

Art & Science of

**NUPOLAR®**

*polarized lenses*



[www.nupolar.com](http://www.nupolar.com)



## World Market Leader In Polarized Lenses

Not all polarized lenses are equal in quality and performance. It has taken NuPolar® technology decades in design and development work to become the true and accepted global standard for polarized lenses.

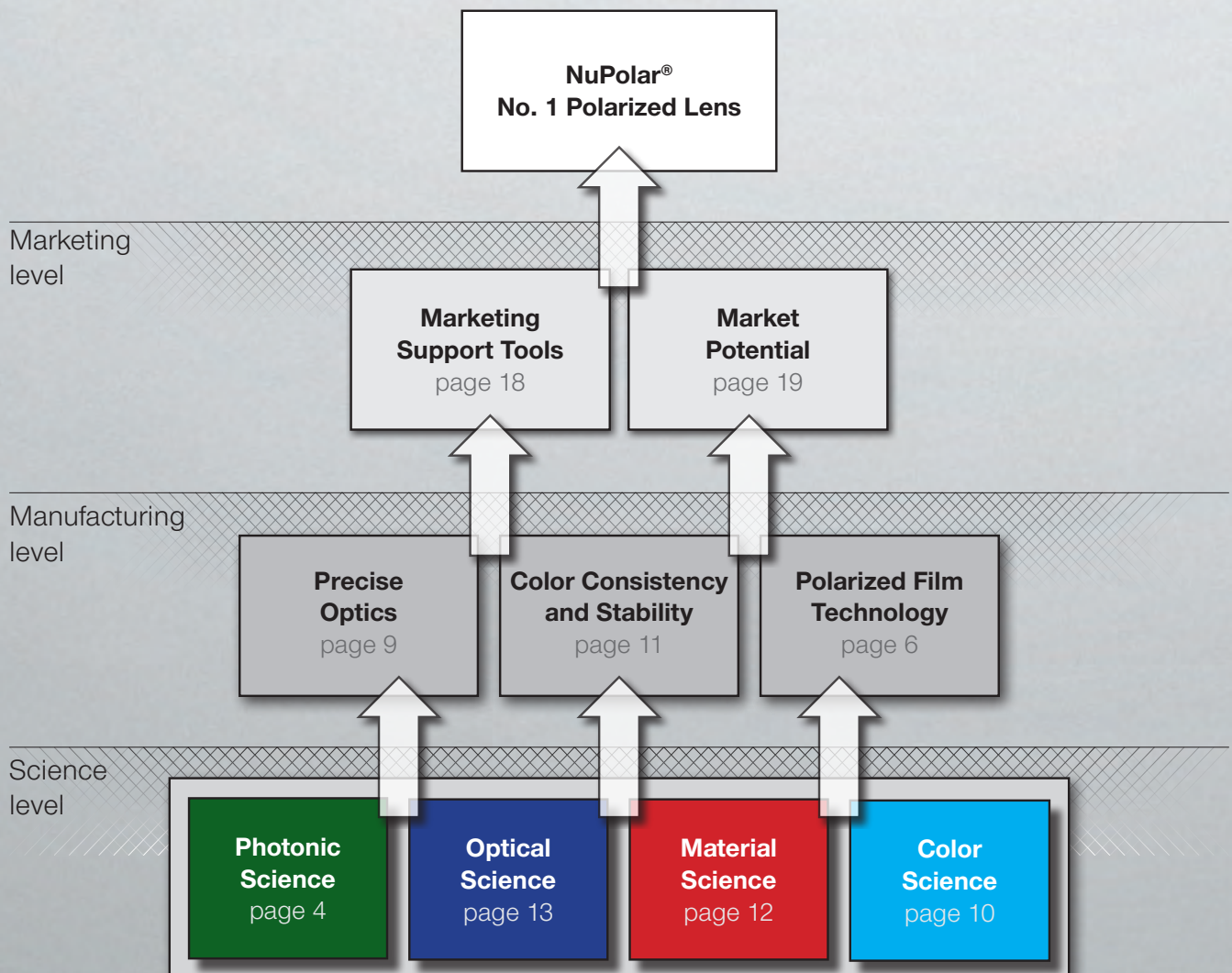
NuPolar lenses, as the market leader, must set the benchmark for stringent performance characteristics of optics, polarized film technology, color consistency, material sciences and more.

NuPolar lenses, as the market leader, must help you grow your business and realize the untapped potential of polarized lenses.

For the last 10 years, NuPolar® lenses have been and continue to be the global standard from which all other polarized lenses are measured.

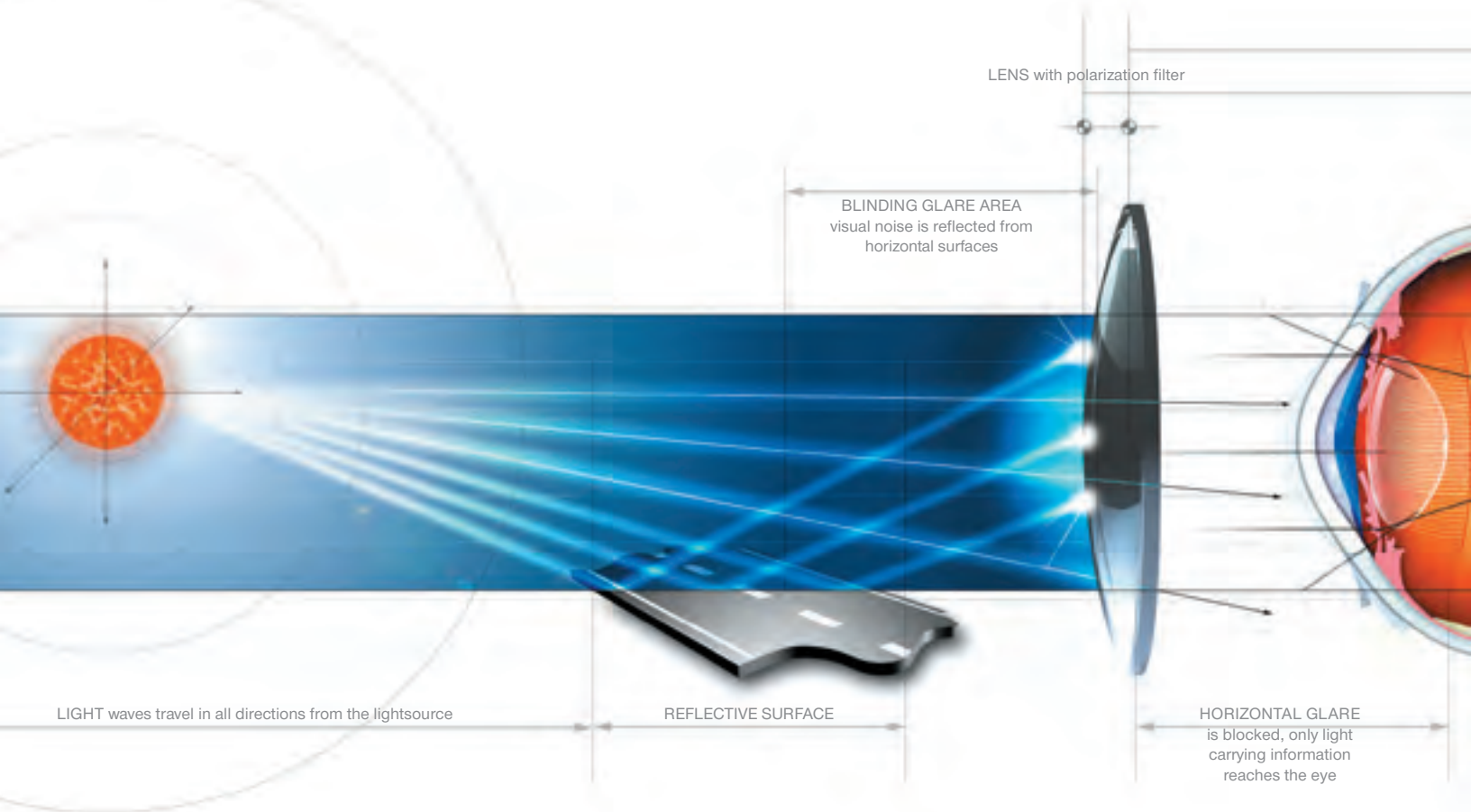
Here is why...

NuPolar® technology  
is founded and based on Science; putting it all  
together properly is NuPolar's Art.



# Photonic Science

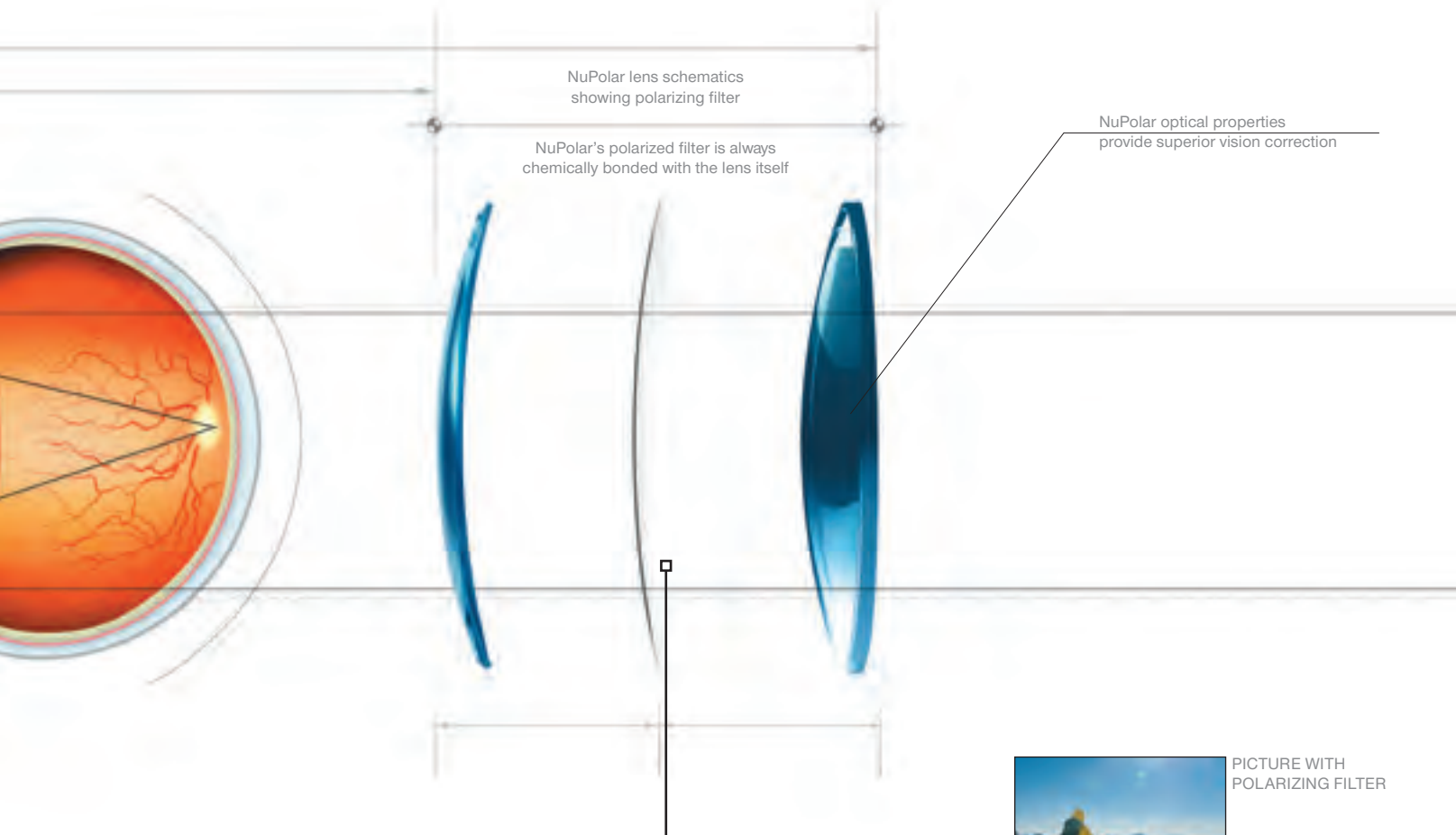
## HOW BLINDING GLARE IS CREATED



Light travels from the sun in the form of waves to our Earth. Once these waves hit a reflective surface these waves change their energy and become scattered. Due to this reflection we can sense colors as well as intensity of light. However, from the moment of reflection, light also may

become polarized and form visual noise — blinding glare that interferes with the real image. The only way to eliminate this glare is to place a polarized lens in its path that can preferentially absorb the interfering glare. This fundamental principle gave birth to polarized eyewear.

AND HOW IT IS ELIMINATED BY POLARIZED LENS



Principle Of Polarization

PICTURE WITH POLARIZING FILTER

PICTURE WITHOUT POLARIZING FILTER

POLARIZER

CRYSTALLINE IODINE MATRIX

POLARIZED FILM MOLECULAR STRUCTURE

DICHROIC DYE MOLECULE

The diagram illustrates the principle of polarization. It shows a light wave passing through a polarizer, which filters out the horizontal component of the wave, leaving only the vertical component. The resulting polarized light is shown as a single vertical wave. The diagram also shows the molecular structure of a polarized film, which consists of a crystalline iodine matrix and dichroic dye molecules. The text 'POLARIZER' is prominently displayed in the center. Two small inset images show a person on a snowy mountain peak, one with and one without a polarizing filter, demonstrating the effect of the filter on glare.

# Advanced Polarizing Film Technology Helps Make NuPolar® The World Market Leader

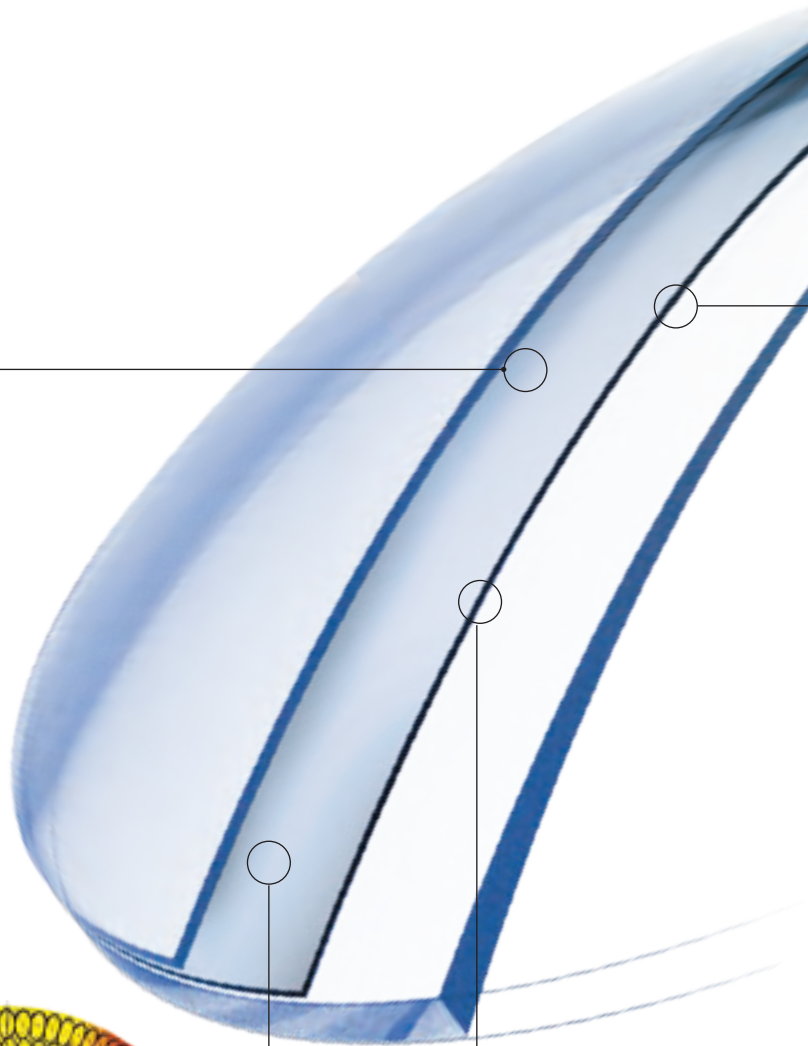
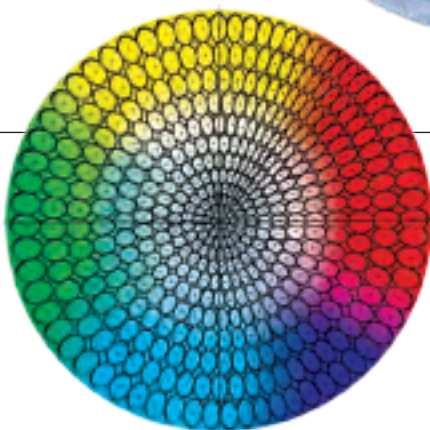
**The most important element of any polarized lens is the polarizer - a unique thin film incorporated into the lens structure. NuPolar film is unique and its performance is unrivaled in the industry.**

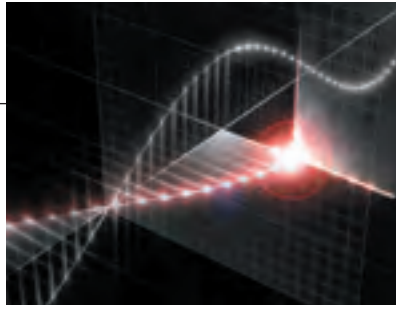
## PROPRIETARY FILM TECHNOLOGY

Younger is one of the few lens manufacturers that has film manufacturing capabilities. This has allowed us to achieve unrivaled excellence in the areas of film placement, color stability, heat stability, and advanced film adhesion. Creating a great polarized lens starts with great polarizing film technology, and here NuPolar® is unrivaled.

## EXCELLENT COLOR UNIFORMITY

Younger colors are always “true colors”. The human eye is a superb “color matching instrument” and NuPolar® lenses are the best product on the market to satisfy these demanding requirements.





## HIGH POLARIZATION EFFICIENCY

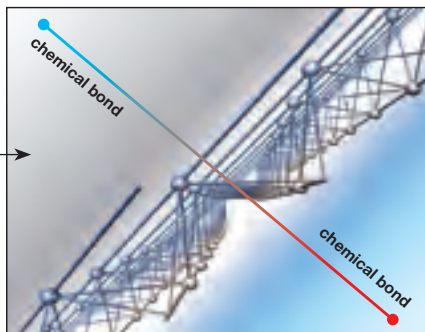
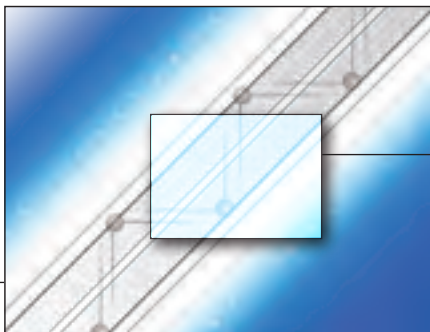
NuPolar never compromises on high polarization efficiency. Some polarized films have such low efficiency that they don't even work with a glare demonstrator.



## EXCELLENT HEAT STABILITY

NuPolar's colors remain stable in the elevated temperatures often required for hard coating and AR processing.

Other lenses often fade or change their colors completely when subjected to the temperatures required during these processing steps.



## SUPERB ADHESION

Before NuPolar, delaminations were an everyday occurrence with polarized lenses.

With NuPolar technology, the film and lens form an integral chemical bond which eliminates the possibility for lens/film delaminations.

The unique chemical composition of the polarizing film facilitates a chemical reaction between the lens material and polarizing film material. As a result, the polarizing film and the lens are linked by a stable chemical bond. This eliminates any chance of film separation.

# How To Achieve A Thin And Optically Stable Lens

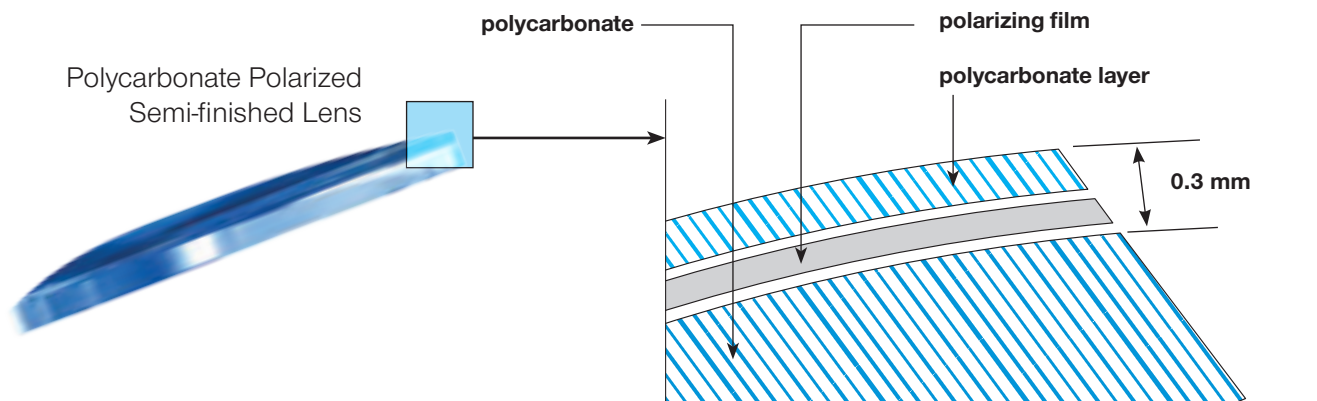
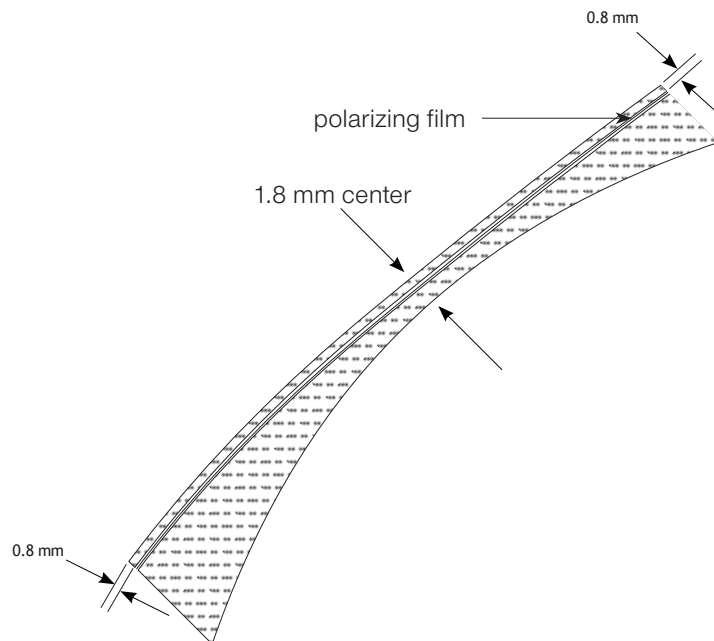
**NuPolar products are always designed to be as thin as possible. This is done by proprietary positioning of the film and by offering the widest possible variety of materials.**

Whatever material is selected, you can be sure that the material and the film have been properly matched to ensure both a thin and an optically correct lens.

So many factors go into making a high quality NuPolar lens. Throughout the manufacturing cycle, from beginning to end, every step must be watched and carefully supervised to ensure that every lens meets the NuPolar standards, regardless of material.

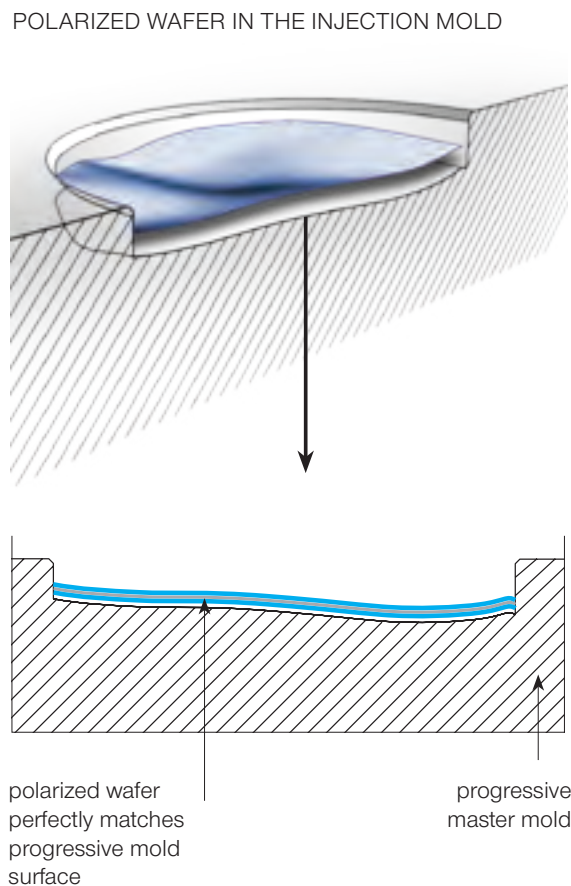
It is very easy to make a mediocre quality polarized lens, yet exceedingly difficult to make a high-quality polarized lens like NuPolar®.

HARD RESIN NUPOLAR CONSTRUCTION APPROACH  
(CROSS-SECTION)



# Precise Replication of Progressive Design

**Optical designers go to a lot of trouble to try and come up with the best design possible for each patient. However, many polarized lenses do not properly replicate the intended design.**



NuPolar progressive designs use patented technology which ensures that the replicated design on the finished lens matches that which the optical designers intended.

Younger's unique film matching technology actually forms the film into nonspherical shapes and often replicates the curvatures of the progressive itself. This allows for the best possible replication of the optical design and insures that the finished lens will have the capability to be processed as thin as possible given the progressive design.

No other polarized lens product takes the care and pride in its film technology as NuPolar® does.

## NuPolar Is Perfect for Digital Surfacing

Excellent digital surfacing capabilities start with having excellent curve control and optics on the front surface of the lens. This curve control can only be achieved through rigorous adherence to manufacturing standards throughout the manufacturing process. The precision of the front curve

of a lens is a result of the care given to it by the manufacturer. NuPolar® products are designed to be freeform friendly. The number of base curves in one-diopter steps is maximized to give as thin and flat a finished lens as possible.

# The Science of Colors

**While many lesser polarized lenses take the approach to have as many colors as possible, we disagree with this philosophy. It is better to have excellent “true and deeply rich” colors, which remain that way, and that are also highly polarizing.**

Many other colors on the marketplace are so light and washed out they cannot even be considered polarizers. Making matters even worse, most of these lenses are not even heat stable, and change their color even more during post-processing.

With NuPolar lenses, feel confident your grays will be deep and satisfying grays, as will your browns, and any other NuPolar color. And they will stay that way!



GRAY-3

Excellent for bright sun conditions while color integrity is maintained. Colors become richer and deeper and maximum blinding glare protection is provided.



GRAY-1

Great for less bright conditions where color integrity should be maintained. Can be over-tinted to a variety of fashion colors without affecting polarization efficiency.



BROWN

A true, deep, rich brown that provides for a wearing experience in which the lens enhances colors and especially highlights greens.



COPPER

Copper is considered by many an excellent high contrast lens which highlights greens and reds. It is particularly effective in cutting through blue haze.



GREEN

Designed to match closely with the timeless appeal of Ray-Ban® G-15® color, Green allows you to confidently recommend this product when requested.



DRIVEWEAR®

The most advanced polarized eyewear on the market. Drivewear lenses can sense and react to varying light conditions both outside and behind windshield of the car.

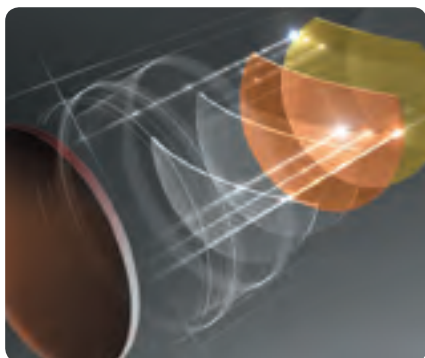
# Color

## Consistency & Stability

When a lens is subjected to heat, it may change color due to thermal degradation. Measuring the color of the lens before and after a key test tells us how much the color has shifted. Polarized lenses are often subjected to high levels

of heat (120 – 140°C) in laboratory processing, particularly during hard coating and AR coating. Using NuPolar's proprietary "HT Film Technology" NuPolar products are the most color stable polarized lenses available.

## Advanced Drivewear Colors



Transitions  
**SOLOFX**

By combining the best properties from two of the most advanced technologies, NuPolar® polarization and Transitions® photochromics, we created Drivewear®, the ultimate NuPolar product for driving. The lens is designed for comfort and safe driving as well as for overcast and bright light outdoors. Drivewear lenses are capable of sensing and reacting to

varying light conditions both outside and behind the windshield of a car. They provide glare protection through polarization and enhance and protect vision through photochromics which are stimulated by both visible and UV light. For more information about Drivewear lenses, order the publication entitled *Art & Science of Drivewear* or visit [www.drivewearlens.com](http://www.drivewearlens.com).

### OVERCAST

LOW LIGHT CONDITIONS  
HIGH CONTRAST GREEN/YELLOW COLOR



### DAYLIGHT

DRIVING CONDITIONS  
COPPER COLOR



### BRIGHT LIGHT

OUTSIDE CONDITIONS  
DARK REDDISH BROWN COLOR





# Material Science

## NuPolar Consistency Across All Materials

### 1.5

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NuPolar® in Hard Resin is consistently seen as the world's standard for all other materials. Optical clarity combined with affordability make this product the “workhorse” of polarized lenses worldwide.

### POLYCARBONATE

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NuPolar polycarbonate provides the impact resistance and protection desired for every activity under the sun.

NuPolar polycarbonate is also perfect for children.

### 1.67

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Brings all the built-in quality and features you have come to expect from NuPolar to the 1.67 market. It is manufactured from MR-10® to insure good processing and stability characteristics while maintaining a 99% polarization efficiency!

### TRILOGY (TRIVEX®) VISUAL ARMOR®

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Combining the best in optics, strength, thinness and lightweight, NuPolar® Trilogy® lenses have it all. Over five years in development, this patented product provides the ultimate balance of features to the wearer. NuPolar Trilogy truly is “Visual Armor” for the eyes.

# Optical Science

## Optical Quality Designed And Built Into Every Lens

### CYLINDER AND CURVE CONTROL

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Because polarized lenses have the additional manufacturing challenge of working around a polarized film, it is difficult to maintain low cylinder and precise curve control. This is one of the areas where NuPolar really excels. Being the market leader really allows us to maximize our manufacturing processes.

### QUALITY TESTING & COMPARISON

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NuPolar lenses are constantly subjected to proprietary and unique testing to ensure that they are the best in the industry. Lenses are subjected to no less than a dozen quality tests throughout the manufacturing process.

In addition, NuPolar lenses are constantly compared and evaluated with the leading lenses in the marketplace. Over and over again, we find NuPolar® is simply superior to any other polarized lens in the marketplace.

### STYLES AND AVAILABILITY

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Whether it be materials, colors, or styles, NuPolar lenses consistently have the availability YOU NEED. NuPolar is made in more progressive styles than any other product. Feel confident that if you need a product with polarized lenses, it's probably available in NuPolar®.

Younger Optics has won 19 OLA Awards of Excellence  
Including the first one ever awarded.

NuPolar® has won more OLA Awards of Excellence  
than any other polarized lens.



# NuPolar Polarized Lens Summary

## UNIQUE

### HEAT RESISTANT POLARIZER

retains polarization and color consistency through all types of secondary processing (such as AR)

## THINNESS

all NuPolar lenses are designed to minimize both center and edge thickness of the lens

## TRUE COLORS

(Gray-3, Gray-1, Brown, Copper, Green)

## AVAILABILITY

wide range of materials, styles and colors

## HIGH EFFICIENCY POLARIZER

all colors provide maximum glare reduction

## INNOVATIVE TECHNOLOGY

film closely follows progressive curves to achieve maximum optical performance (patents pending)

## ONE PIECE CONSTRUCTION

film and lens form an integral bond to eliminate delaminations

As polarized lenses gain in popularity and are being offered by an increasing number of lens manufacturers, it is easy to begin to think that all of these lenses are manufactured the same, and are of equal quality and similar performance. This is certainly not true.

NuPolar is the world's leading brand of polarized Rx lenses. When performance factors such as optics, polarizing efficiency, color consistency, heat stability and many other factors are taken into consideration, NuPolar quality is

unequaled. We worry about the small details of our lenses so that you don't have to. With NuPolar lenses you can always be sure of receiving the most advanced and intelligently designed lens available.

# Where Competitors Fall Short

| NuPolar Versus Other Leading Brands |    |        |              |                  |              |                      |                             |               |                          |                            |
|-------------------------------------|----|--------|--------------|------------------|--------------|----------------------|-----------------------------|---------------|--------------------------|----------------------------|
| Polarized Product                   |    | Optics | Transmission | Color Uniformity | Polarization | Heat Stability Color | Heat Stability Polarization | Film Adhesion | Film Placement At Center | Film Placement Across Lens |
| Brand A                             | UC | 3      | 5            | 3                | 5            | 3                    | 4                           | 2             | 3                        | 4                          |
| Brand B                             | HC | 5      | 5            | 3                | 3            | 3                    | 4                           | 1             | 3                        | 4                          |
|                                     | UC | 5      | 5            | 4                | 3            | 3                    | 4                           | 1             | 3                        | 4                          |
| Brand C                             | HC | 5      | 5            | 4                | 5            | 1                    | 5                           | 4             | 5                        | 3                          |
| Brand D                             | UC | 3      | 5            | 4                | 5            | 3                    | 4                           | 4             | 2                        | 4                          |
| Brand X-1 *                         | HC | 3      | 5            | 4                | 5            | 1                    | 5                           | 3             | 3                        | 2                          |
|                                     | UC | 4      | 5            | 4                | 5            | 1                    | 5                           | 3             | 4                        | 3                          |
| X-2 *                               | HC | 5      | 5            | 4                | 5            | 1                    | 4                           | 3             | 3                        | 3                          |
| X-3 *                               | HC | 5      | 5            | 2                | 5            | 1                    | 4                           | 4             | 4                        | 3                          |
| NuPolar                             | HC | 5      | 5            | 4                | 5            | 5                    | 4                           | 4             | 5                        | 5                          |

\* Brand X distributes under 3 product names

5 Excellent 4 Very Good 3 Satisfactory 2 Poor 1 unacceptable

## Leading Polarized Brand Comparisons<sup>\*\*</sup>

**While most brands do some things well, every brand except for NuPolar® fails to meet acceptable standards in some important product area.**

### Brand A

This product fails in the area of film adhesion. This can lead to delaminations both during processing and while in use by the patient.

### Brand B

Also fails with film adhesion. Only mediocre in the areas of heat stability, polarization and film placement.

### Brand C

Unacceptable color stability when subjected to higher temperatures, particularly during hard / AR Coating. Don't be surprised if no two lenses look the same color.

### Brand D

Poor film placement at center, mediocre optics and heat stability.

### Brand X1, X2, and X3

This leading manufacturer's product falls way short of acceptability in the area of color heat stability. All show poor to mediocre film placement, only moderate adhesion, and one product brand shows poor color uniformity. Also, you may not be sure what product you are going to get, since it appears product is interchanged between three brand names.

### NuPolar®

NuPolar has the highest ranking in every category. Especially in the areas where other products fall short, NuPolar consistently excels.

### Why Ever Settle for Less Than NuPolar®?

No other brand of polarized lenses puts it all together like NuPolar®. This isn't an accident; it is the end result of years of experience manufacturing and developing NuPolar. It's the world's leading brand, and it is clear why so many people within the optical industry choose it every day.

**Remember, not all polarized lenses are the same. Always remember to specify NuPolar® when ordering polarized lenses!**

<sup>\*\*</sup> Test results based on analysis of hard resin products.

# Glare Is Everywhere; Reduce It By Wearing NuPolar Lenses

NuPolar® acts like a “visual filter” for your eyes making every situation where the sun is present look clearer and richer by blocking blinding glare. Camera enthusiasts have known for years that a polarized filter makes their pictures look better... why not give the same benefits to your eyes through NuPolar® lenses?

Notice how NuPolar® makes the sky bluer and the greens greener in pictures ❶, ❹, and ❷.

Look how the rainbow behind Stirling Bridge in Scotland “comes alive” in picture ❶.

NuPolar® can make driving safer by blocking out blinding and harmful glare, as in pictures ❷ and ❸.

Whether in the forest ❹, on a mountain-top ❻, in a grassy field ❷, or just enjoying a coffee in an outdoor café ❺, NuPolar® makes the experience richer and more deeply satisfying.





without NuPolar

5.



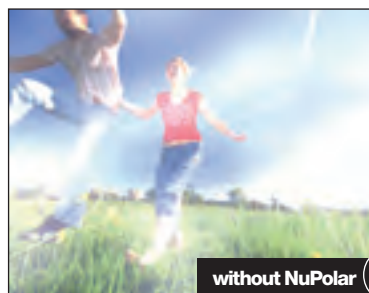
with NuPolar



without NuPolar



with NuPolar



without NuPolar



with NuPolar

THERE IS NO SUBSTITUTION  
FOR POLARIZED LENSES.

ONLY POLARIZED LENSES CAN REMOVE  
BLINDING GLARE.

AND NUPOLAR DOES IT BEST.

# Inadequate Substitutions for NuPolar®

## PHOTOCHROMIC LENSES

Variable tint lenses only reduce light transmittance. They do not block blinding glare.

## ANTI-REFLECTION COATING

AR coating is a great feature for ophthalmic lenses, removing annoying reflections and ghost images.

AR coatings will actually increase light transmittance and reduce the reflections from the back surface of polarized sunwear. However, blinding glare will not be effectively removed by AR coatings alone.



## TINTED LENSES

only reduce light transmittance and do not block blinding glare.



## CLIP-ONS

increase the weight of eyewear and may cause scratches on the lens surface. They also decrease optical quality and create additional surface reflections.



## OVER-FRAMES

that fit over existing sunwear can be extremely heavy and uncomfortable. They limit peripheral vision, may distort optics and their users look unstylish.

# Great sale Supporting Tools

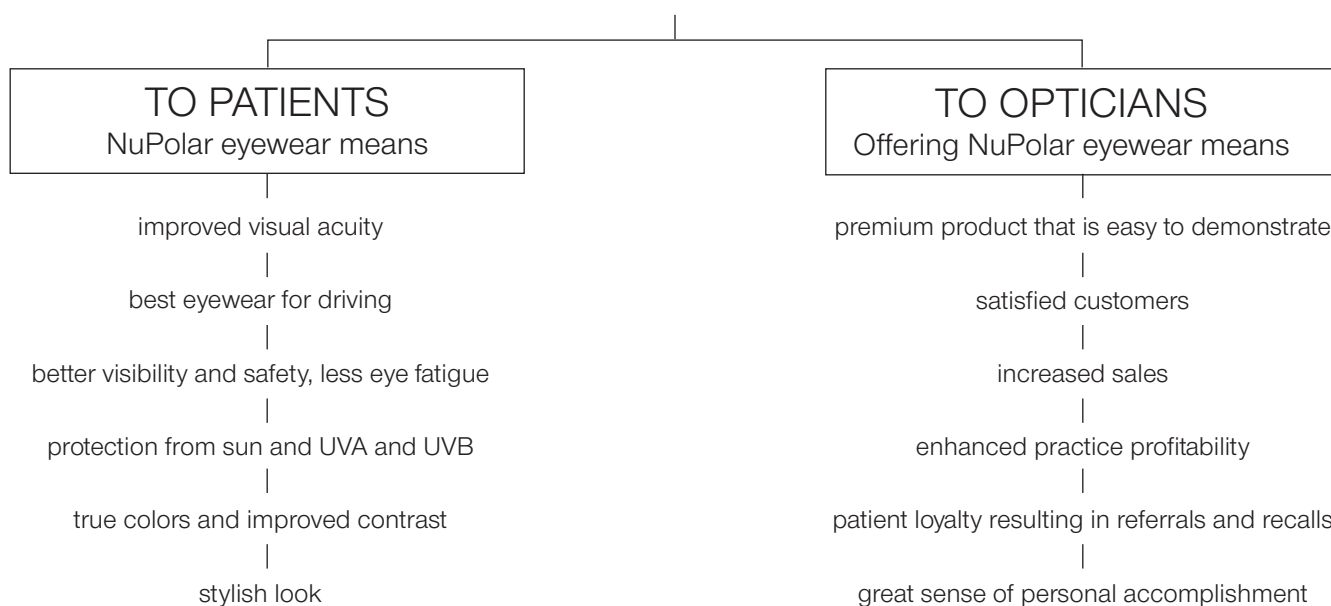


Like all value-added features, polarized lenses require a bit of consumer education. Younger Optics is committed to providing the eye-care professional with a wide range of marketing materials that make this task simple. The most effective of these is the NuPolar Glare Demonstrator. It makes evident the benefits of polarized lenses by allowing customers

the opportunity to “see for themselves” the positive effects of glare reduction.

This demonstrator, as well as many other marketing resources designed to make selling second pairs easier, is available to retailers and labs that sell NuPolar lenses. For a complete list of available resources, please visit the Marketing section at NuPolar.com.

## What NuPolar means



# Unleash the Potential Of the Polarized Lens Market

Every corrective lens wearer should have at least two pairs of glasses: one with clear lenses for indoor and low light conditions, and one with polarized lenses for bright light conditions.



Clear Eyewear

The benefits of sunwear are undisputed, but your patient relies on you for adequate information to choose the right pair.

When you recommend NuPolar® lenses, you are recommending the world's most trusted Rx polarized lenses.



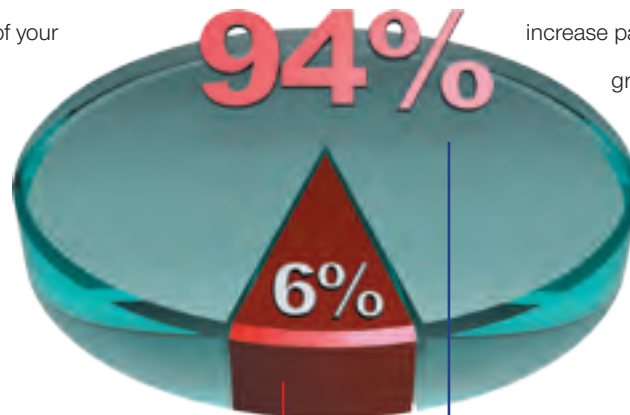
NuPolar Sunwear

Why shouldn't we give our eyes the same benefits we give our feet?



## Untapped Market Potential

Only 6% of Rx lens sales are polarized prescription sunwear. This means that 94% of your customers are not enjoying the incomparable benefits of polarized lenses.



**6% Of Rx Lens Sales**

**Prescription Rx  
Polarized Sunwear**

By introducing NuPolar to your patients, you increase patient satisfaction while also helping grow your business or practice.

**94% OF CUSTOMERS**

**Are not experiencing the benefits  
of polarized sunwear**

## NUPOLAR® LENS AVAILABILITY

| HARD RESIN         | BASES                  | COLORS                        | ADD RANGE   |
|--------------------|------------------------|-------------------------------|-------------|
| Single Vision      | 1, 2, 3, 4, 5, 6, 7, 8 | Gray 3, Brown & Green         |             |
| Single Vision      | 2, 4, 6, 8             | Gray 1                        |             |
| IMAGE® Progressive | 2, 4, 6, 8             | Gray 3 & Brown                | 1.00 - 3.00 |
| FT 28 Bifocal      | 2, 4, 6, 8             | Gray 1, Gray 3 & Brown        | 0.75 - 4.00 |
| FT 35 Bifocal      | 2, 4, 6, 8             | Gray 3                        | 0.75 - 4.00 |
| 7 x 28 Trifocal    | 4, 6, 8                | Gray 3                        | 1.50 - 4.00 |
| Plano              | 6                      | Gray 1, Gray 3, Brown & Green |             |

| POLYCARBONATE           | BASES                       | COLORS            | ADD RANGE   |
|-------------------------|-----------------------------|-------------------|-------------|
| Single Vision           | .50, 1, 2, 3, 4, 5, 6, 7, 8 | Gray 3 & Brown    |             |
| Single Vision           | .50, 2, 4, 6, 8             | Copper & Green-15 |             |
| IMAGE® Progressive      | 2, 4, 6, 8                  | Gray 3 & Brown    | 1.00 - 3.00 |
| IMAGE Wrap® Progressive | 8                           | Gray 3            | 1.00 - 3.00 |
| FT 28 Bifocal           | 2, 4, 6, 8                  | Gray 3 & Brown    | 1.00 - 3.00 |

| 1.67 HIGH INDEX MR-10® | BASES           | COLORS         |
|------------------------|-----------------|----------------|
| Single Vision          | .50, 2, 4, 6, 8 | Gray 3 & Brown |

| TRILOGY®      | BASES      | COLORS         |
|---------------|------------|----------------|
| Single Vision | 2, 4, 6, 8 | Gray 3 & Brown |

### % AVERAGE LUMINOUS TRANSMITTANCE

|                 | GRAY 3 | GRAY 1 | BROWN | COPPER | GREEN |
|-----------------|--------|--------|-------|--------|-------|
| Hard Resin      | 16     | 34     | 17    |        | 15    |
| Polycarbonate   | 18     |        | 19    | 19     | 15    |
| 1.67 High Index | 16     |        | 14    |        |       |
| Trilogy®        | 17     |        | 20    |        |       |

## DRIVEWEAR® LENS AVAILABILITY

| HARD RESIN         | BASES                  | COLORS    | ADD RANGE   |
|--------------------|------------------------|-----------|-------------|
| Single Vision      | 1, 2, 3, 4, 5, 6, 7, 8 | Drivewear |             |
| IMAGE® Progressive | 2, 4, 6, 8             | Drivewear | 1.00 - 3.00 |
| FT 28 Bifocal      | 2, 4, 6, 8             | Drivewear | 1.00 - 3.00 |

| POLYCARBONATE      | BASES      | COLORS    | ADD RANGE   |
|--------------------|------------|-----------|-------------|
| Single Vision      | 2, 4, 6, 8 | Drivewear |             |
| IMAGE® Progressive | 2, 4, 6, 8 | Drivewear | 1.00 - 3.00 |

% Average Luminous Transmittance: Low teens to 30's

All NuPolar lenses block 100% UVB and 99%-100% UVA.  
All NuPolar lenses pass the ANSI Z80.3 standards for Traffic Signal Recognition.



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