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Ref: Eye Safety

I wanted to inform and provide to you that the EyeCheck™ uses a very low-power Light Emitting Diode (LED) and **NOT** a Laser Diode.

There are many regulations on eye safety and maximum exposure levels of Lasers by different international standards groups. There are two prime safety standards for the rating of products with LED emissions. The IEC 60825-1 Edition 1 (1998-01) (Safety of Laser Products Part 1. Equipment classification, requirements and user's guide) and ANSI Z136.1 (American National Standard for Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources).

The output optical power from the EyeCheck is measured at 0.89 micro-Watts (.00000089 Watts, or 0.89E-6 W) with a center wavelength in the near-IR just outside of the visible spectrum. This output optical power is collimated in a ~1.8-mm diameter beam. The resulting Optical Power Density is 35 micro-Watts/cm² (35E-6 W/cm²). This will be needed in a bit to compare with safe limits.

For the equivalent laser diode (deemed more dangerous than LEDs w.r.t. eye safety*), the maximum permissible exposure (as defined by the ANSI standard listed above) for a 10 second exposure is 1.01E-03 W/cm². Even if you had a case where a person held open their eyes for 100 seconds, the maximum permissible exposure is 5.69E-04 W/cm². For this extreme case, the EyeCheck are still a factor of 16 times below the limit.

**To summarize, "Laser light is far more dangerous to the eyes than LED light of the same power. This is because the eye is able to accommodate and concentrate laser light to a very small retinal spot several wavelengths in diameter resulting in a high power density. In contrast, LED light, being from an extended source, cannot be efficiently focused down to much less than the source area, typically half a millimeter in diameter. Consequently, the potential retinal power density from a LED is over a thousand times less than that from a laser of the same power"*

I trust this should satisfy any questions from government or industry that should come up regarding the safety of the EyeCheck® Pupillometer.

Sincerely,

John P. Dal Santo

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