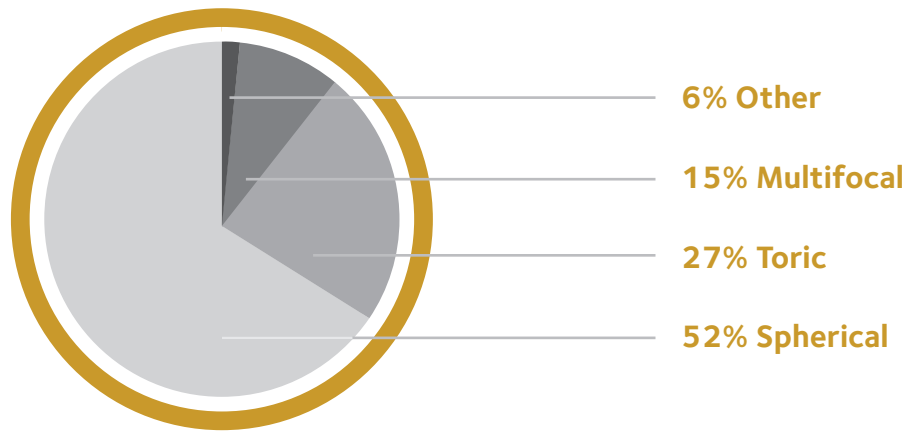


CONTACT LENSES 101, PART 2: CONTACT LENS DESIGNS

Contact lens designs include optical designs that correct for a wide range of vision, including myopia (nearsightedness), hyperopia (farsightedness), astigmatism, and presbyopia (age-related near vision changes).

Soft contact lens designs

These are the most frequently prescribed contact lens designs, along with the percentage of contact lens patients in the United States who wear them¹:



Spherical lens design

These contacts suit patients with myopia or hyperopia with little to no astigmatism power (also called cylinder or “cyl”). Typically, these include patients with less than -0.75 D of astigmatism. Spherical lenses are available in daily, 2-week, and monthly replacement schedules.

If you’re looking at a prescription, you may have noticed that the eyeglass and contact lens prescriptions are different. When determining the power of a spherical contact lens, the eye care practitioner must consider the spherical equivalent and vertex conversion.

Spherical equivalent

- The spherical equivalent gives the closest estimate of a prescription without including any astigmatism correction. This number is calculated by taking the cylinder power of the eyeglass prescription and dividing it in half. Then, the resulting number is added to the spherical power. You don’t need the cylinder axis for any calculations.

Vertex conversion

- Vertex conversion is a calculation that compensates for the change in prescription when you go from eyeglasses to contact lenses. Depending on how far the lens sits from your eye, your brain perceives it as stronger or weaker, although the power of the lens remains the same. This is why the vertex distance—the distance from the back of the lens to the front surface of the cornea—is important!
- Eye care practitioners use what’s called a Vertex Conversion Chart to calculate this.

Toric lens design

Toric contact lenses correct astigmatism, along with myopia or hyperopia. Many of the spherical contact lens brands listed above also come in toric designs. Most toric lenses are available in cyl power increments of 0.50 D starting from -0.75 D. With spherical contacts, you can rotate the lens in any direction, and the power remains the same. With toric lenses, the contact must sit in a specific orientation to provide the proper astigmatism correction.

Contact lens manufacturers use a variety of methods to stabilize their toric lenses. Some of the most common toric designs include²:

Prism ballast—thinner at the top and thicker at the bottom of the lens. The blinking action of the eyelid helps keep the lens oriented.

Peri-ballast—similar to prism ballast, except that the thicker area is closer to the periphery of the lens, away from the optical zone.

Thin zone—thinnest at the top and bottom edges and thicker in the middle of the lens. The upper and lower eyelids help stabilize the lens.

Posterior toric—allows for stabilization to the back of the contact lens, as opposed to the front which most designs use.

Combination—can involve a combination of the designs above.

As with spherical lenses, the practitioner must calculate the toric lens power based on the vertex conversion. Fortunately, CooperVision® has a handy OptiExpert™ app that does all the hard work.

Multifocal lens design

Multifocal contacts are suitable for presbyopic patients or anyone needing distance and near vision correction. Toric multifocals, which combine toric and multifocal lens designs into one lens, are available for astigmatic patients.

Multifocal lenses use what is called “simultaneous images,” which means the patient views multiple prescriptions at the same time. There are two types of simultaneous lens designs³:

Concentric—have alternating rings of distance and near prescriptions, similar to a bull’s-eye target.

Aspheric—gradually change in power as you progress from the center toward the edge of the lens. There are distance, intermediate, and near zones on the lens.

Lens design selection makes a difference

Now that you’re familiar with different types of contact lens designs, you can help patients understand why some contact lenses work better for them than others. Lens selection makes a big difference.

1. Morgan PB, Woods CA, Tranoudis IG, et al. International Contact Lens Prescribing in 2019. Contact Lens Spectrum. <https://www.clspectrum.com/issues/2020/january-2020/international-contact-lens-prescribing-in-2019>. 2. Lai N. Take A Turn With Soft Toric Lenses For Astigmatism. Contact Lens Spectrum. <https://www.clspectrum.com/issues/2019/september-2019/take-a-turn-with-soft-toric-lenses-for-astigmatism>. 3. Denton M. Top 10 Ways to Fail with Multifocal Contacts. Review of Optometry. <https://www.reviewofoptometry.com/article/top-10-ways-to-fail-with-multifocal-contacts>.