

New Sun Lenses

That Make **COLORS** Pop

CATHERINE WOLINSKI / CONTRIBUTING EDITOR

They say there's nothing new under the sun, but sunwear-savvy optical businesses selling color enhancing lenses are beginning to see things a bit differently.

The emerging trend of color enhancing sunwear goes beyond tints and mirrors to proprietary technologies that are specific, scientific amplifiers of visual experience, from boosting colors of everyday outdoor stimuli to improving performance for sports and various activities.

Bringing the beautiful and the functional together into one colorful lens category that spans the aesthetic to the athletic, color enhancing lenses offer immediate improvements in color vision—revealing vivid colors in wearers' visual fields—and in visual acuity, activating an almost superhuman ability to take in details that are not as visible to the naked eye.

The technologies embedded in these sun lenses, developed by leading manufacturers and brands such as Coste, Essilor, Oakley, Ray-Ban, Smith Optics, Maui Jim and Zeiss, can be applied to anything from daily tasks like driving to specialized sports activities and hobbies.

The excitement around color enhancing sunwear—which readily lend themselves to in-store demonstration—is evidenced by practitioners and patients as products are popping up at optical dispensaries across the nation.

“Color enhancing lenses are the new standard,” said Rob Tavakoli, MSBA, ABOC, vice president of SportRx, a privately held investor group that dispenses a majority of its prescription and non-prescription color enhancing eyewear online. “You really can't be in the sunglass game anymore without having a color enhancing technology.”

Tavakoli, who has been a practicing optician at SportRx for 10 years and who personally tests color enhancing sunglasses and sports goggles for various activities, touts

color enhancement, and Oakley Prizm in particular, for its ability to improve contrast, details and safety for those who engage in activities like cycling and mountain biking.

“What's so amazing from a retailer's perspective is how simple and easy it is to sell,” said Tavakoli. “Customers just want to know what's best for what they're doing.”

Everyday Eyesight, Enhanced

At The Optical Shop at Greenwich Ophthalmology in Stamford, Conn., the leader in sales of Maui Jim sun lenses in the Northeast, head optician Ethan Brown said patients who try on a pair of color enhancing sunwear experience a “wow factor” resulting from the lens' ability to make colors “pop”.

According to Brown, patients need only look out the window to experience and become engaged in the visual effects of Maui Jim's PolarizedPlus2 technology.

“We have them look outside and in nicer weather, when the [ground] is blooming and different greens and reds and oranges are popping out, the patient actually has a ‘wow’ factor. They see it's a superior product from looking outside in nature,” Brown said.

Dave Birch, Maui Jim lens trainer, attributes the company's success to the lenses offering an approachable and aesthetically pleasing solution to everyday outdoor activities. “One of the benefits [of PolarizedPlus2] is that it is very versatile,” said Birch. “Depending on the lens color, it can be great whether you're driving or playing tennis.”

Likewise, Terry Tranmer, licensed optician and co-founder of Mountain West Optical in Twin Falls, Idaho, said Smith Optics' ChromaPop lenses “basically sell themselves.”

“I find that a lot of our patients choose ChromaPop because of how vivid all the colors are,” said Tranmer, who also has patients look or go outside during try-on. “We give them choices by showing them just about anything they could order [and they choose ChromaPop].”

Sport-Specific Sight

At Waco Vision Source in Waco, Texas, color enhancement education begins in the exam room and ends on the water, according to practice owner Stacie Layne Virden, OD, FAAO. Virden, who carries Costa 580 lenses, which she prefers “for their combination of tints and optics,” engages patients in discussions about premium lenses from clear indoor/computer lenses to sunwear for specific activities outdoors.

“We have a lot of patients [who] travel for fishing off-shore; there are a lot of lakes and rivers where people fish in the area,” said Virden, whose typical patient interested in color enhancing lenses is “a guy between 30 and 60 who spends his time playing sports or on the water fishing.”

At Costa, which is based in Daytona Beach, Fla., color enhancing lenses are even engineered for different types of fishing, yet they're also appropriate for casual use, said Renato Cappuccitti, Costa director of Rx sales. “Some Costa lenses are specifically designed for specific types of fishing—in really deep, dark blue water in off-shore fishing, gray is more effective in helping you see [as opposed to] closer to the shore, where the water color changes to greenish or brackish and murky.”

Likewise, he said, copper lenses are more suitable for rivers, lakes and in-shore fishing, where the water and fish appear more brown—essentially, each lens enhances the colors of the environment of the fish—but, he added, “you don't need to fish to have a great sunglass.”

Offerings from Oakley cover a wider spectrum but at the same time are wildly specific. The company's continuously expanding Prizm line is now available in no fewer than 12 activity-specific varieties, applicable anywhere from snow-dominant skiing environments to astro turf-clad sports fields to dirt-heavy BMX riding courses.

Rob Tavakoli said the biggest selling point for Oakley Prizm is its simplicity—if you're a golfer, there's Prizm

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Golf; if you're a baseball player, there's Prizm baseball; and if you're one to embark on hiking trails, there's Prizm Trail. But for any color enhancing lens, there is an ideal wearer, he said.

"ChromaPop from Smith Optics, 580 from Costa, PolarizedPlus2 from Maui Jim... I've tested them all, and we carry them all," he said. "All those brands reach out to different demographics. For heavy coastal fishing, there's Costa. For athletic road cycling and mountain biking and baseball and golf, there's Oakley Prizm. It really depends on your demographic and your patient base."

Whatever the case, and whatever your base, "If you're going to sell it, you have to really thoroughly understand the technology and be able to explain it in simple terms," Tavakoli said.

To reveal the varieties and intricacies of the color enhancement trend, *Vision Monday* asked leading lens engineers what sets their sunwear apart. While each distinctive technology boasts its own take on the methods and applications of color enhancement, one might say they can all agree on one thing—there's a new way to see what's under the sun.

Ray-Ban: Chromance

Ray-Ban recently released Chromance, a high chromatic contrast lens featuring higher definition and color enhancement to capture more detail in surrounding environments.

"Our R&D team is constantly exploring new boundaries in lens technology," said Fabrizio Uguzzoni, president, Luxottica Wholesale North America. "These innovative lenses feature high chromatic contrast and allow for higher definition and clarity of the color spectrum. In other words, wearers will see a brighter, more colorful world around them. Not a single detail of wearers' surrounding environment is lost."

The Chromance lens, he continued, "literally fine-tunes light," heightening contrasts, colors and contours, filtering harmful UV rays, and eliminating reflections and glare for 100 percent enhanced perception and clear, comfortable vision quality. In addition, "special hydrophobic and colored gradient mirror lens coatings improve the lenses' high performance characteristics, making them perfect for everyday life's challenges, from all terrain activities to fast-paced urban lifestyles," Uguzzoni said.

For the product's launch, Ray-Ban drew inspiration from outdoor "travelers, explorers and thrill seekers," creating a dedicated Ray-Ban Chromance microsite and social media campaign to showcase the styles and effects of the lens, as told by the faces and globe-trotting adventures of internet-famous travel bloggers and online personalities.



Ray-Ban Chromance draws inspiration from travel bloggers, highlighting the visual effects of vibrant colors seen around the world.



The new Chromance lens from Ray-Ban is available in many of the brand's sunglass styles.

Oakley: Prizm

According to Oakley visual performance lab manager, Wayne Chumbley, Oakley's R&D team began developing Prizm lens technology 15 years ago "in response to no other lens on the market being able to enhance detail and optimize performance for specific environments.

"Then when short wavelength dyes and spectral cameras became available, and Oakley Prizm started to become reality," Chumbley said.

Oakley Prizm isolates specific environments such as the mountains, road, water or athletic field to reveal details that viewers might otherwise miss. According to Chumbley, "the technology works by fine-tuning individual wavelengths of color, resulting in sharpening visual acuity to reveal nuances that would be missed by the naked eye.

"What differentiates Oakley Prizm lenses is that they fine-tune light to give you the best possible visual experience for specific environments. Landscapes that would normally be washed out or dull with other lenses become defined, vibrant and vivid. Prizm maximizes your vision in a full range of environments and

helps you make the most of any activity, from sports to everyday life," he said.

For example, the Prizm Golf lens was designed specifically for the golf course, helping to accentuate greens and browns, "giving golfers that edge to spot transitions between the fairway, fringe and rough, and gauge distance with accuracy," Chumbley said.



Oakley Prizm lens technology is available in a wide variety of colors and frame styles. Pictured here, Oakley Prizm Daily, Oakley Prizm Golf and Oakley Prizm Trail.

Originally launched in October 2015, Oakley has continued to expand the Prizm line by adding new, activity-specific technologies suited to professional athletes as well as everyday consumers. Among the 12 Prizm options are:

- **Prizm Shallow Water:** ideal for viewing fish hiding spots and shadows by enhancing greens and coppers while keeping whites bright.
- **Prizm MX:** enables BMX bike riders to see subtle transitions in dirt and terrain by enhancing browns and reds, while maintaining a "color pop" in green.
- **Prizm Daily:** this sun lens enhances all colors in a manner that is balanced for everyday use.
- **Prizm Snow:** accentuates colors that contrast with snow, such as reds and cyan, since snow environments are dominated by white.
- **Prizm Golf:** helps golfers spot transitions throughout the course by accentuating greens and browns.
- **Prizm Field:** brightens colors like blue (sky) and white

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Products That Enhance Aesthetics and Performance

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(ball), and saturates green and brown (grass and dirt) to optimize game play on the field.

- **Prizm Road:** allows riders to see subtle changes in road texture and spot hazards by brightening whites and enhancing yellows/greens/reds.
- **Prizm Trail:** allows riders to see transitions between dirt more easily in a variety of lighting conditions.
- **Prizm Deep Water:** features added polarization to cut through water glare while dark lens color provides eye comfort for long days deep water fishing, filtering out overwhelming shades of blue on open water, while boosting greens and reds and brightening whites.
- **Prizm Cricket:** increases contrast of red or white cricket ball against green grass and brown dirt by enhancing colors and contrast.

Chumbley thinks potential customers will appreciate

Prizm's benefits once they go outside and try on the lenses in the environment for which they are intended. "Seeing is believing," he said.

Essilor Sun Solution: E-Sun Kolor Up

E-Sun Kolor Up sun lenses "enhance the beauty of colors while maintaining a high level of sun protection," according to Essilor Sun Solution, the Essilor Group division dedicated to non-prescription lenses. The lenses let the wearer see colors more vibrantly in very bright conditions, with optimal comfort and protection, Essilor said. Other features inherent in E-Sun Kolor Up lenses include built-in UV and blue light absorption and a color equalizer that brightens primary colors and improves color sensitivity and contrast. The lenses are available in PPG's CR39 monomer, APX (nylon) as well as NXT and polycarbonate.

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Essilor Sun Solution's Kolor Up lenses are packaged with colorful Mazzucchelli acetate frames.

Lenses That Alleviate Color Blindness

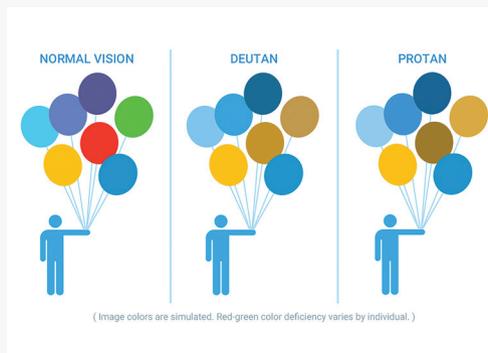
Following 10 years of research and development, which included three National Institutes of Health (NIH) SBIR-funded studies conducted at UC Berkeley and UC Davis, EnChroma eyewear emerged in 2010 as a specialty eyewear for the alleviation of red-green color blindness.

Commonly referred to as "color blindness glasses," EnChroma eyewear is available in both prescription and non-prescription styles, using multi-notch filtering to alleviate red-green photopigment overlap by targeting and eliminating sharp wavelengths of light, resulting in the enhancement of specific colors, according to the company.

EnChroma is available in three densities, listed in ascending order of color transmittance:

- **Cx-14 (14 percent transmittance)**—the standard dark sunglass option for outdoor use.
- **Cx-25 (25 percent transmittance)**—the medium sunglass lens, ideal for indoor/outdoor use.
- **Cx65 (65 percent transmittance)**—indoor/computer lens.

Although EnChroma color-correcting lenses enhance the vibrancy and saturation of certain colors and improve color discrimination, depth and detail and are estimated to help 80 percent of CVD patients, the company empha-



EnChroma corrects red-green color vision deficiency in 80 percent of cases; above, a simulation of normal vision vs. red-green color blindness.



EnChroma glasses for the color-blind are available online; above, the EnChroma Explorer in matte black.

sized that the eyewear is not a "cure" for color blindness.

In addition, said EnChroma president and CEO, Andy Schmeder, while some people have an immediate "wow" reaction to EnChroma glasses, many patients see a small immediate difference, but report large long-term effects including better color discrimination and improved ability to name colors. The role of the ECP, therefore, is crucial, Schmeder said.

"Similar to adapting to a new prescription, or to first-time use of a progressive lens, the EnChroma patient benefits from expert coaching to understand the importance of giving adequate effort and time for the neural plasticity in the brain to adapt and incorporate new information from the eyes," said Schmeder. "Eyecare professionals understand this better than anyone and are uniquely qualified to guide people with color blindness through the experience of using EnChroma glasses to achieve the greatest possible benefit."

To prepare for dispensing EnChroma, the company offers a free, three-part training video online. Practitioners interested in carrying EnChroma are also encouraged to take (and screen patients with) the EnChroma CVD test, also available online. The test expands on the Ishihara test to determine the likelihood the glasses will correct CVD for each individual candidate. ■

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Dispensing Lenses That Offer Patient-Perceptible Benefits

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Essilor is collaborating with Mazzucchelli to offer sunglasses manufacturers and designers a “lens-acetate” package to create eyewear collections which are both fashionable and high quality.

“Kolor Up will help creative and aspirational brands to fulfill their vision for the brand. Kolor Up will help their consumers to become the brand’s lovers and advocates,” said Christophe Mayet of Essilor Sun Solutions.

E-Sun Kolor Up is part of a Essilor’s new E-Sun brand, which also features E-Sun Rx, a lens that offers optimal correction in the sun; E-Sun Polarfun polarized lenses; E-Sun Varia, which Essilor describes as “state-of-the-art photochromic sun lenses,” and E-Sun Magicoat, which feature special coatings to protect and enhance lenses.

Maui Jim: PolarizedPlus2

“We are constantly looking at new technologies and new ways to enhance the vision experience,” said Dave Birch, Maui Jim lens trainer.

Maui Jim’s PolarizedPlus2 lenses use two patented technologies that combine pigments and rare earth elements to filter specific wavelengths of light, reducing scatter, eye fatigue and eye strain. “We remove wavelengths to give better saturation of what we need,” said Birch. This results in enhanced reds, greens and blues, according to Maui Jim’s website.

Also unique to this lens technology is its ability to protect eyes on both sides of the lens, eliminating 99.9 percent of harmful glare from any surface, Birch said.



Maui Jim PolarizedPlus2 color enhancing technology is included in all Maui Jim lenses, including the Maui Jim Blue Hawaii, pictured here.

Available colors include Neutral Grey, “the darkest lens for the brightest conditions” like offshore fishing, boating, lifeguarding and professional golfing; Maui Rose, a dark lens which provides high contrast in dark environments while relaxing eye muscles; and Maui HT, which provides color enhancement for variable low light, useful for pre-cataract patients and AMD patients.

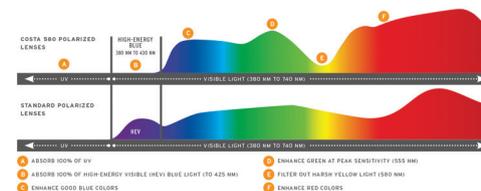
Costa: 580

Costa’s 580P (plastic) and 580G (glass) offer a wide variety of color filtering tints and color mirrored tints that accomplish “three critical things: removing yellow light [at 580 nanometers] that helps enhance green and red; peaking green at 555 nanometers specifically, because the eye is stimulated at that wavelength more than any other; and absorbing more blue light haze than any other lens. Those things together really make this lens superior,” said Costa director of Rx sales, Renato Cappuccitti.

“The 580 technology is definitely what we consider our color enhancing technology,” he said. “Yellow light is almost the shortest wavelength of any of the colors, from 575 to 585 nanometers.”



Costa 580 is available in various styles. Pictured here, Costa Blackfin in matte black with Sunrise Silver Mirror, Costa’s newest lens.



Costa 580 polarized lenses complete six different tasks, targeting specific wavelengths to absorb 100 percent of UV and HEV blue light, filter out harsh yellow light, and enhance blue, green and red colors.

Costa 580 differs from the earlier Costa 400 technology specifically by absorbing different wavelengths in the visible light spectrum, Cappuccitti said.

When compared to Costa 580’s technological advancements, Cappuccitti describes Costa 400, which blocks high-energy ultraviolet blue light up to 400 nanometers, as an “entry level color enhancing lens” using Costa’s “generic lens technology without all the bells and whistles.”

According to Cappuccitti, the yellow light range was targeted because it is the harshest to colors adjacent, mean-

ing it makes the colors alongside of it on the visible light spectrum—red and green—more difficult to see. “When yellow is removed, red and green are more vibrant.”

Zeiss: Vivx High Definition

Zeiss Vivx High Definition lenses, created by Pilla Sport in partnership with Carl Zeiss Vision Sunlens, are ideal for “sports that require maximum efficiency of visual experience for performance outcome,” Philip Pilla, Pilla Sport CEO, told VM.

According to Pilla, the lenses were originally created 25 years ago out of father-and-son necessity. “We started the company out of personal need—we couldn’t find shooting glasses that did anything,” said Pilla, adding that shooting eyewear at the time was thought of as something one simply had to wear for safety. “We revolutionized the shooting industry by introducing a different methodology.”



Zeiss Vivx High Definition Lenses, optimized for shooting, are available as complete pairs or as over-the-frame additions.

That methodology was using color manipulation and filtration and light management to enhance a shooter’s vision, improving their ability to focus on targets as well as see clear separation between targets and backgrounds, Pilla said.

Pilla’s Zeiss Vivx lenses service a variety of shooting sports like traps, skeet and three gun (the fastest growing discipline, according to Pilla), along with other target-dependent sports, such as archery and polo.

“We believe the eyes are the most important aspect of any athletic performance, and are far too often neglect-

ed,” said Pilla. “A lot of people in sports worry about diet and fitness, strength training and endurance, but the aptitude of the eyes is really never talked about.”

Smith Optics: ChromaPop

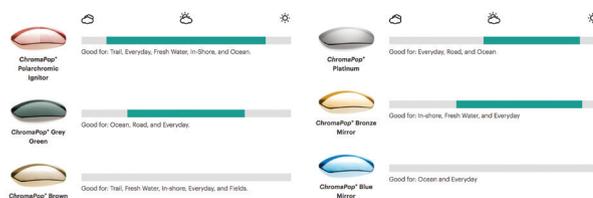
This color-enhancing lens, available in a variety of materials and price points, allows enhanced color definition and clarity by eliminating spectral overlap to separate specific wavelength ranges.

According to Smith Optics director of lens development, Will McNeal, when engineering ChromaPop, Smith “took the approach of how the human eye perceives color and sends signals to the brain,” addressing the sensitivities of the three color sensitive portions of the eye.

“The sensitivities of those groupings have areas of overlap—it’s like having a conversation with multiple people at once,” said McNeal, referring to the short range (blue), medium range (green) and long range (red) wavelengths.

Tints Matter.

Find in your lens for the right environment. Our custom lenses are tuned to deliver you ultimate clarity and durability for any experience.



Smith ChromaPop lenses are available in various tints optimized for different environments.

“When two people are talking, you get the message, but it’s not exactly clear, it’s distracting.”

To clear up color confusion, ChromaPop uses a narrow band filter that cuts out areas of spectral overlap, allowing the brain to receive a stronger signal from one grouping instead of two signals of equal strength. Essentially, McNeal said, “a strong signal means a strong color response to the brain, which makes colors appear brighter and more vivid.”

ChromaPop options include:

- **ChromaPop+ Polarized**—the premium option, made with a cast material called Trivex that offers more clarity in central and peripheral vision than polycarbonate lenses. The lightweight plastic is especially beneficial for prescription lenses, McNeal said.
- **ChromaPop Polarized**—offers 100 percent UV protection an enhanced glare reduction along with water resistance and impact protection, which can be particularly useful for water activities. “A polarized lens removes glare and you can see into the water. Another example is a wet highway, where glare off the road or glare on a windshield can be eliminated.”
- **ChromaPop Performance**—this non-polarized option may be useful for certain activities, particularly when LCD instruments are present, McNeal said. This can be a specialized situation, like an airline pilot flying a plane, or an average situation, like navigating the pump at the gas station on a sunny day. ■

Solutions for ‘Health Blindness’

Mark Changizi, entrepreneur and evolutionary theoretical neuroscientist, originally created O2Amps eyewear—now sold under the name Vino Optics—to cure what he refers to as “health blindness,” or the inability to detect a person’s blood oxygenation levels, which give insight into a person’s physical and emotional state.

Changizi, who is also author of the book, *The Vision Revolution*, believes that there are four “superpowers” of vision: “telepathy” (color); “X-Ray vision” (binocularity); “future-seeing” (motion); and “spirit reading” (object recognition).

In other words, primates (and humans) evolved to use color vision to see skin, and thus under the skin, in order to sense the temperament and health of other primates (think of a blush yielding embarrassment, or a pale skin giving way to illness).

“Originally the markets we intended [the eyewear] to be used for was all about vein finding and having visibility of blood under the skin,” said Changizi, who



Vino Optics lenses are available in three variations: “Vein Glasses,” “Bruise Glasses” and “Colorblind Glasses.”

adapted his original concept once its alternative use was discovered. “Red-green color vision is all about blood under the skin, so you can read emotional states and health—it turned out there were ways of further amplifying that. It hadn’t occurred to us that [color blindness] could be a market.”

O2Amp technology evolved into Vino Optics, which offers solutions to two problems: medical vein-finding (of

which there are two types) and color vision deficiency. Both versions of the eyewear are available in a variety of frame styles, as well as protective eyewear options and uncut clip-on lenses.

- **Oxy-Iso**—the version of the glasses that has been found to diminish the red-green deficiency that lies behind color blindness. “It’s all about the Oxy-Iso for optometrists,” said Changizi, who added that it has been particularly helpful for ophthalmologists who are color deficient, who are able see redness and irritation in patients’ eyes when wearing the lenses.
- **Oxy-Amp**—sold mainly to paramedics, nurses and phlebotomists, enhances oxygenation without blocking anything else, making this lens helpful for clinicians who want to see as much as possible beneath a patient’s skin. The main market for these, Changizi said, is paramedics who have normal color vision, as they are not helpful for color deficient individuals. ■