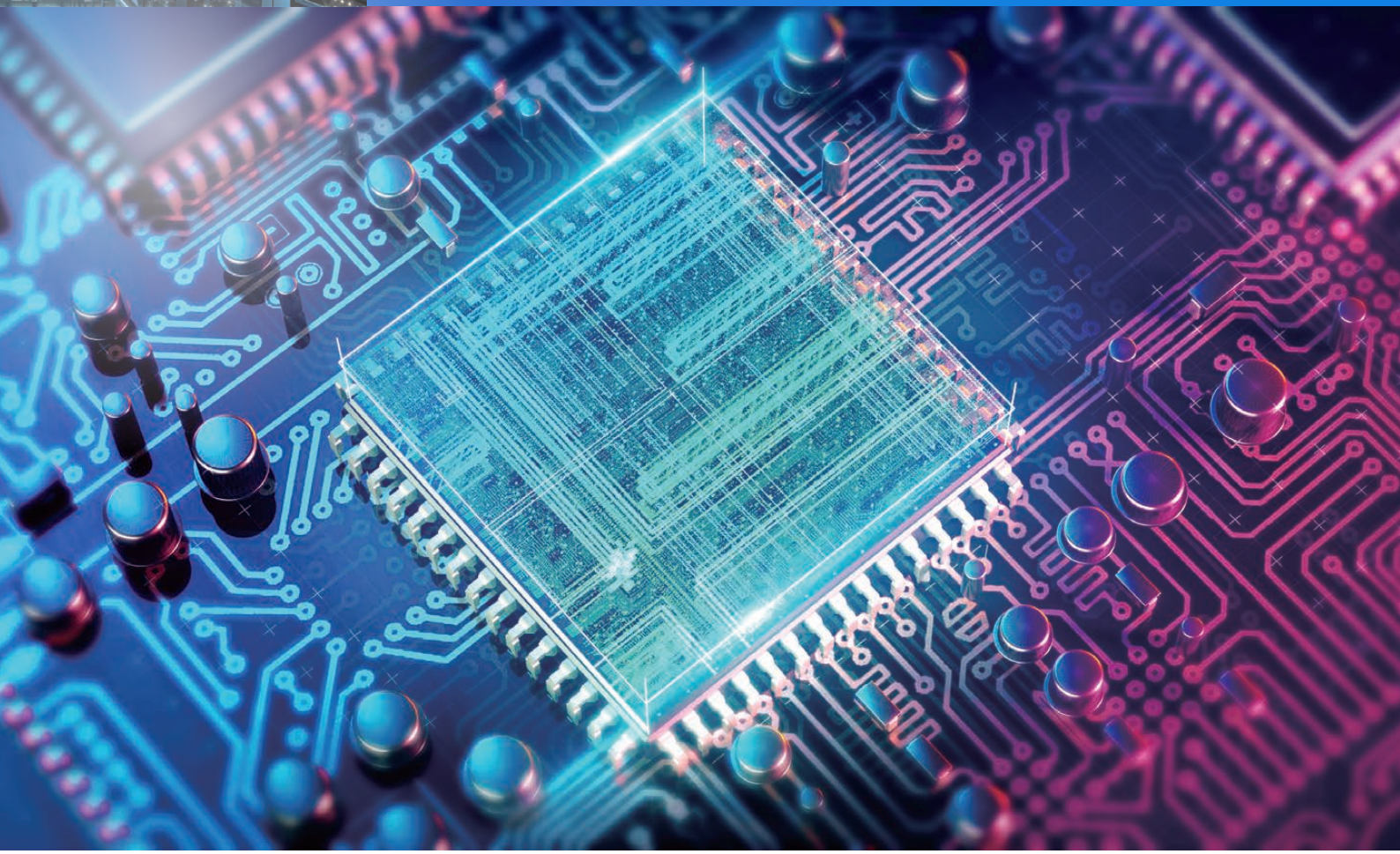
FEPS

FURUKAWA ELECTRIC GROUP

Siloxane-Free Heat Conductive Sheet

F-CO TM Sheet

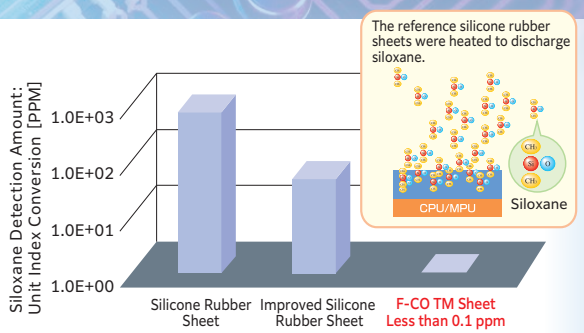


FURUKAWA ELECTRIC POWER SYSTEMS

Reliable Thermal Management for Your Electronics with F-CO TM Sheet!

Siloxane Emission: Less than 0.1 ppm (EE-RT/VHT)

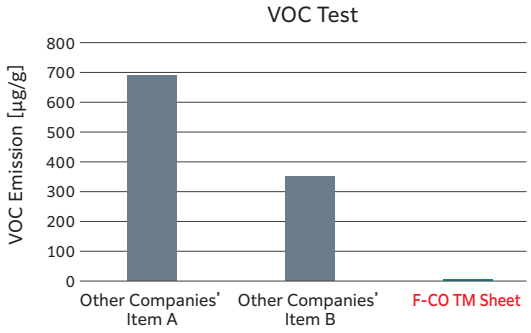
Even trace amounts of siloxane can accumulate in enclosed spaces, increasing the risk of contact failure. TM Sheet uses silicone-free materials, resulting in siloxane emissions below the detection limit of 0.1 ppm.



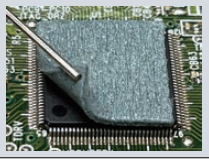
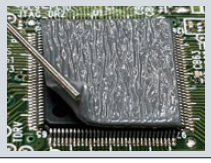
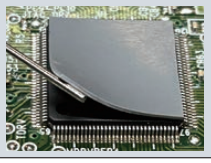
Measurements as a result of driving out the natural components.

VOC Emission: 10 ppm or Less (EE-RT, VHT)

In enclosed spaces, even small amounts of VOCs (volatile organic compounds) can accumulate, increasing the risk of contact failure and corrosion (insulation caused by metals). TM Sheets are characterized by their extremely low VOC emissions.



Lineup

	Unit		VHT	VFT	EE-RT	HF	Measurement Method
							
Thickness[*1]	mm	Min	0.5	0.5	0.3	0.5	JIS B7503
		Max	4.0	4.0	8.0		
Thermal Conductivity	W/m・K		4.5	2.5	3.0	1.2	JIS R2616
Hardness[*2]	Asker C 15 seconds		45	22	50	95	JIS K7312
Volume Resistivity	Ω・cm		1×10^{12}	1×10^{13}	1×10^{10}	1×10^{12}	JIS K6911
Dielectric Breakdown	kV/mm		6.5	6	10	50	JIS K6911
Flammability	—		V-0	V-0	V-0	V-0	UL94
Temperature Range[*3]	℃		-40 ～ 120				Original Standard
Density	g/cm^3		2.5	2.5	2.6	1.7	JIS Z8807
Tack Side[*4]	—		Front side: No tack Back side: tack	Front side: No tack Back side: tack	Front side: No tack Back side: tack	Front side/ Back side：No tack[*5]	

Not specified Values.

*1 Thickness can be prepared in 0.5 mm increments from 0.5 mm to the maximum (EE-RT is also available in 0.3 mm increments). Please consult us for increments other than 0.5 mm.

*2 If you need the hardness value (0 sec measurement data) specified by Asker C hardness, please contact us.

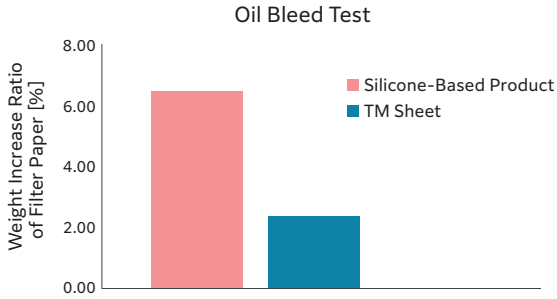
*3 Temperature range is measured by hardness change, etc. and flexible depending on conditions.

*4 TM Sheet doesn't use adhesive on it, but has tackiness of rubber itself (except HF).

*5 It is also possible to add additional adhesive treatment.

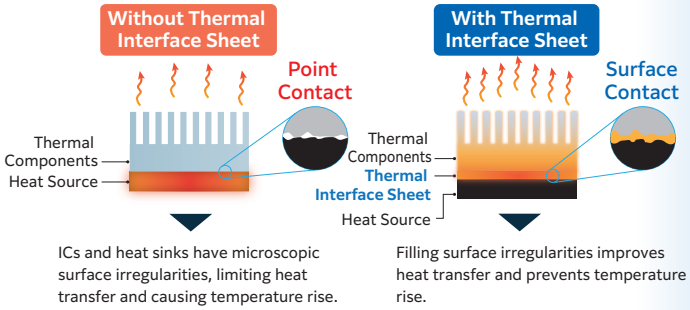
Oil Bleed: Less than 2.5%

Oil bleed from thermal interface sheets can degrade insulators and contact surfaces, potentially leading to long-term performance deterioration. Our product contains a low amount of oil and has extremely high interfacial resistance, making TM Sheets characterized by minimal oil bleed.



Customer Benefit: High Thermal Conductivity

Achieves a top-level thermal conductivity of 4.5 W/m·K among non-silicone thermal interface sheets. Thermal conductive sheets with high thermal conductivity efficiently transfer heat and prevent overheating of electronic devices. TM Sheets can maximize device performance and extend lifespan.



ICs and heat sinks have microscopic surface irregularities, limiting heat transfer and causing temperature rise.

Filling surface irregularities improves heat transfer and prevents temperature rise.

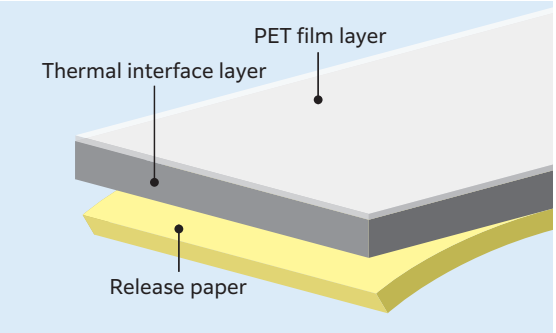
Customer Benefit: Minimum Thickness of 0.3 mm

Flexibly meets required thermal performance and durability. According to the formula on the right, the thinner the material, the lower the R-value (thermal resistance). TM Sheets leverage this feature and are available starting from a minimum thickness of 0.3 mm.

$$R = \frac{L}{\lambda \cdot A}$$

R: Thermal resistance (K/W)
L: Thickness (m)
λ: Thermal conductivity (W/m·K)
A : Cross-sectional area of the material (m^2)

Structure, Size, and Lot



* For the HF type (when no adhesive layer is applied), the PET film layer and release liner are not included. The product consists of the base sheet only.

Size

(1) Uncut Standard Size:
160 x 240 mm (effective size),
PET film base thickness 50 µm

(2) Standard Size:
150 x 230 mm

(3) Custom Cutting:
Available upon request.

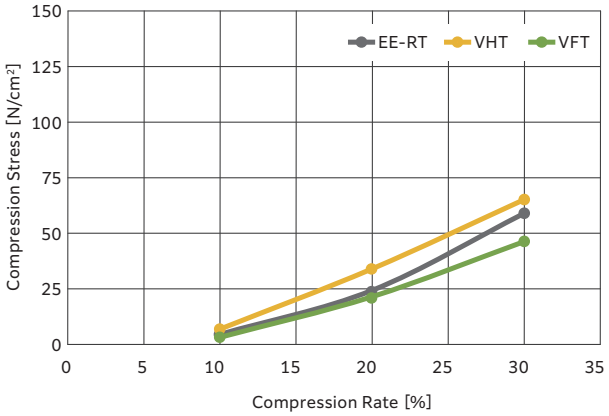
Standard Sizes:
In addition to the above, we can provide your desired shape and dimensions (150 x 230 mm) in uncut form. Please feel free to contact us for any other requests.

Minimum Order Quantity:
Orders are accepted starting from 50 sheets in standard cut size.

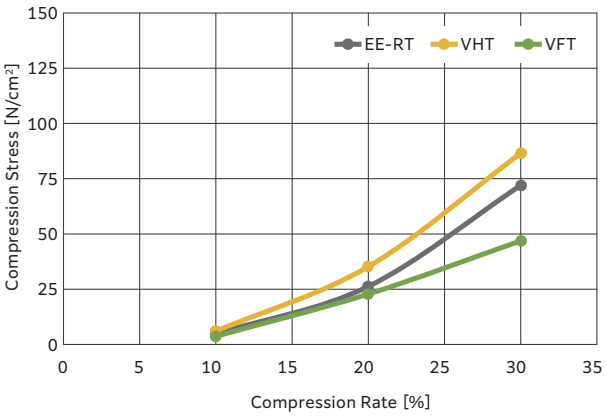
Samples:
For sample requests, please contact us via our website.

Detailed Data of Various Products

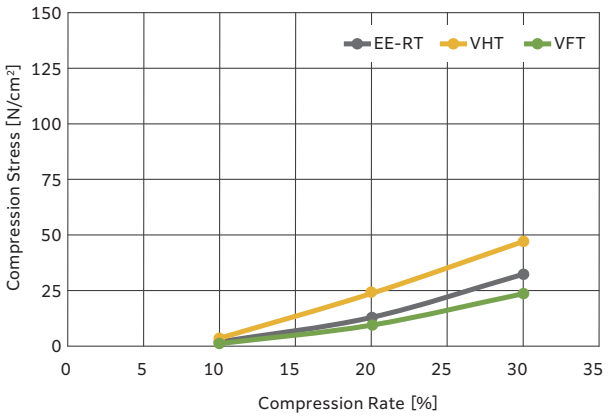
TM sheet 0.5 mm Compression Stress initial



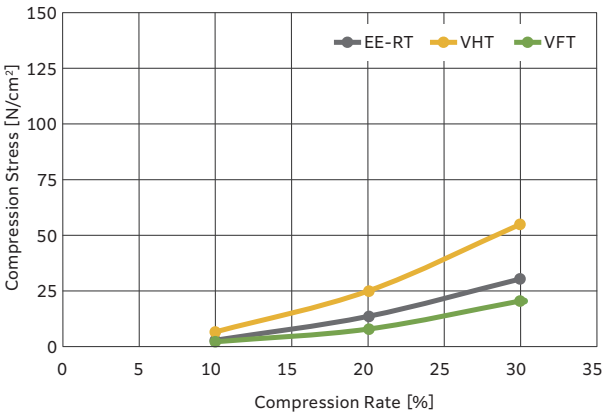
TM sheet 1.0 mm Compression Stress initial



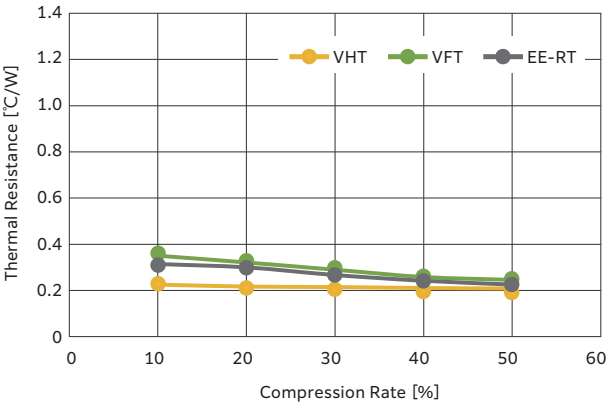
TM sheet 0.5 mm Compression Stress after 10 min



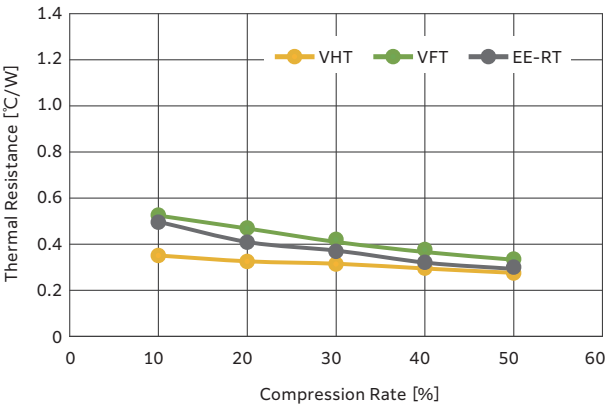
TM sheet 1.0 mm Compression Stress after 10 min



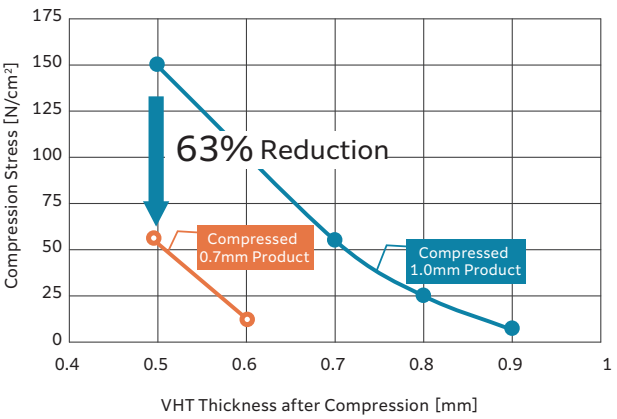
TM sheet 0.5 mm Thermal Resistance



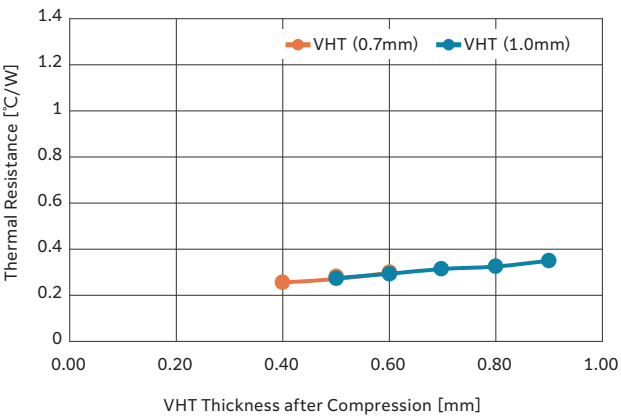
TM sheet 1.0 mm Thermal Resistance



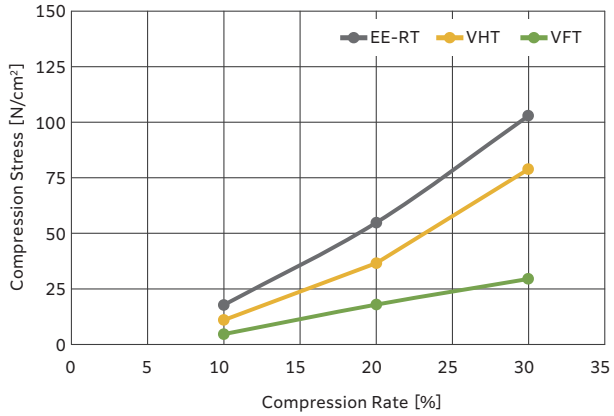
Change of Compression Stress by VHT thickness



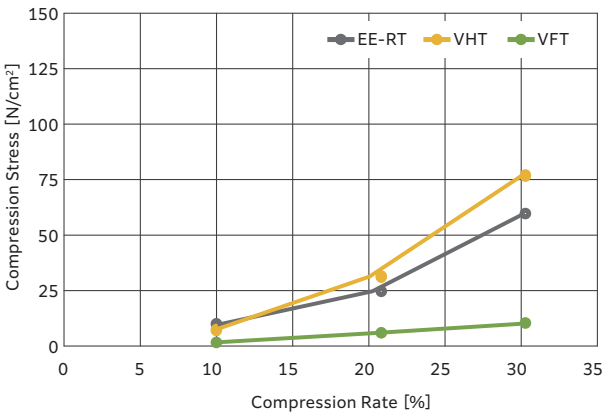
Change of Thermal resistance by VHT thickness



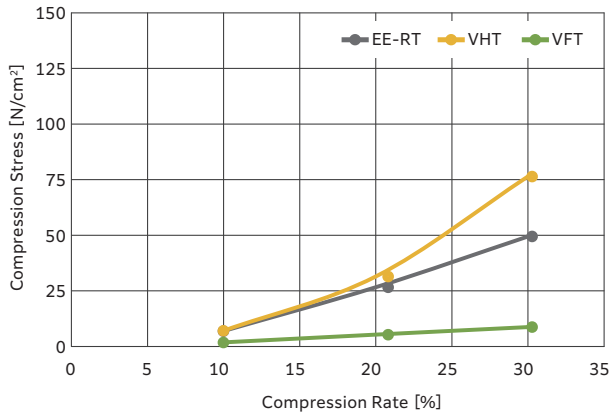
TM sheet 2.0 mm Compression Stress initial



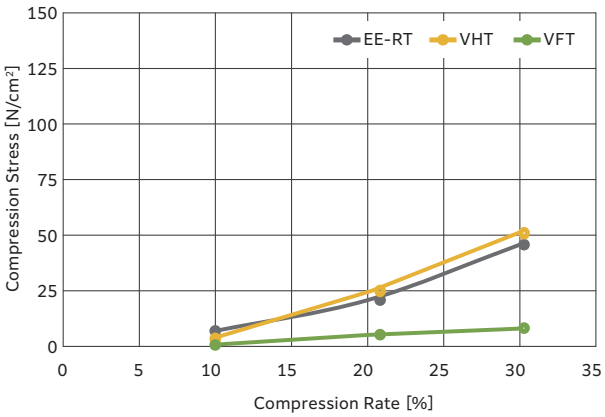
TM sheet 3.0 mm Compression Stress initial



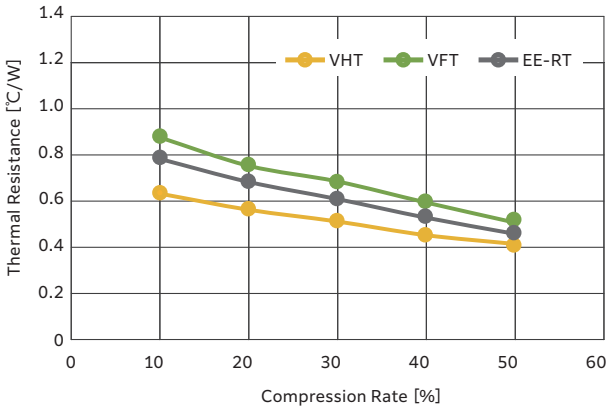
TM sheet 2.0 mm Compression Stress after 10 min



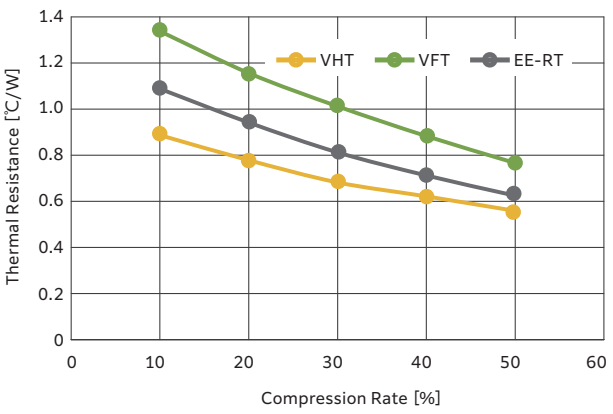
TM sheet 3.0 mm Compression Stress after 10 min



TM sheet 2.0 mm Thermal Resistance



TM sheet 3.0 mm Thermal Resistance



Adoption and Application Examples

【Industrial】

Servers, storage devices, high-performance printers, optical measurement systems, semiconductor manufacturing equipment, communication equipment, battery storage systems, measuring instruments, LCD displays, LED lighting, outdoor units, etc.

*The material stability of the TM series has been positively evaluated at major data centers.

【Automotive】

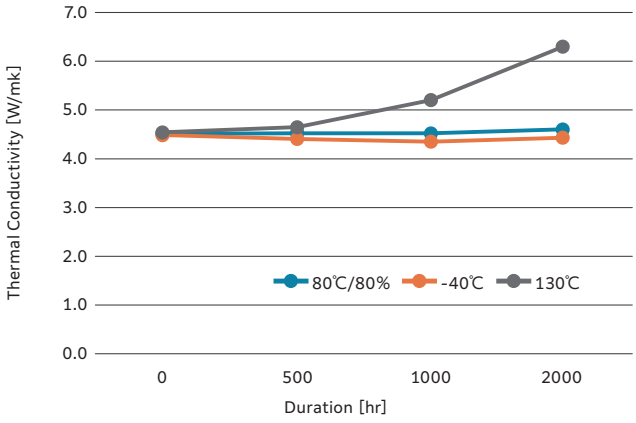
Car navigation systems, autonomous driving technology, hybrid/EV power supplies, cameras, etc.

【Digital Devices】

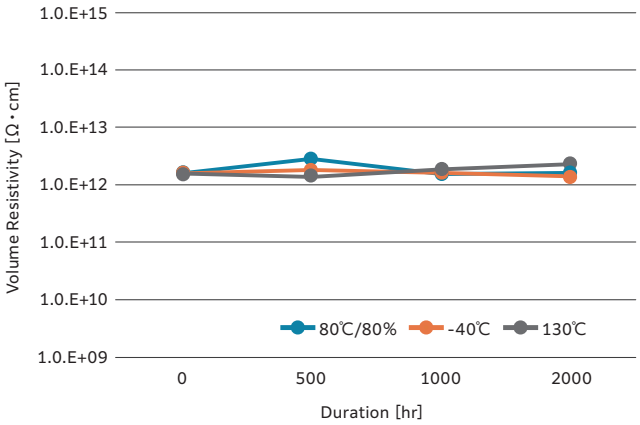
HDDs, SSDs, PCs, Digital cameras, TVs, Video game consoles

Reliability Data of Various Products

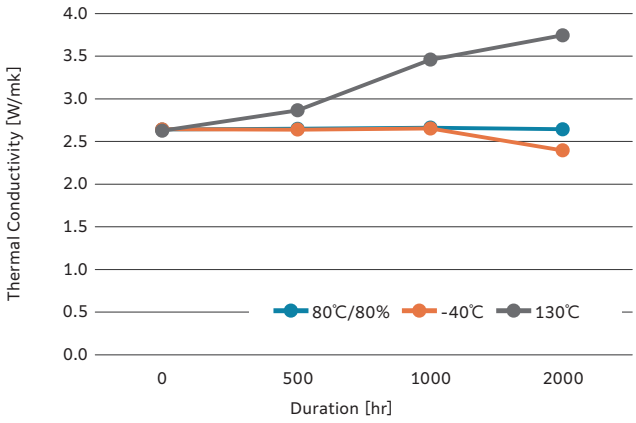
VHT Thermal Conductivity



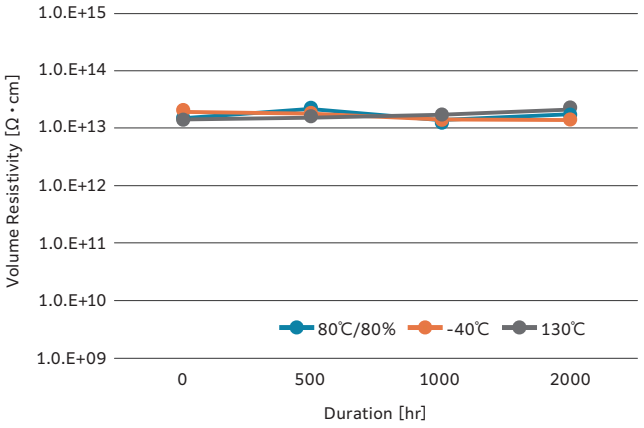
VHT Volume Resistivity



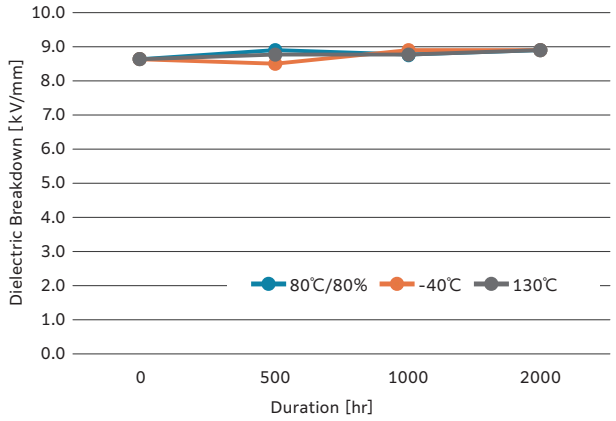
VFT Thermal Conductivity



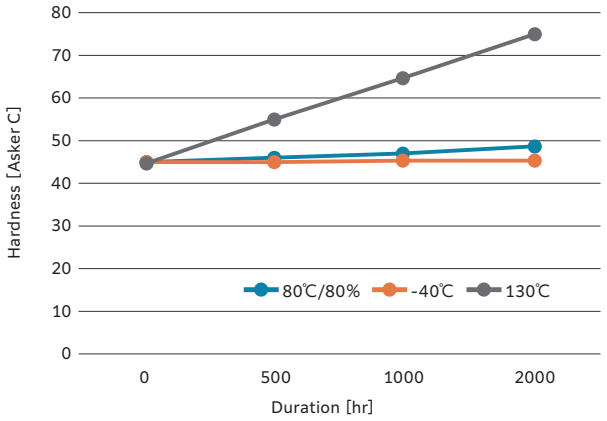
VFT Volume Resistivity



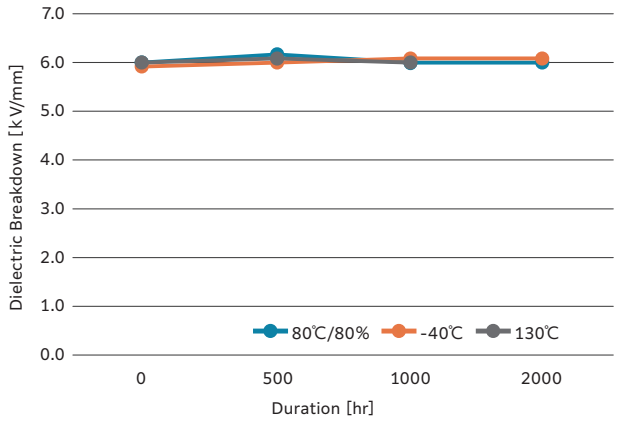
VHT Dielectric Breakdown



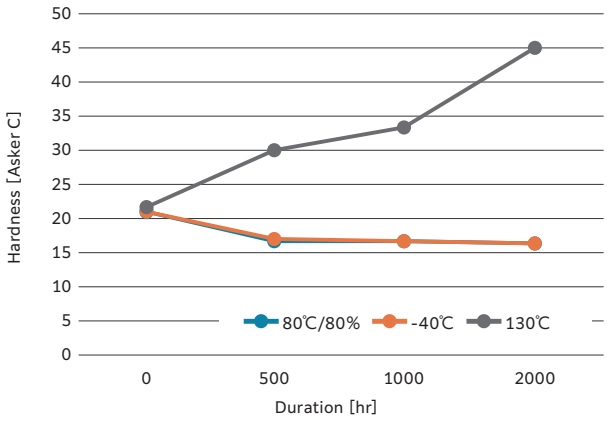
VHT Hardness after 15 seconds



VFT Dielectric Breakdown



VFT Hardness after 15 seconds



F-CO TM Sheet FAQ

Why is the generation of siloxane a problem?	Low-molecular-weight siloxanes can cause contact failures and clouding of optical lenses. Especially in enclosed spaces, even trace amounts can accumulate and lead to these risks.
Which product should I choose?	Each product has its own features, so please refer to the catalog or contact us via the inquiry form.
Do wrinkles on the surface PET film affect thermal conductivity?	Technically, they increase thermal resistance and affect conductivity, but the compression during assembly smooths them out, so the impact is minimal.
What happens if the heat resistance temperature of 120˚C is exceeded?	Exceeding the heat resistance temperature accelerates the hardening of the sheet.
Is it possible to accommodate sizes other than the standard size (150 mm x 230 mm)?	Yes, in addition to standard sizes, we offer custom cuts and uncut standard size. Thickness can also be adjusted.
Is it possible to handle special shapes (hole processing) and other punching processes?	It is possible. We will punch out the maximum number within a range of 150 mm vertically x 230 mm horizontally (minimum size 5 x 5 mm). Depending on thickness and shape, we may not be able to accommodate, so please contact us.
Can you add color to visually confirm that the sheet is attached?	The color of the sheet is only dark gray.
Does thermal conductivity change before and after compression?	Due to reduced contact thermal resistance by compression, heat dissipation changes. For detailed data, please contact us.
Please tell me the recommended compression rate during use.	It depends on the usage environment, but it is more than 10%.
What is the minimum order quantity?	The minimum order quantity is 50 sheets.

Warnings

- For electric and industroial use only, not for human body or skin.
- Please ask industrial waste company when disposal.

FURUKAWA ELECTRIC POWER SYSTEMS CO., LTD. https://www.feps.co.jp/english/

Global sales Department

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Please contact our inquiry form in web site for further information.

EC-517 2506