



Product Training Module: LI Series

Jan 2012

Introduction

- Purpose
 - This training module is used to give an introduction to t-Global Technology's L37-3 product range
- Objectives
 - To identify the key properties of L37-3
 - To identify the key design criteria for product selection
 - To identify common applications for the product
- Content
 - Introduction and background to L37-3
- Learning time
 - 30 mins



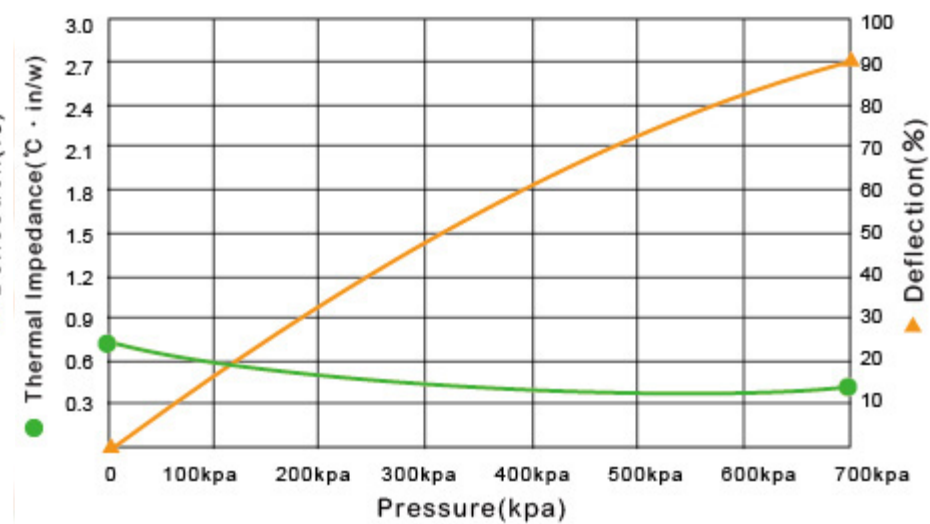
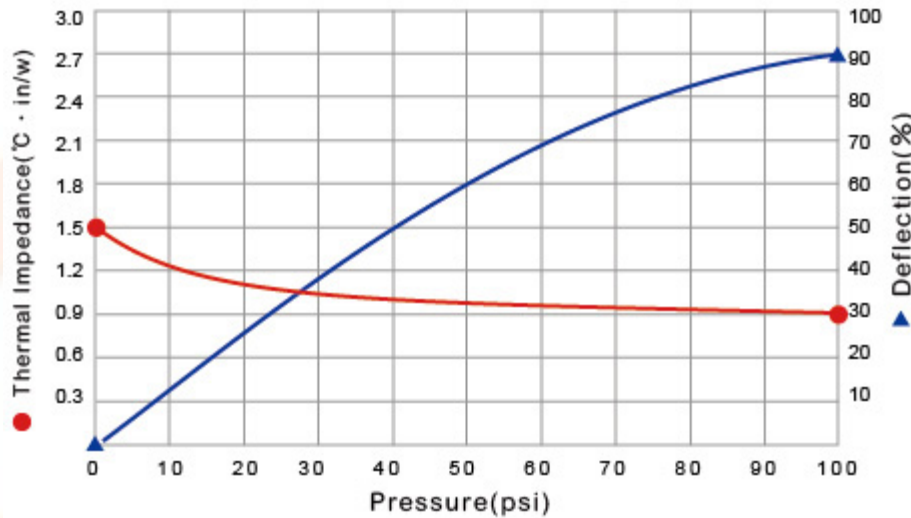
L37-3 - Series

- The L37-3 series is t-Global Technology's core silicone based thermal interface product
- Each member in the family has been developed to address specific industrial needs
- All products are available as standard sheets, custom-die cuts and on rolls
- All products can be supplied with a pressure sensitive adhesive applied to one or both sides

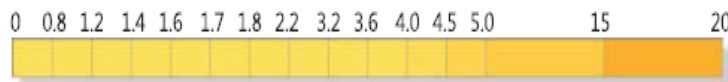
L37-3

- L37-3 has a thermal conductivity of 1.7 W/m.k
- It offers
 - Good thermal conductivity
 - High compressibility
 - Natural surface tack
 - Excellent dielectric breakdown voltage
- Common applications include:
 - Consumer electronics
 - Automotive electronics

L37-3 - Performance



Thermal Conductivity: 1.7 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 5 (Shore A)
(Shore A)



L37-3 - Datasheet

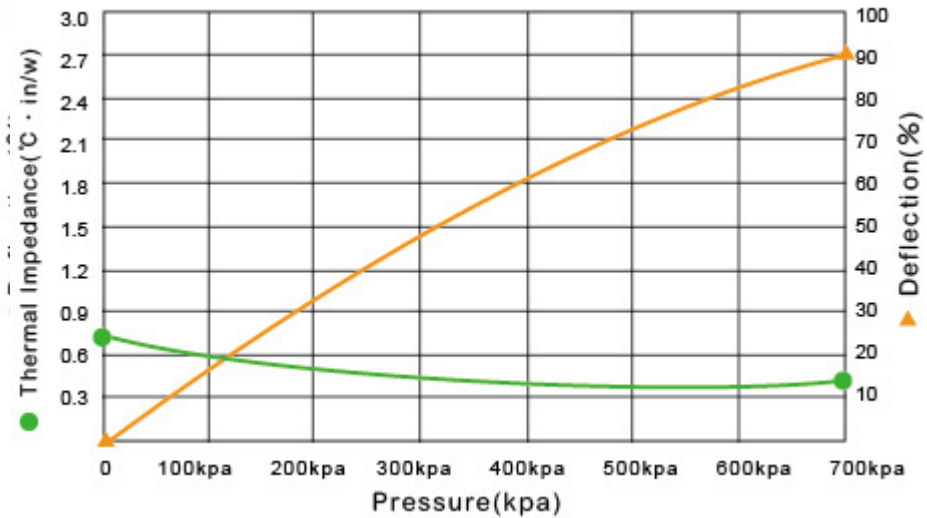
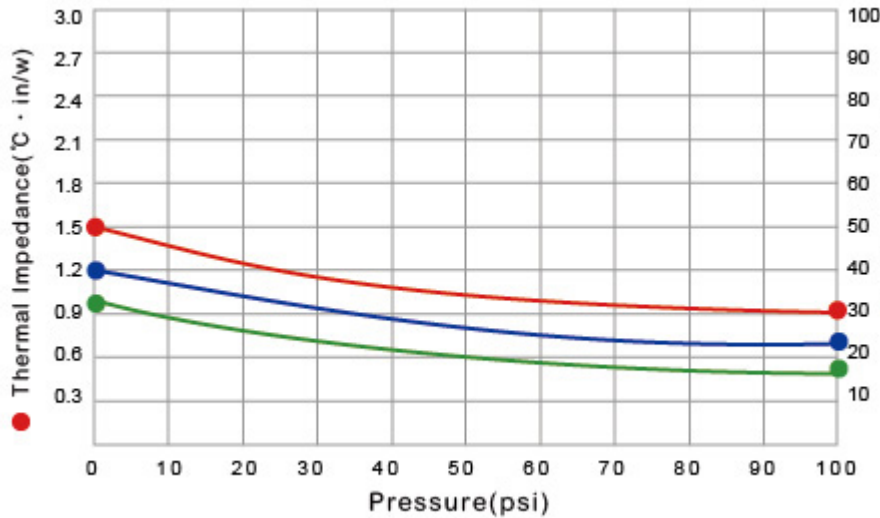
Property	L37-3	Unit	Tolerance	Test Method
Colour	Yellow	-	-	Visual
Reinforcement Carrier	Fiberglass mesh	-	-	-
Thickness	0.3 - 20	mm	-	ASTM D374
	0.0118 - 0.787	inch	-	ASTM D374
Thermal Conductivity	1.7	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>10	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.17	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹²	Ohm-cm	-	ASTM D257
Elongation	-	%	±0.2	ASTM D412
Tensile Strength	66.4	Kgf/cm ²	±5	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	5	Shore A	±3	ASTM D2240

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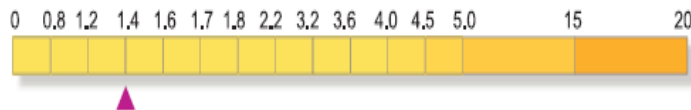
L37-3F

- L37-3F has a thermal conductivity of 1.4 W/m.k
- It is available in standard sheets of
 - 0.25mm
 - 0.30mm
 - 0.35mm
- Common applications include:
 - Consumer electronics
 - Automotive electronics
 - Power devices

L37-3F - Performance

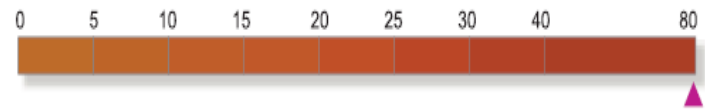


Thermal Conductivity: 1.4 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 0.25 / 0.3 / 0.45mm

Hardness: 80 (Shore A)
(Shore A)



L37-3F - Datasheet

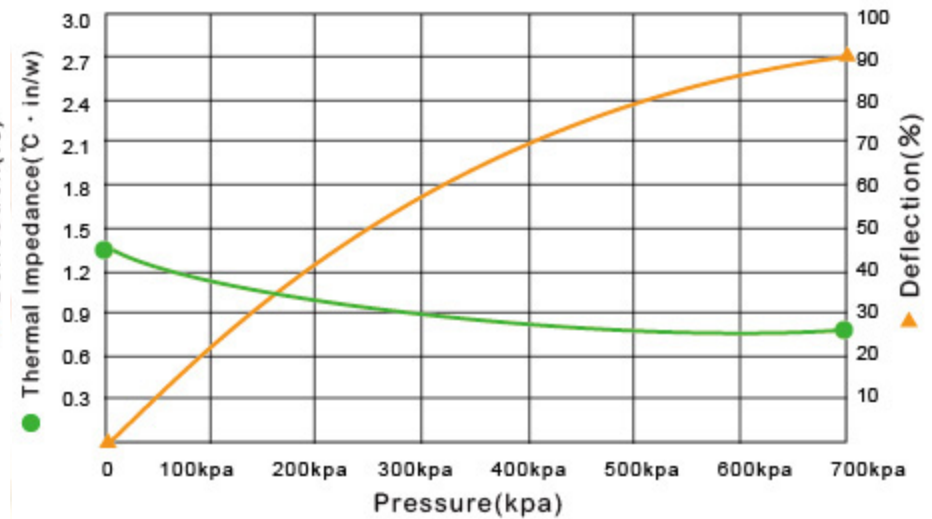
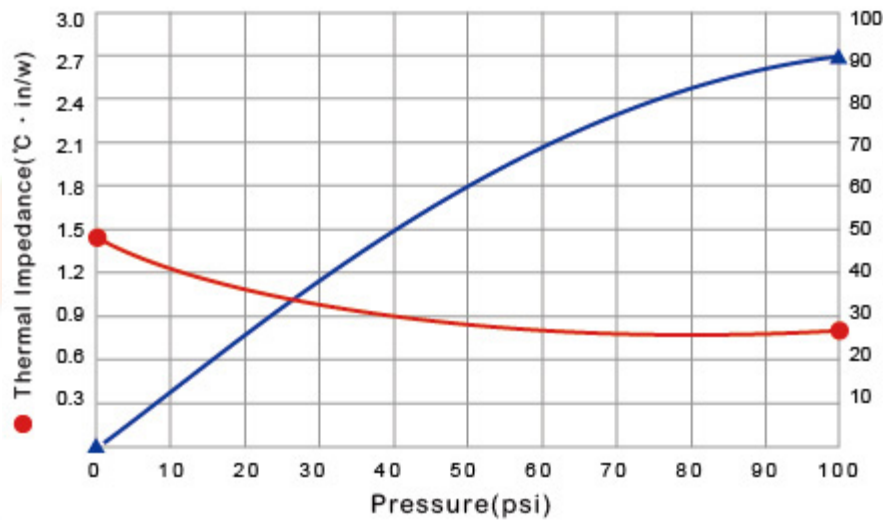
Property	L37-3F	Unit	Tolerance	Test Method
Colour	Yellow	-	-	Visual
Thickness	0.25 / 0.3 / 0.45	mm	-	ASTM D374
	0.0098 / 0.0118 / 0.0177	inch	-	ASTM D374
Thermal Conductivity	1.4	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	3 / 4 / 5	kV	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.0	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹³	Ohm-cm	-	ASTM D257
Elongation	5	%	±0.2	ASTM D412
Tensile Strength	150	Kgf/cm ²	±5	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	80	Shore A	±3	ASTM D2240

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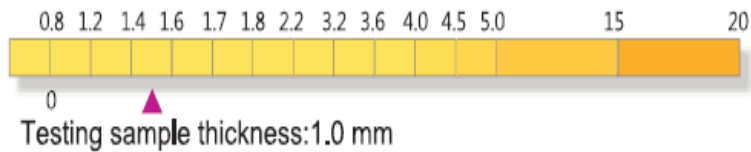
L37-3L

- L37-3L has a thermal conductivity of 1.5 W/m.k
- L37-3L is formulated to have low silicone bleed which makes it suitable for silicone sensitive applications
- TML (according to ASTM E595) is $\leq -0.2\%$
- Common applications include:
 - Optical devices
 - Camera systems
 - Hard drives

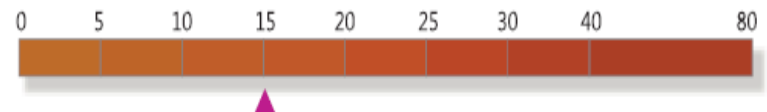
L37-3L - Performance



Thermal Conductivity: 1.5 W/m.k
(W / m.k - Z Axis)



Hardness: 15 (Shore A)
(Shore A)



L37-3L - Datasheet

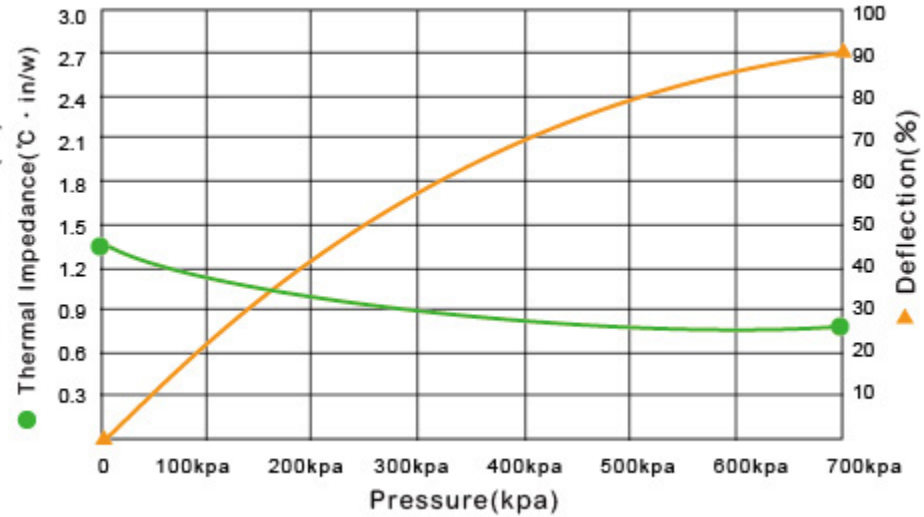
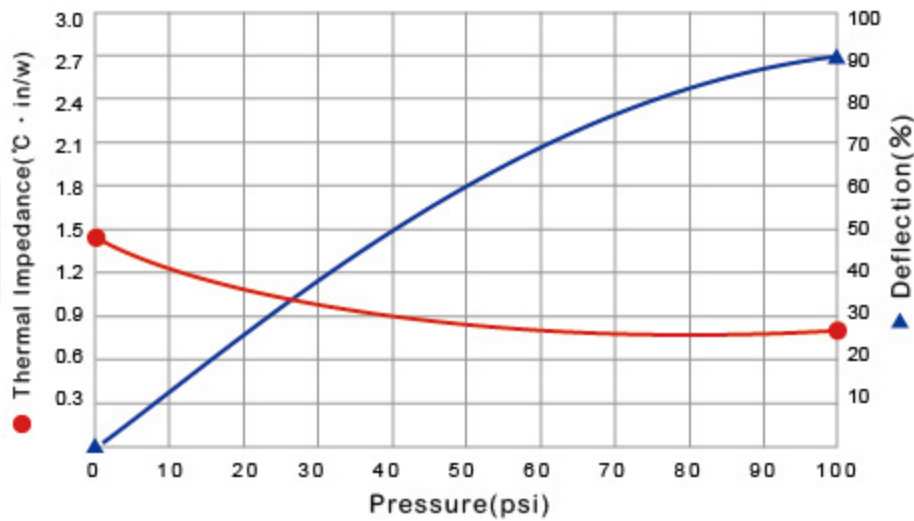
Property	L37-3L	Unit	Test Method
Colour	Yellow	-	Visual
Thickness (The thickness can be ordered)	0.5 - 10 0.0197 - 0.3937	mm inch	ASTM D374 ASTM D374
Op. Temp. Range	-45 to 200	°C	-
Density	2.4	g/cm ³	ASTM D792
Thermal Conductivity	1.5	W/m.k	ASTM D5470
Hardness	15	Shore A	ASTM D2240
Thermal Resistance	-	-	-
t=1.0mm 10psi	2.0	K- in ² /W	ASTM D5470
t=1.0mm 50psi	1.5	K- in ² /W	ASTM D5470
t=1.0mm 100psi	1.0	K- in ² /W	ASTM D5470
Percent Deflection	-	-	-
t=1.0mm 10psi	5	%	ASTM D575
t=1.0mm 50psi	20	%	ASTM D575
t=1.0mm 100psi	50	%	ASTM D575
Breakdown Voltage	15	KV/mm	ASTM D149
TML	<0.2	%	ASTM E595
Tensile Strength	200	PSI	ASTM D412
Elongation	20	%	ASTM D412
UL Flammability	V-0	-	UL 94

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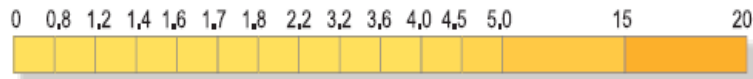
L37-3S

- L37-3L has a thermal conductivity of 1.95 W/m.k
- It is available in thickness up to 20mm
- It is commonly used for applications where better thermal conductivity is needed
- Common applications include:
 - Power electronics
 - Cellular communication devices
 - Automotive electronics

L37-3S - Performance

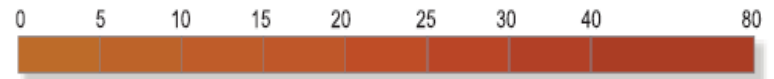


Thermal Conductivity: 1.95 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 5 (Shore A)
(Shore A)



L37-3S - Datasheet

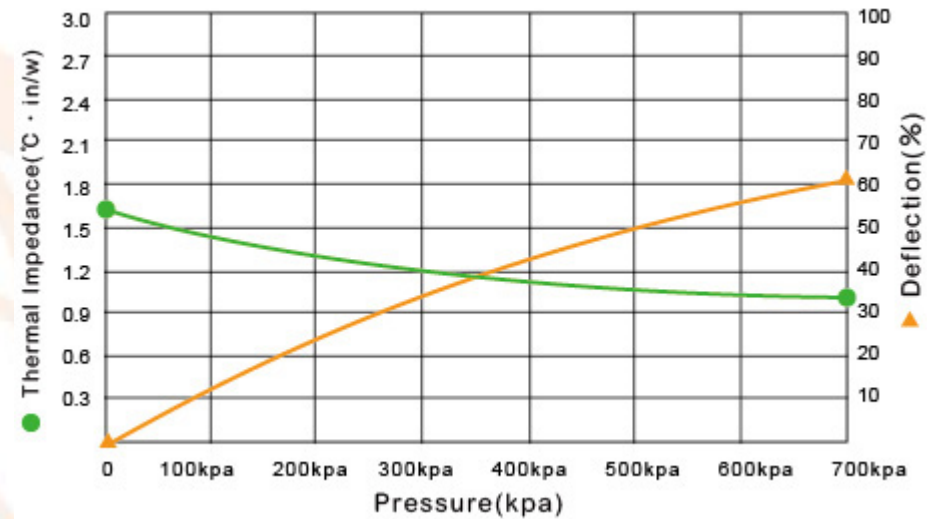
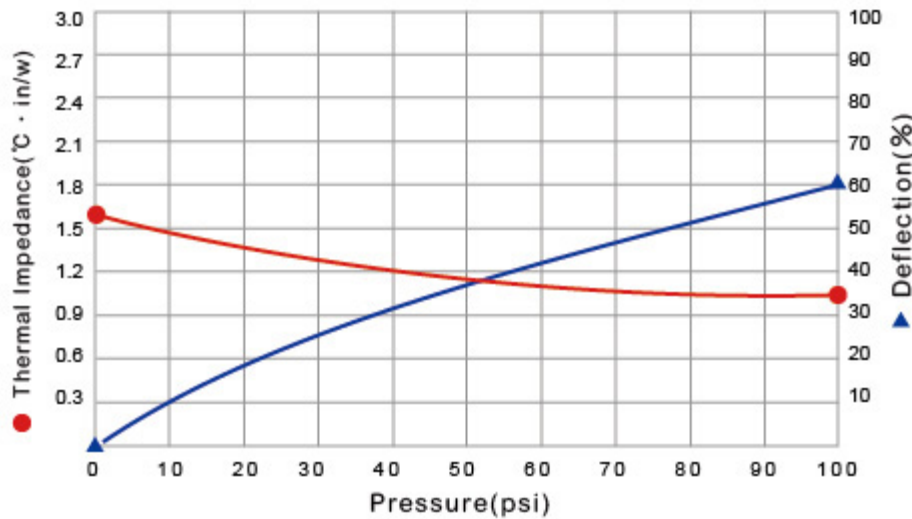
Property	L37-3S	Unit	Tolerance	Test Method
Colour	Light Yellow	-	-	Visual
Thickness	0.5 - 20	mm	-	ASTM D374
	0.0197 - 0.787	inch	-	ASTM D374
Thermal Conductivity	1.95	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>13	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.21	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹²	Ohm-cm	-	ASTM D257
Elongation	350	%	±0.2	ASTM D412
Tensile Strength	8	Kgf/cm ²	±5	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	5	Shore A	±3	ASTM D2240

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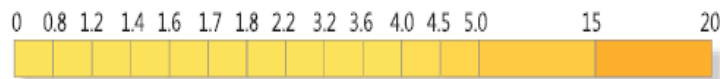
L37-5

- L37-3L has a thermal conductivity of 1.6 W/m.k
- It is available in thickness up to 20mm
- It is commonly used for applications where better thermal conductivity is needed combined with good shock and vibration absorbing properties
- Common applications include:
 - Military electronics
 - Network communications devices
 - Automotive electronics

L37-5 - Performance

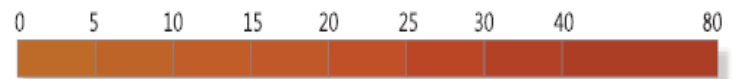


Thermal Conductivity: 1.6 W/m.k
(W / m.k - Z Axis)



Testing sample thickness : 1.0 mm

Hardness: 15 (Shore A)
(Shore A)



L37-5 - Datasheet

Property	L37-5	Unit	Tolerance	Test Method
Colour	Light Grey	-	-	Visual
Thickness	0.3 - 20	mm	-	ASTM D374
	0.0118 - 0.787	inch	-	ASTM D374
Thermal Conductivity	1.6	W/m.k	-	ASTM D5470
Flame Rating	V-0	-	-	UL94
Dielectric Breakdown Voltage	>10	kV/mm	-	ASTM D149
Weight Loss	<1	%	-	ASTM E595
Specific Gravity	2.38	g/cm ³	±0.2	ASTM D792
Working Temperature	-40 to 200	°C	-	-
Volume Resistance	>10 ¹²	Ohm-cm	-	ASTM D257
Elongation	300	%	±0.2	ASTM D412
Tensile Strength	12	Kgf/cm ²	±5	ASTM D412
Standard Shape	-	Sheet ones	-	-
Hardness	15	Shore A	±3	ASTM D2240

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Design Guide Lines

- For effective thermal management L37-3 should be used under a compression of 20 – 45% based on the original thickness
- L37-3 should only be used within the temperature range of – 40 + 200C. For applications outside of this range please contact t-global

Frequently Asked Questions

- **Can L37 Series be reworked?**
 - With care the product can be removed and repositioned without an appreciable loss in thermal performance
- **What is the shelf-life of the product?**
 - Shelf-life for most gap-pads is one year. For gap-pads with an adhesive the shelf life is six months from the date of manufacture. After these dates adhesive strength and inherent tack must be re-characterised
- **Will the pads soften with temperature?**
 - Up to the maximum working temperature, as specified on the individual product datasheet, the materials will not suffer with temperature

Frequently Asked Questions

- Can the L37 series be supplied in different formats?
 - L37-3 can be supplied in sheet form, die-cuts, moulded parts and with adhesive applied to one or both sides
- How does L37-3 respond to ageing and thermal cycling tests?
 - L37-3 does not exhibit any measurable changes in property when tested using all common industry standard environmental test regimes



Summary

- L37 Series is a silicone based gap filler from t-Global technology
- The product family offers the design engineer a number of solutions to specific thermal problems
- Thermal conductivity for the series varies from 1.4 – 1.9 W/m.k
- The series is available as standard sheets, custom die cuts and rolls