

# HFI-B

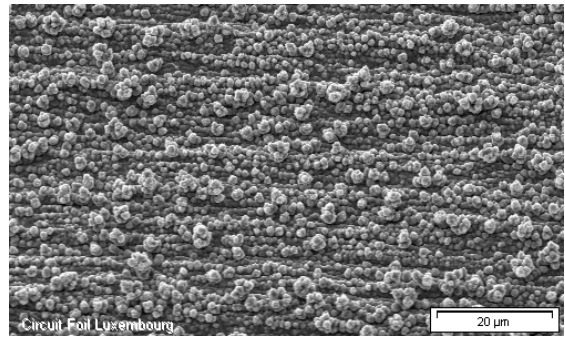
## Technical Characteristics

HFI-B represents a so-called “RTF - Reverse Side Treated Foil”, where bonding treatment is applied to the “shiny” side. The final product exhibits Very Low Profile characteristics for the treatment side. Base foil is characterized by enhanced high temperature elongation properties [Grade 3].

Its Zinc free HFI treatment provides high bond strength on a wide range of high T<sub>g</sub>, low dielectric constant substrates and new engineering plastics. A pure copper treatment limits negative effects on PIM\*.

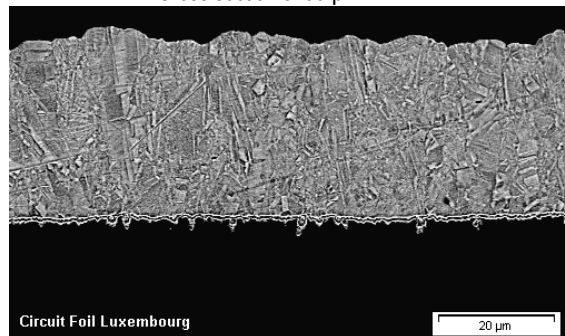
The product is designed for the manufacture of high performance laminates with extended thermal stability and electrical properties designated for very high frequency circuitry applications, as for RF antennas and wireless devices. PCB's manufactured with such laminates may be designed to operate at ultra high frequencies often in hostile or remote locations where long term reliability and stability is of crucial importance.

Additional alternatives for ultra high frequencies (> 40 GHz) are our extremely smooth BF based foils with HFI treatment.



Treated side of 35 µm HFI-B

Cross section of 35 µm HFI-B



\*PIM – Passive Intermodulation:

PIM is an additional interference signal generated when 2 or more signals of different frequency are transmitted thru the same non-linear system. The signals are mixed by the non-linear properties of junctions between dissimilar materials.

## Typical average properties

HFI-B					
MEASURED PARAMETERS	UNITS	PRODUCT GAUGE		IPC	
Nominal Thickness	µm oz.	18 1/2	35 1	Specification IPC-4562A	Test Method IPC-TM-650
Area Weight (± 5 %)	oz/ft <sup>2</sup>	0.52	0.95	(a)1.2.5, table 1-1	2.2.12
	g/m <sup>2</sup>	158	290	(b)3.4.4	
	g/254 in <sup>2</sup>	25.9	47.5	(c)4.6.3	
Untreated Side Roughness (Rz)	µm µ.inch	4 - 7 157 - 276	5 - 8 197 - 315	3.5.6	2.2.17
Treated Side Roughness (Rz)	µm µ.inch	< 5.1 < 201		3.4.5	2.2.17
Tensile Strength Transverse at RT	MPa k.Lb/in <sup>2</sup>	> 276 > 40		3.5.1	2.4.18
Tensile Strength Transverse at 180 °C	MPa k.Lb/in <sup>2</sup>	> 138 > 20		3.5.1	2.4.18
Elongation Transverse at RT	%	> 6	> 10	3.5.3	2.4.18
Elongation Transverse at 180 °C	%	> 2	> 3	3.5.3	2.4.18
Peel Strength (RT) FR4 <sup>[1]</sup>	N/mm Lb/in	> 0.7 > 4.0	> 1.3 > 7.5	3.5.4	2.4.8
Peel Strength (RT) PTFE <sup>[1]</sup>	N/mm Lb/in	> 0.7 > 4.0	> 1.2 > 7.5	3.5.4	2.4.8
High Temp. Tarnish Resistance on untreated side	-	120 min @ 180 °C in air: pass			
Solderability	-	Complies with IPC specification		3.6.3	2.4.12

[1] Laminate construction with thickness ≥ 0.5 mm



## Advanced Product Features

- Higher laminate bond strength on “difficult” high  $T_g$  substrate from a combination of an increased mechanical bonding surface area and, where applicable, chemical adhesion.
- High, but upper limit controlled, temperature elongation, typically between 4 % and 12 %, - [HTE-Type E / Grade 3] {IPC-4562A / 1.2.4.1} prevents “barrel cracking” failures in multi-layer PCB’s arising from CTE mismatch.
- Thermally stable microstructure - stable mechanical properties unaffected by thermal excursion from lamination or post laminate baking cycles - which could degrade laminate dimensional stability, warp & twist, and drilling characteristics (nail heading).
- A high integrity oxidation resistant “NT” passivation process, applied to the untreated matte side, ensuring the production of “ready-to-use” laminate free from traces of oxidation directly from the press; but which is readily removed by simple chemical cleaning prior to circuitisation.
- Improved surface process of the bonding treatment ensures low bonding loss after extremely long thermal cycles or solder float processes.
- A Zinc free bonding treatment which eliminates both high frequency “intermodulation” losses and potentially damaging chemical undercut from aggressive electroless finishing steps.

## Notes

- Products can be supplied in both roll and sheeted formats.
- Roll product is available in widths of 150 mm (~ 5.9”) to 1360 mm (~ 53.5”).
- Product is supplied on sturdy cardboard cores with an ID of ~ 80 mm (3 1/8”). Alternative core sizes and materials are available on request.
- Please visit our website ([www.circuitfoil.com](http://www.circuitfoil.com)) for regular updates.

All of this Technical Information has been determined with due care and thoroughness. However, because the conditions of use and process and application technologies employed can substantially vary, the provided data and figures can only serve as non binding guidelines. They do not constitute a guarantee that the purchased item will possess certain attributes. For this reason, no liability whatsoever can be assumed for them. The buyer is obliged to check the suitability of all supplied products.

### Circuit Foil Luxembourg

POB 9  
L – 9501 Wiltz  
G.D. of Luxembourg

Phone: +(352) 95 75 51 1  
Fax: +(352) 95 75 51 249  
E-mail: [office@circuitfoil.com](mailto:office@circuitfoil.com)  
Internet: [www.circuitfoil.com](http://www.circuitfoil.com)

### Circuit Foil America

625, rue du Luxembourg  
Granby, J2J 2S9  
Canada

Phone: +(1) 450 770 8558  
Fax: +(1) 450 405 4622  
E-mail: [cfa@circuitfoil.com](mailto:cfa@circuitfoil.com)

### Circuit Foil Trading Inc. (USA)

115, East Glenside Ave./Suite 12  
Glenside, PA 19038  
USA

Phone: +(1) 215 887 7255  
Fax: +(1) 215 887 6911  
E-mail: [cftinc@circuitfoil.com](mailto:cftinc@circuitfoil.com)

### Circuit Foil Asia Pacific Ltd. (HK)

Hong Kong Head Office  
Rm. 706, Well Fung Industr. Centre  
68 Ta Chuen Ping Street, Kwai Chung  
N.T. Hong Kong

Phone : +(852) 24 23 97 56  
Fax : +(852) 24 23 70 92  
E-mail : [cfap@circuitfoil.com](mailto:cfap@circuitfoil.com)