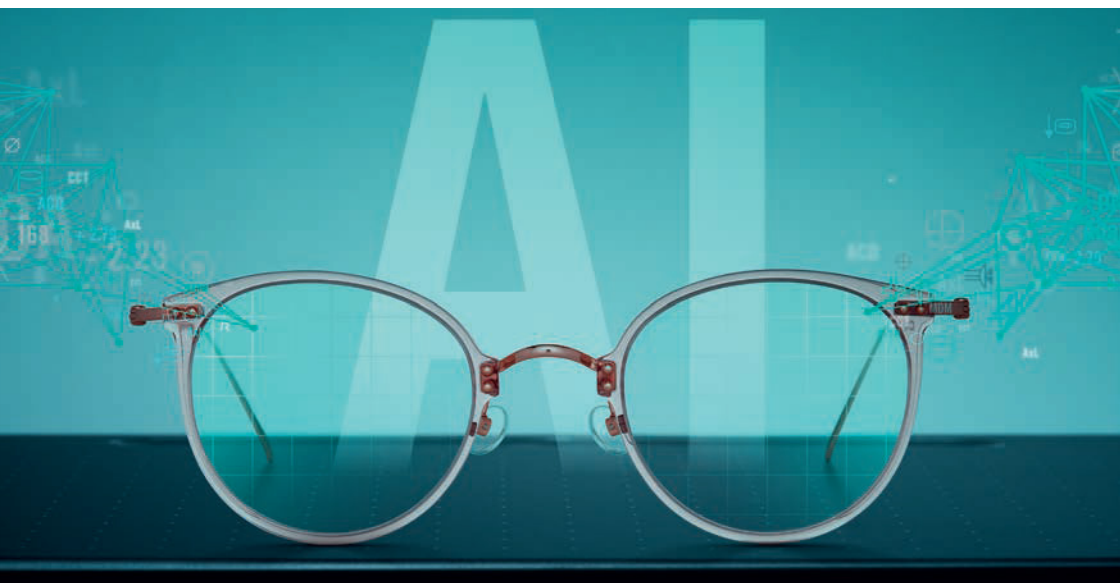# B.I.G. NORM™

BIOMETRIC INTELLIGENT
GLASSES POWERED BY
ARTIFICIAL INTELLIGENCE

RODENSTOCK
Because every eye is different

RODENSTOCK'S NEW PROGRESSIVE LENSES POWERED BY ARTIFICIAL INTELLIGENCE

Today marks the culmination of over 10 years of biometric research at Rodenstock. We are now ready to take the next step in lens calculation and establish a new norm for progressive lenses.

Using only standard prescription values as input in the lens calculation process, our artificial intelligence (AI) technology enables us to create progressive lenses with a much higher level of biometric precision. This means we are finally able to make Biometric Intelligent Glasses the new norm in progressive lens manufacturing, even when biometric measurements of each individual eye are not available. Thereby, we can give sharper vision to more people.

We call these lenses:

B.I.G. NORM™

THE OLD NORM

Before B.I.G. VISION™, when we first began our biometric research, we faced an issue – an old norm used in progressive lens manufacturing. The old norm, the calculation used in standard vision tests, is based on just four prescription values. It is all the input available to most lens manufacturers to tailor lenses to the person's eyes.

With only the four prescription values used the biometric parameters of each eye remain undetermined. The old norm fails to consider the fact that every eye is different – in shape and refractive capabilities.

This is what made us move away from the old norm and begin a journey to bring sharper vision to more progressive lens users by increasing the level of biometric precision in lens calculation.
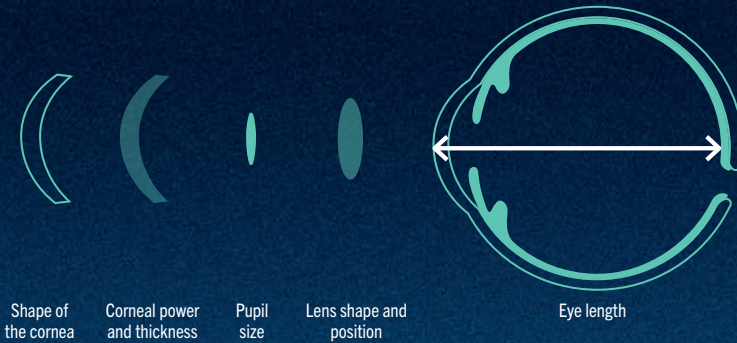
STANDARD PRESCRIPTION VALUES

	SPHERE	CYL	AXIS	ADD
O.D.	-3.75	-1.25	68°	+2.00
O.S.	-5.00	-1.00	123°	+2.00

combined with

STANDARD EYE PARAMETERS*

| Shape of the cornea | Corneal power and thickness | Pupil size | Lens shape and position | Eye length |

*Lenses made using standard eye parameters are not optimally tailored to the eye and suit only 2% of people.

AN OUTDATED ASSUMPTION

MOST LENS MANUFACTURERS ASSUME THAT ALL EYES ARE APPROXIMATELY 24 MM LONG

Eyes are assumed to all be the same length, but they can actually vary by up to 10 mm. This is not taken into account when lenses are tailored using only the input of the standard vision test. Instead, lenses are tailored according to a generic assumption of eye length in the manufacturing process.

20 mm   **24 mm**   **30 mm**
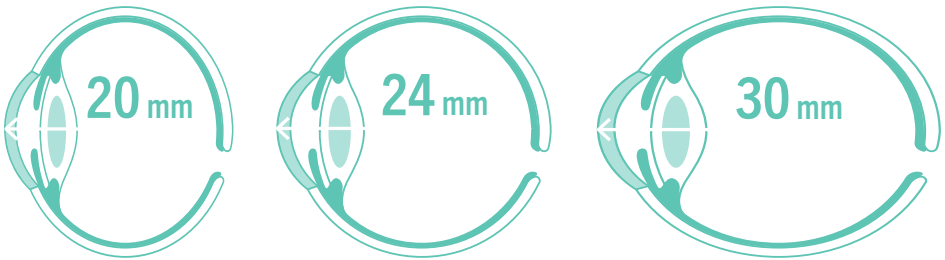
In some cases, this results in light rays not being refracted precisely onto the retina, which negatively affects vision sharpness. Determining the eye's length of each of your eyes precisely is crucial to ensuring your vision is optimal.

USING ONE OF THE INDUSTRY'S BIGGEST BIOMETRIC DATA SETS

DNEye® Scanner

Unique biometric eye model

One of the industry's biggest biometric data sets

Biometric Intelligent Glasses

To create Biometric Intelligent Glasses, we have used the DNEye® Scanner to measure the biometric parameters of hundreds of thousands of eyes. These scans have become one of the biggest biometric data sets in the industry.

By analysing the data, we were able to identify correlations between the biometric parameters of the eye and standard prescription values. These correlations provided us with a way to improve the standard way of determining every eye's biometric parameters.

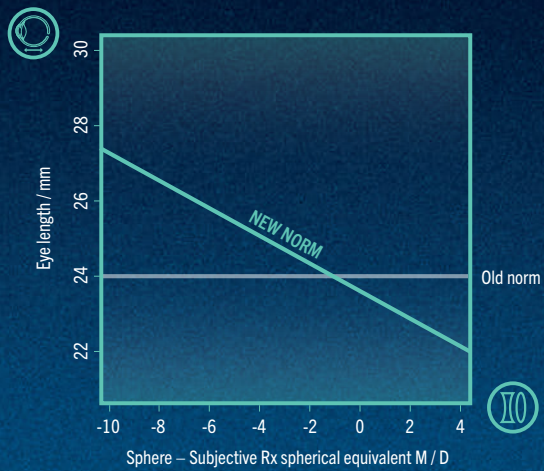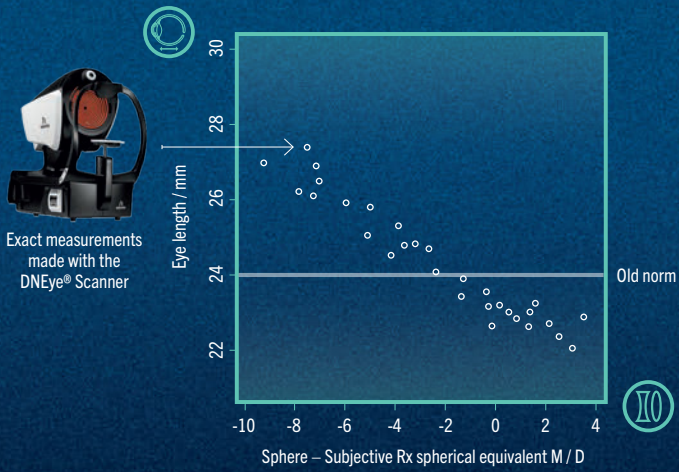# A NEW, MORE PRECISE, STANDARD CALCULATION TO ESTABLISH EYE LENGTH

As our statistical analysis showed, the length of the eye is, in fact, related to the power of the eye (Sphere). Since the power of each of your eyes is identified in any standard vision test our statistical analysis provided us with a way to get more information about the length of your eyes without measuring them.

Thereby, we recognise that eyes can vary up to 10 mm in length from person to person and include this in the crafting of the lens.

A NEW LENS CALCULATION NORM

Determining eye length as precisely as possible is crucial to being able to tailor lenses to suit you. Rodenstock's more precise standard calculation allows us to establish a new lens calculation norm that determines individual eye length with a far higher level of biometric precision.

Using statistical analysis, we are able to determine new, more precise lens calculations for all of the most important biometric parameters in the eye. As well as eye length, this includes the astigmatic power of the cornea, the spherical power of the cornea, pupil radius, crystalline lens thickness, and more.

Exact measurements
made with the
DNEye® Scanner

Eye length / mm

30
28
26
24 — Old norm
22

-10 -8 -6 -4 -2 0 2 4

Sphere – Subjective Rx spherical equivalent M / D

Eye length / mm

30
28
26
24 — Old norm
22

NEW NORM

-10 -8 -6 -4 -2 0 2 4

Sphere – Subjective Rx spherical equivalent M / D

CREATING AN APPROXIMATE BIOMETRIC EYE MODEL

By identifying correlations in the data and putting these correlations into an advanced AI algorithm, we can move away from the old norm within lens calculation.

Our new norms allow us to create an approximate biometric eye model, using just the standard prescription values as input, delivered to Rodenstock by the optician. The norms enable us to introduce a far higher level of biometric precision to standard progressive lenses and provide B.I.G. VISION™ FOR ALL.

	SPHERE	CYL	AXIS	ADD
O.D.	-3.75	-1.25	68°	+2.00
O.S.	-5.00	-1.00	123°	+2.00

Standard prescription
values
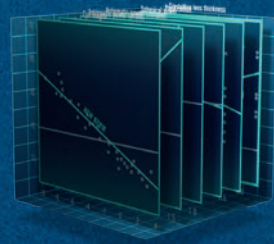
New norms in
lens calculation

Rodenstock's AI algorithm

Approximate biometric
eye model

A STANDARD VISION TEST GAVE NORA ACCESS TO B.I.G. VISION™

To find out more about the benefits of our new AI-powered progressive lenses, we invited progressive lens users to try them. Nora was one of the participants* to experience the new B.I.G. NORM™ lenses, made with a biometric model of her eyes using only the standard prescription values as input.

| Nora	SPHERE	CYL	AXIS	ADD
O.D. Right eye	-3.75	-1.25	68°	+2.00
O.S. Left eye	-5.00	-1.00	123°	+2.00

*External wearer trial conducted with the University of Applied Sciences in Munich

NORA'S EXPERIENCE WITH B.I.G. NORM™ LENSES

With her new, AI-powered progressive lenses, Nora discovered that they were able to support her gaze at any angle and through all parts of the lens. This is the difference Biometric Intelligent Glasses deliver.

On her way to work she constantly uses her vision to orientate herself in the environment, and her brain continually picks up the things that require her focus.

In the process, she constantly shifts between her peripheral vision and focus vision subsystem. This is a dynamic process that progressive lenses have to support to ensure sharp vision, and illustrates one of the BIG benefits of artificial intelligence.

FOCUS VISION

PERIPHERAL VISION   PERIPHERAL VISION
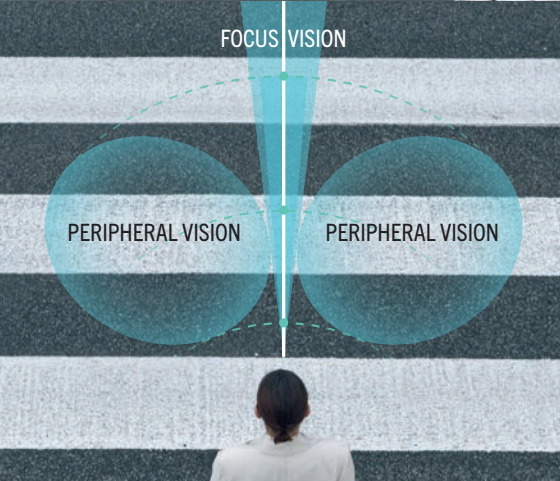
" What struck me immediately when I wore my new spectacles was how fast I got used to wearing them. And when I wore them while walking, I noticed how clear my vision was, which really helped me to orientate and focus. When I'm moving through traffic in the morning, I can really feel the difference. "

SEE BETTER WITH THE POWER OF AI

By crafting the lenses with an approximate biometric eye model using our new AI technology, we are able to tailor each lens far more precisely than when standard values are used in the lens calculation process.

In a spectacle wearer trial of our new AI-powered B.I.G. NORM™ lenses, we explored the effects of the AI technology. The vision benefits vision were clear.

97%
experienced reduced
peripheral aberrations

94%
experienced a wider
progression zone in
the lens

91%
experienced a reduced
swimming effect

97%
experienced reduced
aberrations at far

Results of an external wearer trial conducted with
the University of Applied Sciences in Munich

AI: A GIANT STEP TOWARDS BRINGING B.I.G. VISION™ TO ALL

OLD NORM
(STANDARD EYE MODEL)

B.I.G. NORM™

BIOMETRIC ACCURACY

0%   100%

Biometric accuracy describes the degree to which the biometric parameters of the eye are accurately determined and implemented in the lens calculation process.

In 2020, we launched our B.I.G. VISION™ philosophy. Our ambition at the time was to one day bring B.I.G. VISION™ TO ALL. Today, the new B.I.G. NORM™ lenses enable us to realize our ambition for ophthalmic lenses. They allow us to start a biometric revolution that will finally make B.I.G. VISION™ available to everyone.

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B.I.G. VISION™ FOR ALL

RODENSTOCK

Because every eye is different

Centennial

keeping you in sight

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