B.I.G. VISION™ FOR ALL

Read more about B.I.G. VISION™ at rodenstock.com/bigvisionforall

RODENSTOCK

Because every eye is different

B.I.G. EXACT™

EXACT BIOMETRIC
PROGRESSIVE LENSES FOR
SHARPEST POSSIBLE VISION

RODENSTOCK

Because every eye is different

OUR UNIQUE PHILOSOPHY

B.I.G. VISION™ FOR ALL

At Rodenstock, we recognise people as individuals, with eyes of different shapes and sizes. That's why we at Rodenstock were the first to measure the individual eye and use thousands of data points to produce individual eyeglass lenses.

We call these lenses B.I.G. – Biometric Intelligent Glasses. It's what motivates us to provide people all around the globe with the best progressive glasses.

At Rodenstock, we've had an ambition since the launch of our B.I.G. VISION™ philosophy: To create a B.I.G. VISION™ FOR ALL.

EVERY EYE IS DIFFERENT

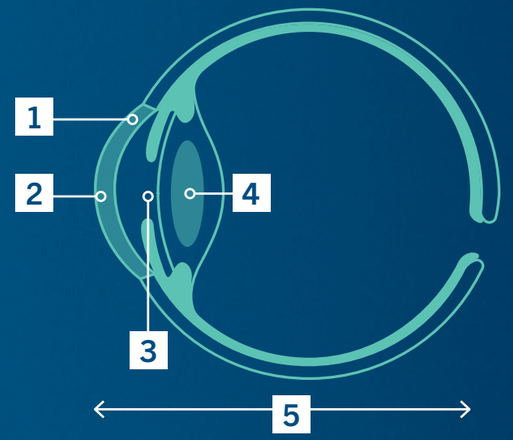
BIOMETRIC PRECISION MAKES THE BIG DIFFERENCE

Today, most lens manufacturers use a standard vision test with just four standard prescription values as inputs for the lens calculation process. These standard values only suit 2 % of eyes and leave 98 % of the world's progressive lens users with glasses that don't fit their eyes precisely.

This has consequences for how precisely the lens can be tailored to the needs of the user's eye.

WHY BIOMETRIC PRECISION ENSURES SHARPER VISION

As light travels through the eye, it is refracted to hit the fovea centralis and form a sharp image on the retina. All elements the light passes through play central roles in creating vision. As they have different refractive indices, each must be determined precisely.



1 Corneal power and thickness:

As the cornea holds up to 70 % of the refractive power in the eye, it is decisive in influencing how light in the eye is refracted. This makes determining the power and thickness of the cornea an important biometric parameter in lens calculation.

2 Corneal shape:

The shape of the cornea influences its spherical and cylindrical power, which affects how light is refracted in the eye. This is why the corneal shape of every eye needs to be determined.

3 Pupil size:

The size of the pupil in different light conditions determines how much light enters the eye. As it influences vision sharpness, it must be determined precisely.

4 Position and shape of the crystalline lens:

The position and shape of the crystalline lens influences how light is refracted. To adapt the spectacle lens optimally to the wearer's needs during the manufacturing process, it is vital to determine the position and power of the lens.

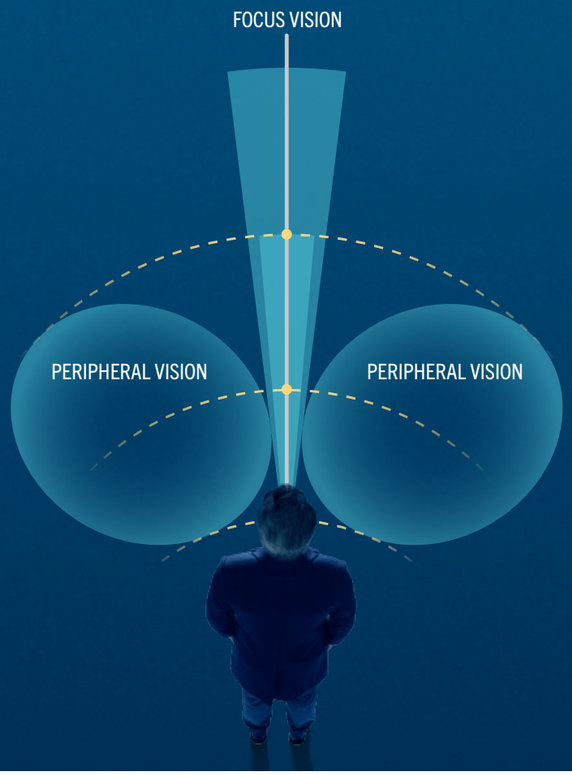
5 Eye length:

Every eye is different in size and refractive power. As the length of the eye impacts how light is refracted – and whether the light rays hit the fovea centralis to create sharp vision – it is important to know the eye length when creating lenses.

WHY B.I.G. VISION™?

The key to understanding the breakthrough technology behind Biometric Intelligent Glasses starts with understanding the dynamic demands of the complete vision system and recognising the fact that you see with your brain, not with your eyes.

It's actually your brain that senses what is happening in the environment around you. To make sure you can navigate through it easily, you need glasses capable of providing you with the best possible input. This ensures that your brain receives the information it needs to accurately orientate and determine what's going on around you, enabling you to decide what to focus on and then act accordingly.



LENSES NEED TO SUPPORT FOCUS VISION AND PERIPHERAL VISION

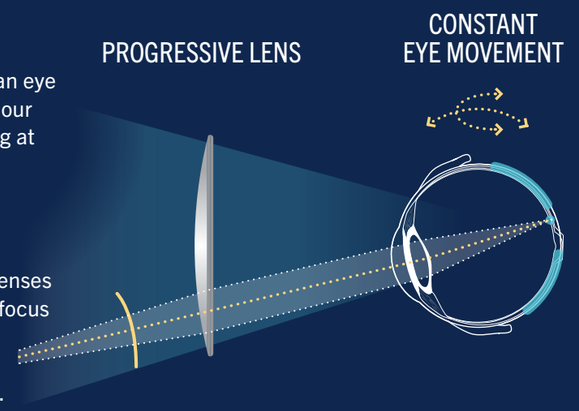
Our vision consists of two subsystems that work together simultaneously with the brain: focus vision and peripheral vision. We use our peripheral vision to orientate ourselves and detect motion in our environment, while our focus vision moves to whatever point of interest the brain picks up on, no matter whether it is near or far away. Based on these inputs, your brain then decides how to act on the information received.

By calculating the lenses using biometric data, we ensure that both the focus and peripheral vision subsystems are supported by seamless transitions in the lenses.

YOUR EYES MOVE 250,000 TIMES A DAY

Eye movement is continuous. In fact, the human eye moves up to 250,000 times a day. This means our vision is constantly in a dynamic state, focusing at near, mid and far distances while we use our peripheral vision to orientate ourselves as the eye moves.

This is why it is so important that progressive lenses support vision at every angle – not just at one focus point in the middle. But in order for them to do that, you need precise data about the individual eye – because every eye is different.



YOU DON'T SEE WITH YOUR EYES. YOU SEE WITH YOUR BRAIN.

PERIPHERAL VISION

Peripheral vision ensures that the brain can orientate and detect changes.

FOCUS VISION

Focus vision moves to whatever point of interest the brain picks up.

IT ALL STARTS WITH THE DNEye® SCANNER

MOVING AWAY FROM AN OLD NORM BASED ON LIMITED BIOMETRIC KNOWLEDGE.

At Rodenstock, we use the measurements of an advanced biometric vision test with a DNEye® Scanner to determine more than 7,000 data points and over 80 parameters of the eye. Combined with the standard prescription values, this biometric data can then be used as input in the lens manufacturing process to determine how the lens can be created so that it suits the user's eyes more precisely.

PARAMETER	RODENSTOCK	MANUFACTURER 1	MANUFACTURER 2
Lower- and higher-order aberrations at far	●	●	○
Lower- and higher-order aberrations at near	●	○	○
Mesopic pupil size at far	●	●	○
Mesopic pupil size at near	●	○	○
Photopic pupil size	●	○	○
Corneal topography (incl. higher- and lower-order aberrations of cornea)	●	○	○
Anterior chamber depth	●	○	○
Crystalline lens power	●	○	○
Vitreous chamber depth	●	○	○
Axial eye length	●	○	○

● Measured or determined and implemented in the lens ○ Measured but not implemented in the lens ○ Not measured at all

BUT WHAT ROLE DO ALL THESE MEASUREMENTS ACTUALLY PLAY IN IMPROVING PEOPLE'S VISION?

Measuring refractions for both near and far sharpens people's vision.

Determining high-order aberrations for both near and far, as well as pupil size in different light conditions, results in sharper vision and better vision at dusk.

Determining corneal power, anterior chamber depth, vitreous chamber depth, axial eye length and crystalline lens power gives people sharper vision at all gaze angles and object distances. The ability to focus more intuitively on different object distances increases. Blurred vision and adaptation time is reduced.

Altogether, these measurements ensure that people have lenses individualised enough to create true precision vision.

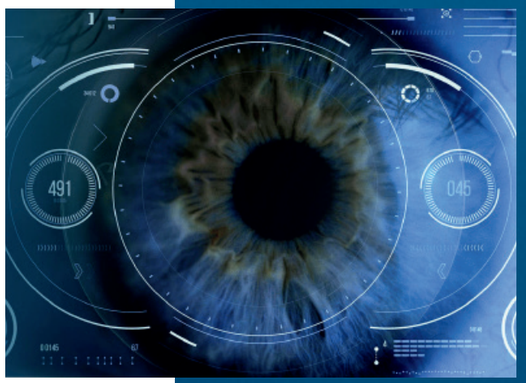
OUR PATH TO BIOMETRIC INTELLIGENT GLASSES

At Rodenstock, we are constantly striving to pioneer how precisely progressive lenses can be crafted. Reaching a whole new level of biometric precision has taken us many years. On our journey, we have reached major milestones.

MILESTONE 1: BIOMETRIC PARAMETER

Traditionally, progressive lenses are manufactured using input from standard prescription values. To realise our ambition, we needed more precise data on the biometric parameters of the eye. This led us to the launch of our DNEye® Scanner, which was the first step towards attaining true biometric precision.

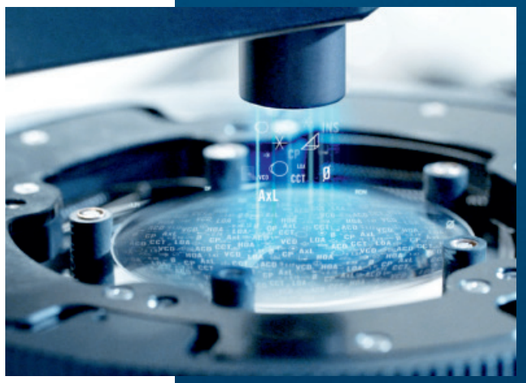
With the DNEye® Scanner, we were able to scan thousands of data points in each individual eye. From these data points, we were then able to successfully build a set of more than 80 biometric eye parameters.



MILESTONE 2: A BIOMETRIC EYE MODEL

The next major challenge was to unlock the value of our biometric parameters. For thousands of hours, we worked with advanced mathematical modelling, constantly pushing the scientific boundaries of lens calculation to transform the more than 80 biometric eye parameters into concrete inputs for the lens calculation process.

In the end, we were able to create a complete biometric model of the individual eye. This biometric eye model enables us to hit the sharp vision centre of every individual eye precisely.



MILESTONE 3: USING BIOMETRIC DATA TO CREATE LENSES

With this biometric model, we were ready to take on the final challenge: transferring the biometric parameters directly into the creation of the lenses. Contrary to the rest of the industry, where biometric data is often measured yet seldom used in lens manufacturing, our biometric eye model provided us with concrete inputs that we could use to manufacture our lenses.

To make use of the biometric eye model's precision in creating progressive lenses, we engineered a way to digitally transfer the information from the DNEye® Scanner into the creation of the lens.

THE RESULT: B.I.G. VISION™ FOR ALL

We are the vision experts. It's what motivates us to provide people all around the globe with the best progressive glasses.

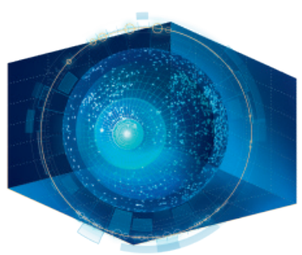
We don't settle for standard – we always go one step further. We go for B.I.G. VISION™ with a ground-breaking glass portfolio:

B.I.G. EXACT™, the world's most precise lenses.

B.I.G. EXACT™: FOCUS ON TRUE PRECISION FOR BETTER VISION

With B.I.G. EXACT™, we offer the first high-precision progressive lenses made using an exact biometric eye model of each eye measured by a DNEye® Scanner. The data is integrated directly into the lens, orchestrating a construction process that results in the world's most precise lenses.

Exact eye measurement with the DNEye® Scanner

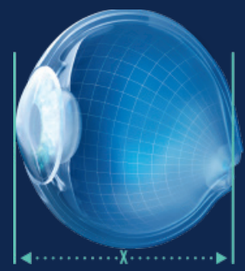


Exact biometric eye model

= **B.I.G. EXACT™**

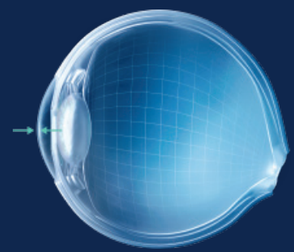
HOW RODENSTOCK MEASURES AND CALCULATES INDIVIDUAL EYES

Using the DNEye® Scanner, we measure all of the eye's relevant biometric parameters that are necessary to create a unique biometric eye model.



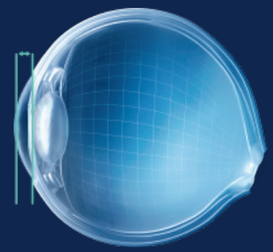
Eye length

The length of individual eyes can vary between people by up to 10 mm.



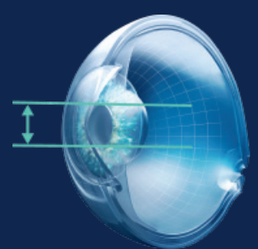
Corneal power and thickness

Both the power and thickness of the cornea influence how light is refracted and focused on the retina.



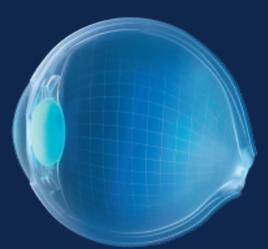
Anterior chamber depth

Rodenstock's ability to measure the depth of the anterior chamber is part of what enables us to accurately determine eye length.



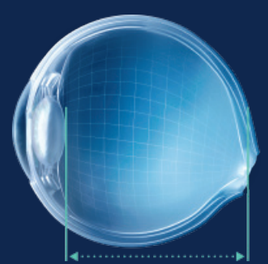
Pupil size

The pupil size changes in different light conditions, and this has to be accounted for in the lens calculation.



Crystalline lens power

The power of the individual lens varies from person to person and eye to eye.



Vitreous chamber depth

The vitreous chamber takes up the largest part of the eye, making it an important biometric parameter.

SIX STEPS TO THE B.I.G. EXACT™ EXPERIENCE

DATA FROM THE DNEye® SCANNER IS INTEGRATED DIRECTLY INTO THE LENS

DNEye® SCANNER

The optician uses the DNEye® Scanner to determine the dimensions of each eye.

CALCULATING THE BIOMETRIC DATA SET

Our patented calculations are used to create the extremely rich biometric data set.

TRANSMITTING DATA TO RODENSTOCK

While competitors also use measurement devices, no one actually transmits this full set of data directly into the production of the lens. We do.

CONSTRUCTING THE EXACT BIOMETRIC EYE MODEL

This data is used to produce an exact biometric eye model of each eye.

DIGITAL TRANSFER OF DATA INTO THE LENS

The exact biometric eye model of each eye is used in the lens calculation, which is then transferred into the lens during production. Each lens is customised in accordance with the biometric parameters.

B.I.G. EXACT™ LENSES BASED ON AN EXACT BIOMETRIC EYE MODEL

Finally, the person receives their glasses integrated with biometric intelligence – and all this just takes a few days.

B.I.G. EXACT™ MAKES A BIG DIFFERENCE

Rodenstock's B.I.G. EXACT™ lenses, based on an exact biometric eye model powered by Rodenstock's unique DNEye® technology, deliver a seamless, dynamic and natural vision experience that works perfectly together with your brain. With B.I.G EXACT™, you can expect up to 40 % sharper vision at near and intermediate distances, increased brain support thanks to sharper vision and an 8.5° wider field of sharp vision at near.

But these are not the only benefits you can expect. A survey of 283 people shows that using our DNEye® technology in the production of the lenses significantly improved their vision experience.

92%
experienced sharper vision than before*

87%
experienced reduced adaptation time**

88%
noticed greater visual comfort with their DNEye® glasses compared to their old glasses*

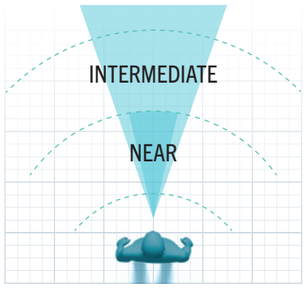
84%
experienced better contrast vision*

80%
experienced better vision at dusk*

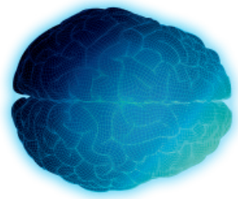
* DNEye® customer survey (2018), Zurich.
** Muschielok, A. (2017). Personalised progressive lenses according to customer requirements – results of a scientific study. Presentation at the Opti-Forum, Munich.

B.I.G. EXACT™ DELIVERS

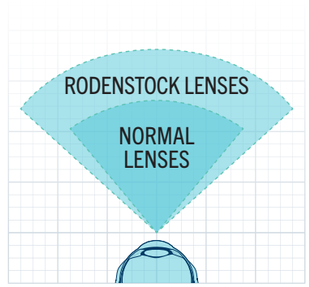
up to **40%**
sharper vision at near and intermediate distances



increased
BRAIN SUPPORT
through sharper vision



an **8.5°**
wider field of sharp vision at near***



*** Quelle: Jeremias, K., Urech, D. (2013). Von der Wissenschaft zur Praxis – und zurück. DOZ 2013(2) 58

OUR B.I.G. VISION™ EXPERIENCE

It’s a combination of leading and patented technologies that makes Rodenstock the only lens manufacturer able to deliver the unique B.I.G. VISION™ experience.

All our B.I.G. VISION™ technologies are further strengthened by protective lens technologies. Together, they ensure that people receive optimal lenses – not only individualised to suit each eye, but also to suit their lifestyle needs. The result is that people enjoy all the benefits of B.I.G. VISION™.

TECHNOLOGIES				
ImpressionIST®	Individual Lens Technology	Eye Lens Technology	Flexible Lens Technology	DNEye® Scanner & DNEye® Technology
ADDED BENEFITS				
X-tra Clean				
ColorMatic®				
PRO410				
Solitaire				

X-TRA CLEAN

Rodenstock’s X-tra Clean sets a new standard in ophthalmic optics by ensuring that dirt and particles are barely able to settle or stick on coated lenses.

COLORMATIC® 3

ColorMatic® 3 glasses are able to fade back up to 30 %* faster and provide noticeable visual comfort. With blue-light filters and a wide selection of colours - whether it’s eye glasses or sunglasses - ColorMatic® 3 offers comfort-able, sharp vision in any situation, in all light conditions.

*compared to ColorMatic IQ® 2 high index

PRO410

This advanced technology protects eyes against potentially harmful elements of blue light and ensures that they only get the light they truly need.

SOLITAIRE

This premium coating is standard in our premium progressive lenses. Solitaire coatings are durable and offer anti-reflection properties and scratch protection.