

Blue cut and UV protective AR coatings

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The aim of this document is to explain the serious advantages of such coatings in the daily life of spectacle and sunglass wearers. Any given information is not binding, can and will be changed without further notice. In case of further questions get in contact with the owner of the document (michael.witzany@satisloh.com).

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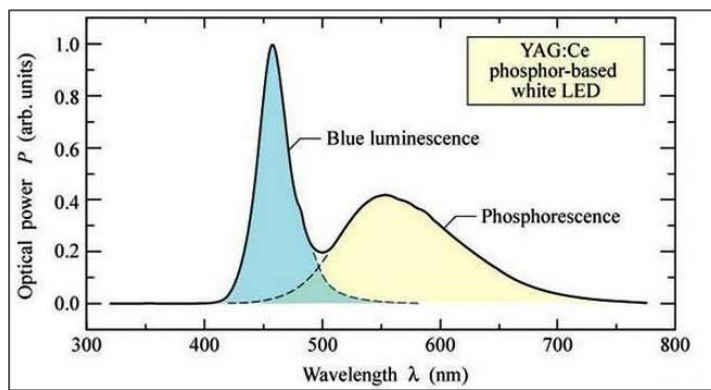
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INTRODUCTION

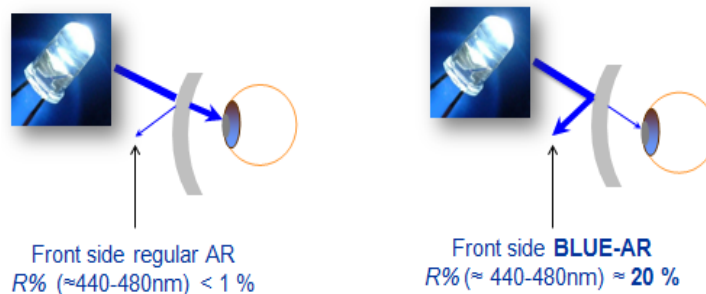
In the global ophthalmic market several Blue cut and /or UV protective AR products are being offered. All of them are cutting the so-called “blue light” wavelength by increased blue reflection on the front side of a lens and/or cutting UV light by reducing UV reflection on the back side of a lens. Some of them are even combined in so-called “complete protection” coating systems.

1. Blue cutting AR

In the last 10 years technology developments greatly increased the use of devices emitting “blue light”. This includes smartphones, tablets, LED TV and monitors as well as metal halide lamps.

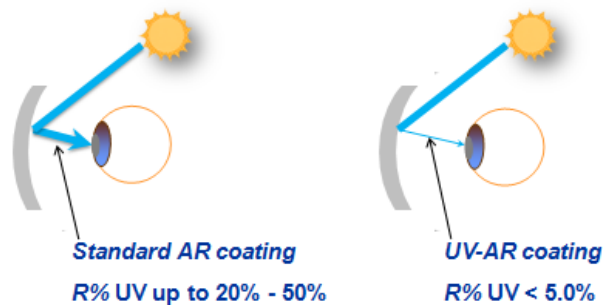


Some medical studies show that “blue light” can generate adverse effects on the natural sleep-wake rhythm. Accordingly a Blue cutting AR has to be applied on the front side (convex side) of transparent spectacle lenses, which increases blue light reflection on the front side and thereby reduces the amount of blue light that reaches the eye.



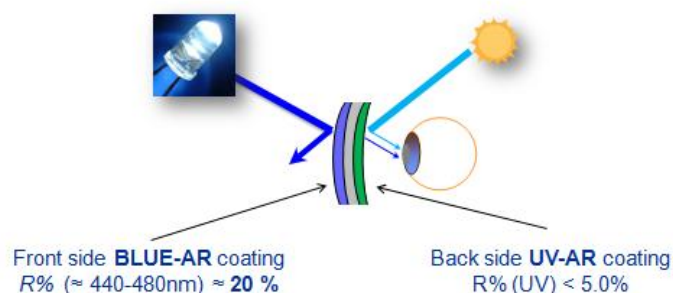
2. UV protective AR

For more than 20 years UV protection with eye- and sunglasses that reduce UV light transmission has grown. Eyeglass materials such as MR8, MR7, PC etc. feature an UV absorption of 100% and the UV absorption of CR39 is 95%. This means eyeglass wearers are already enjoying a certain UV protection from UV light entering into the front side of a lens. But UV eye damage such as cataract can also be induced by back side reflection of UV radiation on AR coated eyeglasses. Current broadband AR coatings are generating up to 50% reflection of back side incident UV radiation. The solution is a UV protective AR on the back side of the lenses.



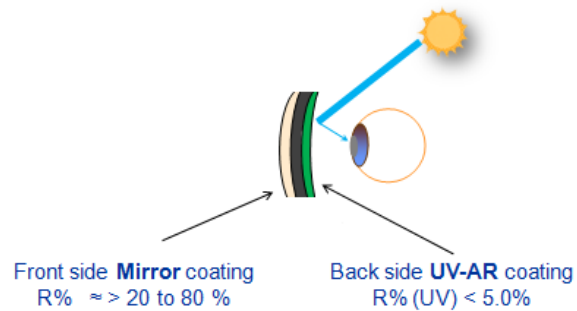
3. Complete Protection AR

“Complete protection” AR products combine both advantages. The Blue cutting AR is applied on the front side of the lens, while on the back side a UV protective AR is applied. This leads to low “blue light” transmission and improves UV protection in comparison to standard AR coatings by factors between 5 and 10 depending on the eyeglass material.



4. Mirror UV

Mirror coated Rx sunglasses are high end products which must provide the best protection against any UV radiation damage. With sunglasses, the wearer's pupil is wide open due to the low light transmission. With that, the risk of retina damage and cataract caused by the high UV reflection of a standard back side AR is significantly increased. The solution is again a back side applied UV protective AR.



5. Summary

Use the right AR depending on the individual needs of the eyeglass wearer:

Process type	Lens type	Benefits
Blue cutting AR	Organic lenses (clear)	<ul style="list-style-type: none">- Front side protection from Blue Light.- Avoid negative effects from tablets, smartphones, LED TVs and monitors, etc.
UV protective AR	Organic lenses (clear and photochromic)	<ul style="list-style-type: none">- Backside UV protection due to reduced UV reflection.- Recommended especially for photochromic lenses.
Complete Protection AR	Organic lenses (clear and photochromic)	<ul style="list-style-type: none">- Front side protection from Blue Light.- Backside UV protection due to reduced UV reflection.
Mirror UV	Organic lenses (tinted sunglasses)	<ul style="list-style-type: none">- Front side Mirror- Back side UV protective AR- Highly recommended for sunglasses, because of wide open pupils of the sunglass wearer.