

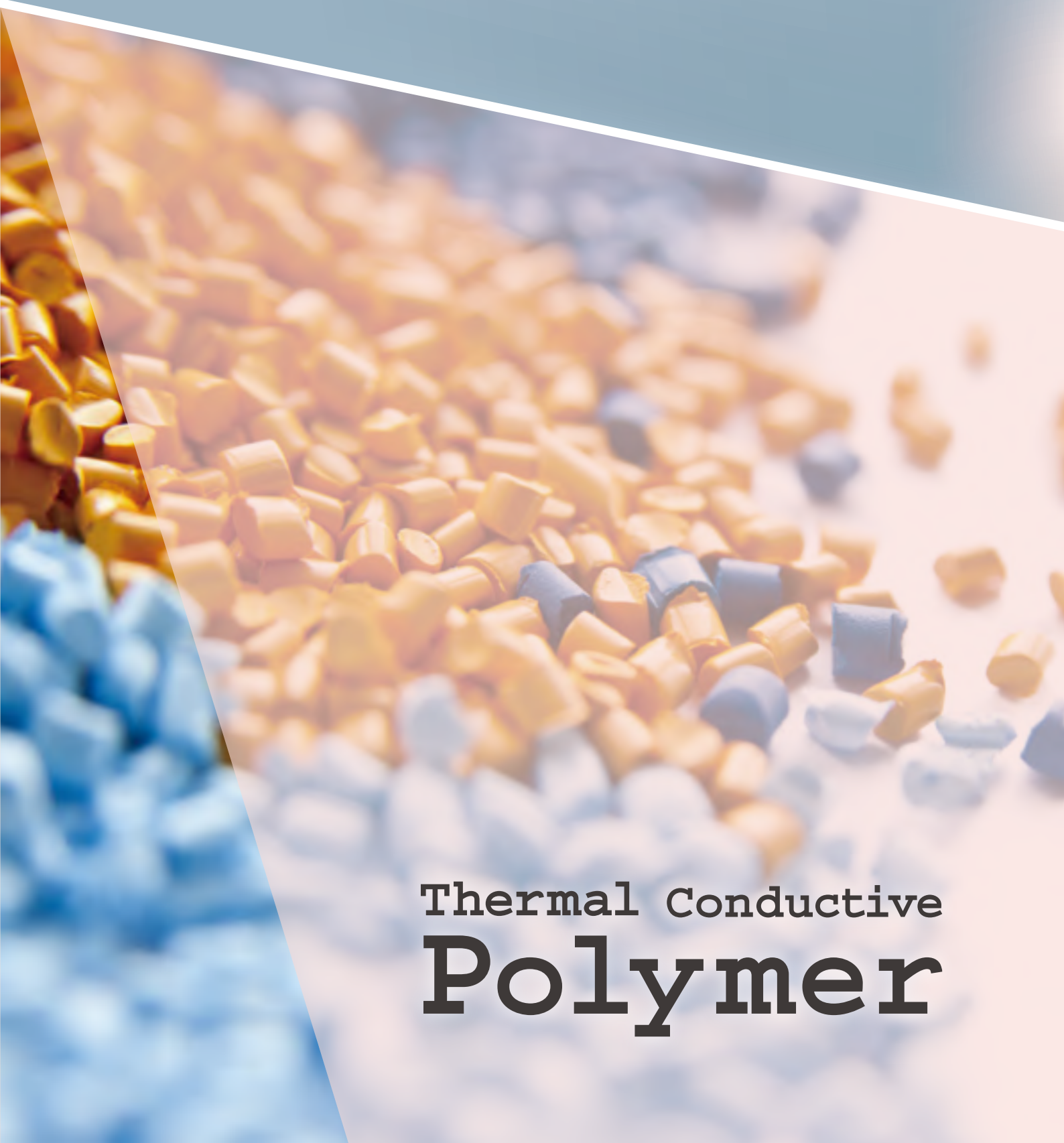
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**NYTEX COMPOSITES CO., LTD.**

High Performance Engineering Plastics



Thermal Conductive  
**Polymer**

INNOVATION  
Eco-AWARENESS  
TECHNOLOGY ADVANCEMENT



## ABOUT US

Nytex Composite Co., Ltd. was established in 1988 and currently has a registered capital of \$800 million NTD (\$27 million USD). We specialize in the compounding and coloring of Nylon 6, 66 composites and high performance polymer composites.

Nytex is continually transforming and improving itself to evolve with the evolution of the global economy. We are proud of being part of this transformation and have become one of the largest Nylon compounders to supply technologically advances and price competitive materials to our partners in Asia Pacific as well as North America. We have been an effective supplier into industries such as, electronics, computers, automotives, sporting goods, power tools, office furniture and many more.

Nytex has been steadily supplying highly qualified materials into the market. Apart from focusing on the traditional nylon composites, we have now developed many new performance polymers with advanced technology to provide a complete solution for the new emerging markets.

## LOCATIONS

Our business locations includes:

Taiwan- Taipei, Changhua  
China- Shanghai, Chengdu, Dongguan, Wuhan, Xiamen  
HK&Macau- Hongkong  
U.S.A.- California

## PRODUCT STRENGTH

superb heat dissipating ability

$$k = 1.0-9.0 \text{ } \frac{W}{m \cdot K}$$

Thermal conductivity 5-45 times higher than general plastic

$$\epsilon = 0.9-0.95$$

Thermal emissivity 3 times as high as aluminum alloy

NYTEX Thermal Conductive Polymer, with thermal conductivity 5-45 times higher than general plastics, thermal emissivity 3 times as high as aluminum alloy, specific gravity 50%-60% of aluminum, is applicable to injection molding process. It helps enhance heat dissipating efficiency of products, simplify design and manufacturing process, also achieve lightweighting purpose.

Certificated with RoHS, REACH, UL card, UL-RTI 140°C , NYTEX Thermal Conductive Polymer offers reliability and safety for your products.

## ADVANTAGES



Lightweighting  
40% less weight than metal



Productivity  
Rapid production cycle



Flexibility  
More flexible in design

## FEATURES

Reliability

- UL94-V0
- UL94-5VA
- UL-RTI 140°C
- Salt-fog resistance
- Electric Insulative
- Compliance with Federal Aviation Regulation
- Compliance with Far25.853: Fire Protection for compartment interior
- Compliance with Boeing & ABD Low Smoke Free Halogen standard
- NFPA 130 Standard for fixed guideway transit and passenger rail systems

Environmentally Friendly

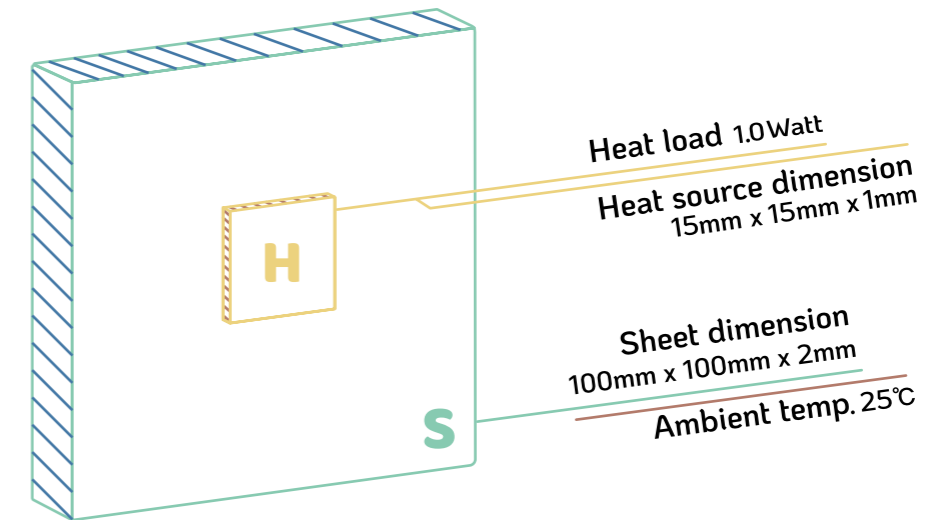
- Compliance with REACH
- Compliance with RoHS
- Reclaim rate of up to 30%
- Reduction of process waste
- Reduction of energy consumption



## STRICT QUALITY ASSURANCE

In order to carefully control the material quality, we own a full range of testing equipment:

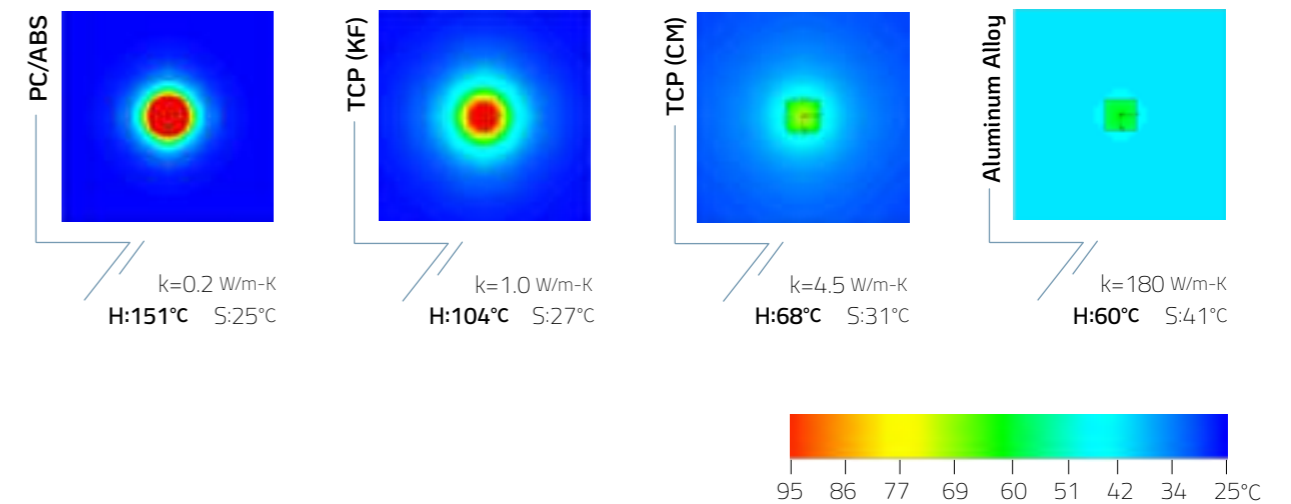
- UL Equivalent Heat Aging Tester
- Universal Testing Machine
- Low & High Temperature Tester
- DSC/TGA Thermal Analyzer
- Melt Index Tester
- Heat Deflection Temperature Tester
- Thermal Tester
- High Voltage Meter



## A THERMAL SIMULATION EXPERIMENT

This is a thermal simulation experiment, which we executed to understand the effect of applying NYTEX thermal conductive polymer. We set a heat source on a material sheet which is the independent variable in the experiment. The sheet is changed into different kind of materials, including PC/ABS, NYTEX thermal conductive polymer KF series, NYTEX thermal conductive polymer CM series, aluminum alloy and NYTEX thermal conductive polymer with aluminum alloy.

As the results showed below, the heat dissipating ability of NYTEX thermal conductive polymer is much higher than general plastics, while close to aluminum alloy.



# NYLOY KF SERIES

NYTEX THERMAL CONDUCTIVE POLYMER

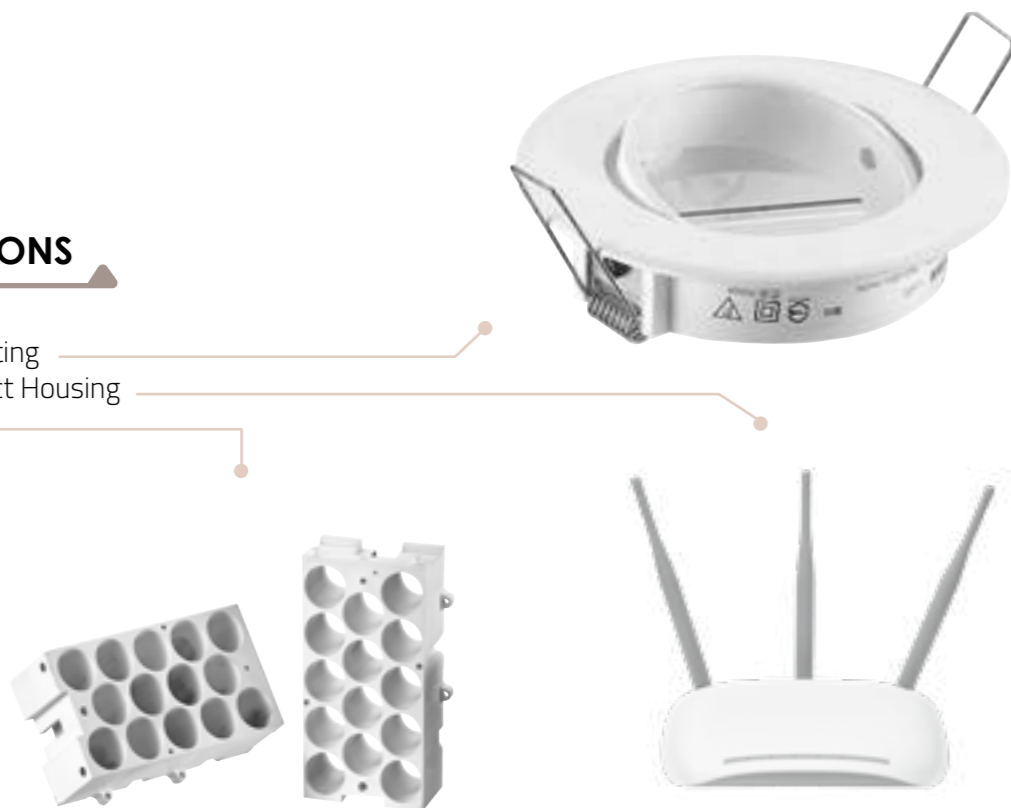
## FEATURES

- For Injection Moulding
- Electrically Insulative
- $k = 0.9-1.3 \text{ W/m-K}$  (through plane)
- UL-94 V0
- RTI 140°C
- Surface resistance( $\Omega$ )  $> 10^{12}$  ohm
- White, Colorable

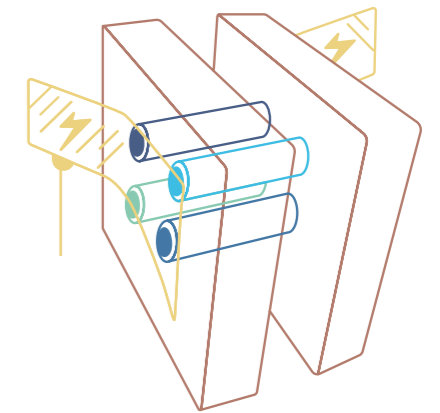


## APPLICATIONS

- Commercial Lighting
- Electronic Product Housing
- Li-ion Battery



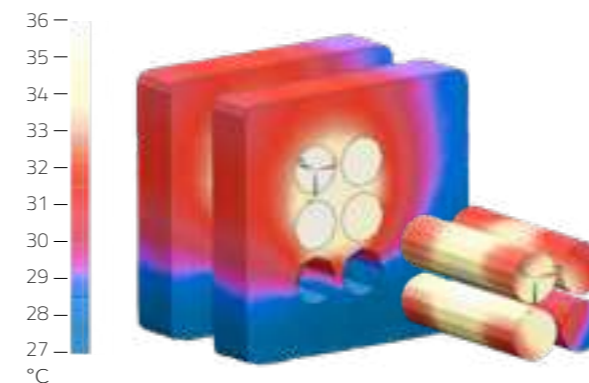
## EXAMPLE



This is a case which applying KF series on Li-ion battery holder. We compared the performance between ABS holder and KF series holder. As the charts listed below, TCP holder helped decrease the cells temperature up to 8°C more than ABS holder. In addition, we can see in the thermal simulative graphic that TCP holder help distributing heat more evenly.

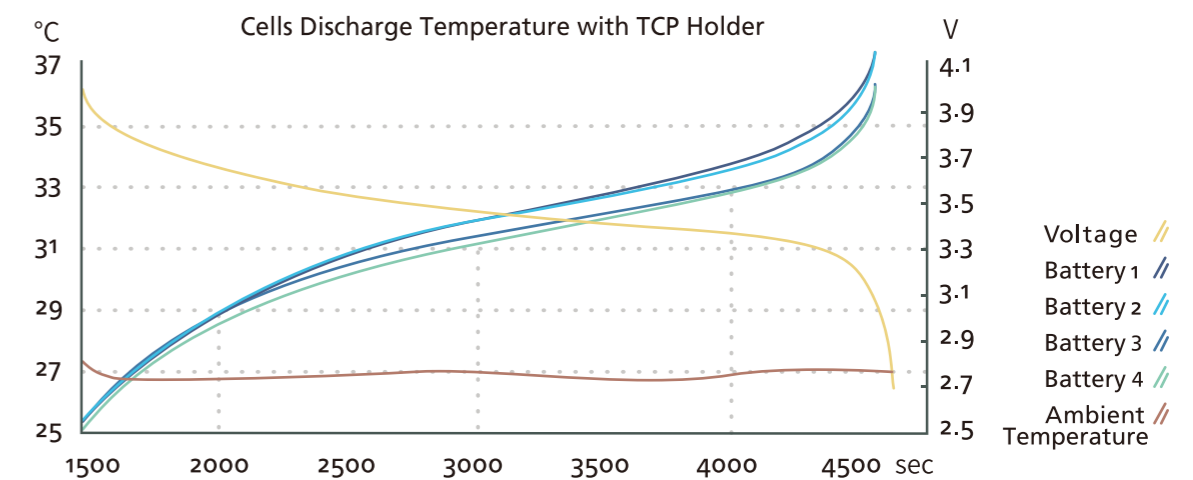
### TCP holder

Battery temperature 10.6 / 9.7 / 10.1 / 10.9 °C



### ABS holder

Battery temperature 18.2 / 17.9 / 17.8 / 18.4 °C



# NYLOY CM SERIES

NYTEX THERMAL CONDUCTIVE POLYMER

## FEATURES

For Injection Moulding  
Electrically Conductive  
 $k = 4.5\text{--}9.0 \text{ W/m-K}$  (through plane)  
UL-94 V0  
Surface resistance( $\Omega$ )  $> 10^5\text{--}10^6$  ohm  
Black



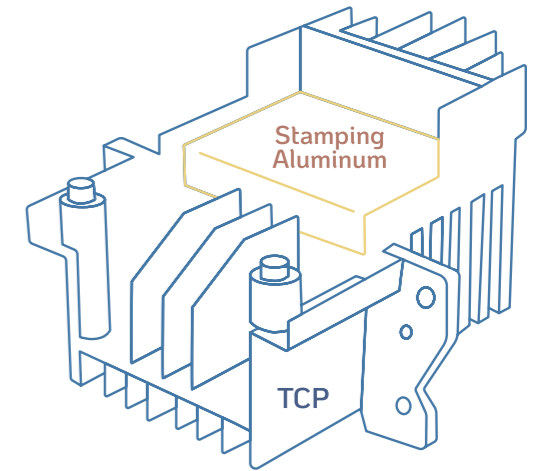
## APPLICATIONS

LED Auto Light  
Heatsink  
Commercial Lighting

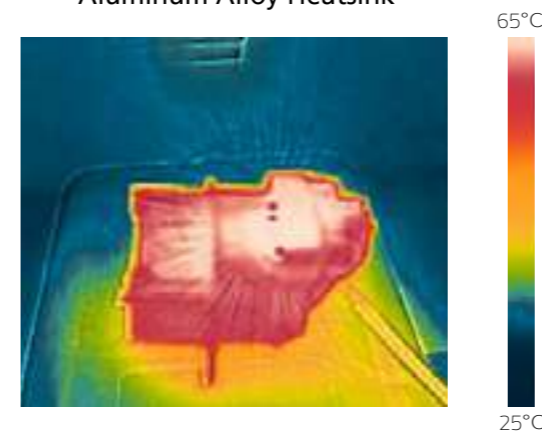


## EXAMPLE

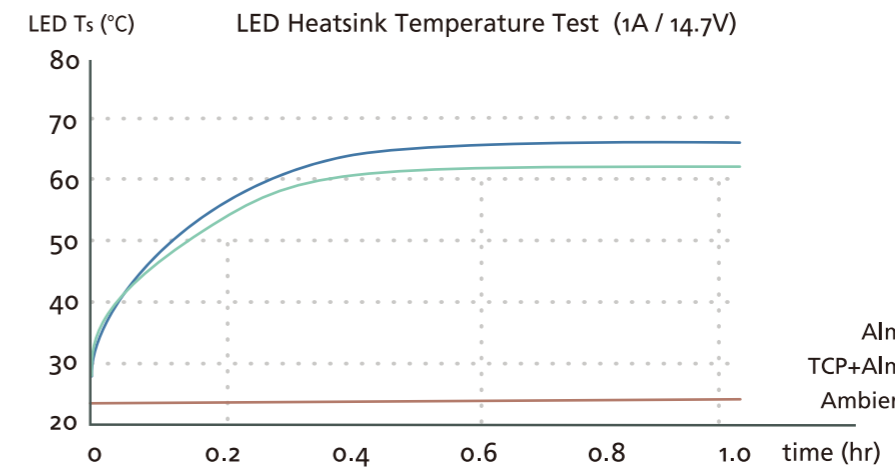
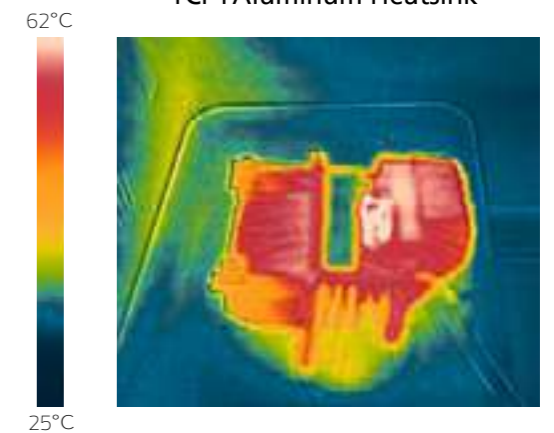
In this case, we made heatsink by both NYTEX thermal conductive polymer and aluminum, then comparing the performance with aluminum heatsink. The results show that NYTEX thermal conductive polymer with aluminum heatsink reduce slightly more temperature than aluminum heatsink. In the IRT image, it demonstrates that the heat distributed evenly on both kind of heatsink.



Aluminum Alloy Heatsink



TCP+Aluminum Heatsink





Commercial Lighting      Li-ion Battery      EMI Shielding

**Product** KF-0030N 311WLT    CM-5000 8045B2    KF-0030N B501WKS    KF-0030N B601WKS    KF-0030N B601WKS    CM-5000 E806BFC

**Base Material** PA6    PA6    PA6    PA6    PA6    PA6

**Color** White    Black    White    Black    White    Black

**Material Properties**

**Mechanical Properties**

Tensile Strength	700	780	270	560	980	kg/cm2 (ASTM D638)
Elongation	1.8	1.1	3.5	2.0	0.8	% (ASTM D638)
Flexural Strength	1200	1200	550	1070	1600	kg/cm2 (ASTM D790)
Flexural Modulus	82000	135000	37000	110000	225000	kg/cm2 (ASTM D790)
IZOD Impact, Notched 1/8" 23°C	3.5	4.5	3.5	3.2	4.3	kg-cm/cm (ASTM D256)

**Thermal Properties**

Heat Deflection Temp. (1.82MPa)	205	210	190	190	217	°C (ASTM D648)
Thermal Conductivity (Through-plane)	1.0	4.5	0.6	0.8	5.3	W/m*K (ASTM E461)

**Other Properties**

Density	1.62	1.52	1.46	1.66	1.50	g/cm3 (ASTM D792)
Mold Shrinkage // flow	0.40	0.20	0.50	0.35	0.17	% (ASTM D955)
⊥ flow	0.50	0.30	0.70	0.60	0.28	% (ASTM D955)
Flammability	1/8"V0	1/8"V0	1/32"V0	1/32"V0	1/8"V0	(UL-94)
		1.0mm 5VA	1/16" 5VA			(UL-94)
Halogen Free	X	0	0	0	0	

**Electrical Properties**

Surface Resistance	> 10 <sup>12</sup>	10 <sup>5</sup>	> 10 <sup>12</sup>	> 10 <sup>12</sup>	10 <sup>3</sup>	Ohms/Square (ASTM D257)
EMI shielding effectiveness					40	dB (GB/T 30142-2013)

The data showed herein is for reference only.

Electronic Products      Auto Lighting

**Product** KF-0030N R811WF    KF-0010N R611WGS    CM-5000 1805BFG    KF-0020N C623B    CM-5000 C805BFG    CM-5000 C809BF

**Base Material** PA6    PA6    PA6    PA6    PA6    PA6

**Color** White    White    Black    White    Black    Black

**Material Properties**

**Mechanical Properties**

Tensile Strength	680	680	760	650	800	450	kg/cm2 (ASTM D638)
Elongation	1.9	1.8	1.0	1.2	1.3	0.5	% (ASTM D638)
Flexural Strength	1210	1200	1150	1100	1300	730	kg/cm2 (ASTM D790)
Flexural Modulus	81000	92000	135000	110000	145000	165000	kg/cm2 (ASTM D790)
IZOD Impact, Notched 1/8" 23°C	3.5	3.5	4	3.5	5	2	kg-cm/cm (ASTM D256)

**Thermal Properties**

Heat Deflection Temp. (1.82MPa)	200	215	210	210	213	200	°C (ASTM D648)
Thermal Conductivity (Through-plane)	1.0	1.0	4.5	2.2	6.0	8.5	W/m*K (ASTM E461)

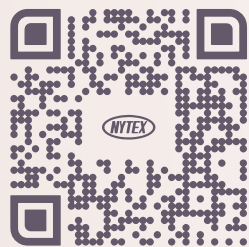
**Other Properties**

Density	1.63	1.86	1.52	2.12	1.52	1.61	g/cm3 (ASTM D792)
Mold Shrinkage // flow	0.40	0.40	0.20	0.40	0.20	0.23	% (ASTM D955)
⊥ flow	0.50	0.70	0.30	0.70	0.30	0.30	% (ASTM D955)
Flammability	1/8"V0	1/16"V0	1/8"V0	1/16"V2	1/8"V0	1/8"V0	(UL-94)
Halogen Free	X	X	0	X	0	0	

**Electrical Properties**

Surface Resistance	> 10 <sup>12</sup>	> 10 <sup>12</sup>	10 <sup>5</sup>	> 10 <sup>12</sup>	10 <sup>5</sup>	10 <sup>3-10<sup>4</sup></sup>	Ohms/Square (ASTM D257)
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