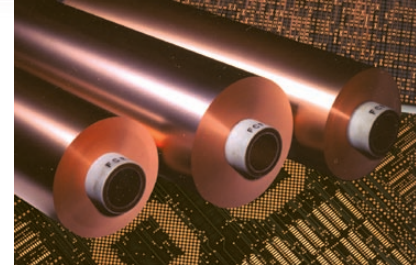


F-WS Copper Foil for FPC

- F-WS has overwhelming market share as a copper foil for the 2-layer FPC.
- This foil is used at the hinge position of cellular phones and notebook computers.



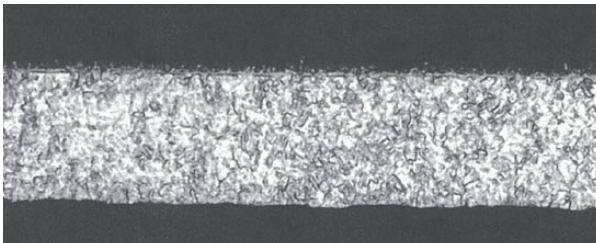
Product

- F0-WS, F1-WS, F2-WS, F3-WS (thickness: 12 ~ 70 μm)

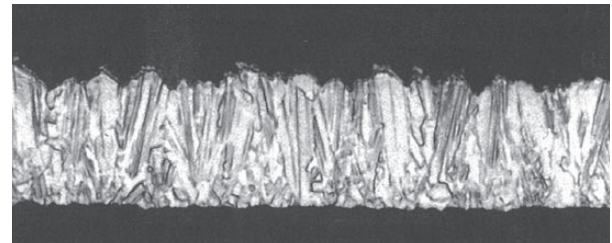
Features

- Superior to rolled copper foils in terms of folding endurance.
- Bond enhancing treatment with a very low surface profile capable of making fine patterns.
- F3-WS is used for high Tg resins and special resins, taking advantage of its high peel strength.
- F3-WS is also used for multilayer boards (e.g., 20 layers).
- Five kinds of bond enhancing treatment are available to suit various resins and uses.
- Good elongation property at room temperature ensures foil crack-free applications even for multilayer boards.

Comparison of Cross-section

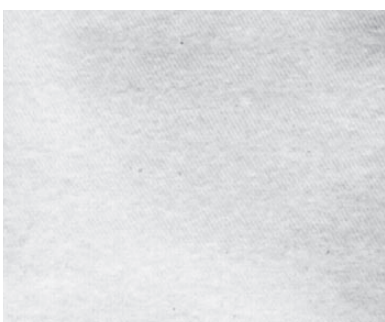


F3-WS-35 μm



GTS-MP-35 μm

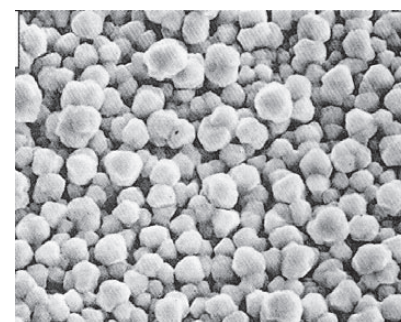
Treated Side (Bond enhancing treatment)



F0-WS matte side



F2-WS matte side



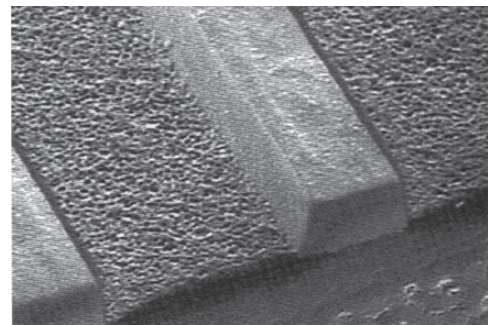
F3-WS matte side

Typical Properties

Test Items	Unit	F0-WS		F1-WS		F2-WS		F3-WS	
		12 μ m	18 μ m	12 μ m	18 μ m	12 μ m	18 μ m	12 μ m	18 μ m
Area Weight	g/m ²	107	153	107	153	107	153	107	153
Tensile Strength (at Room Temperature)	N/mm ²	310							
Tensile Strength (at 180°C)	N/mm ²	180							
Elongation (at Room Temperature)	%	7	10	7	10	7	10	7	10
Elongation (at 180°C)	%	12	14	12	14	12	14	12	14
Surface Roughness Matte side (Rz)	μ m	1.5		1.9		2.1		2.6	
Surface Roughness Shiny side (Rz)	μ m	1.6							
Peel Strength (vs. FR-4)	kN/m	—	—	—	—	0.9	1.0	1.0	1.1
Peel Strength (vs. Highly Heat-Resistant Material, A)	kN/m	—	—	—	—	0.8	0.9	0.9	1.0
Peel Strength (vs. Highly Heat-Resistant Material, B)	kN/m	—	—	—	—	0.7	0.8	0.9	0.9

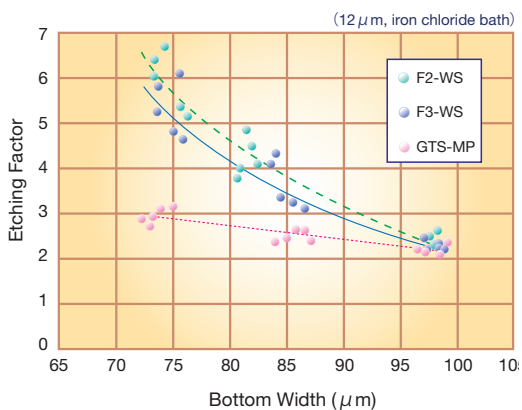
Comparison of Etched Shapes in Circuit Patterning

	Panel Plating Thickness (μ m)	F2-WS	F3-WS	GTS-MP
Foil Thickness (μ m)	—	12	12	12
Roughness Rz (μ m)	—	2.1	2.6	7.0
Minimum L/S (μ m)	0	30/30	40/40	75/75
	15	40/40	50/50	100/100
	25	50/50	75/75	125/125



F3-WS-12 μ m

Comparison of Etching Properties of Copper Foils for Fine Patterning



FURUKAWA ELECTRIC CO., LTD.

<http://www.furukawa.co.jp/english/>

Copper Foil Division, Metals Company

601-2, Otorozawa, Nikko-city, Tochigi-pref, 321-2336 Japan

Phone : +81-288-22-3490 FAX : +81-288-22-3479

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