# VISION EASE® Polarized Tints Manual

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# VISION EASE® Polarized Tints Manual

## Introduction

VISION EASE Polarized Tints polycarbonate lenses start with a fixed light transmission of 37% utilizing a patented polarized film technology. The lenses are a tintable front side hard coat to create multiple performance sunglass and fashion colors such as brown, green, rose and blue in a matter of minutes. A tintable backside coating will only decrease the amount of processing time it takes to achieve your desired color. VISION EASE Polarized Tints are available in SFSV, 75mm diameter, bases 2.00, 4.00, 6.25, 8.50.

| Color | Characteristics |
|---|---|
| Polarized Tints – Base Lens | All-purpose polarized lens providing natural color contrast. Popular for non-specific outdoor activities such as driving, walking, boating. |
| Smoke | Smoke reduces blinding brightness. Great daytime wear and outdoor sports. The dark-tinted lenses decrease glare while maintaining true color perception. |
| Blue | Polarized fashion tint used as outdoor lens or to reduce eye strain caused by artificial light sources.<br>Popular for cloudy, low light driving conditions or computer work. |
| Rose | A vibrant color increasing contrast in bright, sunny conditions. |
| Driver | This color helps block blue light to increase contrast and provide a brighter view on cloudy days. Recommended for most outdoor activities (fishing, golfing, cycling, driving, etc). |
| Absolute Brown | All-purpose polarized lens reducing blue light transmission for improved visual acuity.<br>Popular for driving, water activities, golf. |
| Green | All-purpose polarized lens enhancing contrast in low light. Popular for driving, fishing, shooting. |
| Golf | Highest level of contrast and depth perception in low light conditions. Popular for cloudy-day driving, shooting, tennis. |

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## Availability

- SFSV - high transmission - polycarbonate polarized lens
- Colors: Gray 2 (Base), Smoke, Rose, Golf, Driver, Absolute Brown, Green, and Blue
- SFSV: base 2.00, 4.00, 6.25, 8.50
- Diameter: 75mm
- Capability: Mirror, Flash, Tints, Gradients
- Patented Polarized Film Technology
- 37% Total Light Transmission
- 90% Polarizing Efficiency
- Bayer Coating of 2.0
- Tintable front side hard coat - A tintable backside coating will decrease timing for desired colors
- Cosmetic tints can be obtained within a few seconds to a few minutes; dark tints within 20 minutes (see reference table on page 5).

### Supplies and Set-up Required

- Brain Power Inc. (BPI) Molecular Catalytic (Recommended)
- Lens washing station – close proximity to an active sink

## Pre/Post Lens Treatment

- Lens preparation is best using clean warm water with a few drops of mild dish soap. Isopropyl alcohol, when needed, may also be used. Do not use acetone to clean polycarbonate lenses.
- Prior to tinting, assure all markings have been entirely removed.

## Tinting Preparation

### Tinting Unit

Dye heating units directly affect tint quality.

Ideal units will be capable of closely controlling the temperature within a few degrees.

Agitation of the dye mixture adds to efficiency of unit operation.

Recommended Tint unit - BPI Turbo 6, Phantom Heating System

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### Water

Tap water is typically best for initial mixing; electrolytes in tap water actually enhance the tinting process. Tap water yields the best results after allowing settling a few hours, which allows suspended sediments to settle.

Purified water is excellent for replenishment of evaporation. Beyond the needed electrolytes, most purified water will create an acidic solution, where slightly alkaline water produces faster and darker tints.

In the past, uncoated monomers such as CR39 worked well with DI, distilled, or reverse osmosis treated water, but the introductions of scratch coatings have changed industry practices.

### Mixing procedures

Clean: When mixing fresh dyes, it is important to begin with a clean tank and rinse the dye container completely.

Remove any settled dye – this affects final hues.

Temperature: Dyes should be mixed with warm water. Dye mixtures should be brought up to working temperatures for one hour prior to actual use, assuring activation of all pigments.

pH Balance: If pH measurement is monitored, 8.1 to 8.9 pH is recommended for most scratch-coated products.

### Temperature

Required hue and transmission is directly dependent upon working temperatures. Ideal temperatures for most dyes will be at 205°F:

Typical black dyes will exhibit red hues at 201°F and blue hues at 208°F.

Primary colors such as blue, red, and yellow do not require temperatures quite as hot for color balance.

Do not heat neutralizers beyond 195°F, as they can damage coatings and some substrates:

Rather than rely on unit settings, measure each container. Variances of up to 20°F have been observed.

## Tinting Procedure – Guidelines

### Tinting Length of Time

Performance Sunglass Tints: dark tints typically can be reached within 20 minutes.

Cosmetic tints can be reached within seconds to a few minutes.

Be aware that some coatings will not absorb dye, or may absorb minimal amounts of dye. Additionally, most absorption is on the back surface of the lens. If a lens is backside coated, dye absorption will be affected and dependent on the coating.

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In any case, recommended maximum tinting times of 30 minutes should not be exceeded. Remember that gradient tints also create possible damaging heat and extreme humidity upon the portion of lens above the dye, whether or not the lens is in the dye.

Various manufacturers of dyes and the temperature of dye pot will contribute to the alteration of the final lens color and transmission. Since a lab may not be familiar with tinting polarized lenses that start out at 37% light transmission, some experimentation is recommended for desired results. VISION EASE recommends a dye pot temperature of 205°F for the Polarized Tints product.

Most dyes marketed today produce an excellent end-product. It is important to maintain a fresh dye mixture, as extended use will deplete vital pigments for obtaining the desired hue balance.

### Examples using BPI dye at 205°F

| VISION EASE Color | BPI Color | Total Light Transmission (TLT) | Time |
|---|---|---|---|
| Smoke | BPI #46300 Black | 18% | 6 minutes |
| Blue | BPI #31300 Blue | 30% | 5 minutes |
| Rose | BPI #21700 Crimson | 12% | 4 minutes |
| Driver | BPI #500/550 #37604 | 28% | 4 minutes |
| Absolute Brown | BPI #31105 Absolute Brown | 9% | 12 minutes |
| Green | BPI #49900 G-15 | 18% | 8 minutes |
| Golf | BPI #42802 Golf | 17% | 8 minutes |

### Technique

Due to the nature of polycarbonate, suspended gasses within the dye will adhere to the lens, creating "white spots". Agitation of the lenses every 3 to 5 minutes while in the dye will dislodge most bubbles. If a clear spot does appear, re-dying the lens for 5 minutes will usually help alleviate the spots.

Experience will indicate best methods.

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### Neutralizing

Most commercial neutralizers have been found to attack the polycarbonate substrate, eventually damaging the coating.

The most efficient neutralizing agent tested is a 10% to 30% mild dish soap and water solution at a temperature of 190°F. You can expect to remove as much as 70% to 90% of the unwanted dye.

This method also works with other ophthalmic materials.

## Coatings – AR/UV Treatments/Mirrors

### Tinting Prior to Anti-Reflective Coatings

The cleaning process in anti-reflective coatings often removes some dye, causing a slight bleaching of tint and sometimes hue alteration.

In a pair of lenses dyed to a dark tint that required one lens to be hue modified (such as a little extra blue dye), it is common for those lenses to be returned unmatched. Tinting slightly darker than needed, followed by a quick exposure to neutralizer will typically assure the desired final results.

### Manufacturer/Material Varieties

Lens materials and various coatings provide different tinting results. Due to variations in manufacturing, even prescription power can differentiate final hues and intensities.

Where possible, it is best to develop different dye mixtures for the various materials to achieve correct color sample match.

### Coating Varieties

Not all coatings are tintable. Some coatings are specially formulated for increased scratch resistance, which typically eliminates dye absorbency, although some dye may enter the coating.

Do not attempt tinting lenses if not recommended by the manufacturer.

### U.V. Treatments

The nature of polycarbonate requires no further ultraviolet filtering. Do not attempt to apply U.V. dyes to polycarbonate as structural damage may occur.

Water/Dyes/Procedure:

VISION EASE Polarized Tints polycarbonate lenses will work well with your labs current choice of water whether it is DI water, distilled, purified or tap water.

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### Dye Quality

Manufacturers of dye, lenses, and varieties of lens materials and coatings all contribute to alteration of the final lens color and transmission, so some experimentation is recommended for desired results.

Most dyes marketed today produce an excellent end-product. It is important to maintain a fresh dye mixture, as extended use will deplete vital pigments for obtaining the desired hue balance.

### VISION EASE MyCoat

For applying AR coatings or front side mirrors using VISION EASE MyCoat®, see instructions and guidelines in the MyCoat® Operating Manual.

## VISION EASE Customer Contact

For any additional technical questions, call the toll-free Technical Services Hotline: (888-888-3044 or 763-398-6997). You can also send messages to us via e-mail: techservices@visionease.com

## Reference – ASNI and ISO Light Transmission Specifications

It is the responsibility of the final tinting entity to conform to the following standards.

Please keep in mind there are applicable ANSI and ISO light transmittance specifications for dress sunwear. Most notably traffic signal recognition requirements and daylight use transmission found in ISO 14889 Fundamental Requirements for Uncut Finished Lenses.

*ISO 14889 Section 4.5.2.2 Daylight Use*

- When using illuminant D65, the luminous transmittance of spectacle lenses for driving during daylight shall be >8% at the design reference point.

*ISO 14889 Section 4.5.2.2 Use at Night*

- When using illuminant D65, the luminous transmittance of spectacle lenses for driving at night shall be >75% at the design reference point. VISION EASE Polarized Tints lenses should never be worn at night since they start at 40% light transmission without additional tint.

*ISO 14889 Section 4.5.2.4 Relative Visual Attenuation Quotient for Signal Light Recognition*

- Spectacle lenses conforming to 4.5.2.2 and 4.5.2.3 shall have a relative visual attenuation quotient Q of not less than:
  - 0.8 for Red
  - 0.8 for Yellow
  - 0.6 for Green
  - 0.4 for Blue

It is the responsibility of the final tinting entity to conform to the above standards.