

Kenner Material & System Co., Ltd

CLEMENT YEN

August 13, 2012

Safe Eco Taste Lighting

Affiliate Companies

- **Loyal Chemical Industrial Corp.**
- **Taiwan DarYa International Co., Ltd**
- **VinceraCapital**

Business Segments

Kenner Materail & System Co.

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graph TD; A[Kenner Materail & System Co.] --- B[Professional Tolling]; A --- C[Sheet & Film]; A --- D[Thermal Interface Material]; A --- E[Advanced Compounds]; A --- F[Material for LED Lighting]
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Professional Tolling

Sheet & Film

Thermal Interface Material

Advanced Compounds

Material for LED Lighting

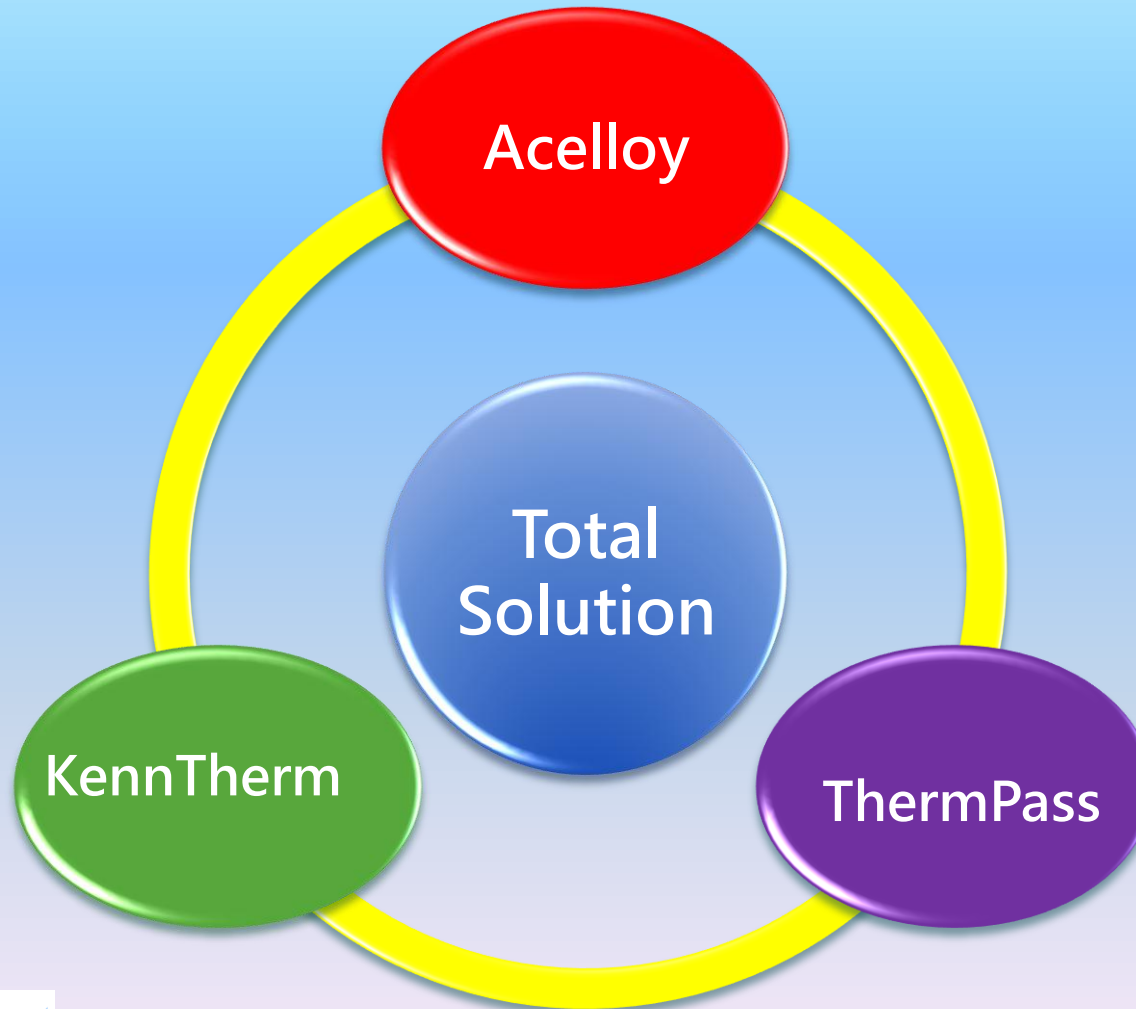
Achievements of KENNER'S People

- Kraton's OEM in Asia
- Conductive PC Sheet and Compounds
- Permanently Antistatic TPE Sheet
- Permanently Antistatic Film and Bags
- Permanently Antistatic Transparent Compounds
- Metal-free TIM Comparable to X23-7762
- TIM Comparable to X23-7783D
- 1.0mmUL94 V0 Polycarbonate for LED Lighting
- Thermally Conductive Plastic for LED Lighting

KENNER'S PRODUCTS

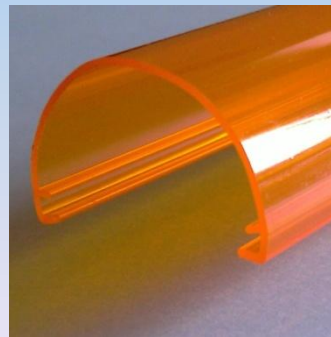
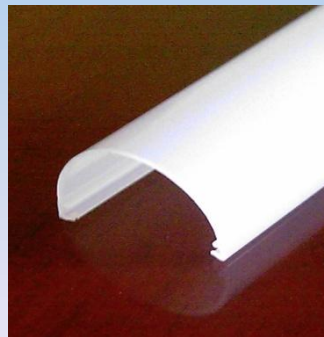
- KennBlend Advanced Polymeric Compounds
- KennElec Electrically Conductive Compounds
- KennElec Electrically Conductive Sheet and Slits
- KennFilm Bags and Film
- KennTherm Thermally Conductive Compounds
- Acelloy Engineering Compounds for LCD
- ThermPass Thermally Conductive Plastics

What does Kenner provide for LED lighting?



Acelloy

Flame retarded Clear PC compounds for LED covers



Acelloy

- Acelloy 3300 series
 - FR PC, Acelloy 3302 : UL94 V2
 - FR PC, Acelloy 3306 : UL94 V2
 - FR PC Diffusing MB, Acelloy 3309 : UL94 V2
- Acelloy 3400 series
 - FR PC, Acelloy 3402 : 1.5mm UL94 V0
 - FR PC, Acelloy 3406 : 1.5mm UL94 V0
 - FR PC Diffusing MB, Acelloy 3409 : 1.5mm UL94 V0
- Acelloy 3600 series
 - FR PC, Acelloy 3602 : 1.0mm UL94 V0
 - FR PC, Acelloy 3606 : 1.0mm UL94 V0
 - FR PC Diffusing MB, Acelloy 3609 : 1.0mm UL94 V0

Flame Retardant Polycarbonate

-Acelloy 3402

- Injection Molding Grade
- Good mechanical Strength
- Non-halogen/non-phosphate
- UL 94 Rating: 1.5mm V0
- Better Transmittance
- Excellent thermal conductivity
- Higher HDT
- Shorter molding cycle time

Flame Retardant Polycarbonate

-Acelloy 3406

- Extrusion Grade
- Good mechanical Strength
- Non-halogen/non-phosphate
- UL 94 Rating: 1.5mm V0
- Better Transmittance
- Excellent thermal conductivity
- Higher HDT
- Shorter setting time

Flame Retardant Polycarbonate

-Acelloy 3409

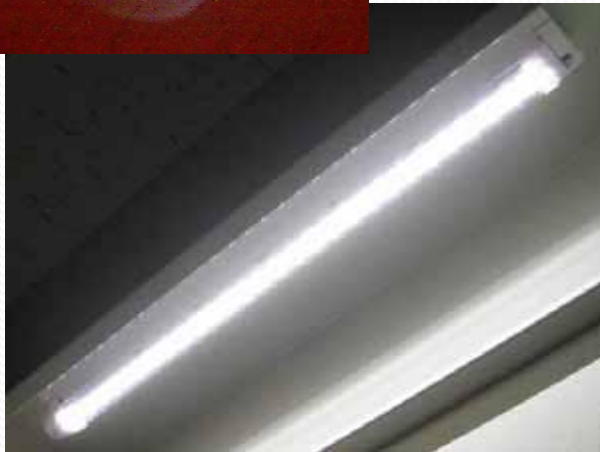
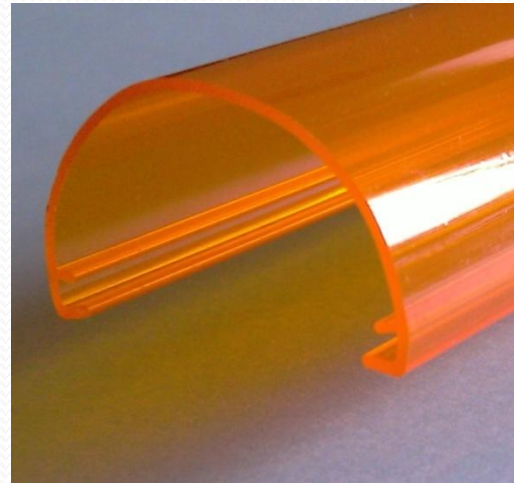
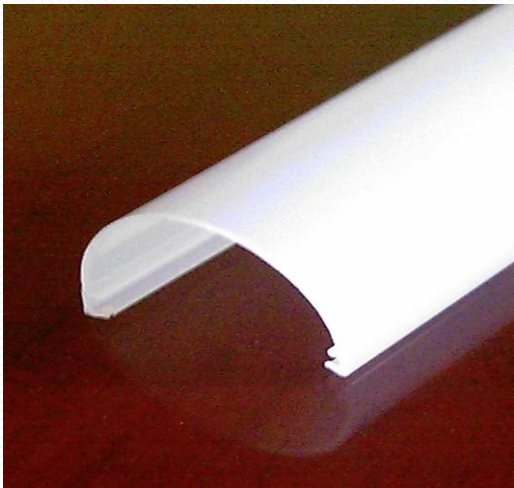
- Good mechanical Strength
- Non-halogen/non-phosphate
- UL 94 Rating: 1.5mm V0
- Diffusing Agent Master Batch

Acelloy Data sheet: 1.5mm V0 Grade

PROPERTIES	STANDARD	UNIT	INJECTION ACELLOY 3402	EXTRUSION ACELLOY 3406
PHYSICAL				
Melt Flow Rate, 260°C/5 kg	ASTM D1238	g/10min	16	8.0
Specific Gravity	ASTM D792	g/cm ³	1.2	1.2
MECHANICAL				
Tensile Strength, Type I, /min	ASTM D638	Kg/cm ²	610	610
Elongation at Break, Type I, /min	ASTM D638	%	110	120
Flexural Strength	ASTM D790	Kg/cm ²	1000	1000
Flexural Modulus	ASTM D790	Kg/cm ²	23500	24000
Impact Strength, 1/8``notched	ASTM D256	Kg-cm/cm	80	80
OPTICAL				
Transmittance, 1.5 mm	ASTM D1003	%	78	80
Haze, 1.5 mm	ISO 14782	%	94	99
THERMAL				
HDT, 1.82 MPa, unannealed	ASTM D648	°C	127	128

Applications :

General house-lighting fluorescent light diffuser



ThermPass

Thermally conductive compound for LED lamp heat sink

What do customers expect for LED light bulbs?

- ☛ Safety
- ☛ Lower cost
- ☛ Stylish color
- ☛ Design freedom
- ☛ Eco-friendly

Advantages with ThermPass Heatsink

- Safety
 - ❖ Electrically Insulative
 - ❖ Less likely get burned
 - ❖ UL94 V0
 - ❖ Survive for drop test
- Lower cost
 - ❖ Best for mass production
 - ❖ With lower price driver
 - ❖ No after painting
 - ❖ Comparable price with Al

Advantages with ThermPass Heatsink

- Stylish color
 - ❖ Pre-colored compounds
 - ❖ Light and shiny color available
 - ❖ Life with taste and joy
- Design freedom
 - ❖ Injection molding
 - ❖ Functionization
 - ❖ Individualization
- Eco-friendly
 - ❖ Easily recyclable
 - ❖ No need of after painting
 - ❖ No need of after finishing

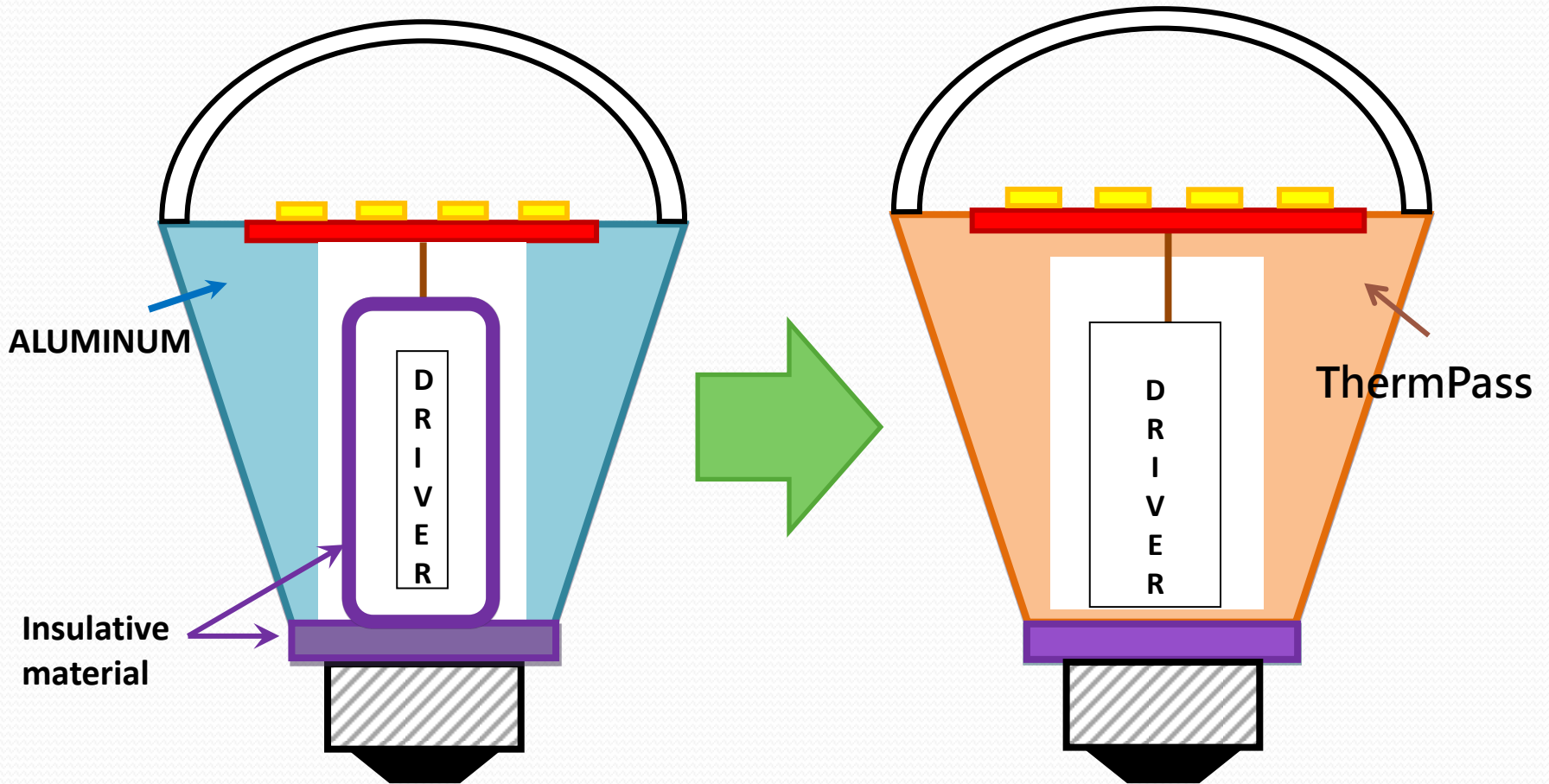
Why plastic?

HEATSINK	Aluminum	ThermPass
Manufacturing process	Die casting	Injection molding
Finishing process	Drilling, trimming, polishing, anodizing, coating, etc.	Not needed
Insulation for driver	Must	Not needed
LED kit weight	80 - 115 g (include the insulative material)	50~ 70 g



Total cost reduced

LED-bulb basic design

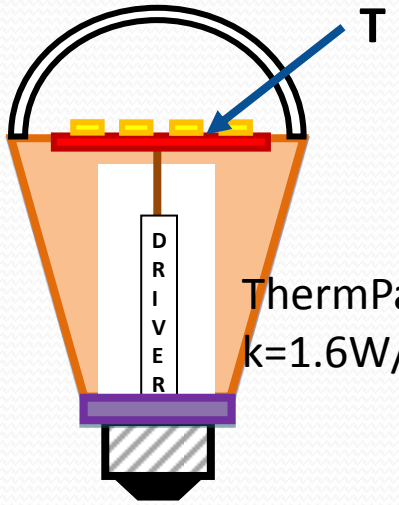
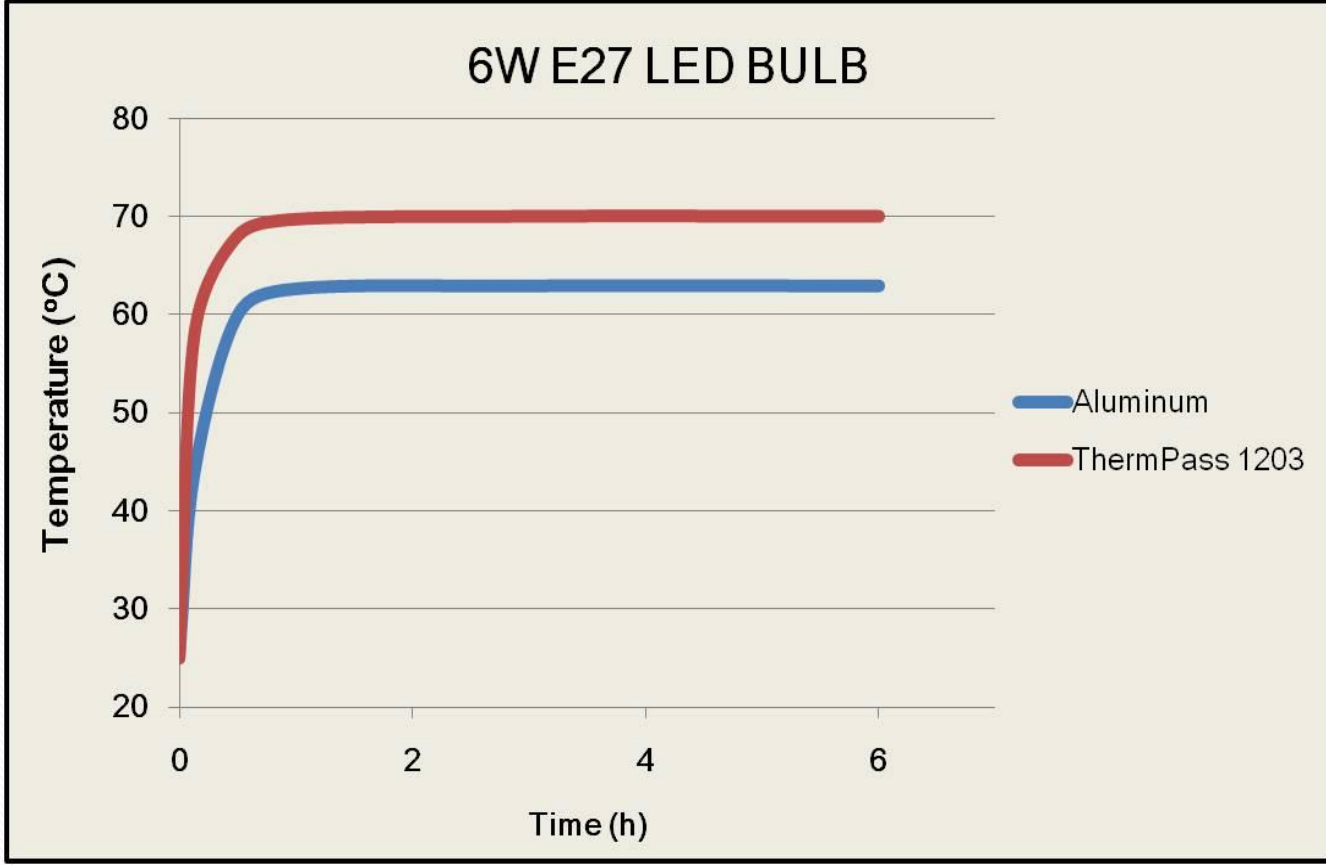
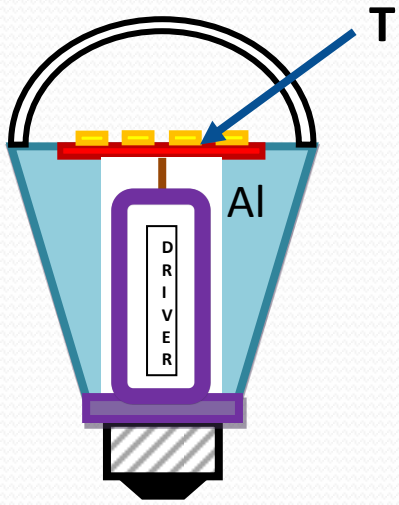


Why choose ThermPass ?

- Easy for Injection molding
- k-value = 1.5 – 3 W/m.K
- Electrically insulative
- UL 94 1.5mm V-0
- HDT up to 125°C
- Stylish colors
- Competitive price

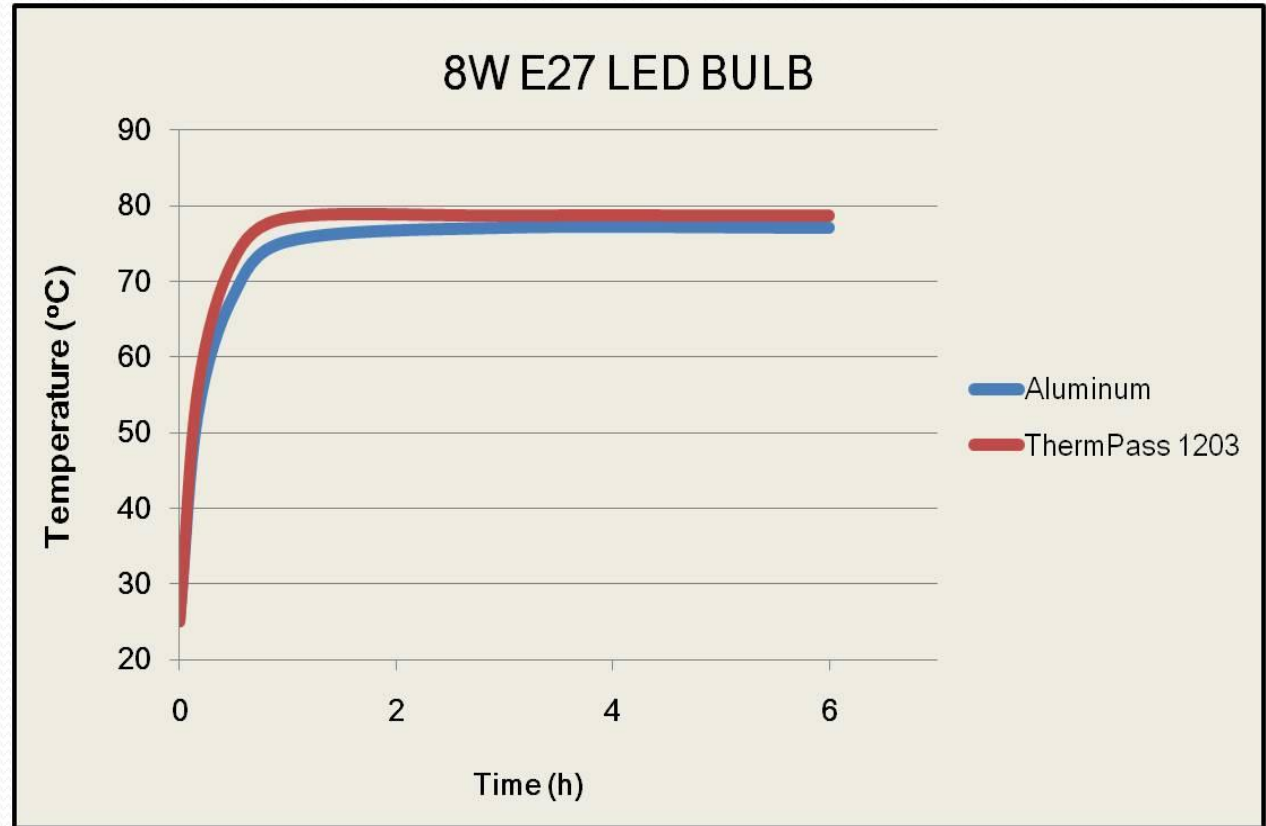
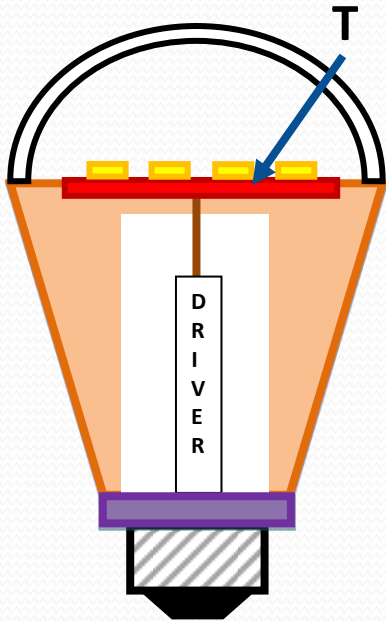
ThermPass - Thermally conductive compound

Conduction	Convection	Radiation		
$Q_{\text{conduction}} = K A \Delta T / L$ K : conductivity W/m-K Plastic <0.4 Conductive plastic 1~3 Aluminum 80~100	$Q_{\text{convection}} = H A \Delta T$ A : surface area	$Q_{\text{radiation}} = \epsilon A \delta \Delta T^4$ ε : emissivity ε _p =0.85 , ε _{AL} =0.02 – 0.1 (rough to polished)		
(ambient temperature = 25°C, object temperature = 70°C, surface area = 0.011m ² , convection coefficient H = 10W/m.K)				
		ε	Convection	Radiation
		Aluminum 0.05	95%	5%
		ThermPass 0.85	55%	45%

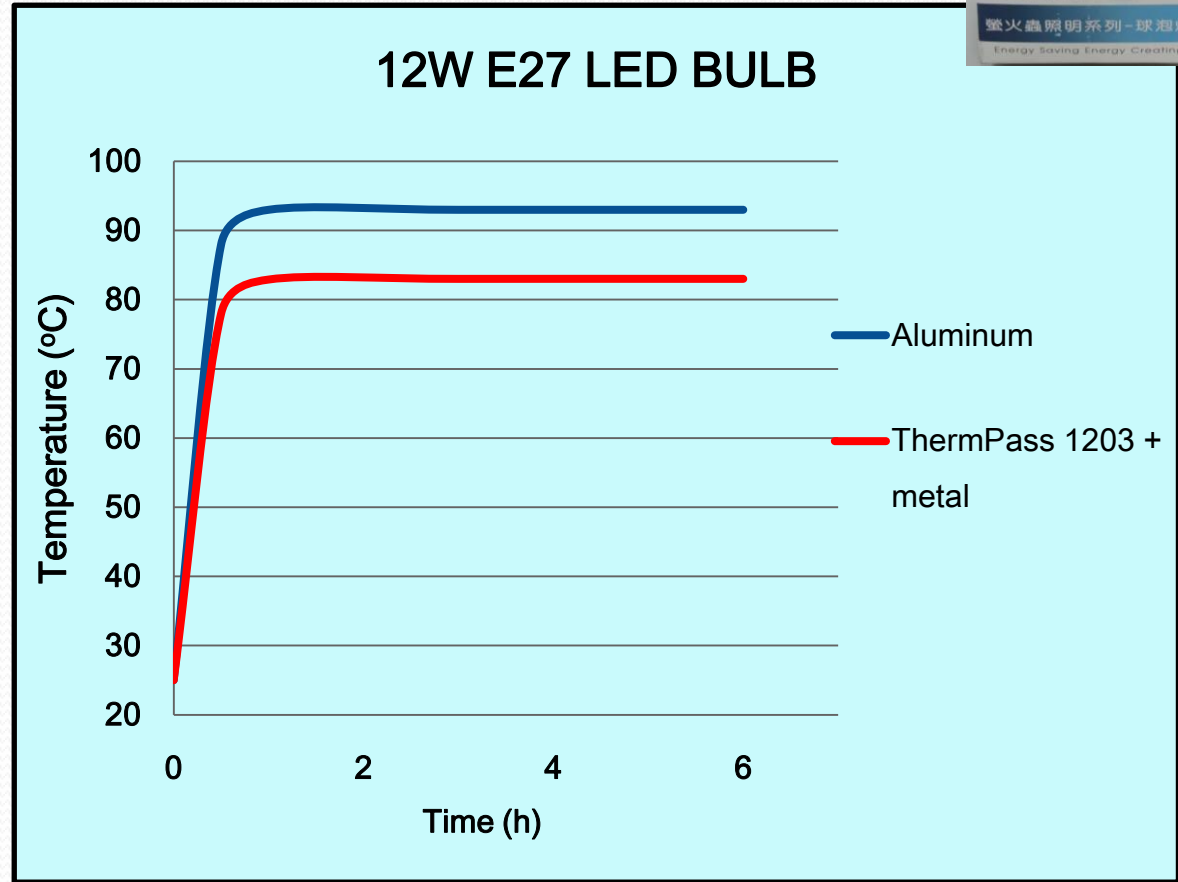
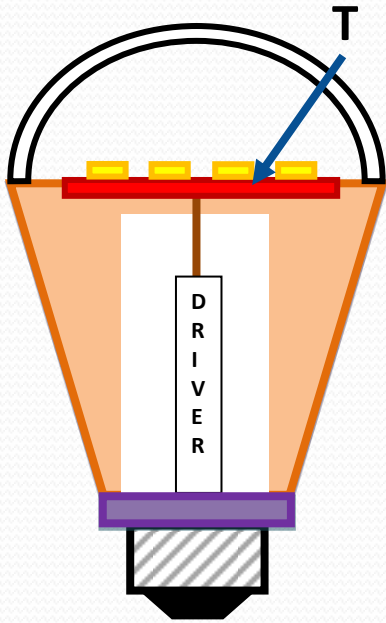


ThermPass 1203
 $k=1.6\text{W/m.K}$

ThermPass + Aluminum insert molding



ThermPass + Aluminum
insert molding



PROPERTIES	STANDARD	UNIT	ThermPass 1201	ThermPass 1203
PHYSICAL				
Color			white & colored	white & colored
Melt Flow Rate, 200°C/10 kg	ASTM D1238	g/10min	4	14
Specific Gravity	ASTM D792	g/cm ³	2.4	2.2
MECHANICAL				
Tensile Strength, 50 mm/min	ASTM D638	Kg/cm ²	140	125
Flexural Strength	ASTM D790	Kg/cm ²	315	300
Flexural Modulus	ASTM D790	Kg/cm ²	73300	63100
Impact Strength, 1/8" Notched	ASTM D256	J/m	20	20
THERMAL				
Thermal conductivity	ISO 22007-2	W/m-K	2.0	1.6
HDT, 0.45 MPa, unannealed	ASTM D648	°C	130	130
ELECTRICAL				
Surface resistivity	ASTM D257	Ohm/sq	>1E+12	>1E+12
Mold shrinkage	ASTM D955	cm/cm	0.006	0.006
FLAME CHARACTERISTICS	UL 94		1.5mm V-0	

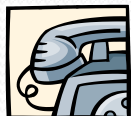
Contact us :

俊馳材料科技股份有限公司 Kenner Material & System Co., Ltd.

地 址 : 桃園縣中壢市內定里合圳北路二段473巷 50號



: No. 50 Ln.473, Sec.2, Hezun N.Rd., Jhongli
City, Taoyuan County 320, Taiwan R.O.C



: +886-3-4621100

E-mail : yench@kenner.com.tw

Website : www.kenner.com.tw

THANK YOU