

ART & SCIENCE OF POLARIZATION

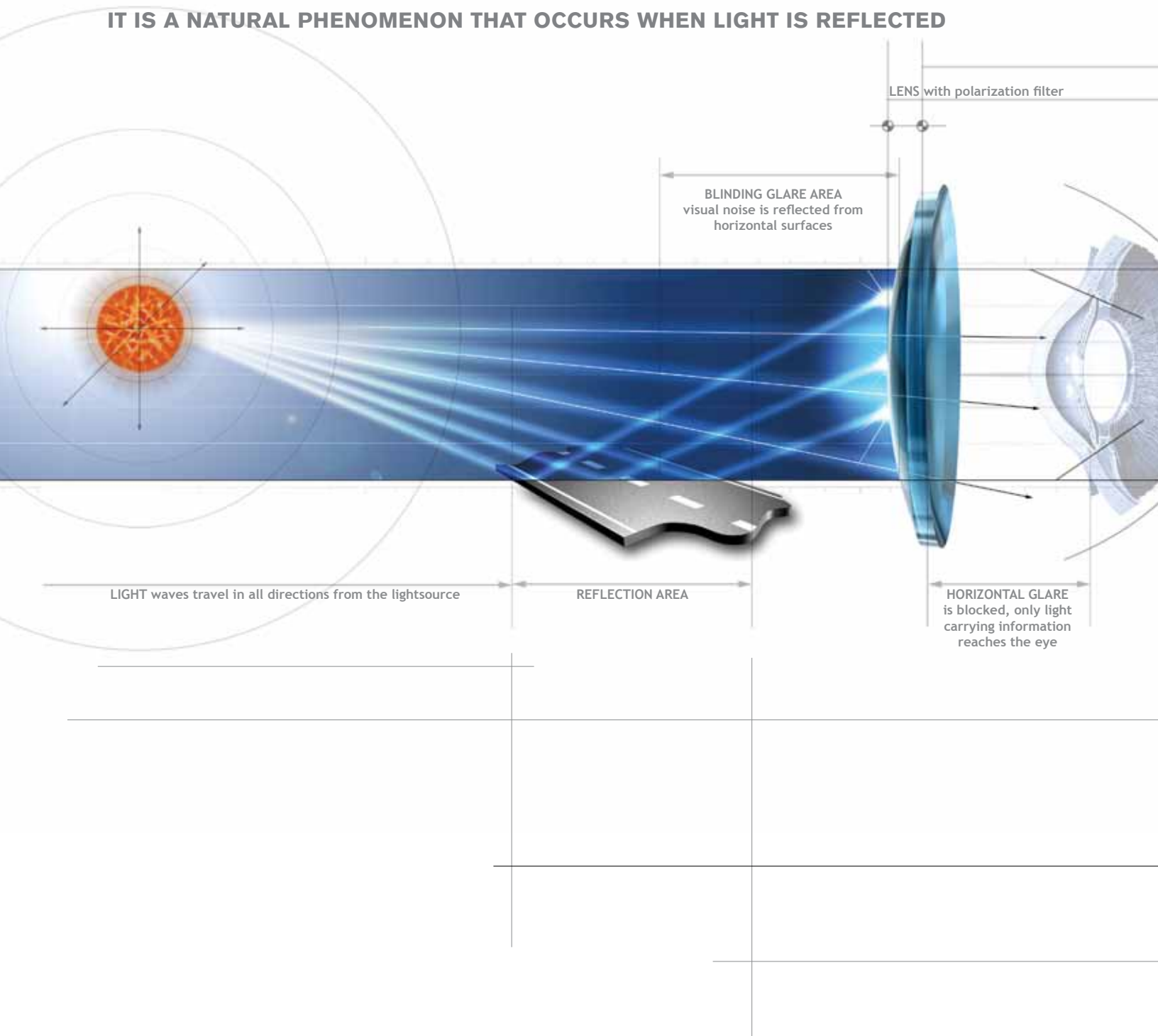


by Younger Optics

NUPOLAR®
polarized lenses

WHAT IS BLINDING GLARE?

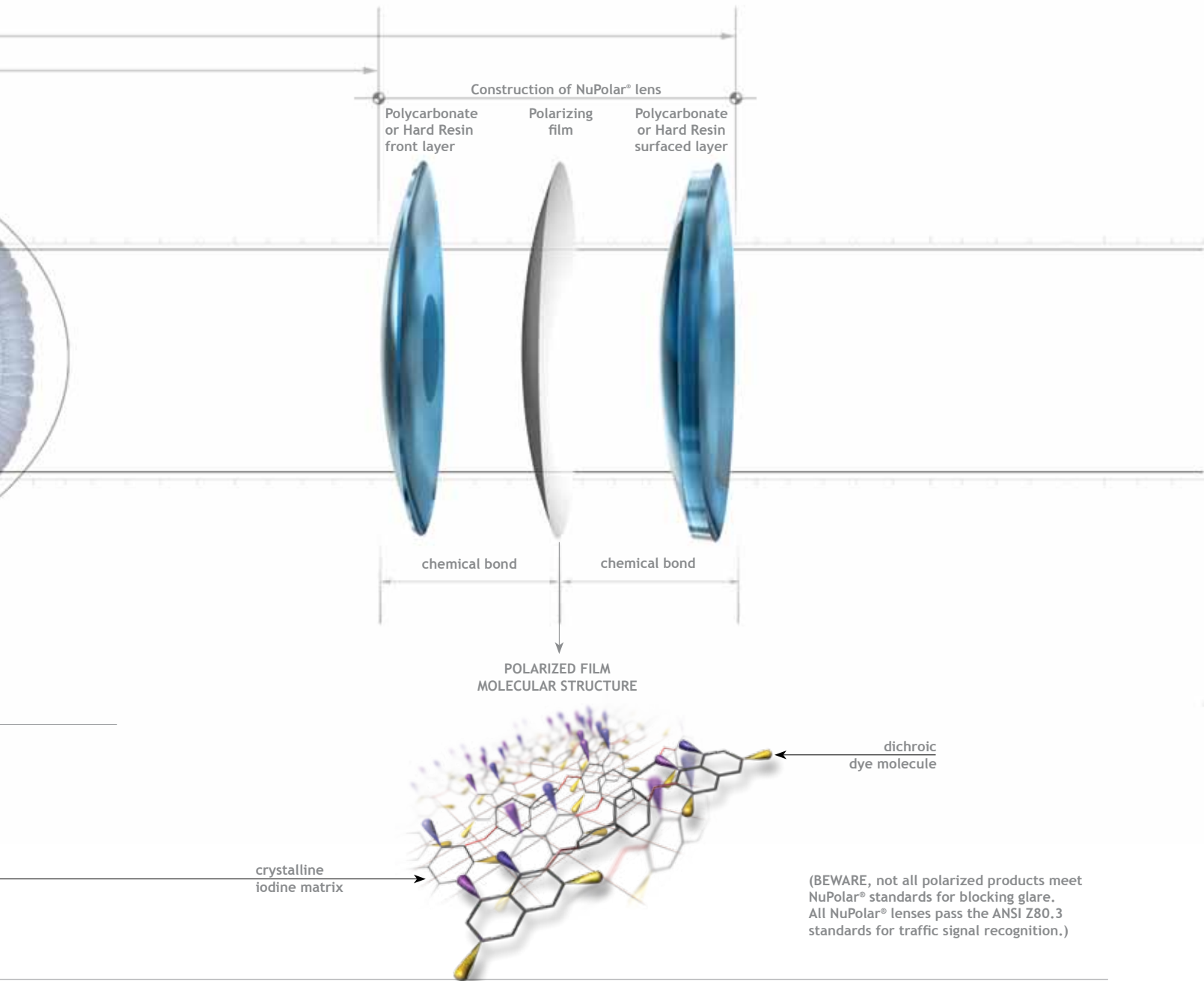
IT IS A NATURAL PHENOMENON THAT OCCURS WHEN LIGHT IS REFLECTED



From the moment of reflection, light becomes polarized and forms 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. This fundamental principle gave birth to **polarized eyewear**.

WHAT IS A POLARIZED LENS?

THE MOST EFFECTIVE TOOL IN PROTECTIVE SUNWEAR

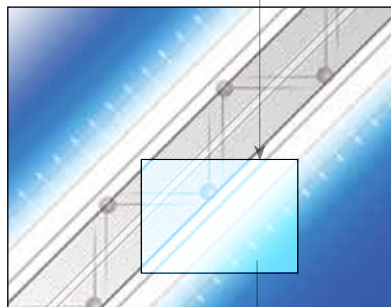
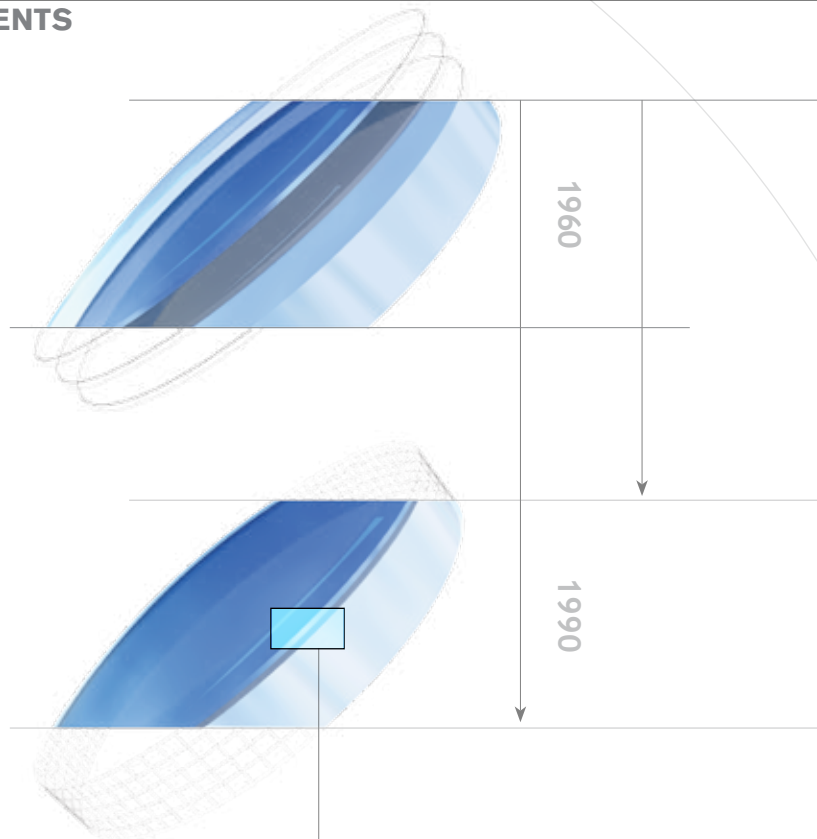


Polarized lenses enhance the most important function of prescription eyewear: **improvement of visual acuity.**

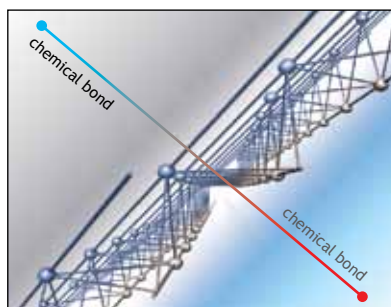
It is the result of polarized lenses' special attribute: ability to **block blinding horizontal glare.** **No other lenses or treatments** can achieve this result.

FROM FIRST EXPERIMENTS

Attempts to create **high quality polarized ophthalmic lenses** in the early sixties were not successful because of optical and mechanical problems. Polarizing filters that existed on the market did not comply with **the high demands of ophthalmic lens quality**. The increased complexity of curvatures of ophthalmic lenses made the task even more difficult.



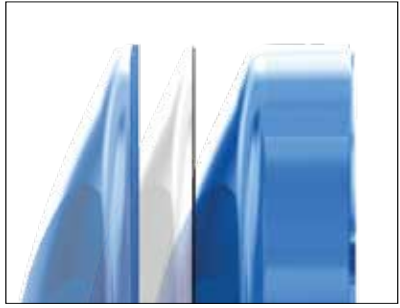
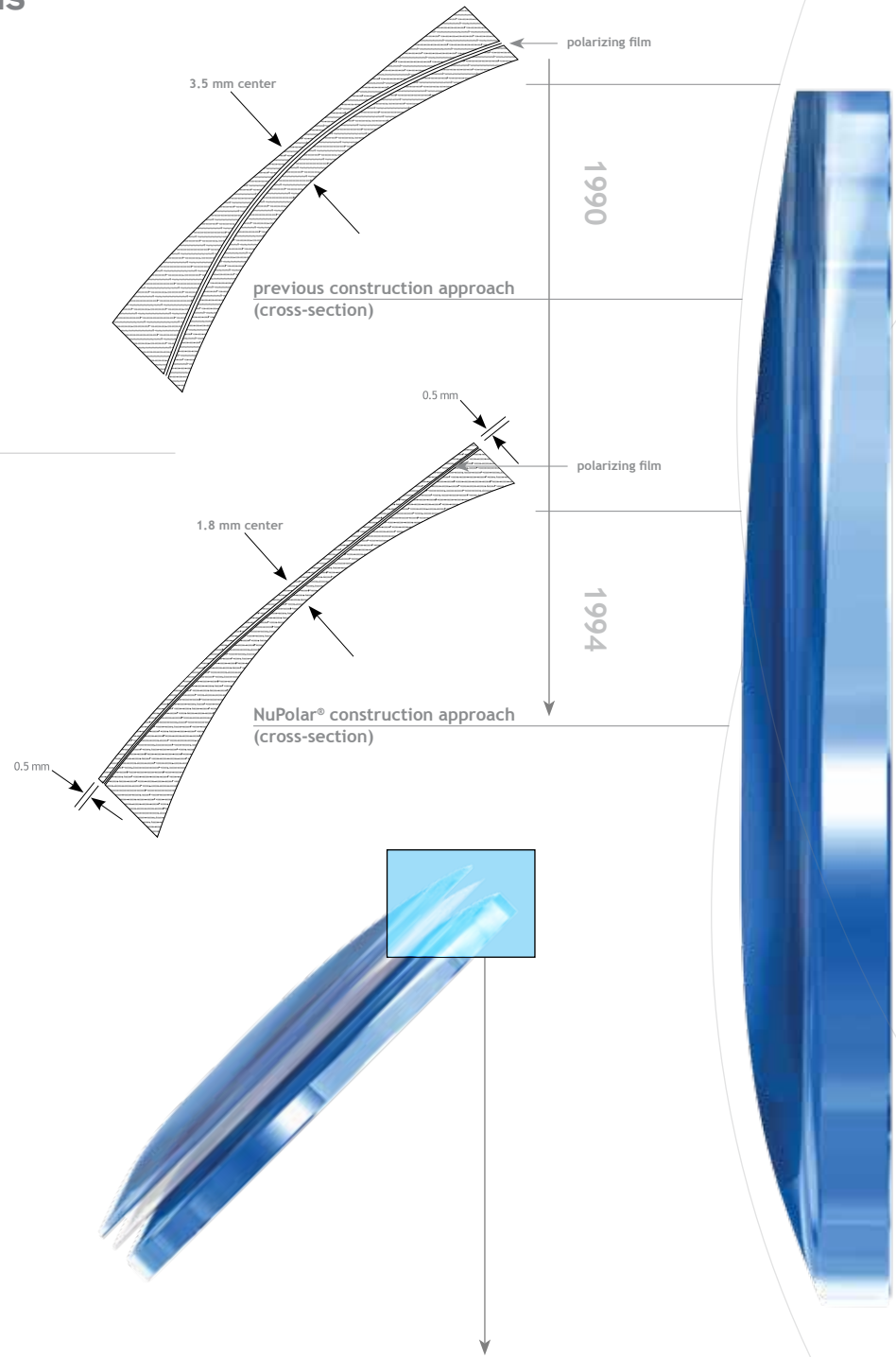
In the early 90's, Younger Optics launched an **ambitious program** to create a polarized lens that would fully comply with **ophthalmic lens requirements**. Younger R&D worked on every component and processing aspect of the lens: polarizing film, optical curvature compliance, chemistry of polymerization and laboratory surfacing requirements.



The **unique chemical composition** of the polarizing film facilitates a chemical reaction between hard resin monomer and polarizing film material. As a result, the polarizing component and hard resin plastic are linked by a stable chemical bond. This **eliminated any chance of film separation**.

TO STATE OF THE ART POLARIZED LENS

Younger Optics created a proprietary technology to match the polarizing film curve with the front curve of the lens. The technology allowed Younger Optics to introduce to the market not only single vision lenses but also multifocal and progressive lenses. NuPolar polarized lenses can be surfaced to the **same thickness** as regular hard resin lenses. This was impossible before the **NuPolar®** lens was introduced in **1994**.



In 1996 NuPolar® was awarded the prestigious **Award of Excellence** by the Optical Laboratories Association. It is the first and only sunglass lens to receive this honor.

Visualization is based on Sph. - 4.50 Add 300 progressive lens

POLYCARBONATE POLARIZED LENSES

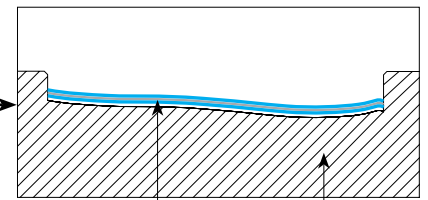
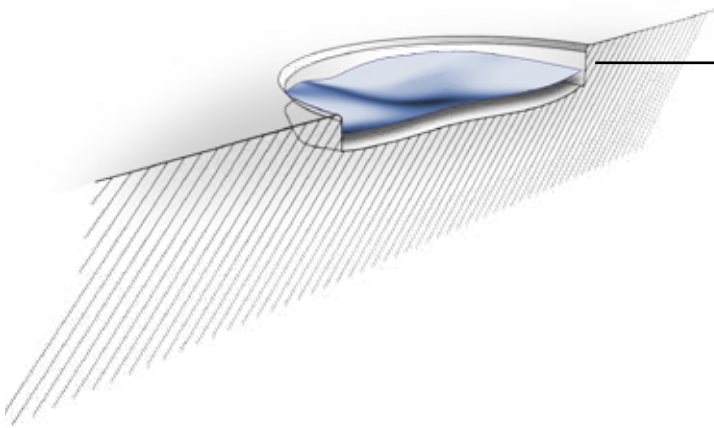
Polycarbonate polarized lenses offer the synergy of **two advanced lens technologies**. All the benefits of polarization are combined with the properties of polycarbonate making the lens thinner, lighter and stronger to address the needs of sport oriented consumers. Previously, the main problem with polycarbonate polarized lenses

was **achieving progressive front curvatures**. Most polarized lenses made of polycarbonate did not reproduce the intended designs.

Younger approached the problem with the goal of manufacturing polycarbonate polarized lenses to the same stringent optical standards as other materials.

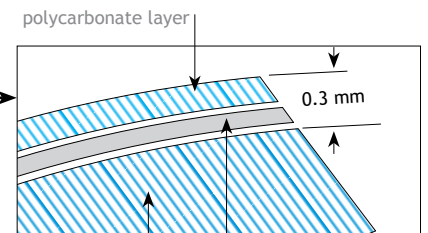
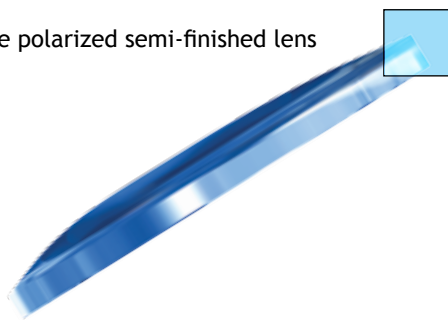
Younger developed patent pending technology to form polycarbonate-encapsulated polarizing film wafers into the required progressive curvature before the injection of polycarbonate. As a result the front curve of the lens **perfectly matches the theoretical design**, just as the optical designers intended it.

polarized wafer in the injection mold



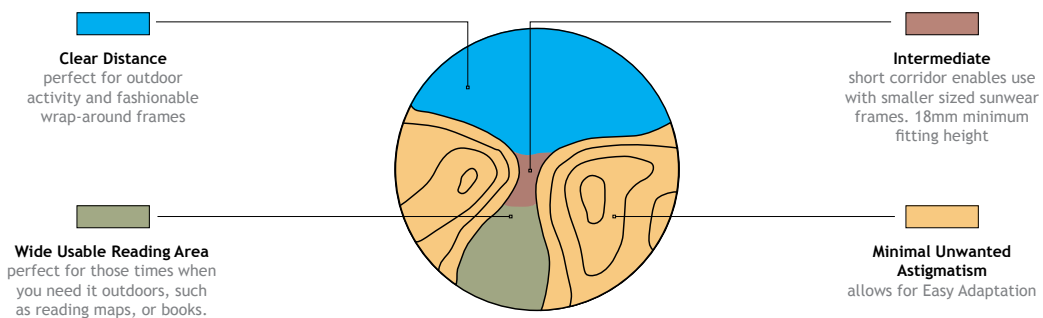
polarized wafer perfectly matches progressive mold surface
progressive master mold

polycarbonate polarized semi-finished lens



polycarbonate layer
0.3 mm
polarizing film
polycarbonate

IMAGE® NUPOLAR® POLYCARBONATE PROGRESSIVE CONTOUR PLOT



DRIVING

Location _____ Central Europe
 Date _____ July 13th, 2003
 Time GMT _____ 11:23 a.m.
 Speed _____ 44.7 M.P.H.
 Driven distance per second _____ 65.6 Ft
 Car _____ mid-size sedan
 Shutter/Aperture _____ 1/250/4.5

There is no other circumstance where **glare is more damaging than while driving a car**. Besides the traditional sources of glare, drivers must endure glare formed by the dashboard on the windshield. Multiple research data shows that glare can reduce a driver's visual acuity. **Polarizing lenses solve this problem.**



TOTAL TIME 2.5 sec.
TOTAL DISTANCE DRIVEN 164.0 Ft

TOTAL REFLECTIONS DURATION 0.843 sec.
TOTAL DISTANCE DRIVEN BLINDED 55.30 Ft

OTHER LENS TREATMENTS

COMPLEMENTARY TO POLARIZED LENSES

PHOTOCHROMIC LENSES

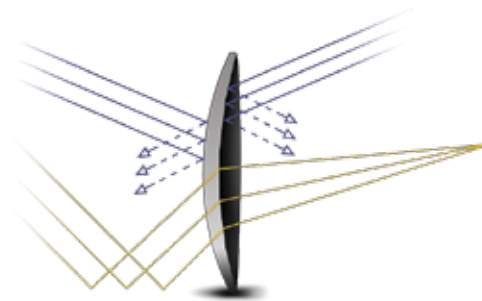


Photochromic lenses, like Transitions® Lenses, are an **excellent choice** for a primary pair of prescription eyeglasses. They are virtually clear indoors, automatically darken outdoors, and provide 100% UV protection providing optimum versatility. Because photochromic lenses are designed for everyday wearing conditions, they do not always provide the sun protection desired by consumers. For example, photochromic lenses are activated by UV light and therefore do **not darken adequately** for some behind the windshield of a car. Also, they **do not block blinding glare**, but only reduce the intensity of light.

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. **Blinding glare will not be effectively removed** by A/R coatings alone.



THERE IS NO SUBSTITUTION

PERCEIVED SUBSTITUTIONS

FOR POLARIZED Rx SUNWEAR

TINTED LENSES



Tinted lenses only reduce light transmittance. **They do not block blinding glare.**

CLIP-ONS



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

OVER-FRAMES



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

FOR POLARIZED LENSES

NUPOLAR GLARE DEMONSTRATOR

HOW TO OFFER POLARIZED LENSES



Younger Optics introduces another effective tool to show the true advantages of polarized lenses - its new Glare Demonstrator. It **realistically demonstrates the effects of glare** and the performance of polarized lenses. Like other value-added features, polarized lenses require explanation to the consumer.

Describing glare effects while driving is usually readily recognized by most patients. In more than 10 years of working with polarized lenses, Younger scientists are convinced, and the patients that wear them agree, that once you begin to wear polarized lenses you will **never switch back to non-polarized sunwear.**

WHAT WOULD WE SAY

ABOUT POLARIZED LENSES

TO PATIENTS POLARIZED EYEWEAR MEANS

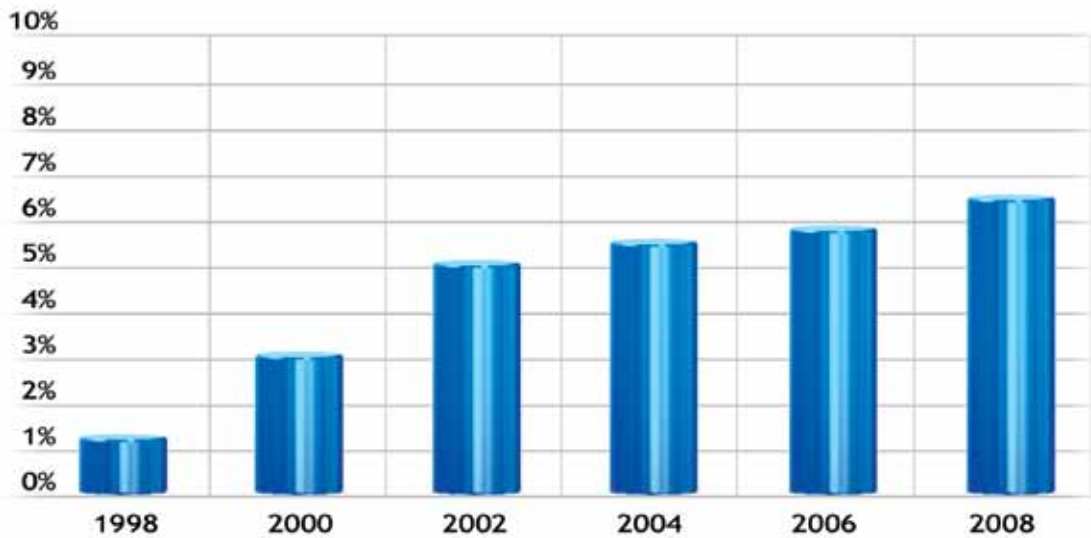
- improved visual acuity
- best eyewear for driving
- better visibility and safety, less eye fatigue
- protection from sun and UVA and UVB
- true colors and improved contrast
- stylish look

TO OPTICIANS OFFERING POLARIZED EYEWEAR MEANS

- premium product that is easy to demonstrate
- satisfied customers
- increased sales
- enhanced practice profitability
- patient loyalty resulting in referrals and recalls
- great sense of personal accomplishment

BLOCKS BLINDING GLARE

POLARIZED LENS SALES (% OF TOTAL U.S. LENS MARKET)



The sales of polarized lenses in USA have been growing tremendously. This fact itself is testament to the greater recognition of product benefits. With greater communication from optical professionals **this growth will continue**. Because everyone should wear polarized lenses.

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 in 0.25 steps
FT28 Bifocal	2, 4, 6, 8	Gray 1, Gray 3, Brown	0.75 - 4.00 in 0.25 steps
FT35 Bifocal	2, 4, 6, 8	Gray 3	0.75 - 4.00 in 0.25 steps
7x28 Trifocal	4, 6, 8	Gray 3	1.50 - 4.00 in 0.25 steps
Plano	6	Gray 1, Gray 3, Brown, Green	-

Polycarbonate	Bases	Colors	Add range
Single vision	0.5, 1, 2, 3, 4, 5, 6, 7, 8	Gray 3, Brown	-
Single vision	0.5, 2, 4, 6, 8	Copper, Green	-
Image® Progressive	2, 4, 6, 8	Gray 3, Brown	1.00 - 3.00 in 0.25 steps
Image Wrap™	8	Gray 3	1.00 - 3.00 in 0.25 steps

High Index 1.67	Bases	Colors	Add range
Single vision	0.5, 2, 4, 6, 8	Gray 3, Brown	-

1.67 High Index lenses are made from MR-10™ material

% AVERAGE LUMINOUS TRANSMITTANCE

	Gray	Brown	Gray 1	Green
Hard Resin	16	17	34	15
Polycarbonate	18	20		15

BEWARE, not all polarized products meet NuPolar® standards for blocking glare.
All NuPolar® lenses pass the ANSI Z80.3 standards for traffic signal recognition.

ALL NUPOLAR® LENSES BLOCK 100% OF UVA/UVB RAYS



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