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# THE CONTINUING EVOLUTION OF HIGH-INDEX LENSES

Manufacturers continue to improve upon existing lens materials by introducing higher indices.

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The direction of the lens market has evolved from using 1.50 conventional resin materials to an array of new higher-index choices. Here are some trends and observations to help you decide which lens material to use for a given patient.

### CR-39

With an index of 1.50 (actually 1.498), CR-39™ was the material PPG Industries, Inc. patented in 1945 and was first sold in the late 1950s. It is surprising to know that after 60 years, this product still has a respectable market share. While precise numbers are difficult to obtain, industry data indicate its market share is likely in the low 30% range for the U.S.

Despite the fact that many people have moved away from it for the properties higher-index

lens materials offer, a good many eyecare professionals (ECPs) continue to use it as the foundation of lens sales. Yet many lens casters admit CR-39 lenses do not command the higher profit margins higher-index premium products do, unless they have a premium lens design. Because of its properties and price, CR-39 and similar traditional resin materials will be on the lens material menu for many years, although it will likely decline as newer products replace it.

### TRIVEX

PPG Industries launched Trivex® in 2001, providing excellent optics similar to CR-39, as well as ultra-lightweight comfort, strength, and protection.

At first glance, some ECPs will pass up Trivex because of its 1.53 (actually 1.523) index. Usually classified as a mid-index material, Trivex found an ally with rimless eyewear since it drills easily and cleanly, and it doesn't create a lot of heat during drilling, making it less prone to warping.

Trivex also resists hole elongation, an issue seen with polycarbonate lenses where drill holes stretch and distort over months of wearing in a rimless mounting.

Trivex is also finding its way into rimmed eyewear due to features like impact resistance, chemical resistance, clarity, and light weight. A popular category is children's eyewear where collision proof is a prime concern of parents. In addition, it's making a big impact on sunwear through NXT® lenses (supplied by Intercast Europe).

The material is well suited for the vast majority of prescriptions ECPs encounter. After all, why use 1.60 or 1.67 lens material for a -1.25D

-1.00D x 175 when a Trivex lens would perfectly suit for this Rx range while providing some attractive features and benefits not available in the higher-index materials?

### POLYCARBONATE

From its humble beginnings as a lens material in the 1970s, polycarbonate has evolved into an industry staple. With its 1.59 (1.586) index, polycarbonate first found its stride as a lens that offered superior impact resistance. This endeared it to parents



Shamir offers SuperLite 1.74 for those looking for a thin lens.



With an index of 1.56, Kaenon Polarized's SR-91 lens offers an Abbe value of 40.

who wanted the highest degree of impact resistance for their children's eyewear. A "duty to warn" campaign helped fuel these safety-related sales, which grew the market. In addition, some optical chains adopted it as the primary lens of choice in an effort to ward off liability issues.

As the price of polycarbonate has come down, its usage has gone up, bringing polycarbonate to a hefty 50% market share. Of course, polycarbonate's fairly low Abbe value continues to cause concern with ECPs fearing potential ghost images and blur, especially as the wearer looks through the periphery of lenses with higher powers. Even so, due to its higher index and lower price, polycarbonate will likely remain a popular material for some time to come.

#### OTHER HIGH-INDEX MATERIALS

While there is a lot of publicity about higher-index lens materials, they command a relatively small portion of the total lens market. For example, lens materials with an index greater than 1.575 and less than 1.625 have only a 1.1% market share (excluding polycarbonate). Lens materials above 1.625 have only a 4.6% share.

The low percentage is not surprising because 85% of all lens prescriptions fall between +/-3.00D while 95% fall between +/-5.00D. That means only 5% fall above +/-5.00D, which is when ECPs would want to consider a higher index material. It appears ECPs are letting the Rx dictate when to employ a high index. This is contrary to the trend in Europe and Asia where a much higher percentage of high-index lenses are used for prescriptions. These overseas markets are more concerned with the overall thinness of finished eyewear while the U.S. makes lens material decisions based on additional factors.

In the high-index category, 1.67 continues to be a favored material for rimless eyewear. In addition to its thinning abilities, it also drills and holds up well in mountings that use screws or other attaching hardware through the lenses. If you require lenses that are thinner than polycarbonate and don't need the impact resistance of poly, 1.67 is a good choice.

For the thinnest lens available, look to 1.74. Be mindful the Abbe value for these lenses will be 32 or 33 with a specific gravity value in the 1.45 to 1.47g/cm<sup>3</sup> range. Even so, if slim is what you're after, look no further than this material.

Lens material trends are dynamic so what may be a trend today may become simply a fad tomorrow when some new trend replaces it. Be sure and keep an eye on the higher-index lens market because there's always something new affecting it.

#### LENS MATERIALS AT-A-GLANCE

MATERIAL	MANUFACTURER	REFRACTIVE INDEX	SPECIFIC GRAVITY	ABBE VALUE
CR-39™	PPG	1.50	1.31g/cm <sup>3</sup>	59
Crown (glass)	Many manufacturers	1.523	2.58g/cm <sup>3</sup>	59
NXT®	Intercast	1.53	1.11g/cm <sup>3</sup>	43-45
Trivex®	Many manufacturers	1.53	1.11g/cm <sup>3</sup>	43-45
Spectralite®	Carl Zeiss Vision	1.54	1.21g/cm <sup>3</sup>	47
EasyLite™	Younger Optics	1.55	1.24g/cm <sup>3</sup>	38
High-X 1.55	X-Cel	1.55	1.20g/cm <sup>3</sup>	38
EvoClear® 1.56	Signet Armorlite	1.56	1.24g/cm <sup>3</sup>	36
SR-91®	Kaenon Polarized	1.56	1.15g/cm <sup>3</sup>	40
Polycarbonate	Many manufacturers	1.59	1.21g/cm <sup>3</sup>	32
EvoClear 1.6	Signet Armorlite	1.60	1.34g/cm <sup>3</sup>	32
Eyas™	HOYA	1.60	1.34g/cm <sup>3</sup>	41
Hyper Index® 1.60	Optima	1.60	1.34g/cm <sup>3</sup>	37
MR 8 1.6	Carl Zeiss Vision	1.60	1.22g/cm <sup>3</sup>	42

SuperLite™ 1.6	Shamir	1.60	1.30g/cm <sup>3</sup>	42
Thin&Lite® 1.6	Essilor	1.60	1.30g/cm <sup>3</sup>	41
TLX1.6™	Signet Armorlite	1.60	1.30g/cm <sup>3</sup>	42
HyperIndex 1.66	Optima	1.66	1.35g/cm <sup>3</sup>	32
1.67 High Index	Signet Armorlite	1.67	1.34g/cm <sup>3</sup>	32
1.67 Super SVAR	Seiko	1.67	1.36g/cm <sup>3</sup>	32
1.67 UltraThin UV	Pentax	1.67	1.36g/cm <sup>3</sup>	32
Eynoa™	HOYA	1.67	1.30g/cm <sup>3</sup>	32
High-X 1.67	X-Cel	1.67	1.20g/cm <sup>3</sup>	31
MR 7 1.67	Carl Zeiss Vision	1.67	1.36g/cm <sup>3</sup>	32
MR 10 1.67	Younger Optics	1.67	1.37g/cm <sup>3</sup>	32
SuperLite 1.67	Shamir	1.67	1.37g/cm <sup>3</sup>	32
Thin&Lite® 1.67	Essilor	1.67	1.37g/cm <sup>3</sup>	32
Eyry™	HOYA	1.70	1.41g/cm <sup>3</sup>	36
Thindex™ 1.70	Vision-Ease Lens	1.70	1.41g/cm <sup>3</sup>	36
Chemilens 1.74	United Vision Corp./ Chemilens	1.74	1.47g/cm <sup>3</sup>	33
HyperIndex 1.74	Optima	1.74	1.47g/cm <sup>3</sup>	33
Seiko 1.74	Seiko Optical	1.74	1.47g/cm <sup>3</sup>	33
SuperLite 1.74	Shamir	1.74	1.47g/cm <sup>3</sup>	32
Thin&Lite 1.74	Essilor	1.74	1.45g/cm <sup>3</sup>	32

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#### WHERE TO FIND IT

Carl Zeiss Vision Inc.  
800-358-8258 • [zeiss.com/lenses](http://zeiss.com/lenses)

Essilor of America, Inc.  
800-542-5668 • [essilorusa.com](http://essilorusa.com)

HOYA VISION CARE, North America  
877-528-1939 • [hoyavision.com](http://hoyavision.com)

Intercast Europe  
+39-0521-607555 • [intercast.it](http://intercast.it)

Kaenon Polarized  
866-KAENON-1 • [kaenon.com](http://kaenon.com)

Optima, Inc.

800-621-1216 • [optima-inc.us](http://optima-inc.us)

Pentax Vision, Division of Seiko Optical Products  
800-401-9101 • [seikoeyewear.com](http://seikoeyewear.com)

PPG Industries, Inc.  
800-323-2487 • [ppgtrivex.com](http://ppgtrivex.com)

Seiko Optical Products of America, Inc.  
800-235-5367 • [seikoeyewear.com](http://seikoeyewear.com)

Shamir Insight, Inc.  
877-514-8330 • [shamirlens.com](http://shamirlens.com)

Signet Armorlite, Inc.  
800-950-5367 • [signetarmorlite.com](http://signetarmorlite.com)

United Vision Corp./Chemilens  
212-356-0010 • [uvco.net](http://uvco.net)

Vision-Ease Lens  
800-328-3449 • [vision-ease.com](http://vision-ease.com)

X-Cel Optical Co.  
800-747-9235 • [x-celoptical.com](http://x-celoptical.com)

Younger Optics  
800-366-5367 • [youngeroptics.com](http://youngeroptics.com)