

# What is a "Free Form" or "Digital Design" Ophthalmic Lens?

Free-form is a new ophthalmic advancement in lens. The term was originally coined to describe a way of creating sophisticated ophthalmic surfaces by utilizing a new method of forming the back surface of a spectacle lens.

Most progressive addition lenses (PALs) are made of plastic, with the most critical components in a progressive found on the front surface. When casting plastic progressive semi-finished blanks, it is the front-side glass mold that creates the smooth, constantly changing progressive curves that change add power in a progressive channel. The most complex operation in manufacturing PALs is creating those front-surface glass molds. A special type of generator had to be developed to cut the complex computer-generated curves required to produce the ever-changing progressive curves. This new generation process was called "free-form."

Traditional generators use ring-like diamond wheels to form the ophthalmic surfaces found in conventional lenses. Free-form generators, however, use a precise diamond tool that cuts curves with a single point, much like those found in contact lens lathes. With the right kind of computer software, a single-point generator can reproduce virtually any complex multi-curve surface.

Free-form generators make it possible to produce the front-side glass molds required for today's complex progressive designs, enabling the lab or manufacturer to produce lens forms that were never possible in the past. Following are examples of what is now possible.

**Improvement No. 1:** During recent years, several major progressive lens manufacturers have introduced advanced progressives that use the patient's personal data to create a personalized progressive designed specifically for each patient.

**Improvement No. 2:** These lenses differ from traditional PALs in that the progressive curves are on the backside of the lens. Placing these curves to the backside broadens the field of view for distance, near, and intermediate zones, as well as other subtle improvements.

**Improvement No. 3:** Single vision lenses that feature atoric curves on the backside of the lens can now also be offered for those with higher prescriptions. These lenses also provide the benefits of clearer vision with a wider field of view.

**Improvement No. 4:** One of the most recent advancements in progressive design features some of the progressive curves on the front side of the lens and the balance of the progressive curves positioned on the backside. Dividing progressive curves in this way is reported to offer distinct advantages. Only free-form generation makes such a lens possible.