



# Unity Relieve: Improved Remedy for Digital Eye Strain

## Technical White Paper

### Summary

New Unity® Relieve lenses are designed for the growing problem of Digital Eye Strain. They provide a higher level of visual comfort for young and pre-presbyopic single vision lens wearers who spend two hours a day or more on digital devices and show visual fatigue symptoms. Unlike other “anti-fatigue” lenses, Unity Relieve is not simply a progressive made with a low addition power. Unity Relieve was designed specifically for its purpose according to the preferences of younger, symptomatic single vision lens wearers and emmetropes who do not yet wear eyeglasses. The result is a design that relieves the symptoms of visual fatigue better than the category leader, reducing the visibility of peripheral distortions as much as possible while providing addition effect only in the area used for close vision, not to allow clear focusing, but to reduce stress on the visual system.

### Background

In the last few years, the phenomenon of Digital Eye Strain has received a lot of attention in the ophthalmic industry. Driven by the widespread adoption of hand-held devices as a primary source of information and entertainment, millions of people have developed symptoms very much like those recognized in an earlier generation as Computer Vision Syndrome (CVS): headaches, dry eyes, eyestrain and intermittent blurry or double vision. But unlike CVS, Digital Eye Strain is the result of prolonged and close viewing of relatively small displays, and lens design strategies used to treat CVS may not be appropriate. For many people, especially those who have not yet developed the age-related condition known as presbyopia, Digital Eye Strain may be their first encounter with vision problems that are not simply a matter of blurry vision.

In response to increasing awareness of Digital Eye Strain, spectacle lens manufacturers have introduced “anti-fatigue lenses” whose purpose is to provide a dioptric addition power that is weaker than the amount used to correct presbyopia. The premise of these lenses is that the symptoms

of Digital Eye Strain are simply a precursor of presbyopia that happen because of a failure of the accommodative response. That premise is debatable, and the results of clinical testing suggest that it is wrong.

### Designed Only for the Symptoms of Digital Eye Strain

*“When your only tool is a hammer, all of your problems look like nails.”*

VSP® has measured and studied first-generation anti-fatigue lenses and they bear a strong resemblance to standard progressive addition lenses, except with a weak add power. The question arose whether this is the best design strategy. Progressive lenses have been developed for people with presbyopia, who have lost the ability to accommodate either partially or completely. The main symptom of presbyopia is persistent blurry vision for middle distance and close viewing. The most successful progressive designs therefore have been created to provide intermediate addition power immediately below the fitting cross, and a wide area of full addition power that is located high enough in the lens to be useful for reading. The majority of such designs even have add power in the periphery above the 180 line. We wondered, paraphrasing the old saying, “if your only tool is a progressive lens, do all your problems look like presbyopia?”

It’s a fact that many people suffering from Digital Eye Strain are not presbyopic. In fact, the majority have excellent accommodation amplitude and are able to see clearly even at very close distances. Furthermore, they do not report sustained blur at intermediate distances. Their symptoms are better understood as the result of stress placed on the accommodative-convergence system as well as the auxiliary muscles participating in the visual response, such as those in the eyelids and eyebrows. There is no reason to think that a lens designed to treat presbyopia is necessarily the right approach to treat Digital Eye Strain.

The design of Unity Relieve is the result of an iterative development process that started with

the assumption that a better anti-fatigue lens should be made specifically for this unique problem. We assumed that most patients who could benefit would either be first-time eyeglass wearers or would be wearing single vision lenses to correct ametropia. We therefore evaluated lens designs that minimized differences between the experimental designs and conventional single vision lenses while providing some positive dioptric power in the lower lens to reduce stress on the visual system. Through trial and error we learned that many symptomatic patients could not tolerate a standard progressive lens made with a weak add, because they were very aware of changes to peripheral and distance vision. They also did not respond well to designs that introduced positive power immediately below the fitting cross. The ultimate design that became Unity Relieve keeps positive power well below the fitting cross and maximizes far vision clarity along the 180 line.

### The Design of Unity Relieve Compared to Eyezen™

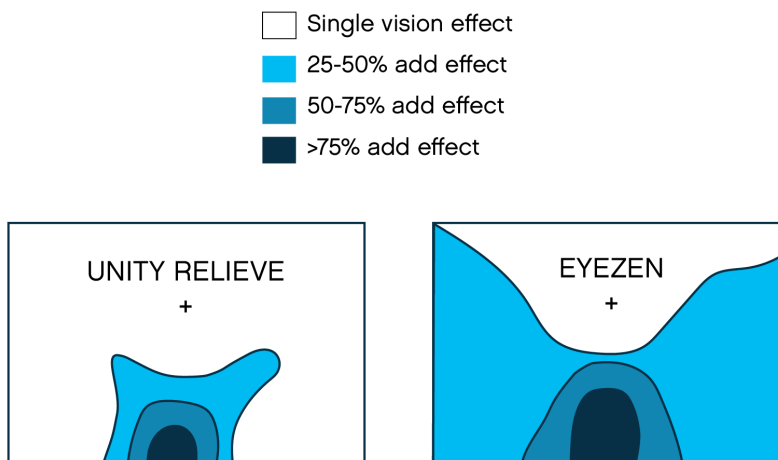
If you compare plots showing how addition effect is distributed in Unity Relieve to Essilor's Eyezen design, the differences are quite striking. These plots show relative mean power\* in a central region 40mm wide by 30mm tall. The Unity Relieve plot is easily distinguished from a progressive addition lens because the entire far zone and peripheral region resembles a single vision lens. Only the

area where eyes turn down and in for close work has significant addition power. In contrast, the Eyezen lens is very similar to Essilor's other progressive addition lenses, with significant addition power present on either side of the fitting cross and throughout the periphery. Very little area of an Eyezen lens conforms to the patient's actual single vision prescription.

### Significantly Improved Performance

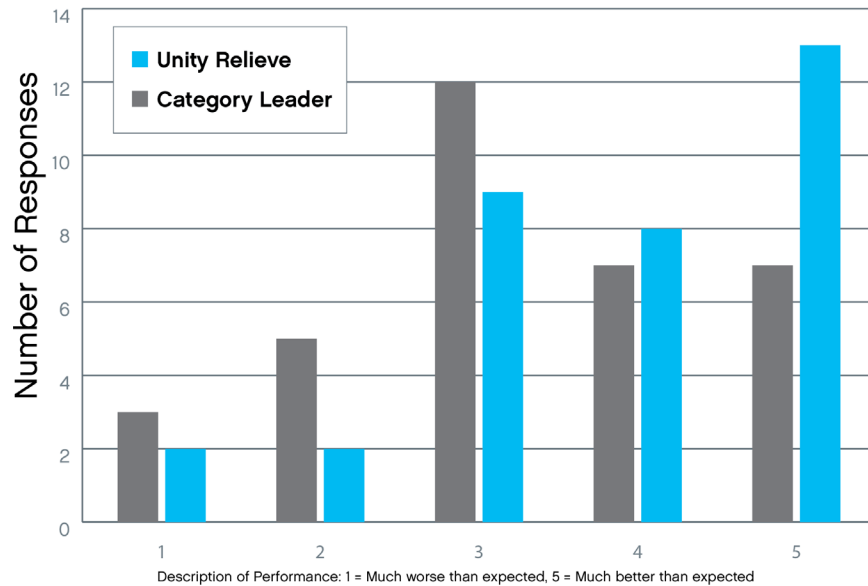
Unity Relieve was compared to the leading anti-fatigue lens design in a randomized, masked crossover study among a population of symptomatic<sup>1</sup> patients who demonstrated moderate to severe symptoms of Digital Eye Strain. Subjects ranged from age 19 to 43 and varied in prior eyeglass wearing experience but they were not previous progressive lens wearers. Each patient in the study wore each lens design for at least one week; half received Unity Relieve first and half started with the other lens. After wearing each design, subjects were asked to evaluate the ability of the test lenses to help relieve their visual fatigue symptoms<sup>2</sup> according to the level of their expectations. The five-point Likert scale was centered on the belief statement "meets expectations" and ranged from "much worse than expected" to "much better than expected." The result: according to patients, Unity Relieve was significantly better than the category leader at relieving symptoms of Digital Eye Strain.<sup>3</sup>

Distribution of Power in Unity Relieve Compared to Eyezen™



\*Plots show percentile contours scaled to the maximum measured addition power. Unity Relieve and Eyezen are offered in different increments of addition power effect and the actual amount of power obtained will depend on which design you choose. Unity Relieve plot is from a measured lens sample of a .70 lens. Eyezen plot shown is from a measured lens sample of an Eyezen 2 lens.

Distribution of Responses: Relief of Visual Fatigue



The following figure shows the distribution of responses; a value of 5 corresponds to “much better than expected.”

Some notable features of this graph include: more than 60% of Unity Relieve wearers reported that the relief of their symptoms of visual fatigue was better than they had expected. Only 40% of the subjects reported that the category leader exceeded their expectations. Furthermore, twice as many wearers reported dissatisfaction with the relief of visual fatigue provided by the category leader compared to Unity Relieve.

As expected from prior studies performed by VSP, there was no relationship between subject age and severity of symptoms.<sup>4</sup> This suggests that competing products whose design is based solely on the patient’s age are not approaching the problem correctly. Furthermore, it appears that the weaker a patient’s symptoms, the less an “anti-fatigue” design is appreciated, although Unity Relieve gets higher scores for both mild symptoms and strong symptoms. The results of the study strongly suggest that a prescribing approach based upon the severity of symptoms, and not patient age alone, gives better relief of symptoms.

### With TechShield Blue AR

Digital device displays keep getting brighter and brighter. While spending so many hours on digital devices, people are unwittingly being exposed to significant amounts of blue light. That’s because displays only have three colors of light emitter that trick the eye into seeing all possible colors in the spectrum. Those new, brighter displays have new and brighter blue light emitters. Blue light is thought by many to be a source of potential eyestrain and is suspected of causing sleep disruption.

Because Unity Relieve is made exclusively to reduce the symptoms of Digital Eye Strain, every pair comes with TechShield™ Blue AR, a premium anti-reflective coating with enhanced blue light protection. Up to 85% of wavelengths shorter than 430 nm are rejected by TechShield Blue. The result is clearer vision, enhanced cosmetics and protection from the shortest blue wavelengths.

### Prescribing and Dispensing Unity Relieve

Unity Relieve is recommended only for patients who are not yet presbyopic. That means in most cases they will be younger than 45 years of age, and more typically less than 40 years old. It is

<sup>1</sup>Subjects were clinically assessed by optometrists and screened for symptoms; non-symptomatic subjects were excluded from the study. Subjects also completed a survey that quantified the severity of symptoms on a 32 point scale; no subject in the study had a symptom score of less than 6.

<sup>2</sup> Described as: Visual fatigue such as headaches, eye strain and blurred vision caused by a prolonged usage of digital devices and/or by prolonged work at close distance.

<sup>3</sup>Analysis of Variance, repeated measures, n = 34 and p < .01

<sup>4</sup>Linear regression of symptom score as dependent variable, age as independent variable, R2 = .005, p= 0.70

available in two strengths. Each design provides relief to the accommodative-convergence system by distributing positive dioptric power smoothly so that it does not rise above the 180 line and it stays out of the way of straight-ahead vision. The Unity Relieve 50 design has a maximum increment of approximately one-half diopter, while the Unity Relieve 70 design has a stronger effect that peaks at about seven-tenths of a diopter.

The choice of Unity Relieve design for any patient depends upon the severity of symptoms as well as the patient's age. Sometimes it also is useful to consider the distance prescription. Patients nearing 40 years old are just beginning to lose a significant amount of accommodative amplitude, and if symptoms are moderate to strong, the Unity Relieve 70 is likely to be the better choice. But even if a patient is above age 35, when they are well-adapted to single vision lenses and have mild symptoms (particularly if they are myopic), the Unity Relieve 50 design is likely to be enough. Conversely, even young patients who have strong symptoms of visual stress and fatigue will need the Unity Relieve 70 design; this is especially true if they are hyperopic. Although dispensers may choose to rely on age only, our study suggests that this does not provide optimum results. However, if you do wish to prescribe based solely on age, we recommend a dividing point of around age 35.

How can you judge the strength of your patient's symptoms? Ask whether they experience headaches, dry eyes, blurry or double vision that comes or goes when looking at digital devices. Remember to ask how often and how severe their symptoms occur. It also is helpful to know whether your patient is a self-described heavy user of digital devices. It actually is quite easy to get a quick read on the situation. If your patient never experiences symptoms of visual fatigue caused by using digital devices, then single vision lenses will be fine. If symptoms are not severe or are infrequent, then Unity Relieve 50 is the right choice. For patients with intense or very frequent symptoms Unity Relieve 70 will be best.

When ordering Unity Relieve lenses, you should provide a fitting height measured to pupil center as the patient looks toward a distant object. In all respects the fitting method is the same as for any other personalized lens, and you may if you wish

include the patient's individual pantoscopic tilt, wrap angle and vertex distance as well as monocular PDs to get the maximum personalization. When you receive Unity Relieve lenses from VSP, you will measure power and prism at the fitting point, just like a single vision lens.

### **Not for Everybody, but for Many**

Many people are doing just fine without eyeglasses or anti-fatigue lenses. But almost everyone under the age of 40 is using digital devices every day and all day. Millions of people do have symptoms of Digital Eye Strain and can benefit from a lens design made just for the relief of visual fatigue caused by overuse of digital devices. Unity Relieve is the first lens made just for them.