

◆ Introduction

The advantages of LED are energy saving, high brightness, small volume, long service life, etc, but it's too hard to improve the IPCE of LED, due to it can only transform 15-20% electricity to light, other 60-70% electricity to heat. Therefore, heat dissipation is important to LED, heat sink is a core of LED lamp. According to simulation and test data, this report demonstrated the Heat-column Heat sink better cooling ability than traditional heat sink which is made of Aluminum by extrusion.

◆ Test Sample

Aluminum Heat Sink

Traditional Heat sink is made of extrusion Aluminum by designed structure for better air convection.

Principle: Metal heat dissipation

Advantage: High thermal conductivity, lower cost, empty, simple processing.

Disadvantage: Limited cooling ability.



Heat Column Heat Sink

Internal structure: Heat Column, a heat transfer device is high thermal conductivity more than any metal by phase change principle.

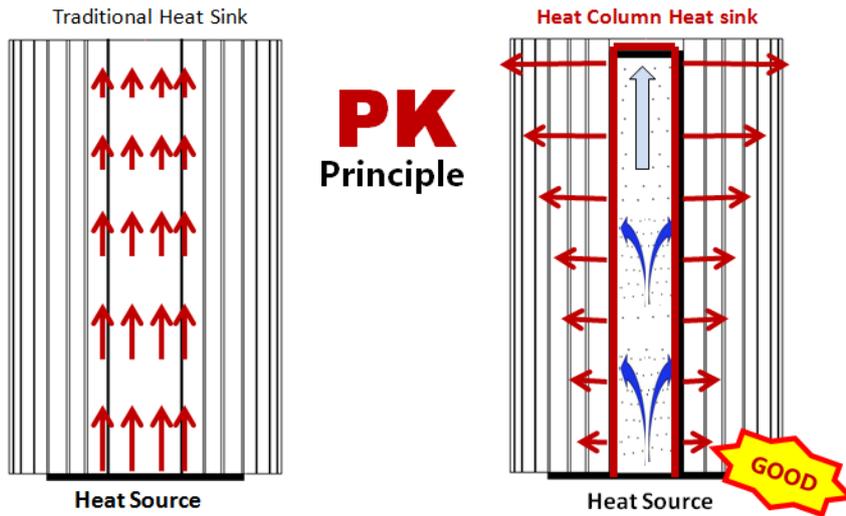
External structure: Extrusion Aluminum structure for better heat dissipation from the heat of heat column.

Principle: Phase change and Metal heat dissipation

Advantages: Start working below 28 deg C, stable performance, long service life, smaller volume and weight than traditional heat sink etc.



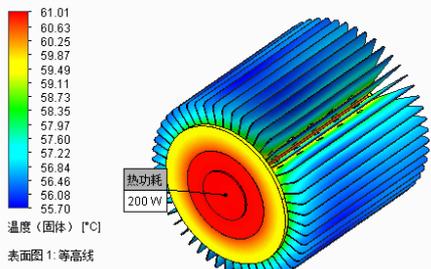
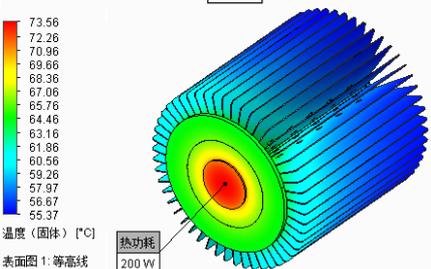
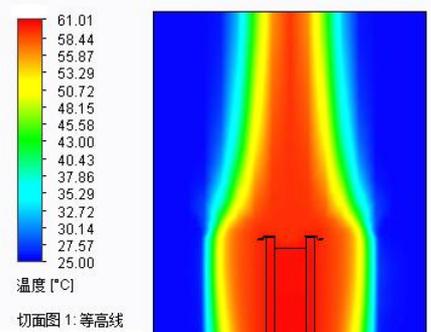
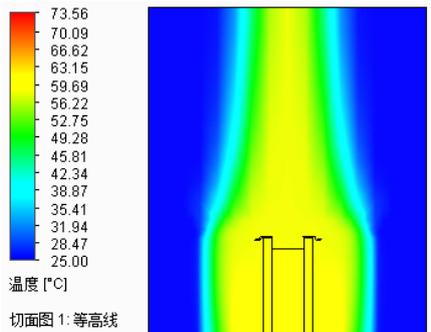
◆ Comparison between the Heat Column Heat Sink and the Traditional Heat Sink



◆ Thermal Simulation

200w Aluminum Heat Sink

200w Heat-Column Heat Sink



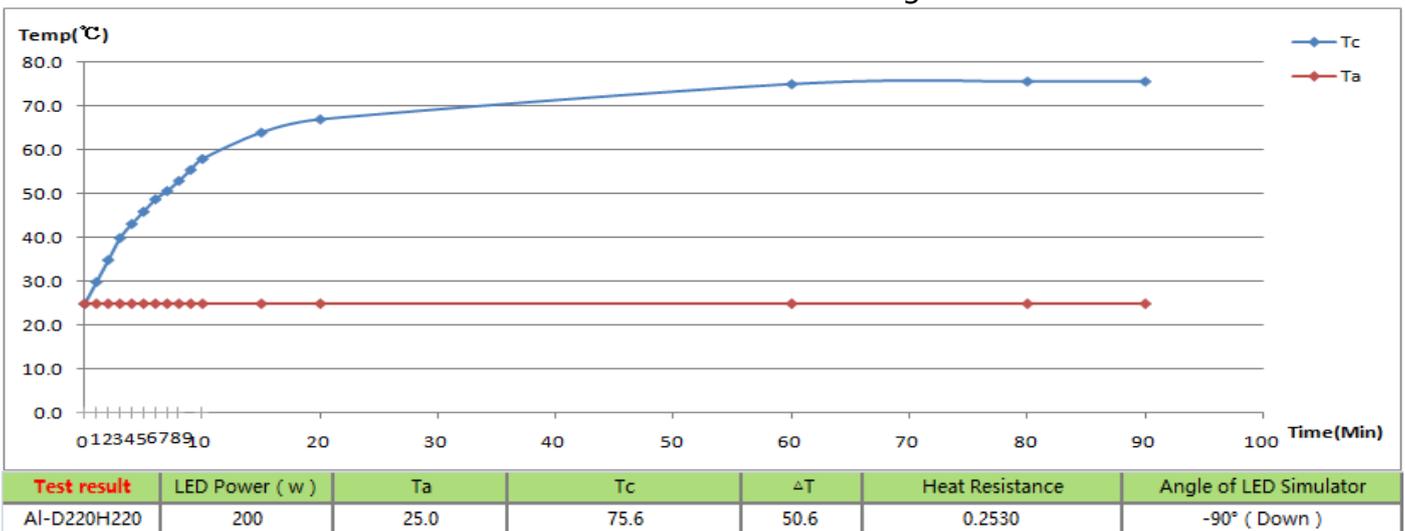
Sample	Aluminum Heat Sink	Heat-Column Heat Sink
Result	The temperature of LED mounting base is highest, around 74° C.	The whole heat sink is almost a same temperature, the temperature of LED mounting base is around 61 ° C.
Conclusion	Limited cooling ability, Efficient utilization of Aluminum material is lower.	Heat Column is a high-efficient heat transfer device. Efficient utilization of Aluminum material is high.

◆ **COB Simulation**

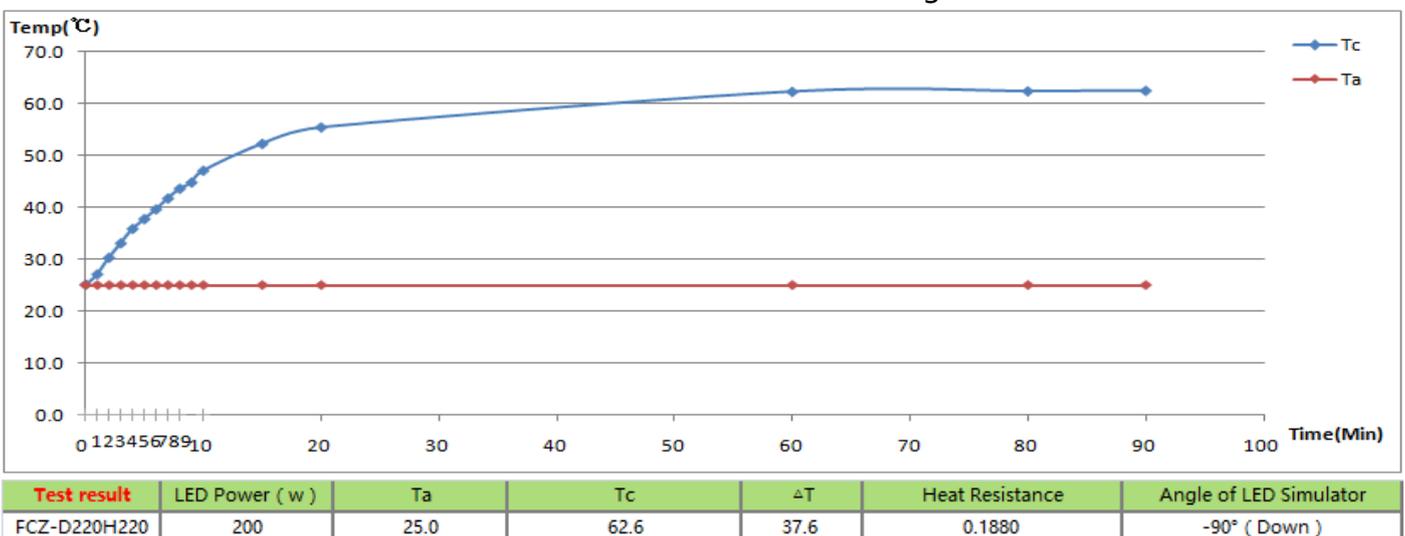
Test Condition:

Test Power: 200w ,Test LED: COB simulator, LED Direction: -90 deg(face floor) ,Ambient Temperature(Ta) =25°C, Test duration : 1.5hs , Test environment : Indoor, no air convection.

200w Aluminum Heat Sink COB LED Cooling Test Curve



200w Heat-Column Heat Sink COB LED Cooling Test Curve



Conclusion:

After 1.5hours test duration, the Tc temperature of the heat-column heat sink base plate is 62.6 °C (Rth: 0.1880°C/W), 13 °C lower than Aluminum heat sink. (Tc of Aluminum heat sink base plate is 75.6°C , Rth: 0.2530°C/W), so the cooling ability is better than traditional heat sink.

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