# UL Task Group Project Update

**March 27, 2019**

# Task group roster

**Brown, Chris**
Self
chris.brown47@gmail.com
General

**Terry McGowan**
Lighting Ideas, Inc.
lightingideas@yahoo.com
Manufacturer

**Steverson, Bryan**
General Services Admin (GSA)
bryan.steverson@gsa.gov
User

**Deng, Lei**
General Electric
Lei.Deng@ge.com
Producer

**Panda, Satchidananda**
Salk Institute
satchin@salk.edu
General

**Walker, Amy**
Underwriters Laboratories
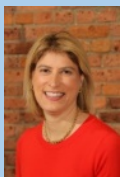Amy.K.Walker@ul.com
Task Group Secretary

**Adam Lilien**
Underwriters Laboratories
Adam.Lilien@ul.com
User

**Rao, Govi**
Noveda Technologies
grao@noveda.com
User

**Karen Willis**
NEMA
Karen.Willis@nema.org
Manufacturer

**Figueiro, Mariana**
Rensselaer
figuem@rpi.edu
General

**Rea, Mark (chair)**
Rensselaer
ream@rpi.edu
Task Group Chair

**Yandek, Ed**
Self
eyandek@aol.com
General

**Lewis, Alan**
Self
allod@comcast.net
General

**Steele, Chris**
Navy
Christopher.t.steele3.mil@mail.mil
User

# Recommended Practice

- *This document is intended for use by those who design and specify lighting in buildings and wish to provide light for vision and for circadian entrainment for typical day-active and night-inactive people.*

- Provide a light measurement and lighting specification methodology as well as a method for verification of effect

# Recommended Practice

- *The amount of light equivalent to that, after one hour of exposure, capable of suppressing the production of melatonin at night by 30% (CS = 0.30) should be continuously available at the occupant's eyes for a minimum of two hours during daytime.*

- In <u>very simple </u>terms, this translates into a vertical illuminance at the eye ($E_V$) of 350 lx for warm sources and 200 lx for cool sources

# Outline

- Quick Guide

- Specification Guide

- Brief Overview

- Recommended Practice

- Appendix A: Informative General Research and Supporting Science

- Appendix B: Circadian Entrainment

- Appendix C: Worked Examples

# QUICK GUIDE

- **Step 1: Establish a circadian-effective light design criterion (e.g., CS = 0.3)**

- **Step 2: Select a luminaire type (e.g., direct/indirect)**

- **Step 3: Select a light source (e.g., 3000 K LED)**

- **Step 4: Perform photometrically realistic software calculations for the building space (e.g., AGi32)**

- **Step 5: Calculate CS from the vertical illuminance at the eye ($E_V$) and the spectral power distribution (SPD)**

- **Step 6: Determine if the selected lighting system meets the circadian-effective lighting design criterion; repeat steps 2-6 if necessary**

# Specification Guide

| Time | CS | 3000 K | | | 4000 K | | | 5000 K | | | 6500 K | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $E_V$ (lux) | $E_H$ (lux) | LPD (W/ft²) | $E_V$ (lux) | $E_H$ (lux) | LPD (W/ft²) | $E_V$ (lux) | $E_H$ (lux) | LPD (W/ft²) | $E_V$ (lux) | $E_H$ (lux) | LPD (W/ft²) |
| 7:00 AM - 4:00 PM | 0.3 | 275 | 483 | | 375 | 659 | | 265 | 466 | | 200 | 351 | |
| 4:00 - 5:00 PM | 0.3 >> 0.2 | | | | | | | | | | | | |
| 5:00 - 7:00 PM | 0.2 | 175 | 307 | 0.52 | 225 | 395 | 0.74 | 175 | 307 | 0.55 | 125 | 220 | 0.43 |
| 7:00 - 8:00 PM | 0.2 >> 0.1 | | | | | | | | | | | | |
| 8:00 PM - EOB | 0.1 | 75 | 132 | | 100 | 176 | | 105 | 184 | | 50 | 88 | |
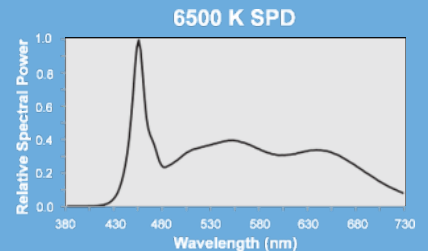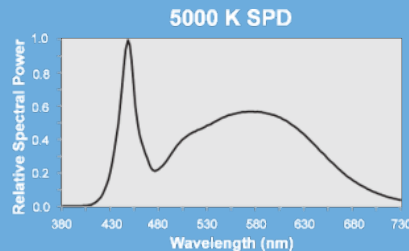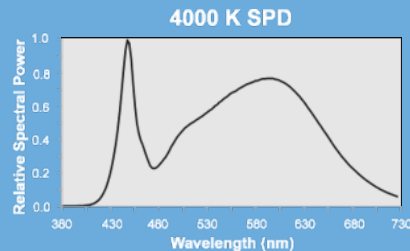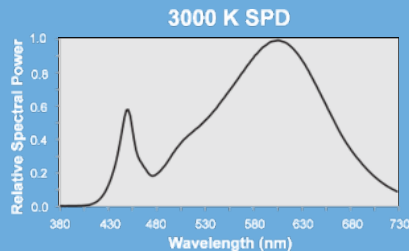


Please note that calculations are based on average SPDs and distributions. Different spectra and distributions may result in different illuminance and CS values.

# Appendix C: Worked Examples

A general method: Specifying $E_V$ and SPD will provide an estimate of CS
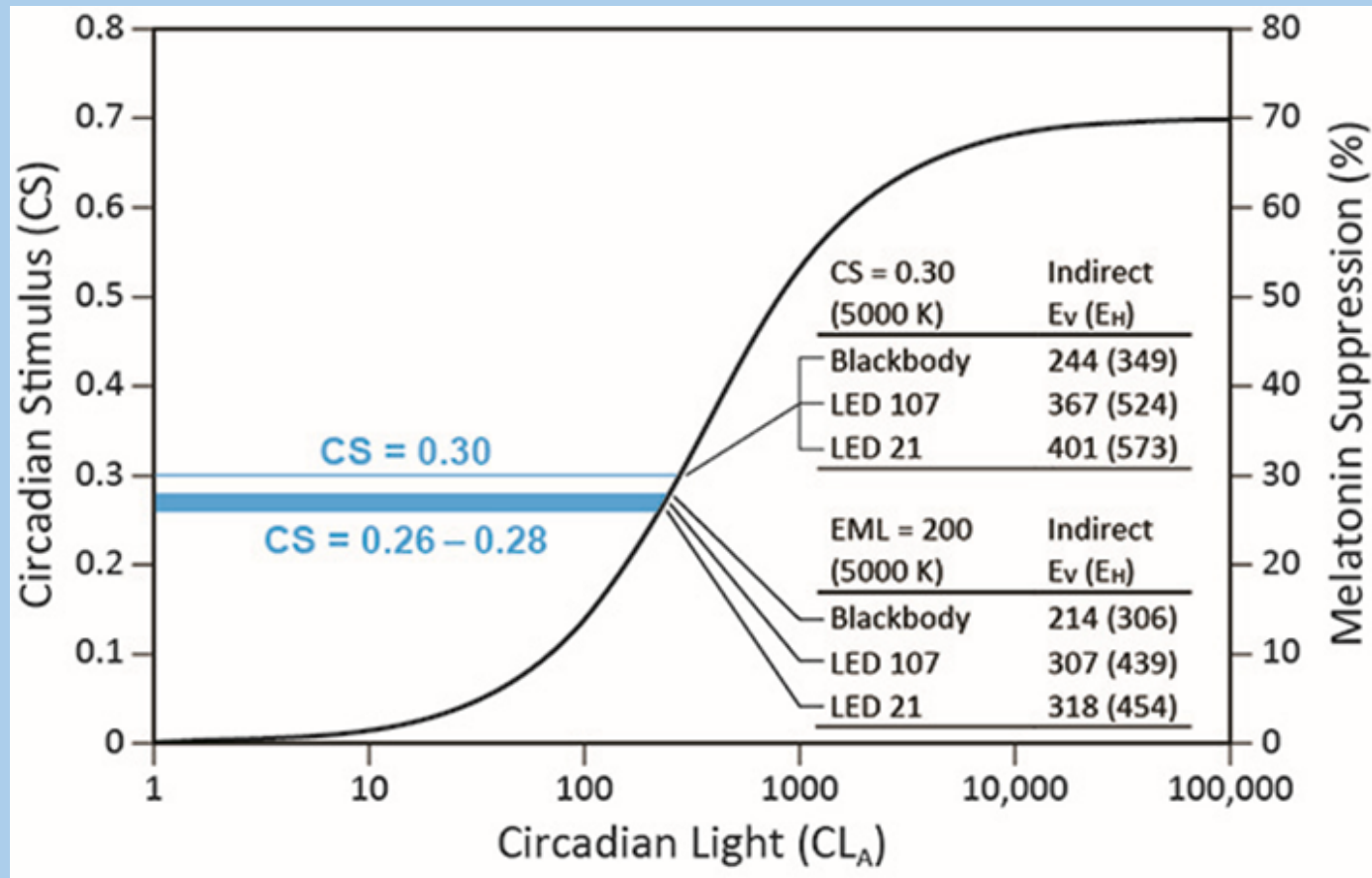
# Next step

- Task Group votes for/against a 45-day public review period

Thank you