LATTICE STRUCTURE

Lattice structure refers to the density of the lens. A lens with a loose lattice structure is referred to as a "soft" lens and will tint rapidly. Conversely, one with a tight lattice structure, or a hard lens, will take longer. Even though your lenses are from the same manufacturer, there may be a difference in their hardness. Each batch run may have lenses which have been subjected to variations in relative position in the curing oven, temperatures to which they have been exposed, and the length of time cured. The longer the cure, the harder the lens. There is little probability of getting lenses from the same batch run on a consistent basis. The mixing of surfaced and stock lenses should also be avoided as much as possible, as the surfaced lenses, which began as a much thicker blank, have been cured differently and will accept tint differently. Lattice structure, tint solution temperature, prior preparation with BPI® Lens Prep II™, and scratch resistant coatings all affect the coloring times. The harder the lens or the lower the temperature, the longer it will take to tint it. Darker colors will take longer. The hotter the tint, the faster results will be obtained. We recommend a minimum of 200°F, (93.3°C) but for dark shades, tint solutions as hot as 210°F (98.9°C) have been used.

LENS TINTING CHEMISTRY

Be sure to use BPI® Lens Prep II™. More than just a surface cleaner, it conditions the lens surface. BPI® Lens Prep II™ is used one capful to a quart of water and should be changed every 3-4 days, depending on use. Do not rinse or wipe lens after using Lens Prep II™; to do so will negate its effectiveness.

BPI® COLOR DEVELOPER™: Injudicious use of BPI® Color Developer™ may cause color changes. The effectiveness of Color Developer™ is so great that only a drop or two every other day need be used. Overuse of this concentrate will cause a loss of the red side of the spectrum. Since Color Developer™ is used primarily as a re-suspending agent for tints infrequently used, this chemical will not often be used in your grays or browns, which are used more frequently. To correct a brown, black or gray tint solution which shows a blue/green over tone, add pink or red a little at a time until proper color balance is restored.

GENERAL PRINCIPLES: All colors, particularly dark grays, should be examined by daylight or special bulbs. Most fluorescent or incandescent lights will make the shades of tinted lenses appear more blue or red than they look in daylight.

QUART/LITER BOTTLES OF TINT: The dilution factor when using larger bottles of concentrate is approximately one part tint to ten parts water (preferable de-ionized or distilled). Probably the most important thing to remember when using the larger bottles of concentrate is that the pigment will settle to the bottom of the bottle during storage and that THOROUGH MIXING of the tint in its bottle must be done BEFORE pouring out a part to be diluted. The reason for this is that layers of pigment will settle to the bottom of the bottle during storage. In order to maintain the color standard throughout the use of the bottle, it must be well mixed. By adding a couple of ordinary glass marbles to each bottle, you can facilitate mixing. Storing these bottles on the side so pigment settles over a wider area results in thinner layers which are more easily mixed. Failure to shake these containers well will result in a reddish cast during the first part of the use of the bottle, and a blue-green cast during the use of the last part. It should be remembered that tint is more economically purchased in these larger containers only if that amount will be used within the recommended shelf life of 6 months. For those who normally tint a dozen or so lenses daily, the small 3 oz. container of concentrate or packets of the BPI® Pill® has been shown to be more economical. It should be noted that, since the larger sized bottles are specially ordered, they cannot be returned.

Tinting today's lenses

The next section will describe some areas of concern in dyeing plastic lenses. Since lenses made from CR-39® monomer may include different co-polymers and are often catalyzed and cured differently, they vary in brittleness, hardness, density, and for our specific purpose, their ability to accept colors. It has been established that certain lenses dye faster than others. We have found from laboratory tests that the more dense the lens is, the more difficult it is for the tints to penetrate the lattice of the polymer. Some lenses will tint a different color from others even though they are introduced into the same tint tank for the same period of time. These properties are inherent in the lenses and are not variations in the coloring system. The following rules should be followed as closely as possible, although there still will be some variations.

Tint plastic lenses after they have been cut and edged to fit the frame.

Select the same manufacturer's lenses for dark lenses, such as Gray No. 3, Green No. 3, and Brown No. 3. Even though the same manufacturer's lenses are chosen, many times they are cured and catalyzed somewhat differently because of different batches and their position in the curing ovens.

Try to avoid mixing a surfaced lens with a stock lens. In most cases, these lenses have been catalyzed somewhat differently, because a surfaced lens began as a much thicker blank, and thus is somewhat different, it will accept the color in a different manner.

Be sure to clean lenses completely, removing all ink marking, oil, and fingerprints that might have accumulated on the lens.

The use of BPI® Lens Prep II™ in its concentrated form has been found to clean the lenses very well before they are tinted. BPI® Lens Soap™ is also useful in this application.

UV PROTECTION

Lenses made from CR-39® monomer may be treated to prevent UVA transmission by using BPI® Diamond Dye™ 400nm, BPI® UV-ONLY™, BPI® UV Crystal Clear™ or other BPI® UV dyes. These treatments should be applied before any tinting to prevent color fading of the lens and contamination of the UV dye.

HARD COATED & HIGH INDEX LENSES

Lenses are now commonly available with scratch resistant coatings either on the front surface or both front and back surfaces. On some lenses, this will depend upon whether surfaced or stock lenses are used. When possible, check with the lens manufacturer for the recommended tinting procedure. The variety of coatings in use causes unpredictable tinting results. In general, tint is absorbed only where the lens is not coated. Some coatings will accept color unevenly, or only at the edges or at coating defects. When experimenting with lenses with different types of coatings, you may wish to lower the tint temperature to avoid damaging certain lenses.

Care should be taken when neutralizing such lenses which may be sensitive to thermal shock. Other coatings which tint slowly will require higher temperatures. Scratch resistant coatings usually affect both tinting times and color results. If a lens has a non-tintable coating on either surface, increase tinting time. If a lens has a tintable coating, it should accept primary colors (such as pink and blue) with no shade difference, compared to an uncoated lens, although it may take somewhat longer. Mixed colors such as grays, browns, and greens may produce shades different from those produced on uncoated lenses. The difference will depend on the 'bias' of the coating. Some coatings, for example, may favor blue so that they tint blue-gray from a gray tint, while a different coating may appear green-gray from the same tint pot. This is because it is the coating being tinted, not the lens. The best procedure is to use one type of coating as often as possible, so that color results are more predictable. Do not mix two types of coating in a lens pair, or a coated with an uncoated lens. Depending on the coating used, special tints may be available, or certain colors may work better than others. It is recommended you keep the primary tints red (or pink), yellow and blue available for any necessary color correction or matching.

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