

Melanopiska LED-åtgärdsfaktorer

Omvandla fotopiska (visuella) evalueringsparametrar till melanopiska (biologiska) evalueringsparametrar (enligt CIE S 026 / E: 2018, DIN SPEC 5031-100).

CRI	Motsvarande färgtemperatur*	Ljusflöde från armatur	MNER	MDER	MEER
>90	2700 K	3800 lm	1,04	0,48	0,53
	3000 K	3800 lm	1,05	0,55	0,61
	3500 K	3800 lm	1,04	0,65	0,71
	4000 K	3800 lm	1,02	0,72	0,80
	4500 K	3800 lm	1,00	0,78	0,86
	5000 K	3800 lm	0,99	0,83	0,92
	5700 K	3800 lm	0,97	0,90	0,99
	6500 K	3800 lm	0,96	0,96	1,06

CRI: Färgåtergivningindex min.

Motsvarande färgtemperatur*: Värderna enligt ANSI

Ljusflöde från armatur: Armaturklassat ljusflöde

MNER: Melanopisk verkningsgrad (naturlig)

≙ mv, mel, nat (omvandlingsfaktor relativt till naturligt referensljus, liknar beräkning av färgåtergivning, vid samma korrelerade färgtemperatur (CCT))

MDER: Melanopisk verkningsgrad (dagsljus), CIE S 026/E:2018

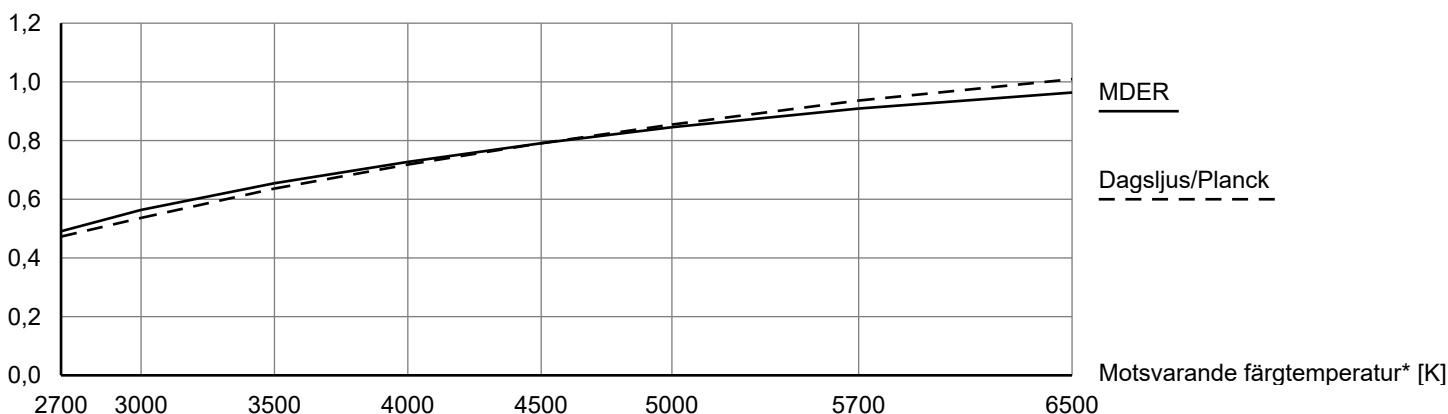
≙ mv, mel, D65 (DIN SPEC 5031-100, omvandlingsfaktor relativt till D65-ljus, för beräkning av dagsljusekvivalent melanopisk belysning)

MEER: Melanopisk verkningsgrad (ekvivalent energi), CIE S 026/E:2018

≙ R (ekvivalent melanopisk luxmått, melanopisk grad)
lämpligt för beräkningar enligt WELL Building Standard v2 (L03)

Dagsljus/Planck: Dagsljusarmaturer används som naturliga referensarmaturer från 5000K och uppåt, och Planck-strålande armaturer används för lägre CCT.

MDER



Meddelande till ljusdesigner:

Läs i supplementet eller kontakta våra planerare av belysningslösningar för att få veta hur man beräknar melanopiska belysningseffekter.

Tillägg: https://www.thornlighting.com/PDB/Teaser/EN/TLG_Melanopic-Datasheet-Supplement.pdf

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Notes regarding the conversion of visual evaluation variables into biological evaluation variables

The conversion factors specified in the “Melanopic Data Sheet” can be used to convert the results of a photopic light calculation or measurement into melanopic evaluation variables.



Photopic (visual) evaluation



Melanopic (biological) evaluation

- 1 Reception area of the vertical illuminance at the eye of the observer, relevant for melanopic evaluation
- 2 Light from light source **photopically evaluated** with standard measuring and planning tools
- 3 Light from light source **melanopically evaluated** with formula (photopic value multiplied by factor from Zumtobel data sheet = melanopic value)

Notes regarding melanopic light planning

The specified “melanopic action factors” enable the light planner to perform calculations to determine biological effectiveness (in accordance with CIE S 026/E:2018, DIN SPEC 5031-100, DIN SPEC 67600 and [WELL Building Standard](#)). With regard to the aspects of “Human Centric Lighting” and “Human Centred Design”, these extended planning parameters are attributed increasing importance for optimised light quality and well-being.

The luminaire and its spectrum contribute to the biological effect, but a holistic approach is required: *Integrative, holistic planning includes the application and effects of light in the planning process from the outset and, amongst other things, helps to implement energy-efficient solutions for biologically effective light through suitable use of daylight.**

A holistic planning should take the following aspects into account: *, **, ***

- Luminous intensity (illuminance)
- Changes in the spectrum during transmission
- Changes in the spectrum during reflection
- Changes in the spectrum through absorption
- Area and room angle (geometric arrangement of the light)
- Light direction (geometric arrangement of the light)
- Daytime adapted light
- Season adapted light
- Duration of light exposure
- Spectral and spatial distribution of light over time
- Rapid light changes
- Luminous intensity (illuminance) at other times
- Correction factor for age with melanopic effects of light
- Correction factor for age-dependent reduction of transmission by the eyes
- Correction factor for age-dependent pupil constriction

Another source for planning all aspects of “Human Centric Lighting” is the [licht.wissen 21](#) Guide to Human Centric Lighting (HCL), available free of charge at licht.de.

*DIN SPEC 67600, **DIN SPEC 5031-100, ***No claim to completeness