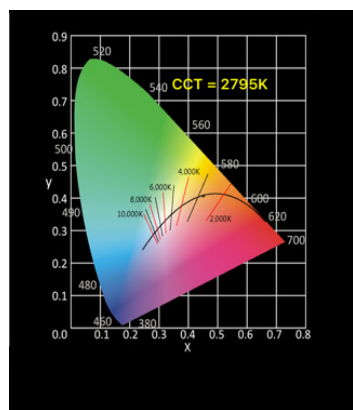


Report of Photometry & Chromaticity for NVC Lighting Ltd.

NTU43/66/830 - TULSA 43W Opal LED Panel



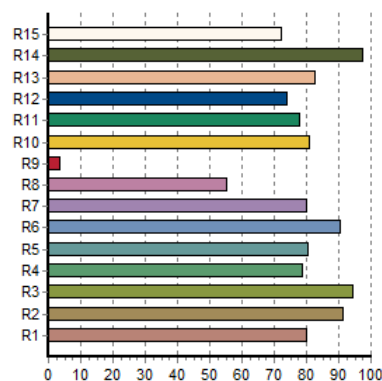
CIE1931 Chromaticity Diagram

A. Product Description

Product Name	tulsa opal	Sample Number	NTU43/66/830
Date	26-05-2017		
Manufacturer	NVC Lighting Ltd.		
Tester	lightlab photometrics	Reviewer	KB
Temperature	25degC	Re. Humidity(%)	53
Spectrum Range	380 ~ 780 nm.	Wavelength Step	1 nm.

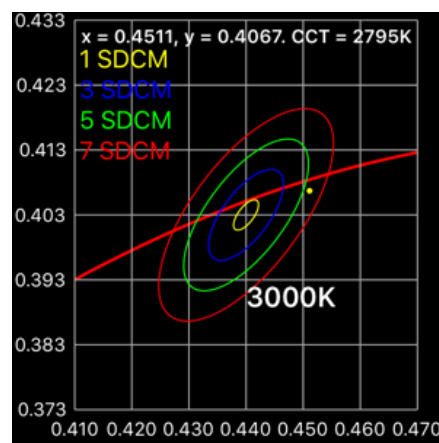
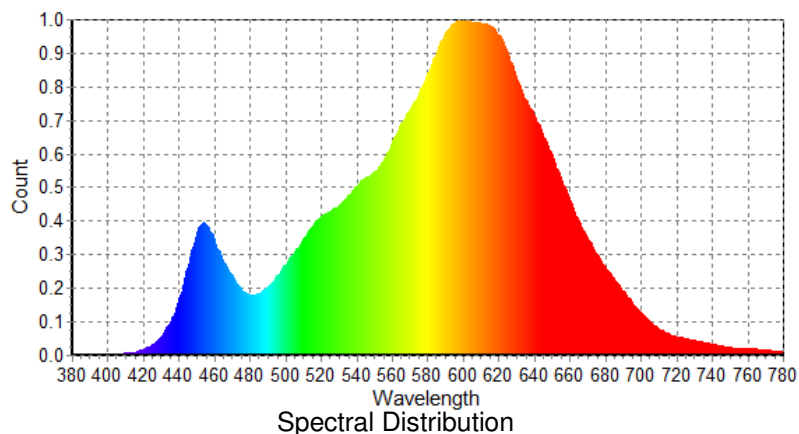
C. Photometry and Chromaticity

CIE_x	0.4511	Δv	-0.0007
CIE_y	0.4067	ld(nm)	584.0
CIE_u'	0.2586	Purity(%)	57.0
CIE_v'	0.5245	FWHM(nm)	120.0
CCT(K)	2795	SP ratio	1.26
Luminaire lumens	4260	PPFD(umol/sec m^2)	
lp(nm)	600.0		28.3
TLCI(Qa)	66.48	GAI	48.8



Histogram Diagram of CRI

CRI(Ra)		82	Re(thru R1~R15)		76
Qa		83			
 R1	80.4	 R6	90.7	 R11	78.3
 R2	91.8	 R7	80.6	 R12	74.2
 R3	94.8	 R8	55.8	 R13	83.2
 R4	78.9	 R9	3.7	 R14	97.9
 R5	80.7	 R10	81.5	 R15	72.4



IEC SDCM

filename : NTU43-66-830.LDT
 meas. number : 2280
 luminaire number : NTU43/66/830
 date / operator : 26-05-2017

**default lamp type(s)**

no of lamps	lamp type	luminaire lumens	input wattage
1	LED MODULE	4260 lm	41.9 W

dimensions

luminaire		luminous area	
length	: 595 mm	length	: 555 mm
width	: 595 mm	width	: 555 mm
height	: 10 mm	height	: 0 mm

coordinate system

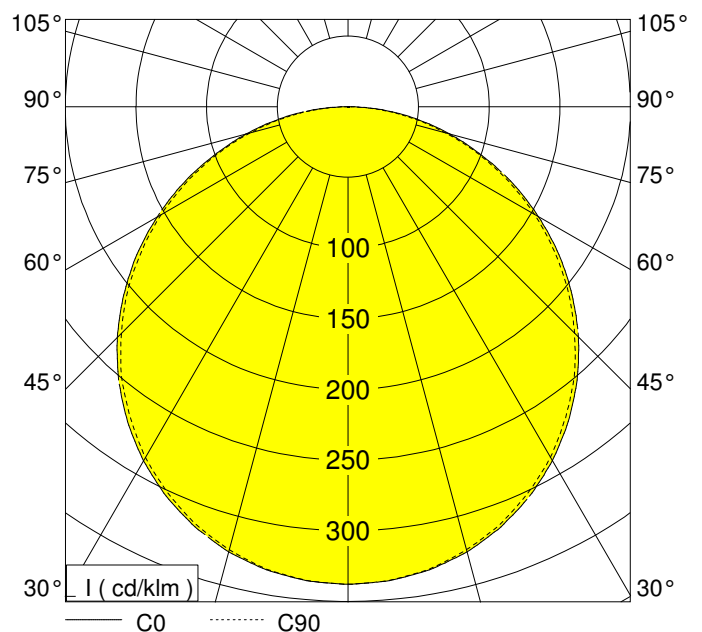
no of planes	: 7	samples / plane	: 37
first c-plane	: 0.0 °	first gamma-angle	: 0.0 °
step angle	: 15.0 °	step angle	: 5.0 °
last c-plane	: 90.0 °	last gamma-angle	: 180.0 °
symmetrics : symmetry to C0 / C90			

performance

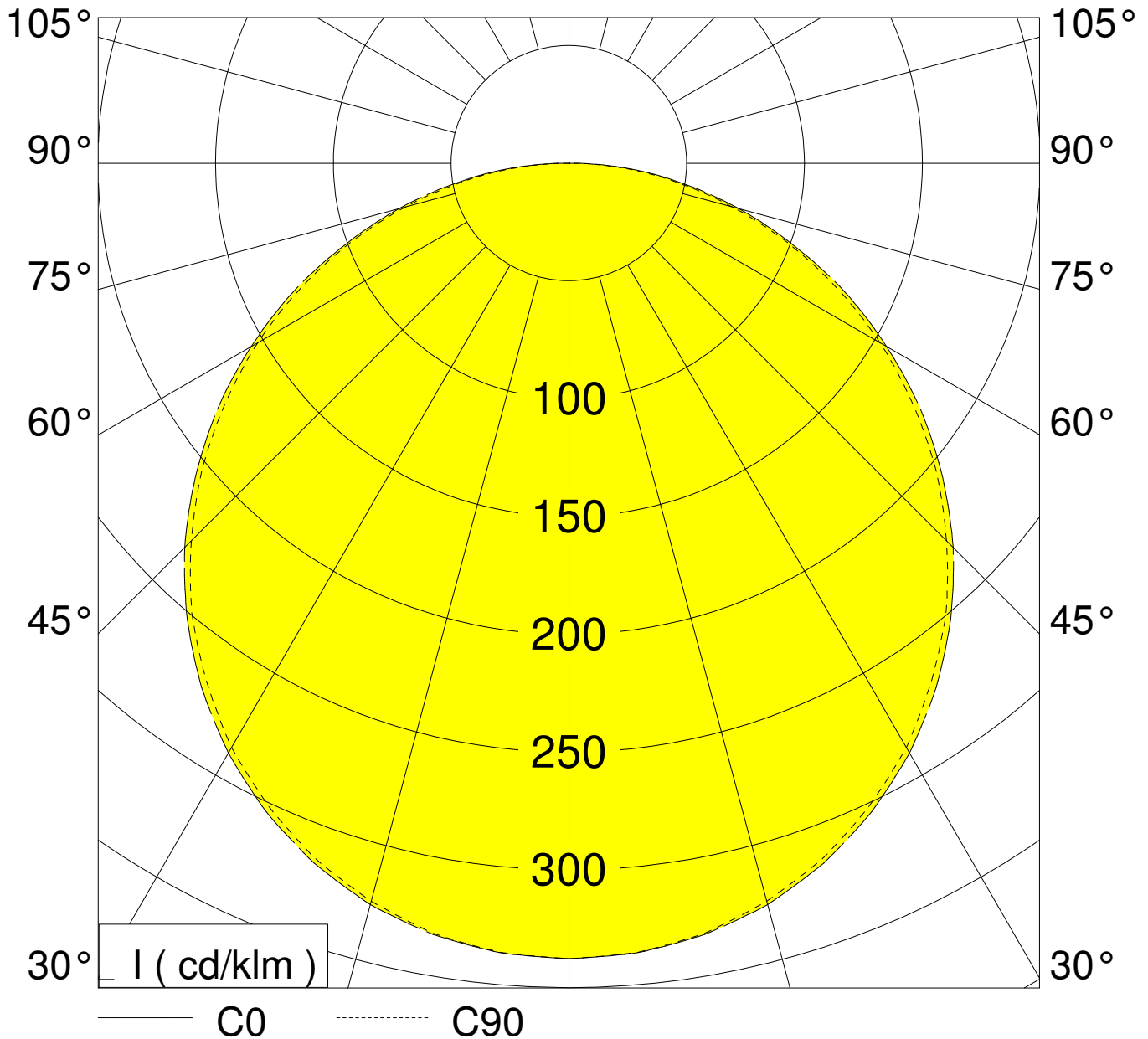
light output ratio	: 100.0 %
DFF	: 100.0 %
UFF	: 0.0 %

classification

LiTG / DIN	: A40
UTE	: 1.00E
CIE	: 46 77 95 100 100
BZ	: 4 5 5 5 5 5 5 5
Ambient Temperature	: 25 degC
Input Voltage	: 240 V
Circuit Watts	: 41.9W
Amps (running)	: 0.180A
V.A.	: 43.20VA
Power Factor	: 0.97
CCT	: 2795K (measured): 3000K (declared)
CRI (Ra)	: 82
Luminaire Lumens	: 4260LLm
Output Current DC	: 1040mA
Output Voltage DC	: 36.4V
Output Power	: 37.86W
Luminaire Lm/circ.Watt	: 102Lm/circ.Watt
Driver Efficiency	: 90%
Driver Details	: ARC-EC1105-40Q1-30



Measurements made are in absolute units. The luminaire is treated as if it was a lamp as it is not possible to measure each LED separately - hence an LOR of 100%
 The Light output ratio in real terms would be less than 100%. If it was possible to compare real LED lumens with the total output from the luminaire we could obtain an actual LOR
 This also means that the total lumens emitted from the LED's would be greater than the Luminaire Lumens measured. In reality the LED lumens would approximate to this value divided by the actual Light Output.



	C 0.0	C 15.0	C 30.0	C 45.0	C 60.0	C 75.0	C 90.0
0.0°	337.40	337.40	337.40	337.40	337.40	337.40	337.40
5.0°	336.20	336.30	336.40	336.20	336.10	336.00	336.00
10.0°	332.20	332.30	332.30	332.20	332.10	331.90	331.70
15.0°	325.60	325.40	325.30	325.00	324.70	324.40	324.10
20.0°	316.00	315.90	315.70	315.40	315.10	314.60	314.10
25.0°	303.70	303.60	303.40	303.00	302.50	301.80	301.10
30.0°	288.90	288.80	288.70	288.10	287.40	286.80	286.20
35.0°	271.60	271.30	271.00	270.40	269.80	268.90	268.10
40.0°	252.00	252.00	252.10	251.20	250.30	249.60	248.90
45.0°	230.50	230.20	230.00	229.20	228.50	227.50	226.50
50.0°	206.80	206.90	207.00	206.10	205.20	204.30	203.40
55.0°	182.10	181.90	181.80	180.90	180.00	179.00	178.10
60.0°	155.60	155.90	156.20	155.20	154.20	153.30	152.50
65.0°	129.10	128.80	128.60	127.80	127.00	126.30	125.50
70.0°	100.90	101.20	101.50	101.00	100.50	99.60	98.70
75.0°	74.60	74.50	74.50	73.30	72.20	72.00	71.70
80.0°	48.70	48.70	48.60	48.30	47.90	47.00	46.20
85.0°	24.50	24.40	24.20	24.10	23.90	23.10	22.30
90.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.0°	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	cd / klm						

glare rating according to UGR											
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 -workplane		20	20	20	20	20	20	20	20	20	20
room dimensions X Y		viewed crosswise					viewed endwise				
2H	2H	18.1	19.6	18.3	19.8	20.0	18.0	19.5	18.2	19.7	19.9
	3H	19.1	20.3	19.4	20.5	20.6	19.0	20.2	19.3	20.4	20.5
	4H	19.9	21.0	20.2	21.2	21.4	19.8	20.9	20.0	21.1	21.3
	6H	20.5	21.6	20.8	21.8	22.0	20.3	21.4	20.6	21.7	21.9
	8H	20.8	21.9	21.1	22.1	22.3	20.6	21.7	20.9	21.9	22.2
	12H	21.0	22.1	21.3	22.3	22.6	20.8	21.9	21.1	22.1	22.4
4H	2H	18.2	19.3	18.5	19.5	19.7	18.1	19.3	18.4	19.5	19.7
	3H	20.2	21.3	20.5	21.5	21.8	20.1	21.2	20.4	21.4	21.7
	4H	21.2	22.2	21.5	22.5	22.8	21.1	22.1	21.4	22.4	22.7
	6H	21.7	22.6	22.1	22.9	23.2	21.6	22.4	21.9	22.7	23.0
	8H	22.1	22.9	22.5	23.2	23.5	21.9	22.7	22.3	23.0	23.4
	12H	22.5	23.3	22.9	23.6	24.0	22.3	23.1	22.7	23.5	23.8
8H	4H	21.4	22.2	21.8	22.5	22.9	21.3	22.1	21.7	22.4	22.8
	6H	22.6	23.3	23.0	23.7	24.2	22.4	23.2	22.9	23.6	24.0
	8H	23.1	23.8	23.6	24.3	24.7	22.9	23.7	23.4	24.1	24.6
	12H	23.3	23.9	23.8	24.4	24.9	23.2	23.8	23.6	24.2	24.7
12H	4H	21.6	22.4	22.0	22.8	23.2	21.5	22.3	21.9	22.7	23.1
	6H	22.8	23.5	23.3	24.0	24.4	22.7	23.4	23.1	23.8	24.3
	8H	23.2	23.8	23.6	24.2	24.7	23.0	23.6	23.5	24.1	24.5
variation of observer position											
S =	1.0H	+0.1/ -0.1				+0.1/ -0.1					
	1.5H	+0.2/ -0.3				+0.2/ -0.3					
	2.0H	+0.3/ -0.5				+0.3/ -0.5					
standard-table		BK07					BK07				
correction for luminaire		6.0					5.9				
correct glare indices for a total flux of 4260lm											

class		glare rating for service value of illuminance (lx)								
A	A	1000	750	500	--	≤ 300				
1	B	2000	1500	1000	750	500	≤ 300			
2	D					2000	1000	500	≤ 300	
3	E						2000	1000	500	≤ 300

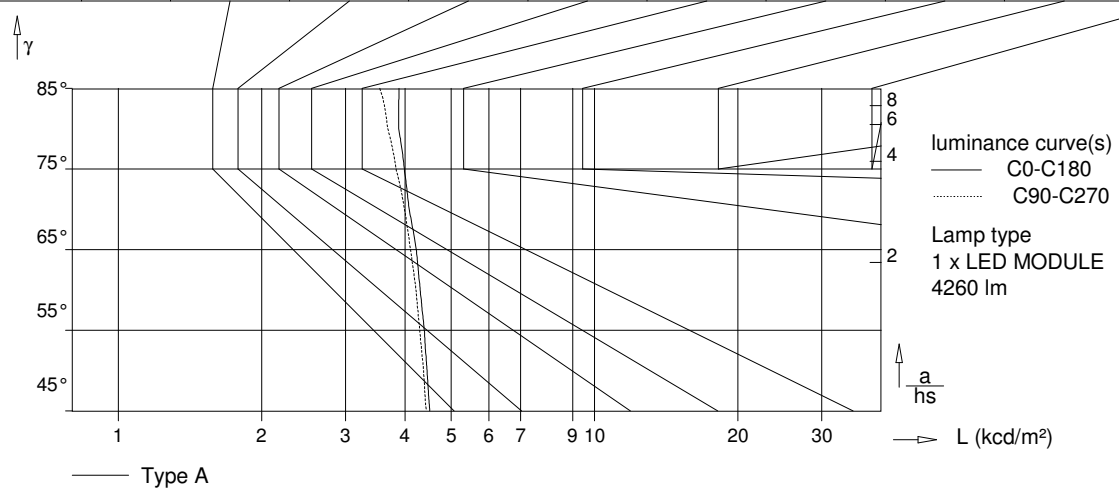


Table of intensities

gamma	C 0	C 90	C 180	C 270
45°	4508.3	4430.0	4508.3	4430.0
50°	4449.5	4376.3	4449.5	4376.3
55°	4390.8	4294.3	4390.8	4294.3
60°	4303.9	4218.2	4303.9	4218.2
65°	4224.8	4106.9	4224.8	4106.9
70°	4080.0	3991.1	4080.0	3991.1
75°	3986.3	3831.3	3986.3	3831.3
80°	3878.7	3679.6	3878.7	3679.6
85°	3887.7	3538.6	3887.7	3538.6

all values in cd/m²

utilization factors / TM5											
reflection			room index								
C	W	F	0.75	1.0	1.25	1.5	2.0	2.5	3.0	4.0	5.0
70	50	20	59	67	75	80	87	92	95	100	103
70	30	20	51	59	67	73	81	86	90	96	99
70	10	20	46	54	62	67	76	81	86	92	96
50	50	20	57	65	72	77	84	88	92	96	99
50	30	20	50	58	66	71	79	84	87	92	96
50	10	20	45	53	61	66	74	80	84	89	93
30	50	20	56	63	70	75	81	85	88	92	95
30	30	20	50	57	64	69	76	81	85	89	92
30	10	20	45	53	60	65	73	78	82	87	90
0	0	0	43	50	57	62	69	74	78	82	85
BZ-class			4	5	5	5	5	5	5	5	5
SHRnom : 1.50						SHRmax : 1.622					

