mm	15.00	40.00
K1	D/mm	18.38 D 5mm	63 D 18.37mm
K1 Axis	Degrees	0	180
K2	D/mm	18.38 D 5mm	63 D 18.37mm
K2 Axis	Degrees	0	180
Surgically Induced Astigmatism (SIA)	Dioptre	0	1.5
Incision Location	Degrees	0	360
Lens Thickness (LT)	mm	2.5	8
Central Corneal Thickness (CCT)	µm	350	700
White-to-White (WTW)	mm	8	14
A-Constant		116.5	121
Pre-LVC anterior corneal radius	µm	5.5	9.5
Corrected Ametropia	D	0.5	12

TECHNICAL SUPPORT

Raytrace management falls within the Digital Health Department at Rayner.

Please email ***digitalhealth@rayner.com*** for all technical support and enquiries related to:

- Raytrace
- Manual calculations
- Optimisation of constants
- Support with uploading optimised or manufacturer suggested constants
- Reported outcomes

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