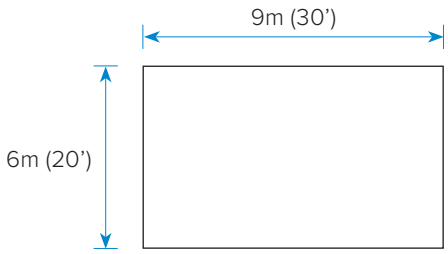
COOLEDGE™

A SURPRISING AMOUNT OF ILLUMINATION

Much as a diffuse sky delivers high levels of light by virtue of scale, the immersive illumination that is experienced under a luminous ceiling similarly does not require a large number of lumens per area, unlike the troffers and linear pendants that supply much of the general illumination in public spaces today.

CASE STUDY PARAMETERS

Room Dimensions	ft	m
Length	30	9
Width	20	6
Area	600	54
Ceiling Height	10	3

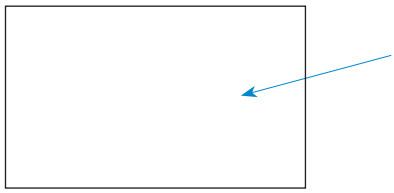


Photometric Details	Ceiling	Wall	Floor
Reflectances	80%	70%	20%
Light Loss Factor	0.85		
L.O.R (Light Output Ratio)	50%		

A photometric study using standard calculation software was done for 3 scenarios for a space with the attributes described to demonstrate the impact of luminous surface area on illuminance levels. In each example, the photometric properties – distribution, efficacy, etc. - of the luminous surfaces remain the same. The only changes are the size and layout of the surfaces.

SCENARIO 1: CONTINUOUS LUMINOUS CEILING

Luminous Surface: 5.8m x 8.8m = 51 m^2 (549 sqft)



Luminous Ceiling: 5.8m x 8.8m
Total Luminous Area: 51 m^2
Light Source: Cooledge TILE Interior

The first scenario shows the illuminance values that result for a ceiling that has roughly the same dimensions as the space itself. In this case, the resulting values indicate that the illuminance targets for many applications can be achieved when using the most energy efficient (lower lumen) configuration.

TILE Output (lm)	Average Maintained Illuminance (fc)	Power Density (W / sqft)	Average Maintained Illuminance (lux)	Power Density (W / sqm)	Uniformity	
					Max/Min	Average/Min
150	**49**	1.1	**527**	11.8	2.2	1.8
300	**98**	2.3	**1054**	24.6	2.2	1.8
600	**196**	4.8	**2108**	51.2	2.2	1.8

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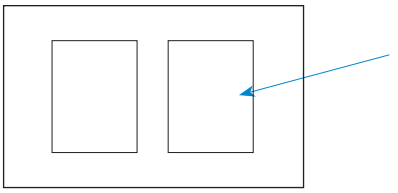
SCENARIO 2: SEGMENTED LUMINOUS CEILING

Luminous Surface: 2m x 3m x 2 = 12 m^2 (129 sqft)



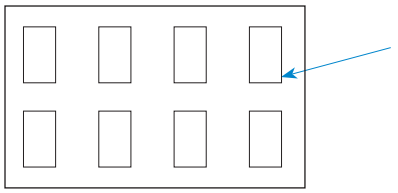
Large Discreet Luminous Surfaces:
2m x 3m (x2)
Total Luminous Area: 12 m^2
Light Source: Cooledge TILE Interior

The second scenario is based on the use of two large light boxes to illuminate the space using a "segmented" luminous ceiling. As should be expected, the illuminance values are lower by a factor of ~4 from the continuous ceiling with an additional decrease in overall uniformity. However, the illuminance levels are still more than double those of a design that achieves good uniformity using the traditional form factor of recessed troffers.

TILE Output (lm)	Average Maintained Illuminance (fc)	Power Density (W / sqft)	Average Maintained Illuminance (lux)	Power Density (W / sqm)	Uniformity	
					Max/Min	Average/Min
150	**11**	0.3	**119**	2.8	4.3	2.7
300	**22**	0.5	**238**	5.8	4.3	2.7
600	**44**	1.1	**476**	12.0	4.3	2.7

SCENARIO 3: TROFFER EQUIVALENT ("2X4" TYPE)

Luminous Surface: 0.6m x 1.2m x 8 = 5.8 m^2 (62 sqft)



Small Discreet Luminous Surfaces:
0.6m x 1.2m (x8)
Total Luminous Area: 5.8 m^2
Light Source: Cooledge TILE Interior

For comparison, the third scenario assumes the same photometric properties for the luminous surfaces, however, a traditional "2x4" troffer form factor was used. The illuminance values achieved by the configuration using the highest lumen output TILE (600lm) are comparable to a troffer style luminaire.

TILE Output (lm)	Average Maintained Illuminance (fc)	Power Density (W / sqft)	Average Maintained Illuminance (lux)	Power Density (W / sqm)	Uniformity	
					Max/Min	Average/Min
150	**5**	0.1	**54**	1.3	2.1	1.7
300	**10**	0.2	**109**	2.8	2.1	1.7
600	**20**	0.5	**218**	5.8	2.1	1.7