Touch the Flicker

Measurement compliant with the **EU ECODESIGN DIRECTIVE** requirements

GL **SPECTIS 1.0 Touch + Flicker**

Precise device to measure Flicker Index along with the colorimetric and photometric parameters.

THE REVISED DIRECTIVE OF THE EUROPEAN COMMISSION ON ECODESIGN FOR LIGHT SOURCES, INTRODUCES NEW REQUIREMENTS FOR LIGHT FLICKER INDICATORS:

- **PstLM**
- **SVM**

WHAT IS FLICKER?

- Flicker is the perception of temporal changes in the light output (luminance flicker) or color (chromatic flicker) of the light
- Part of a broader problem termed Temporal Light Artifacts (TLA) that include:
  – Stroboscopic Effect that appears when an object with continuous motion is illuminated with a flickering light source
  – Phantom array occurs when we make a saccade (fast eye movements) and the image of the fluctuating light source is transited across the retina

WHY MEASURE FLICKER?

- Flicker frequencies from a few Hz to 70-100 Hz can be perceived by humans
- Long exposure to light flicker causes headaches, migraines, increases eye strain and attention distraction
- Flicker impacts workplace comfort and effectiveness while reducing visual task performance and productivity

WHAT IS MEASURED?

- New Ecodesign Directive introduced: PstML and SVM
- IESNA has defined two primary quantities used to characterize flicker:
  - Flicker Index
  - Flicker Percentage
- Fundamental flicker frequency is also commonly captured

MADE IN EUROPE

GL Optic devices are manufactured in the EU and sold and serviced world wide.

GL OPTIC Light quality control

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Touch the Flicker

GL **SPECTIS 1.0 Touch + Flicker** – the latest innovation from GL Optic, integrates the accurate measurement of light flicker with all the measurement quantities of the GL **SPECTIS 1.0 Touch.** Flicker quantification is accomplished with a combination of photodiodes, high speed analog circuits, and high sample rate analog to digital (A/D) converters.

SPECTROMETER AND PHOTODIODE MEASUREMENT

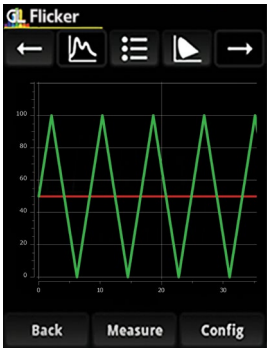
GL Optic spectrometers are predominantly designed and preconfigured for light measurement. The B class cosine corrected measurement head is a standard accessory allowing for the proper measurement of light.

With the addition of a separate, dedicated photodiode and real-time data processing, they measure flicker as well.

SIMPLE PERIODIC WAVEFORM PROPERTIES AND FLICKER METRICS

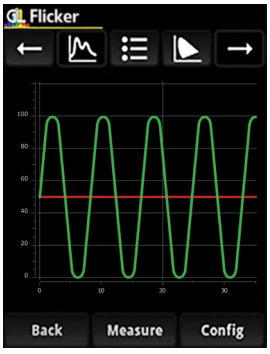
TRIANGLE WAVEFORM SHAPE

- Flicker Percent = 100%
- Flicker Index = 0.250
- Flicker Frequency 100 Hz



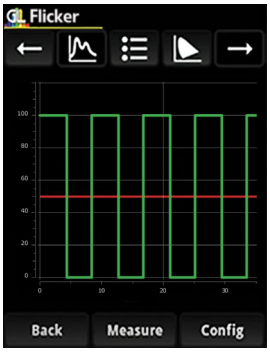
SINE WAVEFORM SHAPE

- Flicker Percent = 100%
- Flicker Index = 0.318
- Flicker Frequency 100 Hz



SQUARE WAVEFORM SHAPE

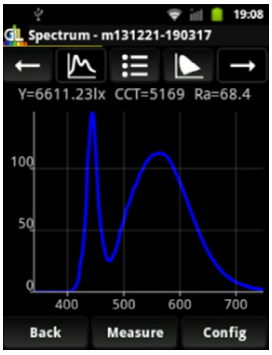
- Flicker Percent = 100%
- Flicker Index = 0.500
- Flicker Frequency 100 Hz



INTEGRATED FLICKER AND ILLUMINANCE SPECTRORADIOMETRIC MEASUREMENT INSTRUMENT

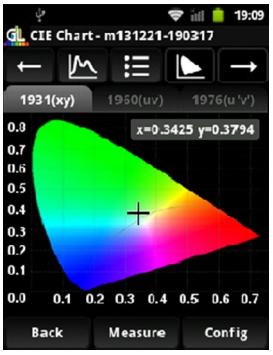
SPECTRUM

The calibrated spectroradiometer provides Spectral Power Distribution curves that are the basis for all the photometric and colorimetric calculations.



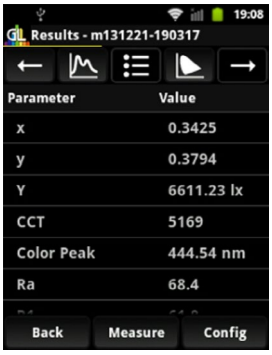
COLOR

Various CIE Chromaticity Charts and calculated color coordinates help the user to check the light color output.



VALUE

It displays high accuracy illuminance measurements and includes all the key photometric and colorimetric values directly on the screen such as:
lx, fc, x,y, color coordinates,
CCT, CRI and radiometric scaling.



GL OPTIC Light quality control

SYSTEM CONFIGURATION AS REQUIRED BY EU ECODESIGN DIRECTIVE

GL AUTOMATION

Intelligent management software for peripheral devices, allows, **in a simple and intuitive way, to create measurement scripts.**

GL SPECTROSOFT

Comprehensive measuring software for fast spectral analysis **– it measures, calculates, verifies and creates reports for every parameter.**

Network interference generator
AC-WAVEFORM GENERATOR GL 750VA_M7622

It simulates mains voltage disturbances, based on pre-saved programme. These programmes were created basing on the document IEC / TR 61547-1 which defines the PstLM parameter. The generator **allows to create fully automatic product testing process for PstLM.**

GL SPECTIS 1.0 Touch + Flicker

KEY FEATURES:

- Compact, portable, solidly built
- Intuitive, color LCD touch screen user interface
- Laboratory grade accuracy and repeatability
- Dark current and temperature compensation
- Automatic accessory detection and calibration loading
- Use standalone, or in conjunction with system accessories

INCLUDES:

- Certificate of calibration to reference standard
- Cosine-corrected standard diffuser head (illuminance)
- Versatile interfaces: USB, SD card
- Remote trigger socket
- Universal mount for tripod or optical bench use
- Rugged case, charger, cable

EU ECODESIGN DIRECTIVE

The revised regulation of the European Commission on Ecodesign for light sources introduces new requirements for light flicker indicators – PstLM and SVM.

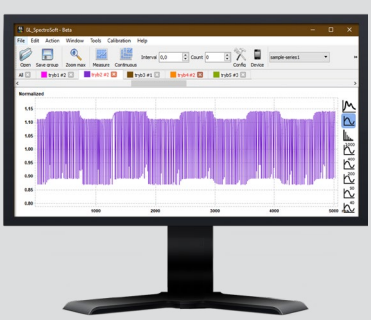
PstLM stands for Short Term Perceptibility for light modulation, which determines the resistance of the light source power supply system to network disturbances. PstLM = 1 means 50% chance that the Observer will detect Flicker. **Ecodesign Directive require PstLM ≤ 1.**

SVM stands for Stroboscopic Visibility Measure - new parameter, determining the occurrence probability of the strobe effect. The strobe effect visibility threshold is SVM ≥ 1. With SVM ≤ 1 the strobe effect will not be visible to the Observer. **Ecodesign Directive requires to obtain SVM value of ≤ 0.9. before 01/09/2024 and after this date, an SVM threshold of SVM≤ 0.4 applies.**

To perform a Flicker measurement according to Ecodesign requirements the meter with an appropriate measuring range is not enough. It is essential to create appropriate power conditions.

PstLM determines the resistance to network interference and, therefore, appropriate simulation of such disturbances must be created under laboratory conditions. For this purpose, it is necessary to use programmable AC-WAVEFORM GENERATOR GL 750VA_M7622, which generates the signals with appropriate resolution and speed.

To make such measurement even faster, GL AUTOMATION software will easily and quickly allow to create a script that will carry out the entire measurement.



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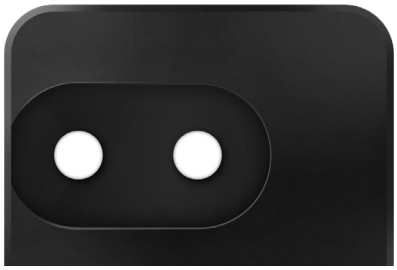
GL **SPECTIS 1.0 Touch + Flicker**

SPECTRAL PARAMETERS AND FLICKER METRICS

FLICKER MEASUREMENT		
Measuring signal frequency range	0.1 Hz to 12.5 kHz	
Sampling rate	125 kHz (10x max. measured frequency)	
Flicker illuminance	0.1 lx – 15 000 lx	
Calculated parameters	▪ **Flicker frequency** ▪ **Flicker Index** ▪ **Flicker percentage** ▪ **SVM** (Stroboscopic Visibility Measure) ▪ **PstLM** (Short Term Perceptibility for light modulation) – available only with the GL Spectrosoft PRO/LAB ▪ **SAM** (Stroboscopic Acceptability Metric), ▪ **Mp** (also referred to LRC Flicker Perception), ▪ **VESA** (Video Electronics Standards Association), ▪ **JEITA** (Japan Electronics and Information Technology Industries Association), ▪ **Flicker and FFT chart are available**	
SPECTRAL PARAMETERS		
Spectral range	340 – 780 nm	
Illuminance	10 – 100 000 lx	for white LED
	0.01 – 100 000 lx	Available with optional GL **SALLI Diffuser**
Luminous flux	Available with optional GL **OPTI SPHERE**	
Luminance	Available with optional GL **OPTI PROBE**	
Luminous intensity	Calculated in GL **SPECTROSOFT**	
Physical resolution	~ 1.7 nm	
Wavelength reproducibility	0.5 nm	
TECHNICAL DATA SHEET		
Flicker sensor	high-speed photodiode, V(λ) correction class B	
Spectral sensor	CMOS image sensor	
Number of pixels	256	
Integration time	10 ms – 10 s	
A/D conversion	16 bits	
Signal to noise ratio	1000:1	
Cosine correction	Class B according to DIN 5032 Part 7	
Stray light	2*10E-3	
Spectroradiometric accuracy	< 3 %	
Measurement uncertainty of color coordinates (x.y)	0.0015	
Display full color	240x320 px	
PC interface	USB 2.0 standard	
Micro SD card	4GB	
Power	Li-ion battery 3500 mAh; 3.7V	
Power consumption	600 mA	
Power supply	USB mini socket: 5V, 1A	
Ambient temperature	5 – 35°C	
Dimensions	74.5 mm x 145.5 mm x 36.6 mm	
Weight	349 g	



GL **SALLI**

A diffuser that uses two sensors for the measurements of illuminance low levels.

The GL **SALLI** adapter enables the use of two measuring systems. It provides angular correction for the spectroradiometer and a photodiode what enables a simultaneous measurement with both sensors.

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