Next-Gen Blue Light Reduction Requirements on Screen Accessories

IN COOPERATION WITH

eyesafe®

TÜVRheinland®
Precisely Right.

TÜV Rheinland is Your Reliable Partner

TÜV Rheinland pioneered low blue light testing and certification, guiding the industry towards improved blue light management solutions in 2014. Over the years, we've evolved our certification, introducing metrics like brightness decay-weighted blue light hazard and screen color temperature changes, which ensured an ideal balance between blue, green, and red, maintaining a consistent color temperature (CCT) while effectively reducing harmful blue light. In collaboration with Eyesafe, we introduced the Retina Protection Factor in 2018, the world's first blue light standard for accessory. Now, in 2023, we present our latest update – xx% Blue Light Reduction, empowering consumers to make informed choices for their eye health.

Amidst increasing scientific and medical research on blue light exposure, Eyesafe and TÜV Rheinland are releasing updated blue light accessory requirements, targeting the light filtered between 435-440 nanometers (nm). Studies suggest this wavelength poses the greatest risk to retinal health as referenced by the Spectral Weighting Factors for Blue-Light Hazard as published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 2013 and the American National Standard Institute (ANSI) in 2015.

The accessory certification program was originally established in 2018. Now, in 2023, TÜV Rheinland and Eyesafe present our latest update - Blue Light Reduction, with additional peak protection at 435-440nm. Blue Light Reduction is a universal and comprehensive measure to assess blue light hazard filtration of accessory optical film. This new index, XX% Blue Light Reduction shows the reduction level of toxic blue light of accessory optical film, empowering consumers to make informed choices for their eye health.

Product Scope:

Accessory optical film

Effective Date:

Effective Date of the New Standard:
Immediate
Deadline for Application of the Old Standard:
30th June 2024

Our Services:

TÜV Rheinland's innovative Blue Light Toxicity Reduction (BLTR) calculates the hazardous blue reduction ratio based on the ICNIRP toxicity weighting function B(λ), as well as considers two crucial factors: shift of CCT and luminance reduction ratio.
With levels ranging from 20% Blue Light Reduction to 80% Blue Light Reduction, our certification caters to varying display performance requirements, promoting a comfortable and safe viewing experience. Embrace this cutting-edge technology to elevate your product and meet the latest industry standard.

Comparison of Testing Requirements

Current Standard: RPF Classification Rules

CLASSIFICATION REQUIREMENT	RPF LEVEL	LUMINANCE REDUCTION	SHIFT OF CCT
RPF15	15	≤20%	≤250K
RPF20	20	≤20%	≤350K
RPF30	30	≤20%	≤500K

New Standard:

Peak Protection at 435-440nm

The peak radiant energy reduction ratio for each wavelength shall be calculated as follows:
(E(λ) withoutfilm-E(λ) withfilm) / E(λ) withoutfilm

Blue Light Toxicity Reduction

BLTR Level = 100*(LB without - LB with) / LB without, in which

- $LB_{without}$: is the blue light hazard weighted irradiance calculated without film;
- LB_{with}: is the blue light hazard weighted irradiance calculated with the film.

LB= ∑L(λ) x B(λ) x Δ λ

- Lλ= Eλ (λ, t) is the spectral irradiance in W/m-2/nm
- B(λ) = Blue-Light Hazard Function (see attachment extract from ICNIRP Guidelines (http://www.icnirp.org/cms/upload/publications/ICNIRPVisible_Infrared2013.pdf)

Δ λ = 1

Shift of CCT

The application of the film will reduce the blue content and lead to a display colour temperature deviation than display default setting. The performance of the film shall not lead to a colour temperature shift too much and affect the intended use of display.

Luminance reduction ratio

The luminance reduction ratio is measured at the center position of the integrating sphere with and without film:
T = (Lwithout film-Lwith film) / Lwithout film
where

- Lwith film is the luminance level measured at the screen center with the film
- Lwithout film is the luminance level measured at the screen center without the film

Classification matrix:

Blue Light Reduction

20%
30%
40%
50%
60%
70%
80%

BLUE LIGHT REDUCTION RATIO ACCESSORY	PEAK PROTECTION AT 435-440NM	BLUE LIGHT TOXICITY REDUCTION	SHIFT OF CCT	LUMINANCE REDUCTION
20% Blue Light Reduction	At least 20%	≥15%	≤250K	≤20%
30% Blue Light Reduction	At least 30%	≥15%	≤250K	≤20%
40% Blue Light Reduction	At least 40%	≥20%	≤350K	≤20%
50% Blue Light Reduction	At least 50%	≥20%	≤350K	≤20%
60% Blue Light Reduction	At least 60%	≥30%	≤500K	≤20%
70% Blue Light Reduction	At least 70%	≥30%	≤500K	≤20%
80% Blue Light Reduction	At least 80%	≥40%	≤500K	≤30%

IN COOPERATION WITH

eyesafe®

TÜV Rheinland Greater China
Hotline
+886 2 21721001 (Taiwan)
+852 21921022 (Hong Kong)
+86 4008831300 (Mainland China)
service-gc@tuv.com

www.tuv.com

TÜVRheinland®
Precisely Right.

 P1SB120enGC23081.0