ALPHA PREMIUM PROGRESSIVE

REMOVING OBLIQUE ABERRATION

JUZVISION

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Alpha Premium Free-form Personalized Progressive Lens

The Alpha Premium Freeform uses IOT Digital Ray-Path®. This is the one of the latest technological advancements used to make digital lenses. The important difference appears when calculating the back surface. Instead of using a pure geometrical method, Digital Ray-Path® technology uses an advanced three-dimensional calculation model that considers the real position of the lens and the natural movements of the human eye. The result of this innovative calculation method is a progressive lens that is personalized and provides better vision in all zones of the lens.

Better vision on every point of the lens

Lenses calculated with this technology method provide a new visual experience to wearers. Digital Ray-Path® is based on the realistic simulation of the optical behaviour of the lens when it's placed in front of the wearer's eye. This simulation computes the oblique aberrations that have a negative impact on the lens visual performance. Oblique aberrations are reduced in every point of the lens, considering the rotation of the eye and the real position of the lens. As a result, Digital RayPath® creates a unique lens for each wearer that provides better vision in every zone of the lens.

Benefits

- Improved vision in distance, intermediate and near zones
- Totally customised lens
- Larger, clearer visual fields
- Material & Base flexibility
- High Performance for high prescriptions & also for sport frames

- Optimum Inset
- Oblique Aberrations Minimization
- Frame flexibility

Ordering

Alpha Premium	Available Power Range	Cyl.	Add	Index
Alpha Premium 14. Min Ht 14mm **Alpha Premium 16. Min Ht 16mm** **Alpha Premium 18. Min Ht 18mm**	-8 to 6	-4.00	+0.50 - +3.50	1.50 FreeForm
	-8 to 6			1.50 Polarized Brn/G15/Gry
	-8 to 6			1.50 Trans 7 Sign Brn/Gry
	-10 to 8	-4.00	+0.50 - +3.50	1.60 FreeForm
				1.60 UV ++ Freeform
				1.60 Polarized Brn/Grey
				1.60 Trans 7 Sign Brn/Gry
	-12 to 8	-4.00	+0.50 - +3.50	1.67 FreeForm
				1.67 UV ++ FreeForm
				1.67 Polarized Brn/Gry
				1.67 Trans 7 Sign Brn/Gry
	-12 to 8	-4.00	+0.50 - +3.50	1.74 FreeForm

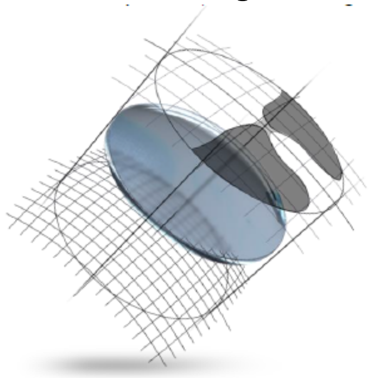
History

IOT started as a Joint-Venture between members of the Optics Department at the University Complutense of Madrid and the software company Indizen Technologies. Since the beginning, IOT focused its efforts to combine in- depth knowledge of ophthalmic optics with enterprise-level software development. This combination of skills was oriented to create the first company specialized exclusively in free-form lens design. From the beginning, IOT has considered free-form technology as the key innovation that will let independent RX-labs be successful in this increasingly demanding industry. But harnessing the potential of free-form technology requires more than just new machinery. IOT offers the rest of the ingredients: accessible know-how on advanced free-form lenses, custom-made state-of-the art lens designs and exclusive service.

The Evolution

Conventional Progressives

Traditionally, progressive lenses have been produced using a moulded blank that incorporates the progressive surface on the front side. These progressive blanks are produced in large quantities, and are available in multiple materials, each with a range of base curves, each with several add values. The wearer prescription is generated using traditional equipment to cut a simple curve, a sphere or a torus, on the back side of the lens. The progressive design itself is fixed, moulded on the front surface, and it doesn't change for different prescriptions. All wearers of a particular progressive will end up getting identical lens designs. However, ideally a progressive lens should be different for each wearer, and the design should change not only with the prescription, but also with other factors such as the lens material, the selected frame, and the visual needs of the wearer. With conventional progressives, personalization for each wearer is not possible, and that is a significant limitation. Example of this type of lens in our catalogue are the Regular Progressive and the Short Progressive.



Digital Progressive Lenses

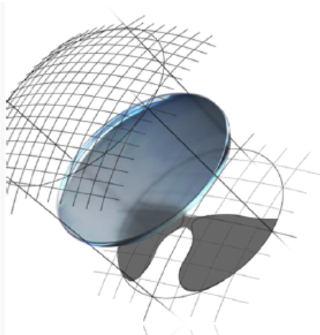
What are the advantages of digital surfacing?

Digital surfacing technology has been a real revolution in the optical industry. This lens production technology allows the optical lab to generate and polish a complex surface on the back side that is specifically designed for each lens. With this new production method, the lens is processed from a moulded blank that has a spherical front surface. The progressive design, combined with the prescription, is processed on the back surface of the lens. The main advantage offered by this technology is the ability to produce personalized lenses. The lens design becomes unique, according to the prescription, material, frame and even the visual preferences selected by each wearer.

What makes some digital lenses better?

The term "digital lens" applies to any lens made with digital surfacing technology. But in order to achieve optical performance superior to that of conventional progressives, the lens has to be calculated using an advanced lens design technology. The digital surface has to be computed in a way that uses the wearer's individual information to provide better vision, on every point of the lens, for that specific person. And this is exactly what Digital Ray-Path® does.

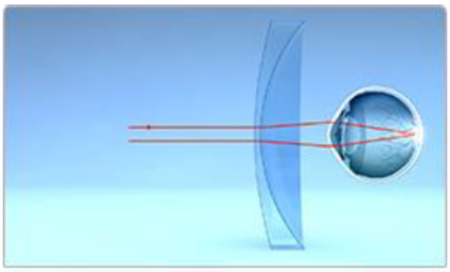
Digital Progressive Lenses



Digital Ray-Path® is a lens design technology that improves vision for the wearer through every point of the lens by implementing a realistic computerized simulation of the lens' optical behaviour when it is placed in front of the wearer's eye. This simulation analyses the oblique aberrations, which are optical effects that have a negative impact on the lens' visual performance. These aberrations are evaluated at every point of the lens, bearing in mind the rotation of the eye and the real position of the lens. With this information, Digital Ray- Path® is able to optimize the lens surface by compensating and correcting these undesired aberrations. As a result, Digital Ray-Path® creates a lens that provides better vision through every point of the lens. The wearer will perceive wider, more comfortable visual fields in the distance, intermediate and near vision zones.

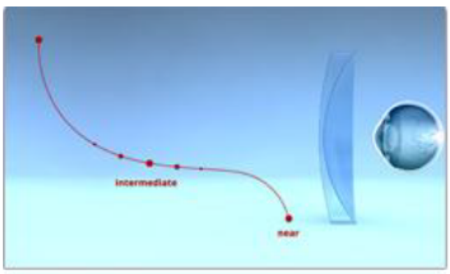
Step 1: Eye - Lens System

Digital Ray-Path® prepares a simulation of the lens in front of the eye, taking into account all of the wearer's personalization parameters. The more parameters that are measured and provided, such as tilts or back vertex distance, the more accurate the simulation will be.



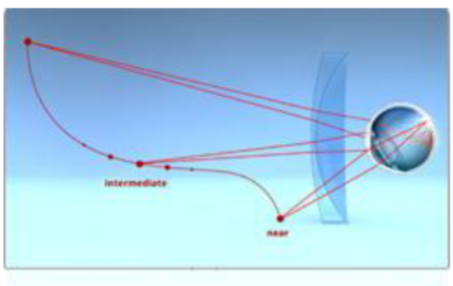
Step 2: Space Object

Digital Ray-Path® uses information about the progressive design selected for the wearer to determine which areas of the lens are meant for distance, intermediate or near vision.



Step 3: Ray Tracing

Digital Ray-Path® simulates how the eye rotates to look in every direction, at various distances. For each position of the eye, it computes the oblique aberrations that would limit the visual quality through that particular point of the lens. Digital Ray-Path® uses this information to minimize these undesired aberrations point by point across the lens.



Result

A unique digital lens optimized for each individual user

Personalisation

Personalization can make a big difference in ophthalmic lenses. When a lens is optimized for a single wearer, the best possible optics are achieved. Even two wearers with the same prescription and lens material will receive different lenses comprehensively tailored to their individual biometrics and frame selection. Each wearer will experience the best quality of vision and superior comfort.

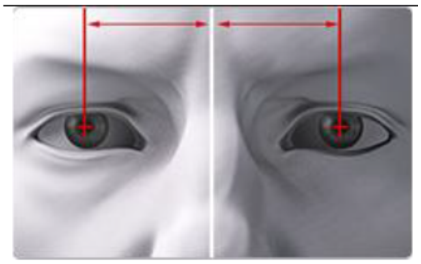
Unique Parameters

The personalization parameters used for the compensation calculation are specific to each individual wearer. These parameters represent the unique identity of each wearer and make it possible to create customized lenses.

1. Prescription and Addition

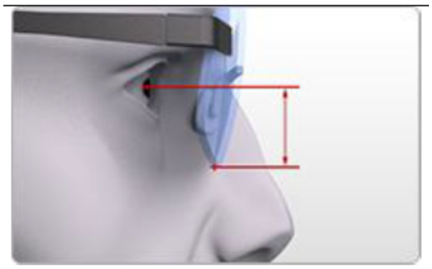
Digital Ray-Path® calculates the power that the user will perceive once the lenses are fitted on the selected frame. The power of the lenses is compensated, so the wearer effectively gets the desired prescribed power when looking through the lens.

2. Naso-pupillary Distance (NPD)



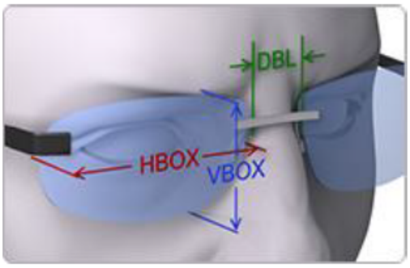
This is the distance from the axis of symmetry of the face (the centre of the nose) to the centre of the pupil. It is recommended to measure the naso-pupillary distance for each eye separately.

3. Pupil Heights (SEGHT)



This is the vertical distance from the pupil centre to the bottom of the frame when the wearer is looking straight ahead. It is recommended to measure it for each eye separately.

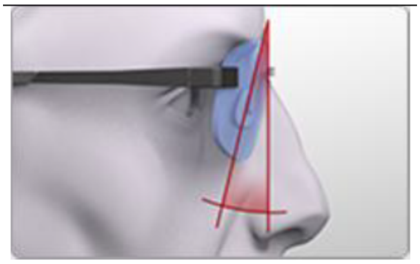
4. Frame Sizes



Horizontal Box Size (HBOX), Vertical Box Size (VBOX) and Distance Between Lenses (DBL)

Frame dimensions are used to calculate the final diameter and thickness of the lens. Lens diameter will be selected automatically to obtain the minimum possible thickness. Frame dimensions also improve the efficiency of the optimization, because the final lens is optimized only where it is needed. Finally, pupil heights can be used to automatically select the best corridor length in progressive lenses, in cases where it is not specifically indicated by the ECP.

5. Pantoscopic Angle (PANTO)

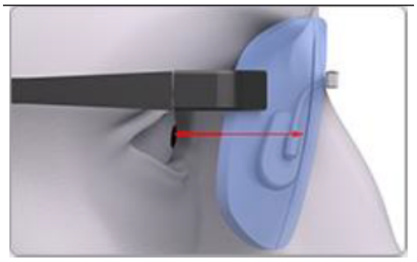


This is the angle in the vertical plane between the optical axis of a spectacle lens and the visual axis of the eye in primary position.

6. Wrap Angle (ZTILT)

Frame curvature.

7. Back Vertex Distance (BVD)



Distance between the cornea and the back surface of the lens. Pantoscopic, wrap angle and back vertex distance are used by Digital Ray-Path® to factor in the real position of the lens in front of the eye.

Degrees of Personalisation

When Digital Ray-Path® lenses are ordered; they can be partially or completely personalized, depending on the information that is available from the wearer. In any case, the advantage over conventional lenses is significant

Total Personalisation

When possible, the ECP should take measurements for all personalization parameters and send them with the lens order for a full compensation. These parameters will be used by Digital Ray-Path® to refine the optimization of the lens. Including these parameters guarantees the best lens for each specific wearer.

Partial Personalisation

When some of the personalisation parameters are not available, the final lens will be personalized using standard values for those parameters that are missing. These standard values have been selected carefully to guarantee a correct optimization for the most common use cases. Standard values shouldn't be used in cases that require special fitting, like curved frames. Even if some parameter values are missing, Digital Ray-Path® will still provide superior vision over a conventional lens. The way that prescription, progression, material and base curve are combined on each point of the lens will still be optimized, which accounts for a significant improvement of the lens.

Benefits

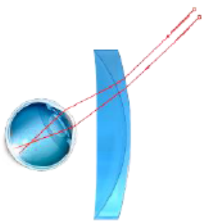
Digital Ray-Path® lenses offer superior vision because they reduce oblique aberration. Oblique aberration is an optical effect that is present in all ophthalmic lenses, and it reduces the wearer's visual acuity. Digital Ray-Path® drastically reduces the amount of oblique aberration at every point of the lens. The resulting effect for the wearer is better vision in all zones of the lens.

Removing Oblique Abberation

Oblique aberration is the focusing error, including astigmatic errors that are experienced by a wearer when looking through an area of the lens that is significantly away from the centre. This adverse optical effect is caused by the way that light propagates within the lens at oblique angles, hence the name oblique aberration. It is difficult to compute, and requires detailed simulation of light propagating through the lens and into the eye. Besides chromatic aberration, it is the main optical effect that limits the performance of ophthalmic lenses. Fortunately, the combination of digital surfacing technology and Digital Ray-Path® can drastically reduce oblique aberration.

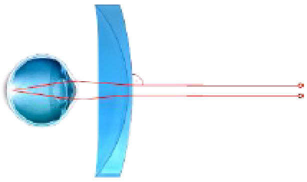
Eye looking in lateral direction

Oblique aberrations appear when the wearer is looking peripherally, through a portion of the lens that is away from its center. In those cases, the image is not focused on the fovea and the wearer will see the object out of focus, vision will be blurred, and visual acuity will be reduced.



Eye looking through lens centre

When the user is looking through the centre of the lens, there is no oblique aberration, and the image remains focused on the fovea. Conventional lenses are designed to perform well only in this central direction of sight.



Achieving Larger Visual Fields

Progressive Lens

In progressive lenses, oblique aberration has a greater negative effect, because fundamental areas of the lens, specifically the near vision zone and the progression channel, are always away from the lens centre.

Variable Inset Optimization

In progressive lenses, the inset is the horizontal shift of the reading area towards the nose, with respect to the distance reference point. The inset is an important value that has been ignored for a long time. Every person needs a different inset to maximize the binocular near visual field. The correct inset value depends on the prescription, pupillary distances and near working distance. In Digital RayPath® lenses, the inset is exactly calculated for each wearer, taking into account all the individual's parameters

Personalization for High Prescriptions and more wrap Frames

In high prescriptions and more wrapped frames, the effect of oblique aberration becomes more pronounced. In these situations, lens optimization with Digital Ray-Path® is even more essential. Oblique aberration is the reason it is often difficult for wearers of conventional lenses to adapt to their new sport frames, especially if they have a significantly high prescription. Digital Ray-Path® technology is just as effective on extreme prescriptions and curved frame shapes, providing sharp visual acuity in all gaze directions and fast wearer adaptation.

Oblique aberration in high prescriptions.
In high prescription lenses, oblique aberration becomes more severe from centre to edge, compared to low or medium prescriptions. High prescription wearers, whether myopic, astigmatic or hyperopic, may find very limited clear visual fields in lenses that are not optimized. The higher the prescription, the more the wearer will notice the advantages of Digital Ray-Path®.

Oblique aberration in wrap frames

Removing oblique aberration is especially important in curved wrap frames. Uncompensated oblique aberration is the reason why some wearers feel uncomfortable when they are using their prescription lenses fitted in a high wrap frame. In conventional lenses, oblique aberration reduces the clear visual field, and wearers feel like they can only see clearly through the centre of lens. Digital Ray-Path® can easily correct the effects of high curvature and wrap and provide an improved visual experience for users of sport frames.

Frame Flexibility

Digital Ray Path® lenses, provide excellent vision for any wearer, regardless of the frame that is selected. The Digital Ray-Path® optimization process provides new freedom in frame selection. The lenses are completely personalized for each frame, so there are no longer frame limitations imposed by the prescription. No more worries if a high myopic wearer wants to choose a sport frame. Even in such an extreme case, with a high base curve and high addition, the wearer will have excellent vision in any gaze direction. Additionally, Digital Ray Path® lenses can be calculated with automatic de-centration to improve the final thickness of the lens. The final lens diameter will be perfectly calculated for the specific frame selected.

Wearers can choose any frame they like, without restriction

Visit www.juzvision.com for more information