Unified Glare Rating (UGR) for up to Three Luminaires

Discomfort glare rating from background luminance and each luminaire's luminance, solid angle and Guth position index, by the UGR formula.

Method: UGR formula; CIE 117; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Background luminance	40.000	
Luminance of luminaire 1 (cd/m²)	6,000.0	
Solid angle of luminaire 1 (sr)	0.004000	
Guth position index 1	2.5000	
Luminance of luminaire 2	6,000.0	
Solid angle 2	0.003000	
Guth index 2	4.0000	
Luminance of luminaire 3	0	
Solid angle 3	0	
Guth index 3	1.0000	

Calculated results

Parameter	Value	Unit
Glare sum ΣL²ω/p²	29,790	
Unified glare rating	18.160	

Notes for this case

• UGR = 8·log₁₀[(0.25/L_b)ΣL²ω/p²]: bright, large luminaires close to the line of sight (small Guth index) dominate. Typical limits are UGR 19 for offices and 22–25 for industrial work; luminaire makers publish UGR tables for standard rooms, which are the usual design route.

Formula and method

$$UGR = 8 \log_{10} \left(\frac{0.25}{L_b} \sum \frac{L^2 \omega}{p^2} \right)$$

Variables

L_b	Background luminance	-
L_1	Luminance of luminaire 1 (cd/m²)	-
ω_1	Solid angle of luminaire 1 (sr)	-
p_1	Guth position index 1	-
L_2	Luminance of luminaire 2	-
ω_2	Solid angle 2	-
p_2	Guth index 2	-
L_3	Luminance of luminaire 3	-
ω_3	Solid angle 3	-
p_3	Guth index 3	-
Σ	Glare sum ΣL²ω/p²	-
UGR	Unified glare rating	-

Method and standards

Glare rating.

Assumptions and limits

- Valid for luminaires of solid angle about 0.0003–0.1 sr.

References

UGR formula, CIE 117, Discomfort Glare in Interior Lighting (UGR formula)

Report details

Report reference	FCC-WNCT-T4GA (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/lighting/unified-glare-rating

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.