

CoolBlock® HC-01-3x11 Rectangle Pin Fin LED Cooler

Thermal Data

The thermal performance of a LED cooler, expressed as Thermal Resistance Rth in K/W (or °C/W) tells you how many degrees Kelvin (or Celsius) the base of the LED cooler will incline per Watt of dissipated power Pd.

This dissipated power Pd is the heat loss a LED package or LED COB/LOB will create besides the efficient light generation.

Typically for white LED packages the efficiency varies with the color CCT and the CRI – values here below can be taken as a rule of thumb for white LED packages (phosphor corrected blue light)

CCT 4000 - 7000 and CRI 70 - 80 → 35% efficiency → 65% heat loss

CCT 2700 - 3000 and CRI 85 - 97 → 30% efficiency → 70% heat loss

For other LED packages like horticulture specific wave lengths or UV, we recommend you to look up the thermal efficiency in the datasheet or contact the supplier.

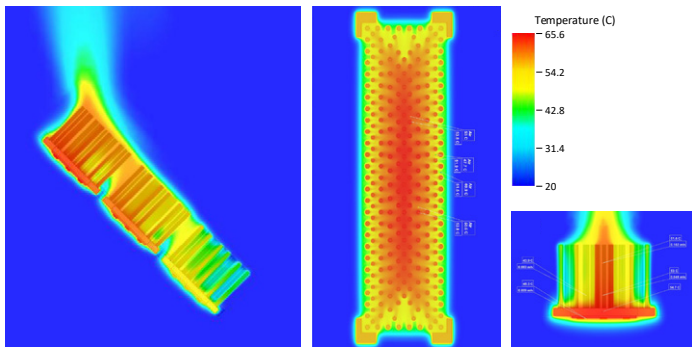
Keep in mind that for horticulture LED packages, example 660nm Deep Red, the thermal losses are drastically lower and can be as low as 40%, meaning you could almost use double the electrical power Pe on the same LED cooler for the same temperature rise dT.

Next the Thermal Resistance Rth is not a fix value – the nominal value we declare corresponds with a 50°C temperature rise – The table below explains the thermal resistance Rth for various dissipated power values.

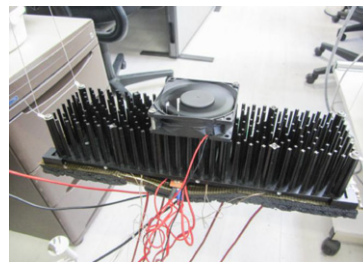
In this way you can completely predict the temperature you are going to get in your LED luminaire.

Difficulties figuring it out – just let us know and our engineers will do the math for you.

CoolBlock® HC-01-3x11 thermal simulations results CFD



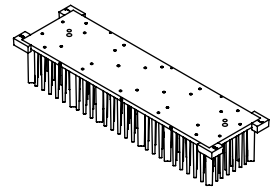
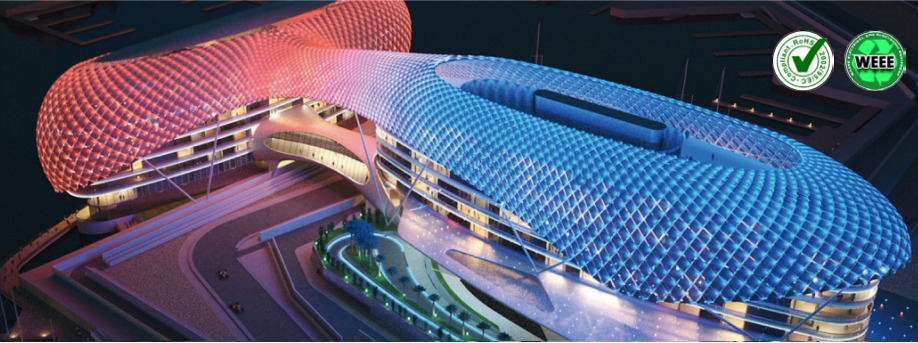
Single fan solution



3 fans solution



Fan Speed: 12V = 1310 RPM 24V = 2350 RPM



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Fan (Optional)	Pd = Pe x (1-ηL)	Heat sink to ambient thermal resistance R _{hs-amb} (°C/W)					Heat sink to ambient temperature rise T _{hs-amb} (°C)				
		-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)	-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)
Dissipated Power Pd(W)	25	0.64	0.32	0.23	0.19	0.14	16	8	6	5	3
	50	0.55	0.30	0.22	0.18	0.13	27	15	11	9	7
	75	0.50	0.29	0.22	0.18	0.13	38	22	16	14	10
	100	0.48	0.29	0.21	0.18	0.13	48	29	21	18	13
	150	-	0.28	0.21	0.18	0.13	-	43	31	27	20
	200	-	0.28	0.20	0.18	0.13	-	55	41	36	26
	250	-	-	0.20	0.18	0.13	-	-	50	45	33
	300	-	-	0.20	0.18	0.13	-	-	60	54	39

Heat sink to ambient temperature rise T_{hs-amb} (°C)

— CoolBlock® HC-01-3x11 without fan — With 1 fan (12V) — With 1 fan (24V) — With 3 fans (12V) — With 3 fans (24V)

