Trivex-based Trilogy Lenses

and their suitability for different prescriptions

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The Optical Lens Innovators

With the proliferation of lens materials on the market

it is no wonder that eyecare professionals (ECPs) find themselves a bit overwhelmed. With all this choice, some practitioners have decided to stick with old favorites like CR-39® instead of trying newer options. Others have been dazzled by the staggering array of high index offerings and have come to assume that they must use the highest index lens material they can for any given prescription in order to obtain the thinnest, lightest possible pair of lenses. Others are mostly concerned with lens impact resistance and immediately default to polycarbonate material.

There is one lens material that offers a number of advantages that many ECPs have overlooked. They often recognize that lenses made from Trivex® are good choices for providing superior impact resistance, and are a terrific choice for rimless eyewear. But they've managed to overlook a host of other very appealing features. Trivex is surprisingly suitable for the vast majority of your patients. It is remarkably light weight and is comparable to the thickness of polycarbonate and 1.67 lens materials in many cases. It also provides clearer optics than polycarbonate and 1.67 due to its higher Abbe value.

To help you understand the advantages of Trivex lenses, this article uses data based on Trilogy® lenses, a series of ophthalmic lenses produced from Trivex material by Younger Optics. In this way, you will see real data analyzed from a contemporary lens product made from this material.

RX Distribution

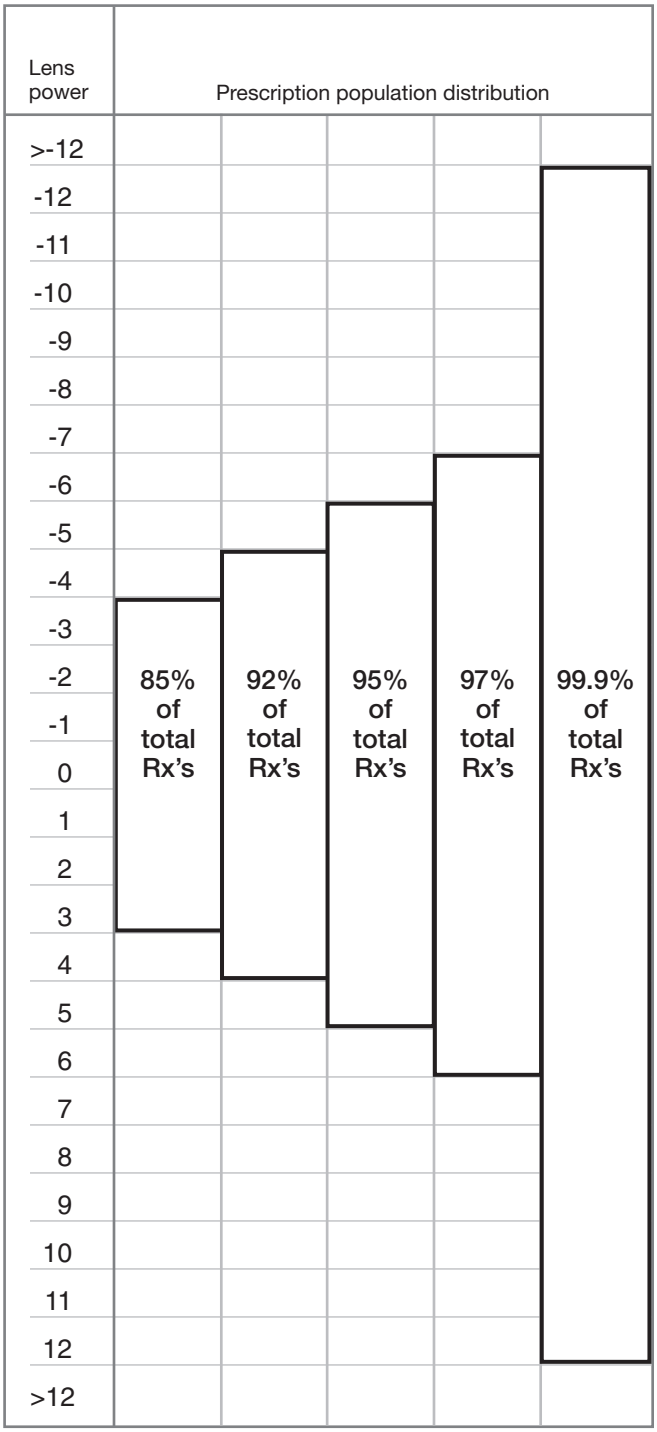
Table 1 (right) illustrates the distribution of prescriptions ranging from +12.00D to -12.00D. As you can see by the percentages listed, this range takes into account nearly all prescription powers routinely seen in ophthalmic offices.

Where is the greatest concentration of prescriptions found? The vast majority of prescriptions fall in the range of +3.00D to -3.00D. In fact, 85% of prescriptions fall in this category. If you are offering a lens material to your patients, you want it to have properties that are exceptionally appealing in this range because it represents a huge portion of the prescription eyeglass lens wearing population. From +4.00D to -4.00D, you will be covering 92% of prescriptions. At +5.00D to -5.00D, you'll encompass 95% of prescriptions and at +6.00D to -6.00D, you'll cover 97% of prescriptions.

Another way to analyze this data is to notice that while 85% of Rxs fall in the +3.00D to -3.00D range, only 7% more Rxs are added by going to +4.00D and -4.00D, only 3% fall in the +4.00 to +5.00D and -4.00 to -5.00D category, and only 2% fall in the +5.00 to +6.00D and -5.00 to -6.00D category. All higher Rxs represent only 3% of the total Rx range mix. These data are based on an analysis of 134,856 Rx lenses ordered through retail and laboratory settings.

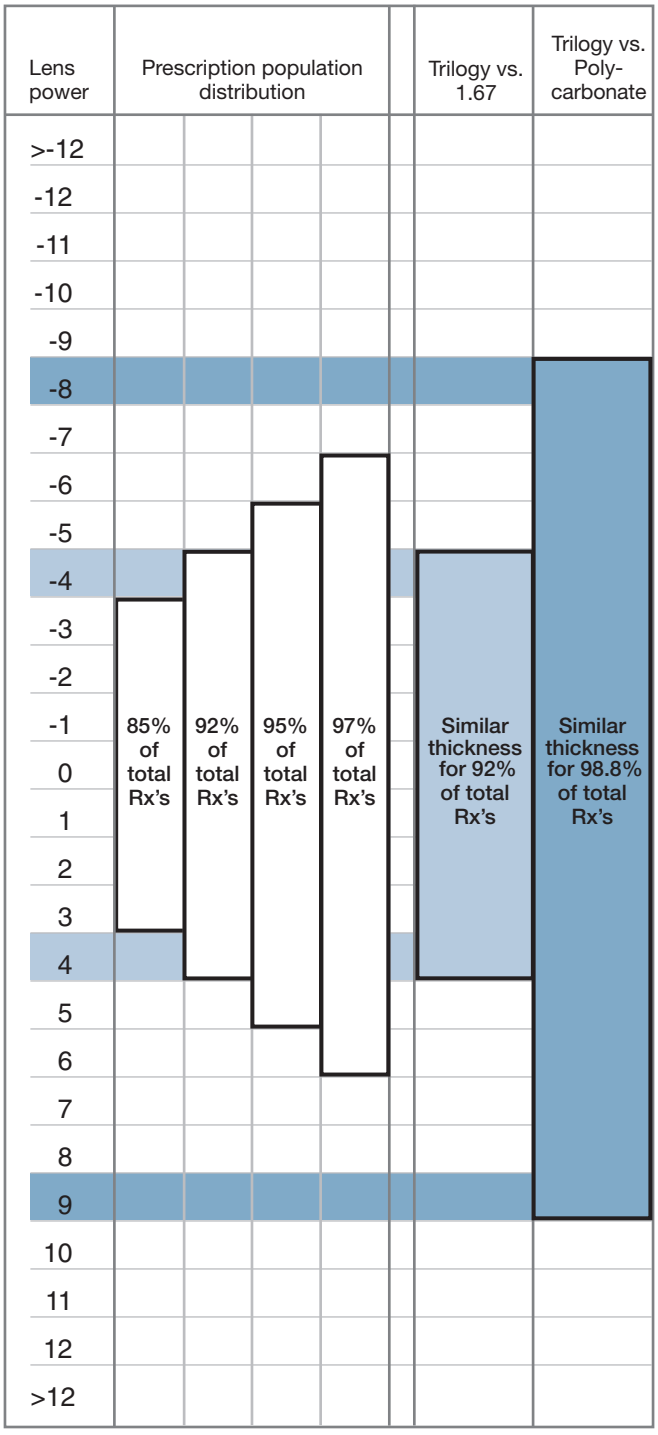
While these high percentages may surprise you, the real gravity of the situation becomes clear when you translate these figures into eyeglass buyers. With almost 75% of the U.S. population needing corrective lenses, this means that over 170.7 million people use vision correction and are in the eyewear market. In 2007, 68.2 million pairs of eyeglass frames were purchased in the U.S. resulting in $15.7 billion in retail Rx lens and ophthalmic frame sales.

TABLE 1 Rx Distribution



Thinness

TABLE 2 Lens Thinness



SPHERICAL lens calculations, 50 mm diameter
Same lens thickness (CT = 1.5 mm/ET = 2 mm).

MATERIAL CONSIDERATIONS

Now that you realize how Rxs are distributed, what lens material is best suited for the vast majority of prescriptions (the ones that fall into the categories in Table 1)?

This is a difficult question to answer because lens material selection is based on many criteria, not one or two. It is safe to say, however, that most eyecare practitioners will focus on the material's lightness, thinness, impact resistance, and good optics as their primary concerns.

One of the great surprises of Trilogy lenses is how well they compare in thickness to higher index lens materials. Many ECPs dismiss Trivex as an option because they feel that its mid index of 1.53 is too low to be useful. Nothing could be further from the truth. In fact, lenses made using Trivex mid-index material, such as Younger Optics' Trilogy lenses, compare very favorably with high-index lens materials like polycarbonate and 1.67.

Table 2 (left) illustrates how Trilogy lenses compare in thinness to lenses made using polycarbonate or 1.67 materials. The data in the table were developed using lenses of the same diameter (50mm) and equal powers. Edge thicknesses for plus lenses were the same (2.0mm) while center thicknesses for minus lenses were the same (1.5mm).

Table 2 (left) indicates Trilogy lenses compare favorably in thickness (within 0.5mm) to polycarbonate in the +9.00D to -8.00D range of Rxs. When assessed against 1.67, Trilogy falls within 0.5mm of 1.67 lenses for Rxs ranging between +4.00D to -4.00D. To say this another way, Trilogy lenses provide reasonably comparable thicknesses to polycarbonate lenses in the +9.00D to -8.00D range and does the same thing within the +4.00D to -4.00D range against 1.67.

These are important findings because they illustrate just how well Trivex lenses like Trilogy provide the thinness that patients want across most of the Rx patient population (greater than 98% compared to polycarbonate and 92% when compared to 1.67).

Lightness

One of Trivex's great strengths is its lightness. Weight in lens materials is designated by specific gravity. **Table 3** (below) lists the specific gravity values for the five lightest lens materials in common ophthalmic usage. As the table illustrates, Trivex-based Trilogy has the lowest specific gravity value meaning that it is the lightest ophthalmic lens materials being used today.

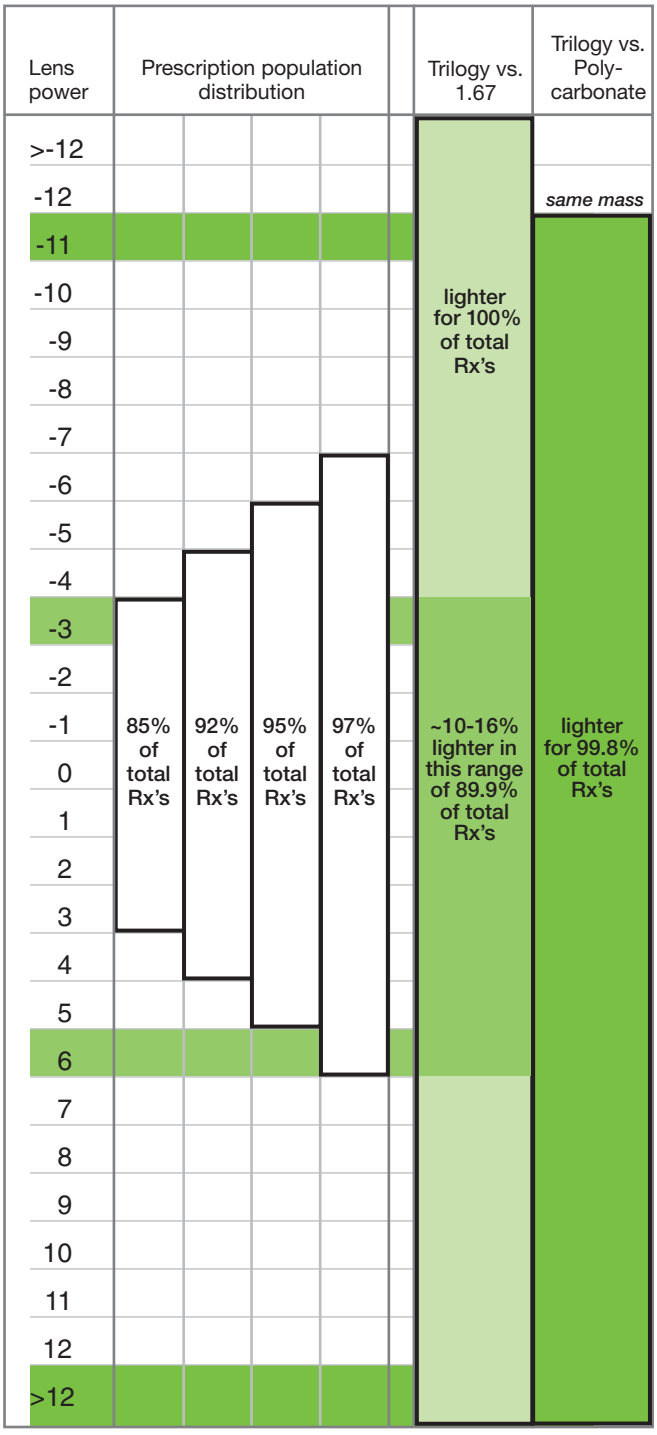
Table 4 (right) translates this advantage into a graphical illustration of just how light Trilogy lenses are. When compared to polycarbonate lenses, Trilogy lenses are lighter than polycarbonate from +12.00D through -11.00D and equal in weight for -12.00D Rxs. Compared to 1.67, Trilogy lenses are always lighter across the +12.00D and -12.00D Rx range. In fact, they also are 10% to 16% lighter than 1.67 lenses across the +6.00D to -3.00D range, which encompasses 89.9% of all Rxs (see **Table 4**).

While it is evident that Trilogy's lightness is a substantial advantage based on these values, their real value is realized at the time of dispensing when your patient slips on their new eyewear and comments how nice and light their new eyeglasses are. This kind of patient experience is invaluable for building patient confidence in you and buyer loyalty to your office.

TABLE 3 Specific Gravity of Lens Materials

MATERIAL	SPECIFIC GRAVITY
Trivex	1.11g/cm³
Polycarbonate	1.21g/cm³
Spectralite	1.21g/cm³
Finalite	1.22g/cm³
Super Fin	1.21g/cm³
CR-39	1.32g/cm³

TABLE 4 Lens Weight



SPHERICAL lens calculations, 50 mm diameter
Same lens thickness (CT = 1.5 mm/ET = 2 mm).

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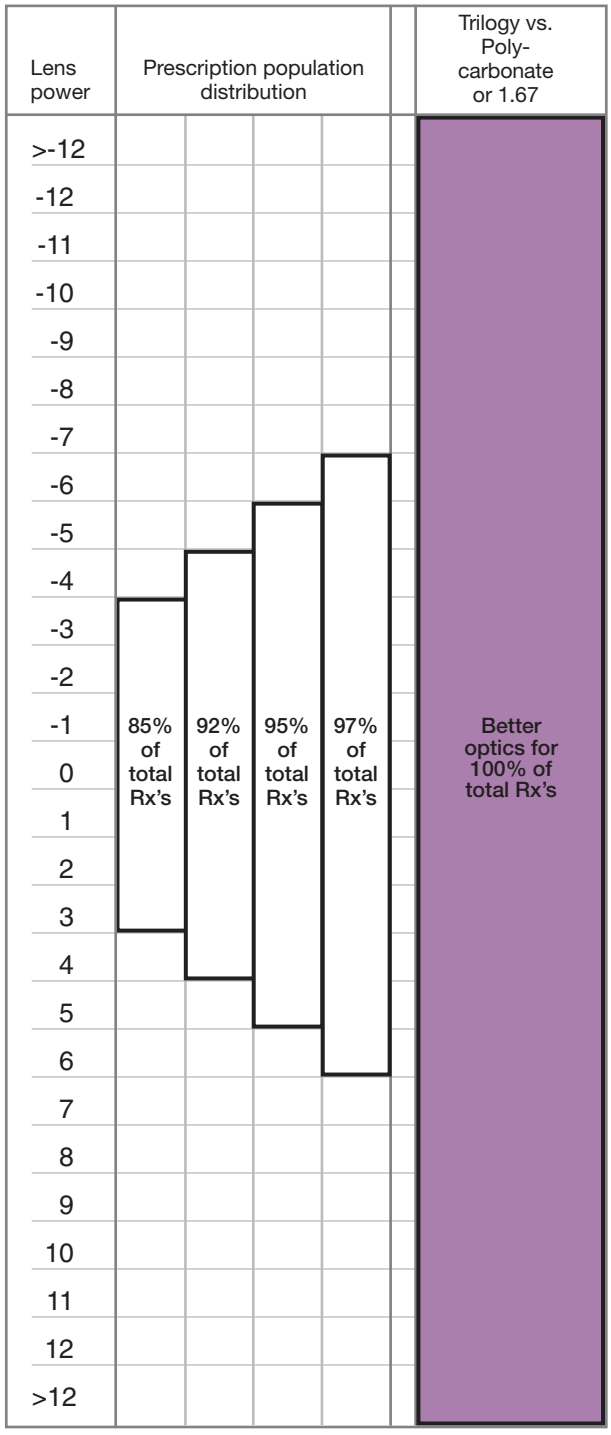
TABLE 5 Abbe Value comparison



Another advantage of lenses made of Trivex lens material such as Trilogy is how optically clear they are. One aspect of this clarity is due to the Abbe value of the material. Since lenses are essentially a series of prisms, they break light up into its component colors just like a prism does. This aberration is known as dispersion and it is inherent in all lenses regardless of the material. When patients detect dispersion in a lens, they will report to you that they see colored ghost images around objects viewed through the lenses, usually colored red and blue (both ends of the visible spectrum).

Some lens materials control dispersion better than others. The way for you to know how well a material controls it is by referencing its Abbe value. The higher the Abbe value of a lens material, the better it controls dispersion. You also want a lens material that has an Abbe value at or higher than the Abbe of the eye (which also has inherent dispersion).

Trivex lens material has one of the highest Abbe values of today's commonly utilized lens materials – 45 for Trilogy lenses. Since the eye's Abbe value ranges between 43 and 45, this means that vision through the lens will appear color-free and optically clear, even in high powers where colored ghost images usually become bothersome in lenses that have a low Abbe value. Polycarbonate's 30 Abbe value and 1.67's 32 Abbe value make them more susceptible to this problem. Most eye care professionals have also experienced patients who are more prone to noticing colored ghost images in their lower powered lenses, which makes having a lens with good Abbe value control even more important.

Table 5 illustrates how Trilogy lenses provide better optics for patients than polycarbonate and 1.67 lens material, based on Abbe value.

Other Advantages

Trivex lenses like Trilogy have other advantages too. For example, they absorb 100% of UV light. They also have remarkable impact resistance that exceeds the ANSI 87.1 High Velocity Lens Impact Test where a ¼ in. pellet is fired at the lens at 150 ft. per second (103 MPH). This is the same standard that safety lenses are held to so you know they are tough. You'll also find that Trivex lenses are resistant to the common chemicals found around the home, office, or optical shop so you can recommend them confidently.

If you have overlooked Trivex-based lenses, such as Trilogy, as core product for most of your patients, you may wish to rethink that decision. With its many advantages, you'll find that it handily meets the needs of nearly all your Rx lens patients.

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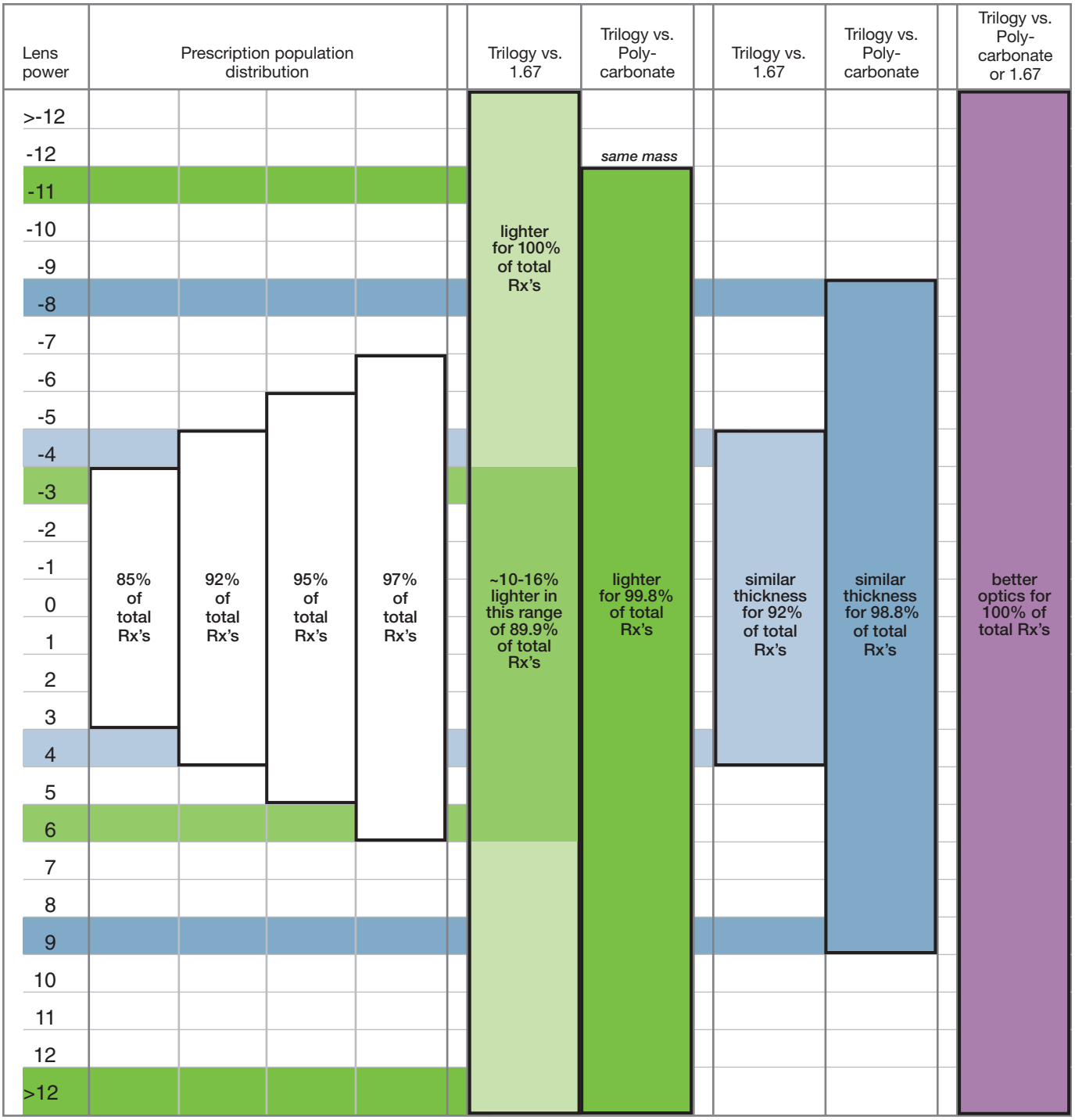
Trivex-based Trilogy Lenses

TABLE 6 Comprehensive Chart



SPHERICAL lens calculations,
50 mm diameter
Same lens thickness
(CT = 1.5 mm/ET = 2 mm).

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