



TECHLUME

A U S T R A L I A

LM-79 Test Report

Testing Method:	IES Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
Relevant Standards:	IES LM-79-08
Test Date and Time:	9/10/2023 10:33:16 AM
Test Location:	Techlume Australia - East Goderich Street Deloraine, TAS 7304
Operator:	Johnny Elmer
Measurement Number:	VFR-231009-0214-MS
Measurement Method:	Far Field, Type C Horizontal
Measurement Distance:	450.7 cm

Equipment Used

System Name:	LabSpion Goniometer
Sensor Name / Model:	Viso LabSensor Model2 / Freedom VIS (Custom Viso)
Spectrometer Range:	360 nm – 830 nm
Calibration Date:	7/12/2022
Flicker Meter Type:	Viso Systems LabFlicker
Manufacturer:	Viso Systems, Denmark

Test Conditions

Ambient Temperature:	25 °C ± 1 °C
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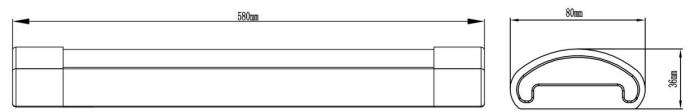
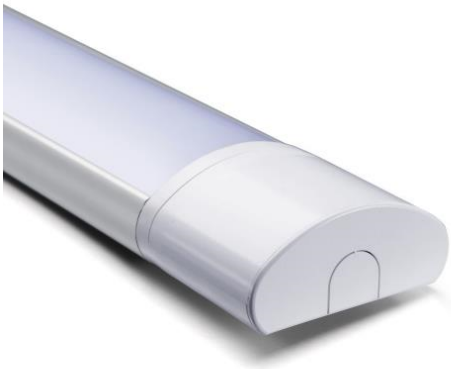
Remarks

The results stated in this report represent the tested sample only. All photometric and colourimetric data has been measured in compliance with IES LM-79-08 standards.



Product Overview

Product Description:	CADE 20W Interior Batten, 600mm, Tri-Colour, End Terminal, Non-Dim
Item Number:	LC2389 (4000K)
Manufacturer:	Decrolux Lighting Pty Ltd



Photometric Measurements

Total Luminous Flux	Luminous Efficacy	Luminous Intensity
2238 lm	116 Lumen/watt	694 cd

Correlated Colour Temperature, Target	Correlated Colour Temperature, Measured	Colour Rendering Index (CRI)
4000 K	4153 K	Ra 85.6

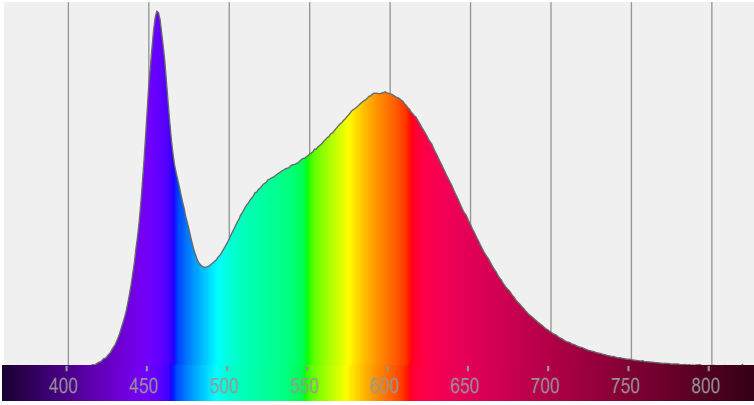
Electrical Measurements

Input Voltage	Input Current	Input Power	Input Voltage Frequency
240 VAC	0.090 A	19.3 W	60 Hz

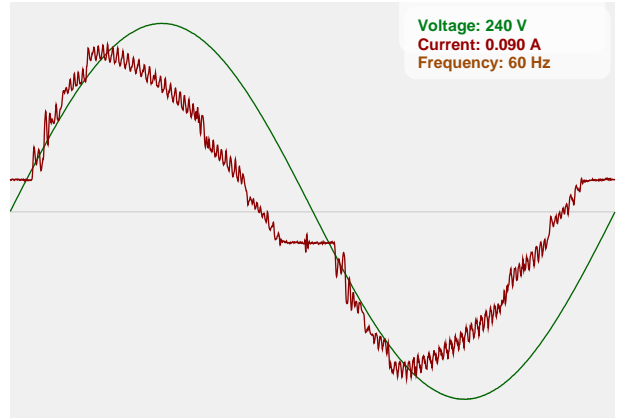
Power Factor	Stabilisation Time	Stabilisation Variation	Hours Operated Prior to Test
0.9	Lamp stabilized in 30 min 3 sec	+0.8%	0 hours



Spectral Power Distribution (SPD)



Input Power Curve

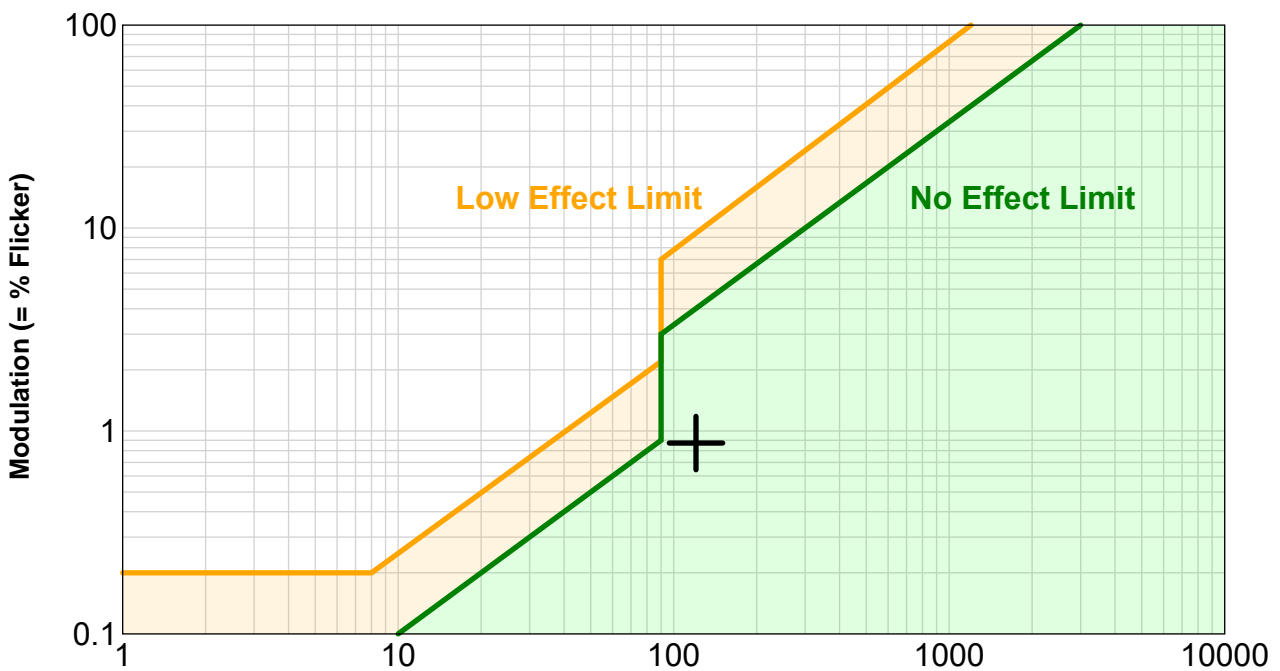


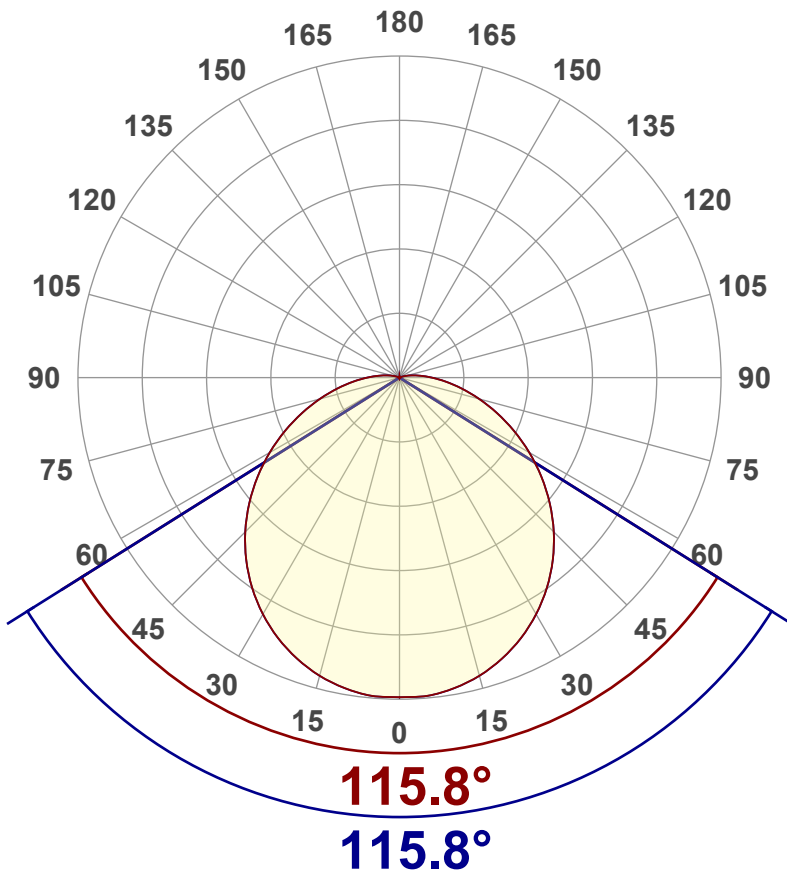
Flicker Details

Flicker Sample Rate	Flicker Percentage	Flicker Frequency	Flicker Index
20000 sample/s	0.87%	120.48 Hz	0

Flicker SVM Value	Flicker PstLM Value	Measurement Time (PstLM)	Measurement Time (all other indices)
0.01	0.19	180 s	1.2 s

IEEE 1789 Frequency/Modulation Plot



Angular Distribution – 0° / 90° Plane

Main Values

Total Lumen Output	2238 lm
Lumen Up%	3.23%
Lumen Down%	96.77%
Peak Intensity	694 cd
Beam Angle (90%)	115.8°

Cut-off Angle

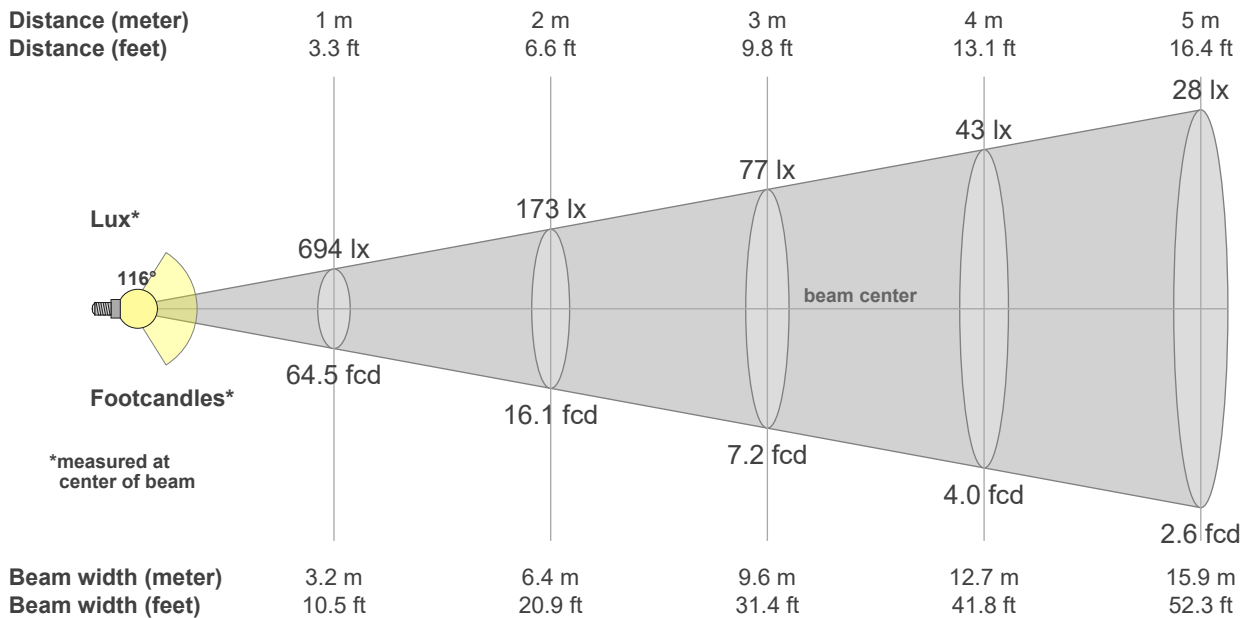
Average 2.5%	207.6°
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Field Angle

Average 10%	180.3°
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Intensity Ratio

In 120° Cone	71.1%
In 90° Cone	48.0%

C000-C180
C090-C270

Beam intensities from 1 – 20m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	m
3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6	ft
694	173	77	43	28	19	14	11	9	7	6	5	4	4	3	3	2	2	2	2	lux
64.5	16.1	7.2	4	2.6	1.8	1.3	1	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	fc



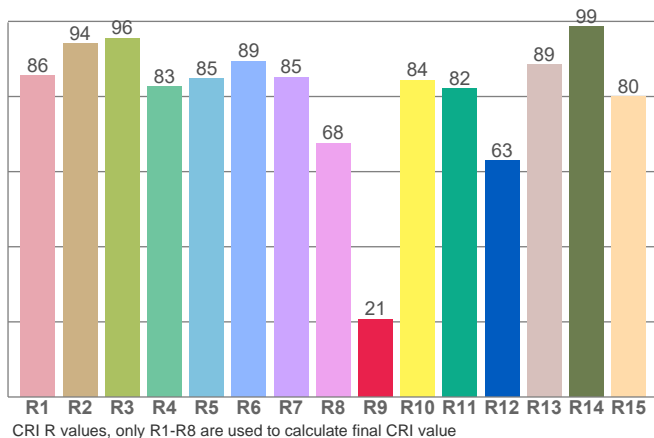
Colour Details

Colour Rendering Index (CRI)	Colour Rendering Index R9 Value	Colour Rendering TM30-18
Ra 85.6	R9 = 20.7	R _f 83.9, R _g 94.3

Colour Quality Scale	Correlated Colour Temperature, Target	Correlated Colour Temperature, Measured
CQS = 83.0	CCT = 4000 K	CCT = 4153 K

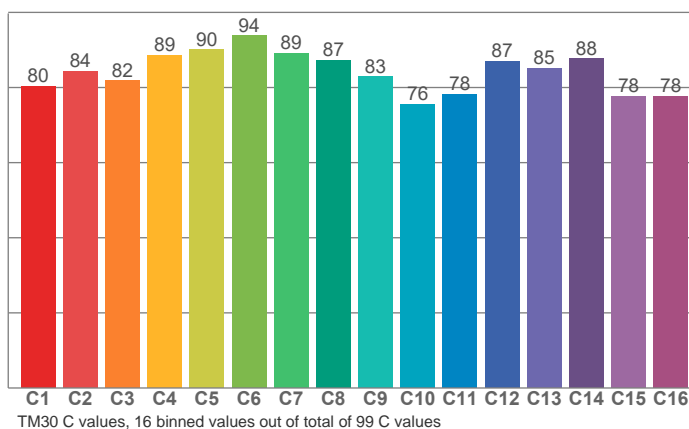
MacAdam Steps	Colour Coordinates CIE 1931	Colour Deviation from BBL
SDCM = 4.2	(x;y) = (0.381;0.377)	Duv = -0.0029

Colour Rendering Index per reference colour (CIE 1995)



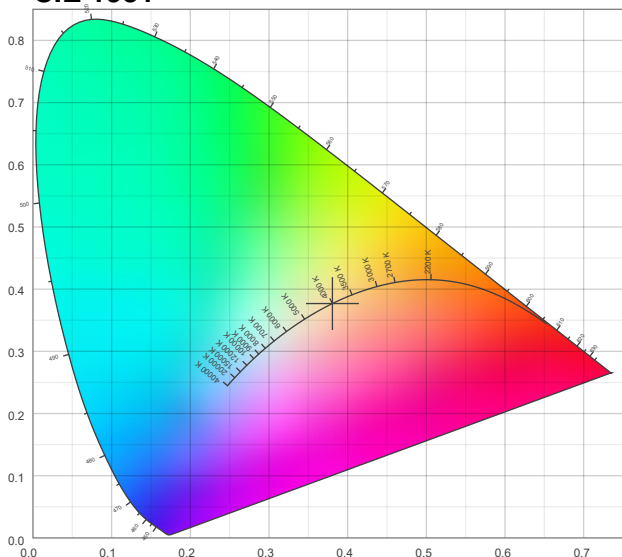
R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85.6	94.1	95.6	82.6	84.7	89.4	85.1	67.6	20.7	84.3	82.0	62.9	88.5	98.6	80.0

TM30-18 Rf-values per hue bin

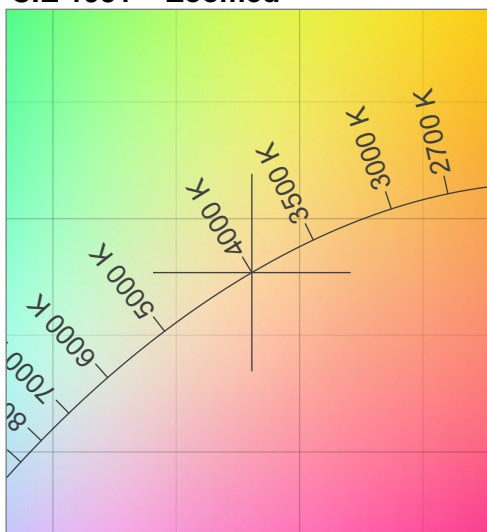


C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
80.3	84.4	81.9	88.6	90.1	93.8	89.2	87.3	82.8	75.5	78.2	87.0	85.1	87.7	77.7	77.7

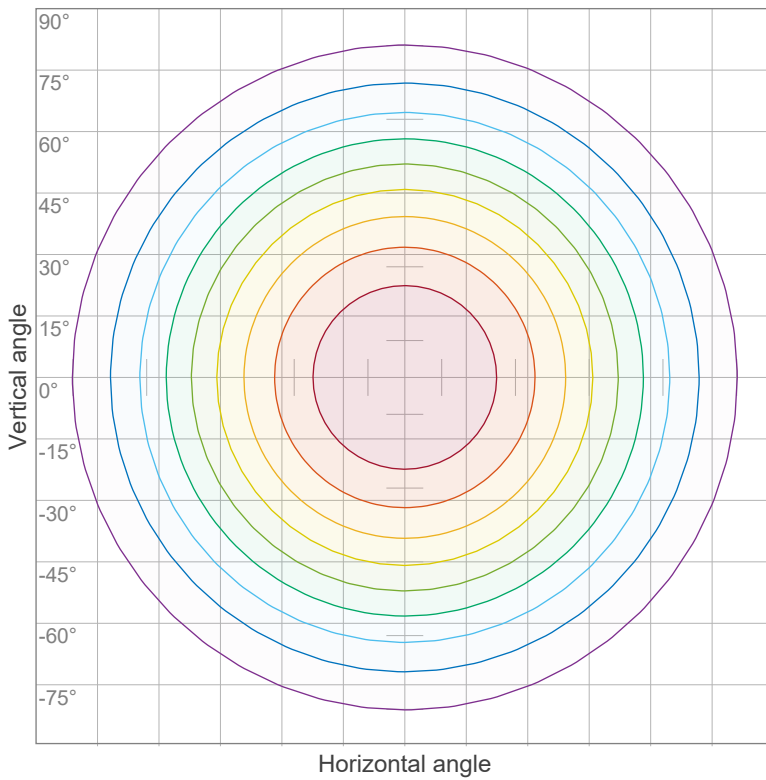
CIE 1931



CIE 1931 – Zoomed



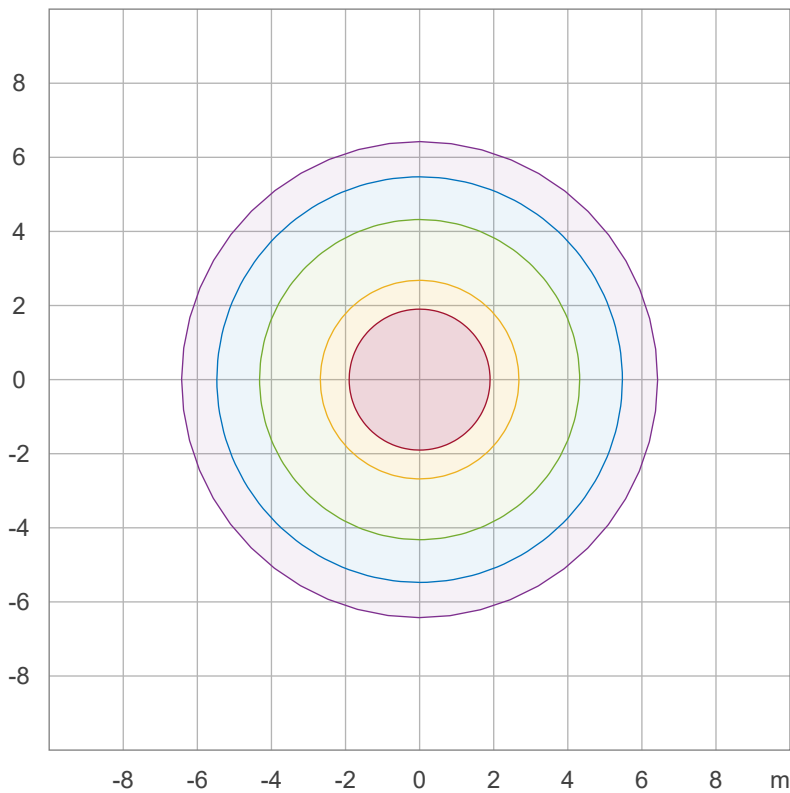
Iso-intensity Diagram (Iso-Candela)



90 %	624.4 cd
80 %	555.0 cd
70 %	485.6 cd
60 %	416.3 cd
50 %	346.9 cd
40 %	277.5 cd
30 %	208.1 cd
20 %	138.8 cd
10 %	69.4 cd

Peak intensity: 693.8 cd
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50.0 %	38.5 lx
30.0 %	23.1 lx
10.0 %	7.7 lx
5.0 %	3.9 lx
3.0 %	2.3 lx

Peak illuminance: 77.1 lx
Mounting height: 3.0 m
Number of c-planes: 24



Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances		70	70	50	50	30	70	70	50	50	30
ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room size		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	2H	22.1	23.3	22.4	23.7	24.0	21.6	22.8	21.9	23.2	23.5
	3H	23.8	25.0	24.2	25.4	25.7	23.0	24.3	23.5	24.7	25.0
	4H	24.6	25.8	25.1	26.2	26.5	23.8	25.0	24.2	25.3	25.6
	6H	25.5	26.6	25.8	26.9	27.3	24.4	25.5	24.8	25.9	26.3
	8H	25.9	26.9	26.2	27.3	27.7	24.7	25.7	25.1	26.1	26.6
	12H	26.2	27.3	26.6	27.6	28.2	24.9	25.9	25.3	26.3	26.8
4H	2H	22.6	23.8	23.1	24.2	24.5	22.2	23.4	22.7	23.8	24.1
	3H	24.6	25.6	25.0	26.0	26.5	24.0	25.1	24.4	25.4	25.9
	4H	25.5	26.5	26.0	26.9	27.5	24.8	25.8	25.3	26.2	26.8
	6H	26.5	27.4	27.0	27.8	28.2	25.5	26.4	26.1	26.8	27.3
	8H	26.9	27.7	27.5	28.2	28.6	25.9	26.7	26.4	27.1	27.6
	12H	27.4	28.1	27.9	28.6	29.1	26.2	26.9	26.7	27.3	27.9
8H	4H	25.8	26.6	26.3	27.1	27.5	25.2	26.0	25.7	26.4	26.9
	6H	26.9	27.6	27.5	28.1	28.7	26.1	26.8	26.7	27.3	27.9
	8H	27.5	28.1	28.1	28.7	29.4	26.6	27.1	27.1	27.7	28.4
	12H	28.2	28.6	28.8	29.2	29.9	27.0	27.5	27.6	28.0	28.7
12H	4H	25.8	26.5	26.3	27.0	27.5	25.2	25.9	25.7	26.4	26.9
	6H	27.0	27.6	27.6	28.2	28.9	26.2	26.8	26.8	27.4	28.1
	8H	27.7	28.2	28.3	28.7	29.4	26.8	27.2	27.4	27.8	28.5
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0.1 / 0.0					0.1 / -0.1				
S = 1.5H		0.1 / -0.1					0.1 / -0.2				
S = 2.0H		0.3 / -0.3					0.3 / -0.4				

Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR (RCR: Room Cavity Ratio)																		
Room Values are expressed as percentage of Lumen delivered to the task surface																		
0	118	118	118	118	115	115	115	115	109	109	109	104	104	104	99	99	99	97
1	106	101	96	92	103	98	94	90	93	90	86	89	86	83	85	82	80	78
2	96	87	80	74	93	85	78	72	81	75	70	77	72	68	74	70	66	64
3	87	76	68	61	85	74	66	60	71	64	58	68	62	57	65	60	56	53
4	80	67	58	51	77	66	57	51	63	55	49	60	54	48	57	52	47	45
5	73	60	51	44	71	59	50	43	56	48	43	54	47	42	52	46	41	39
6	68	54	45	38	66	53	44	38	51	43	37	49	42	37	47	41	36	34
7	63	49	40	34	61	48	39	33	46	38	33	44	37	32	43	37	32	30
8	58	45	36	30	57	44	35	30	42	35	29	41	34	29	39	33	28	26
9	55	41	32	27	53	40	32	27	39	31	26	37	31	26	36	30	26	24
10	51	38	30	24	50	37	29	24	36	29	24	35	28	24	34	28	23	22

NOTE: An asymmetry correction has been applied to the beam distribution of this measurement in order to accurately calculate UGR.

