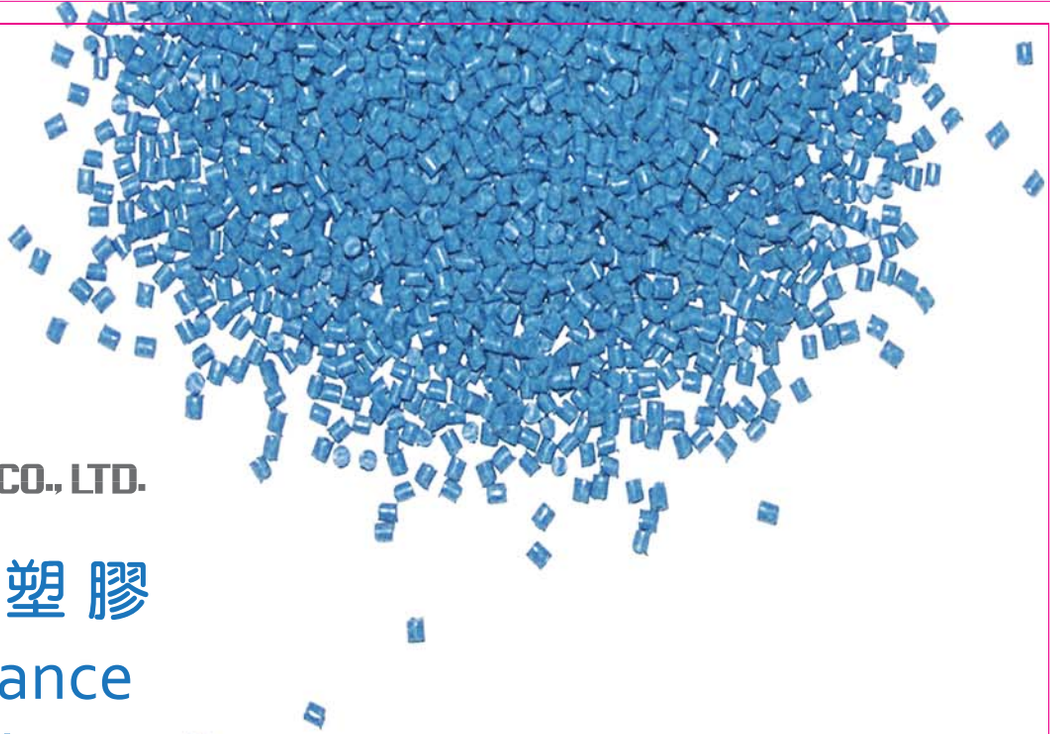
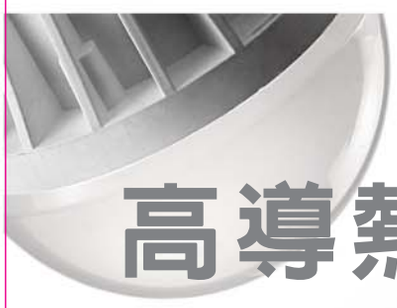


NYTEX COMPOSITES CO., LTD.

高性能工程塑膠
High-Performance Engineering Plastics



高導熱塑膠
Thermal Conductive Polymer
NYLOY® KF series

耐特 NYTEX COMPOSITES CO., LTD.
科技材料股份有限公司
新北市汐止區新台五路一段94號17F
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http://www.nytex.com.tw

IN CARE OF NATURE.
CHERISH THE SCARCE RESOURCE.

高導熱塑膠
Thermal Conductive Polymer

NYLOY® KF 系列

節能、環保、阻燃

提供LED室內及戶外照明燈具的塑膠散熱材料，包括導電型和絕緣型。
具有快速及優良加工特性，低成本及高效導熱功能。

NYLOY® KF series

Energy Saving, Environmental Protection, Flame Retardant

We provide thermal conductive polymers for both indoor and outdoor LED lighting. Our materials consist of both electrical conductive and non-conductive grades. It enables higher productivity attributing to a lower cost product.

一般塑膠的熱傳導率只有0.2（W/m-K），導熱塑膠K值大約是傳統塑膠的 5-100 倍。

General Plastic K=0.2(W/m-K) but Thermal Conductive Polymer K=1~100(W/m-K) which is 5~100 times greater!

鰭片材料比較　Heat Sink Comparison

高導熱塑膠

- 熱傳導較低 ~1.3-16 W/m-K
- 機械強度低
- 良好的電器隔絕效果
- 重量-比重1.5-2.3
- 高生產效率
- 製造成本較低
- 設計具靈活性

Thermal Conductive Polymer

- Less thermal conductivity (K~1.3-16 W/m-K)
- Less mechanical strength
- High electrical insulative property
- Light weight - Specific Gravity 1.5-2.3
- High productivity
- Low manufacturing cost
- Flexibility of design

鋁

- 熱傳導較高 ~100-200 W/m-K
- 機械強度高
- 電器隔絕效果低
- 重量-比重2.7
- 生產效率差
- 成本較高
- 需二次加工

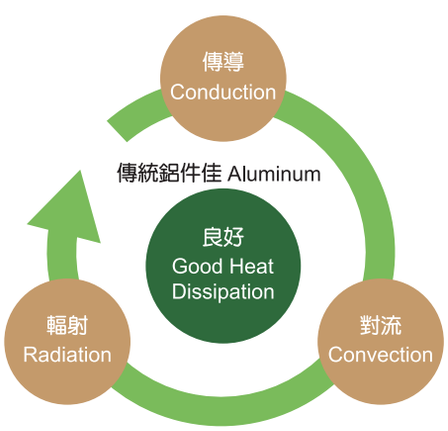
Aluminum

- High thermal conductivity (K~100-200 W/m-K)
- High mechanical strength
- Poor electrical insulative property
- Heavy weight - Specific Gravity 2.7
- Low productivity
- High manufacturing cost
- Post-forming process required

Why Select NYLOY®

- ★ 成品溫降模擬
- ★ 成品成本估算
- ★ 材料使用建議
- ★ 射出成型建議
- ★ 協助模具開立
- ★ Heat sink temperature evaluation
- ★ Product cost evaluation
- ★ Material recommendation
- ★ Molding condition planning
- ★ Mold development co-working

導熱塑膠優異的散熱能力
Thermal Conductive Polymer's excellent heat dissipation ability by radiation



導熱塑膠佳
Thermal Conductive Polymer

使用導熱塑膠的優點
Advantages of Thermal Conductive Polymer

節 能
- 取代鋁壓鑄與鋁擠製程
- 減低金屬資源及加工浪費
- 降低能源消耗

Energy Saving
- Replace aluminum die cast and extrusion
- Reduction of process waste
- Reduction of energy consumption

環 保
- 符合歐盟REACH規範
- 符合歐盟RoHS規範

Environmental Friendly
- Compliance with REACH
- Compliance with RoHS

設 計
- 重量較金屬輕40%
- 更彈性的結構設計
- 表面較金屬更美觀
- 快速的生產週期

Design
- 40% less weight than metal
- More flexible in design
- Better surface texture
- Rapid production cycle

重複使用
- 可回摻比例30%

Recyclable
- Reclaim rate of up to 30%

阻 燃
- UL94-V0
- UL94-V2

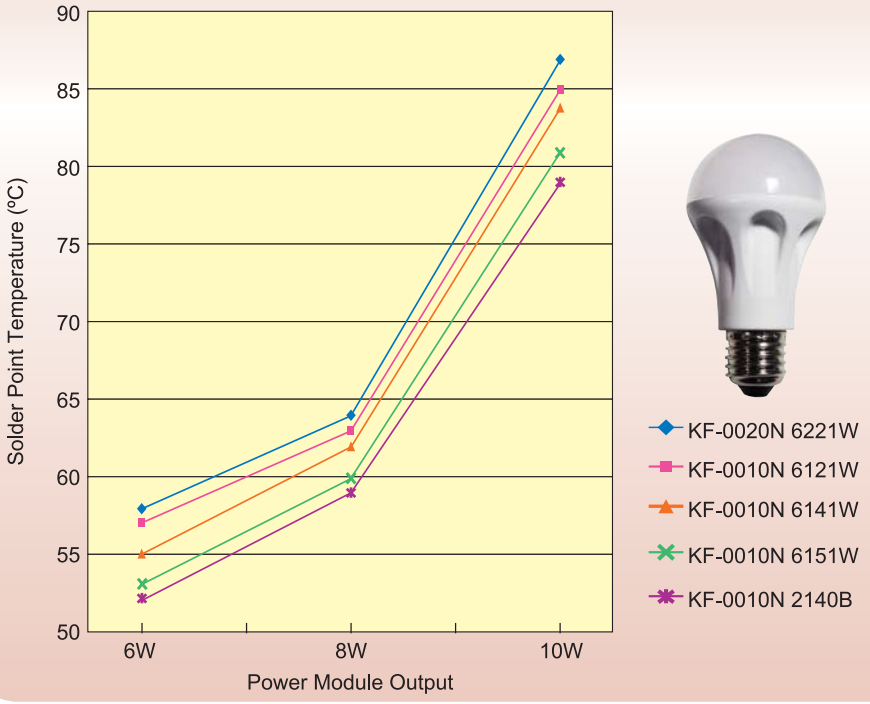
Flammability
- UL94-V0
- UL94-V2

不同材料的熱輻射係數　Typical Thermal Radiation Value

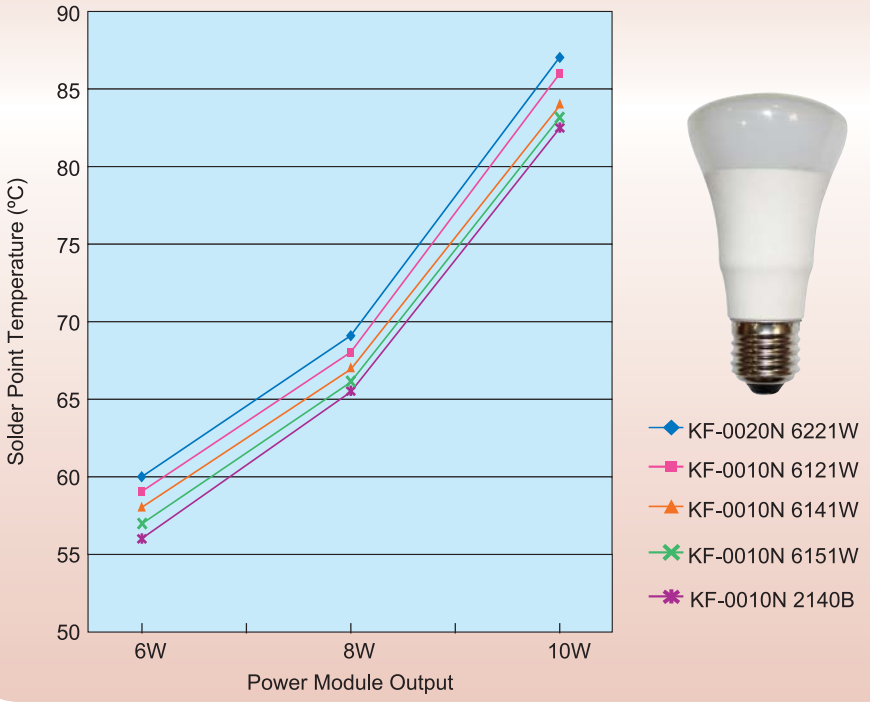
材料 Materials	鋼 Steel	鋼 Iron	不銹鋼 Stainless Steel	鋁 AL	銅 Copper	導熱塑膠 Thermal Conductive Polymer
拋光未氧化 Unoxidized	0.05 ~ 0.1	0.2 ~ 0.3	0.1 ~ 0.25	0.02 ~ 0.1	0.04 ~ 0.05	0.8 ~ 0.9
粗加工輕微氧化 Slightly oxidized	05 ~ 0.6	0.75		0.3 ~ 0.4	0.5	
嚴重氧化 Heavy oxidized	0.8 ~ 0.95	0.8 ~ 0.95		0.4 ~ 0.45	0.8	

功率對比較圖：不同材料製作鑲鋁管燈杯

Arch Heat Sink Performance with Different Materials



Torch Heat Sink Performance with Different Materials



UL規範　UL Standard

IEC規範檢驗結果　IEC Standard Testing Results

KF 0010N

Need more information? Click Here to go to the UL iQâ„¢ for Plastics database

Component - Plastics　E135714

NYTEX COMPOSITES CO LTD

6 LANE 468 CHANGSUI RD, SEC 4, PEITOU HSIANG CHANGHUA HSIEN 523 TW

KF-0010N

Polyamide 6 (PA6), mineral reinforced, flame retardant, furnished as pellets

Color	Min Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
ALL	0.8	V-0	0	0	65	65	65
	3.2	V-0	0	0	65	65	65

Comparative Tracking Index (CTI): -　Inclined Plane Tracking (IPT): -

Dielectric Strength (kV/mm): -　Volume Resistivity (10^x ohm-cm) : -

High-Voltage Arc Tracking Rate (H/TR): -　High Volt, Low Current Arc Resis (D495): -

Dimensional Stability (%): -

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

Report Date: 2013-01-29

Last Revised: 2013-01-29

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IEC and ISO Test Methods

Test Name	Test Method	Units	Thickness Tested (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	0.8	V-0 (ALL)
			3.2	V-0 (ALL)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	C	-	-
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	C	-	-
IEC Comparative Tracking Index	IEC 60112	Volts (Max)	-	-
IEC Ball Pressure	IEC 60695-10-2	C	-	-
ISO Heat Deflection (1.80 MPa)	ISO 75-2	C	-	-
ISO Tensile Strength	ISO 527-2	MPa	-	-
ISO Flexural Strength	ISO 178	MPa	-	-
ISO Tensile Impact	ISO 8256	kJ/m²	-	-
ISO Izod Impact	ISO 180	kJ/m²	-	-
ISO Charpy Impact	ISO 179-2	kJ/m²	-	-

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Notice of Disclaimer

UL規範網頁請參考：http://data.ul.com/link/plas.aspx?ULID=101365592

Please refer to UL standard website : http://data.ul.com/link/plas.aspx?ULID=101365592

测 试 报 告

报告编号：W01314330198

上海市质量监督检验技术研究院　共 2 页 第 2 页

检验结果汇总

序号	检 验 项 目	技 术 要 求	检验结果	单项判定	备注
1	球压	— 试验温度：75℃		符合	IEC62650
		☒ 压痕直径≤2mm	0.5mm		
2	灼热丝	— 试验温度：650℃		符合	IEC60695-2-11
		— 灼热丝施加时间 ta：30s			
		☒ 样品没有燃烧或灼热	未起燃		
		☒ 移开灼热丝后，火焰或灼热30s内熄灭，并且	/		
		☒ 铺底层所用包装绢纸不起然	/		
3	针焰	— 燃烧器内径：0.5mm		符合	IEC60695-11-5
		— 火焰高度：12mm			
		— 火焰持续时间：30s			
		☒ 无火焰或灼热	/		
		☒ 移去针焰后，火焰或持续灼热时间 t_b < 30s	0s		
		☒ 包绢纸不起燃或白松木板不炭化	通过		
4	绝缘电阻值	— 试验电压：500VDC		符合	IEC60598-1
		☒ 带电部件与可触及部位之间绝缘电阻值≥2MΩ	> 10MΩ		
5	耐电压	— 试验电压：5000V，5min		符合	IEC60698
		— 试验部位：带电部件与可触及部位之间			
		☒ 试验中，无击穿现象。	无击穿		
以下空白					

SQI/KJ-JL/BG-03

KF 0020N

Need more information? Click Here to go to the UL iQâ„¢ for Plastics database

Component - Plastics　E135714

NYTEX COMPOSITES CO LTD

6 LANE 468 CHANGSUI RD, SEC 4, PEITOU HSIANG CHANGHUA HSIEN 523 TW

KF-0020N

Polyamide 6 (PA6), mineral reinforced, flame retardant, furnished as pellets

Color	Min Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
ALL	0.8	V-2	0	0	65	65	65
	1.6-1.8	V-2	0	0	65	65	65

Comparative Tracking Index (CTI): -　Inclined Plane Tracking (IPT): -

Dielectric Strength (kV/mm): -　Volume Resistivity (10^x ohm-cm) : -

High-Voltage Arc Tracking Rate (H/TR): -　High Volt, Low Current Arc Resis (D495): -

Dimensional Stability (%): -

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Report Date: 2013-01-25

Last Revised: 2013-01-25

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IEC and ISO Test Methods

Test Name	Test Method	Units	Thickness Tested (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	0.8	V-2 (ALL)
			1.6-1.8	V-2 (ALL)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	C	-	-
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	C	-	-
IEC Comparative Tracking Index	IEC 60112	Volts (Max)	-	-
IEC Ball Pressure	IEC 60695-10-2	C	-	-
ISO Heat Deflection (1.80 MPa)	ISO 75-2	C	-	-
ISO Tensile Strength	ISO 527-2	MPa	-	-
ISO Flexural Strength	ISO 178	MPa	-	-
ISO Tensile Impact	ISO 8256	kJ/m²	-	-
ISO Izod Impact	ISO 180	kJ/m²	-	-
ISO Charpy Impact	ISO 179-2	kJ/m²	-	-

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UL規範網頁請參考：http://data.ul.com/link/plas.aspx?ULID=101364431

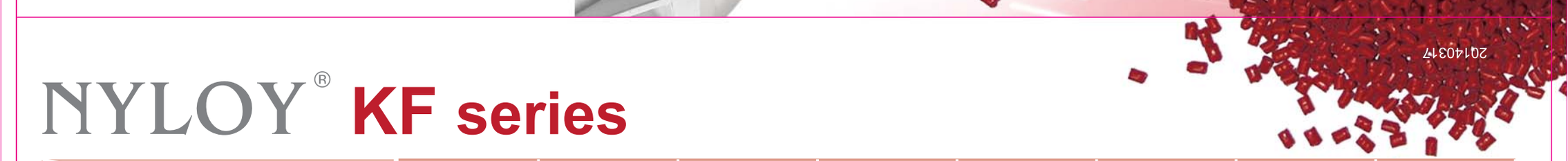
Please refer to UL standard website : http://data.ul.com/link/plas.aspx?ULID=101364431

No. WJ13-048　共 2 页 第 2 页

检 验 报 告

上 海 电 器 设 备 检 测 所

序号	检验项目	技术要求	观察或测量结果	判定	备注
1	弯矩试验	—	灯头不松动	提供数据	试验条件：施加 40N 轴向拉力
2	相比电痕化指数（CTI）	—	CTI 600	提供数据	—



NYLOY® KF series

產品 Product	KF-0010N 2140B	KF-0010N 6121W	KF-0010N 6141W	KF-0010N 6151W	KF-0020N 6221W	KF-0020N 6231W	KF-0020N 6241W	KF-0020N 6260B1
基材 Base Material	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon	尼龍 Nylon
顏色 Color	黑色 Black	白色 White	白色 White	白色 White	白色 White	白色 White	白色 White	黑色 Black
物性 Material Properties / 測試規範 Testing Standard / 單位 Unit								
機械性能 Mechanical Properties								
抗張強度 Tensile Strength	ASTM D638	kg/cm²(MPa)	500 (49)	520 (51.0)	480 (47.1)	580 (56.9)	680 (66.7)	630 (59.8)	620 (60.8)	530 (52.0)
斷裂伸長率 Elongation	ASTM D638	%	0.7	1.4	1.2	0.8	2.5	2.0	1.7	0.6
抗折強度 Flexural Strength	ASTM D790	kg/cm²(MPa)	900 (88.2)	900 (88.2)	950 (93.1)	1000 (98.0)	1200 (117.6)	1050 (102.9)	1100 (107.8)	900 (88.2)
抗折彈性系數 Flexural Modulus	ASTM D790	kg/cm²(MPa)	130000 (12745.1)	65000 (6372.5)	96400 (9451.0)	127000 (12451.0)	65000 (6372.5)	75000 (7352.9)	85000 (8333.3)	130000 (12745.1)
衝擊強度 IZOD Impact, Notched 1/8" 23°C	ASTM D256	kg-cm/cm(J/M)	2.7 (26.5)	3.5 (34.3)	2.7 (26.5)	2.7 (26.5)	3.5 (34.3)	3.0 (29.4)	3.0 (29.4)	2.7 (26.5)
熱性能 Thermal Properties								
熱變形溫度 Heat Deflection Temp (4.6kg/cm²) (0.46MPa)	ASTM D648	°C	195	195	195	195	195	195	195	210
熱傳導係數 Conductivity								
Through-plane	ASTM E1461	W/m*K	3.1	1.0	1.5	2.0	1.0	1.3	1.5	4.0
In-plane	ASTM E1461	W/m*K	12.0	3.5	5.0	6.0	3.5	4.5	5.2	15.2
其他性能 Other Properties								
密度 Density	ASTM D792	g/cm³	2.20	1.97	2.35	2.56	1.65	1.86	2.13	2.23
模收縮率 Mold Shrinkage								
橫向 // flow	ASTM D955	%	0.45	0.85	0.78	0.72	0.95	0.85	0.74	0.56
縱向 ⊥flow	ASTM D955	%	0.35	0.70	0.60	0.58	0.80	0.72	0.60	0.44
阻然特性 Flame characteristics								
耐燃性 Flammability	UL-94		V0	1.6mm V0	1.6mm V0	1.6mm V0	1.6mm V2	1.6mm V2	1.6mm V2	1.6mm V2
電氣性能 Electrical Properties								
表面電阻 Surface Resistance	ASTM D257	Ohms/Square	1.00E+12	1.00E+14	1.00E+14	1.00E+14	1.00E+14	1.00E+14	1.00E+14	1.00E+12

● (1) 本物性表為典型測試值，僅供參考，不作為正式質保承諾。
● (2) 耐電壓擊穿測試 > 5KV。

● This data is for reference only.
● Breakdown Voltage Test > 5KV.