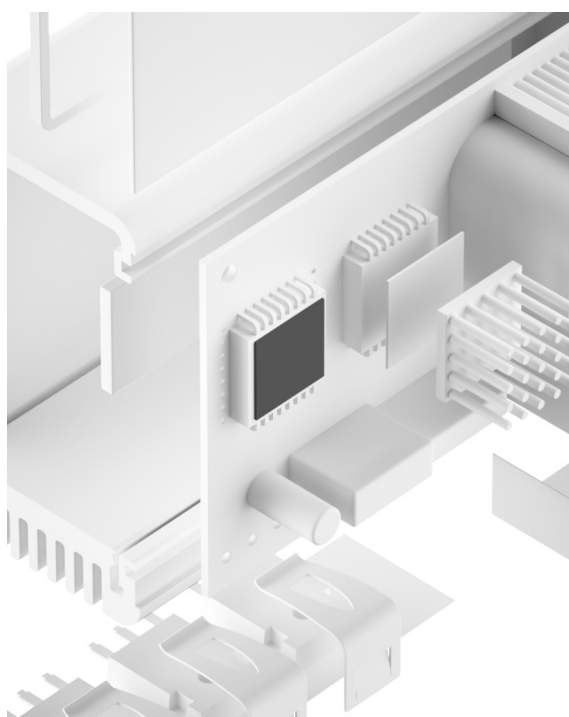


TERMISK LEDENDE MATERIALE

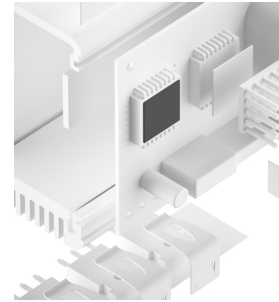


**GRAPHITE
FOILS**

GRAPHITE FOIL TFO-S-CB

ANISOTROPIC

TFO-S-CB consists of more than 98% pure natural graphite. Due to the flake-like shape they show anisotropic thermal conductivities in-plane (x-y-plane) and in through direction (z-direction). Their softness allows for a good compliance to the contact surfaces. Thus the total thermal resistance is minimised. Their low densities compared to copper (15%) or aluminum (50%) make them ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments.



PROPERTIES

- Maximum contact through good surface compliance
- Very low weight
- Silicone-free
- Very high temperature resistance
- EMI-shielding through high electrical conductivity

AVAILABILITY

- Sheet 300 x 500 mm
- Roll 300 mm x 50 m
- Die cut parts
- Non adhesive (TFO-SXXX-CB)
- Adhesive on one side (TFO-SXXX-CB-A1)

APPLICATION EXAMPLES

Thermal link of:

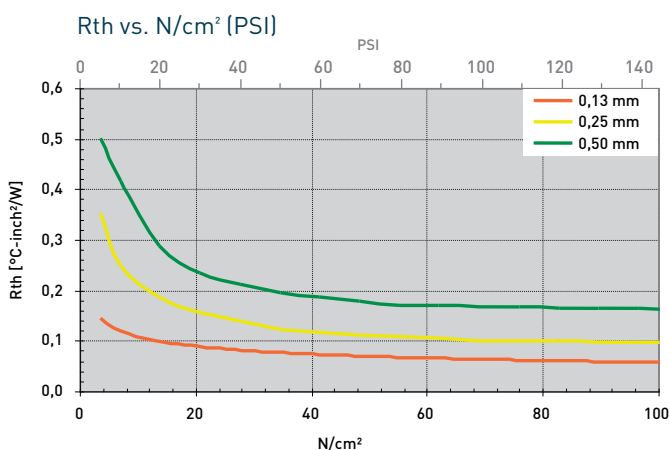
- CPUs to heat sinks
- Power modules
- Semiconductors
- IGBTs

For use in Power inverters / Laptops / Automotive power supplies / Industrial PCs

PROPERTY	UNIT	TFO-S130-CB	TFO-S250-CB	TFO-S510-CB
MATERIAL		Natural Graphite 98%	Natural Graphite 98%	Natural Graphite 98%
Colour		Grey	Grey	Grey
Thickness	mm	0.13 ± 0.03	0.25 ± 0.03	0.5 ± 0.05
Hardness	Shore A	85	85	85
UL Flammability	UL 94	V0	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance ¹ @ 150 PSI	°C-inch ² /W	0.06	0.10	0.16
Resistance ¹ @ 30 PSI	°C-inch ² /W	0.09	0.16	0.23
Resistance ¹ @ 10 PSI	°C-inch ² /W	0.12	0.24	0.40
Thermal Conductivity (Z Direction)	W/mK	8	8	8
Thermal Conductivity (X-Y Direction)	W/mK	140	140	140
Operating Temperature Range	°C	- 250 to + 400	- 250 to + 400	- 250 to + 400
ELECTRICAL				
Volume Resistivity	Ohm - cm	11.0×10^{-4}	11.0×10^{-4}	11.0×10^{-4}
Dielectric Constant	@ 1 MHz	< 0.001	< 0.001	< 0.001

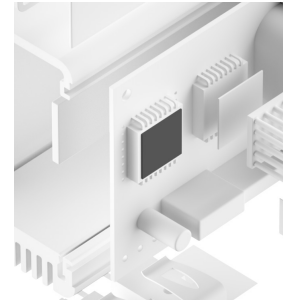
Measurement technique according to: ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.
Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.13 mm / 0.25 mm / 0.5 mm



PYROL YTIC GRAPHITE FOIL TFO-Y-PG

HIGHLY ANISOTROPIC CONDUCTIVE



TFO-Y-PG consists of pure pyrolytic graphite. Due to the synthetic structure it shows highly anisotropic heat spreading conductivities in-plane (x-y-plane) and in through direction (z-direction). Its softness allows for a good compliance to the contact surfaces. Thus the total thermal resistance is minimised. Their low densities make them ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments. Due to its flexibility it is bending resistant. It can be used for curved surfaces and corners because its thermal conductivity will remain unchanged in the absence of sharp folds. Special configurations are dielectric with insulating films or laminated on flexible gap filler elastomers.

PROPERTIES

- Maximum contact through good surface compliance
- Very low weight
- Silicone-free
- Very high temperature resistance
- EMI-shielding through high electrical conductivity
- UL VO

AVAILABILITY

- Sheet 115 x 180 mm
- Sheet 180 x 230 mm (0.07 - 0.1 mm Thickness)
- Non adhesive (TFO-YXXX-PG)
- Adhesive (TFO-YXXX-PG-A1)
- Die cut parts

SPECIAL CONFIGURATIONS

- With PEEK Laminate (TFO-YXXX-PG-PKXXX)
- With Polyimide Laminate (TFO-YXXX-PG-PIXXX)
- With PET Laminate (TFO-YXXX-PG-PEXXX)
- As laminate on ultrasoft silicone gap filler elastomer (TFO-YXXX-PG-GFXXX)

APPLICATION EXAMPLES

Thermal link of:

- CPUs to heat sinks
- Laser diodes
- TEC modules

For use in high end computers / Analyzers / Photonics

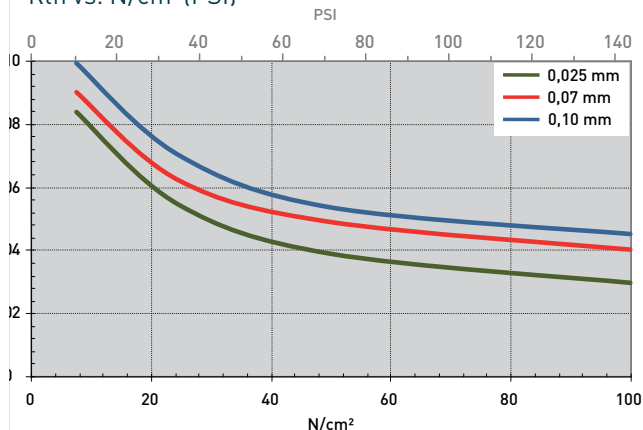
PROPERTY	UNIT	TFO-Y025-PG	TFO-Y070-PG	TFO-Y100-PG
MATERIAL		Pyrolytic Graphite	Pyrolytic Graphite	Pyrolytic Graphite
Colour		Grey	Grey	Grey
Thickness	mm	0.025 ±0.010	0.07 ±0.015	0.10 ±0.030
Density	g/cm³	1.9	1.21	0.85
UL Flammability	UL 94	V0	V0	V0
RoHS Conformity	2015 / 863 / EU	Yes	Yes	Yes
THERMAL				
Resistance¹ @ 150 PSI	°C-inch²/W	0.03	0.04	0,045
Resistance¹ @ 30 PSI	°C-inch²/W	0.06	0.07	0,078
Resistance¹ @ 10 PSI	°C-inch²/W	0.08	0.09	0,10
Thermal Conductivity (Z Direction)	W/mK	18	20	25
Thermal Conductivity (X-Y Direction)	W/mK	1,600	1,000	700
Operating Temperature Range	°C	- 250 to + 400	- 250 to + 400	- 250 to + 400
ELECTRICAL				
Electrical Conductivity	S/cm	20,000	10,000	10,000

Measurement technique according to: ¹ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.025 mm / 0.04 mm / 0.05 mm / 0.07 mm / 0.10 mm

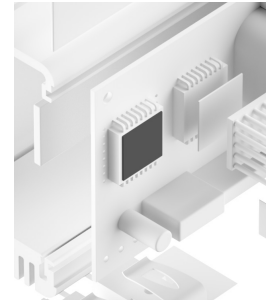
Rth vs. N/cm² (PSI)



PYROL YTIC GRAPHITE FOIL TFO-ZS-PG

SOFT, ANISOTROPIC HIGHLY CONDUCTIVE

TFO-ZS-PG consists of pure soft pyrolytic graphite. Due to the synthetic structure it shows a high anisotropic heat spreading conductivity in-plane (x-y-plane) and an outstanding thermal conductivity in through thickness direction (z-direction). Its flexibility and softness allow for a very good compliance to larger uneven contact surfaces such as IGBT base plates. Thus the total thermal resistance is minimised. Compared to copper or aluminum the material is ideal for applications where low weight is required. The very high temperature resistance allows for the use in extreme hot environments.



PROPERTIES

- Maximum contact through good surface compliance
- Very soft
- Very low weight
- Silicone-free
- Extremely temperature resistant
- EMI-shielding through high electrical conductivity

AVAILABILITY

- Sheet 90 x 90 mm
- Sheet 90 x 180 mm
- Sheet 180 x 180 mm
- Die cut parts

APPLICATION EXAMPLES

Thermal link of:

- GBT modules
- Laser diodes
- TEC modules
- High flux LEDs

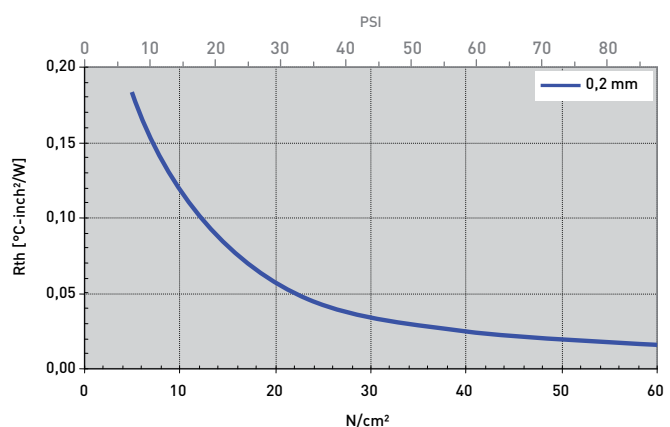
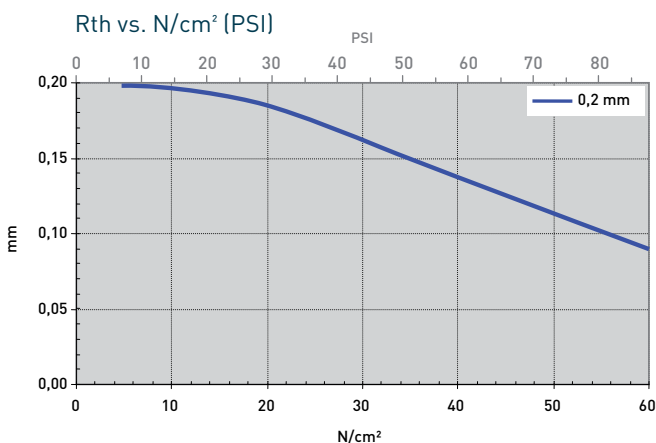
For use in liquid cold plates / high end computers / Analyzers / Photonics / LED arrays

PROPERTY	UNIT	TFO-ZS200-PG
MATERIAL		
Colour		Grey
Thickness	mm	0.2 ±0.05
Density	g/cm³	0.5
Flammability	UL 94	VO
RoHS Conformity	2015 / 863 / EU	Yes
THERMAL		
Resistance¹ @ 90 PSI @ Thickness	°C-inch²/W (mm)	0.015 (0.09)
Resistance¹ @ 30 PSI @ Thickness	°C-inch²/W (mm)	0.055 (0.18)
Resistance¹ @ 10 PSI @ Thickness	°C-inch²/W (mm)	0.181 (0.19)
Thermal Conductivity (Z Direction)	W/mK	30
Thermal Conductivity (X-Y Direction)	W/mK	500
Operating Temperature Range	°C	- 250 to + 400
ELECTRICAL		
Electrical Conductivity	S/cm	10,000

Measurement technique according to: 'ASTM D 5470. All data without warranty and subject to change. Please contact us for further data and information.

Shelf life adhesive: 6 months when stored in original packaging at room temperature and 50% relative humidity.

Thicknesses: 0.20 mm

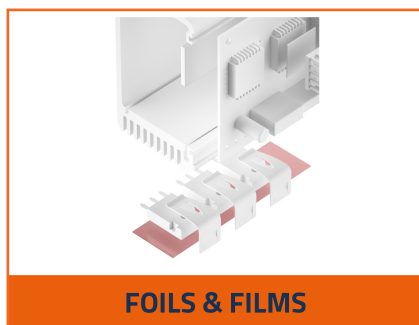




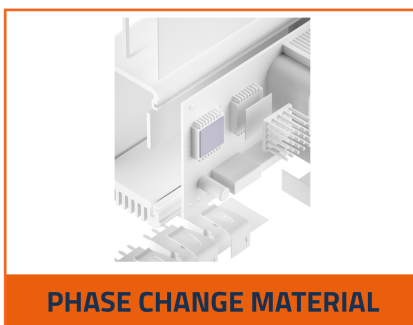
KØLEPROFILER



VORES PRODUKTSORTIMENT INKLUDERER:



FOILS & FILMS



PHASE CHANGE MATERIAL



SARCON GAP FILLER TYPE



EKSTRUDEREDE



CLIPS



KØLEPROFILER

VI FØRER PRODUKTER INDENFOR KATEGORIERNE:



AUTOMATIK



**HVAC & BYGNINGS-
AUTOMATIK**



ELVARME



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