

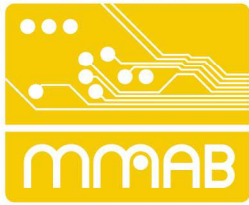
## Capability – Technical PCB properties for MMAB Group

BASIC INFORMATION	Standard	Special- Advanced
Layer count rigid boards	1-12 layer	14-32 layer
Base material rigid boards	FR-4 low, mid, high Tg Halogen free, Aluminium	RF-material PTFE, thermoset ceramic filled, mixed dielectric polyimide, FR2, CEM3, Glass
Flex & Flex-rigid	2-6 layers	6-14 layers
Mixed dielectric	Yes FR4+thermoset	Yes FR4, thermoset, PTFE
Aluminum based pcb	Single sided IMS 2-4 W/mK	
Copper based pcb	Single sided up to 390 W/m-k	
CEM3 White	Thermal conductive 1-2 W/m-k	
Antennas & domes	Yes	3000 mm in length
DIMENSIONS	Standard	Special- Advanced
Dielectric innerlayer min.	0,1 mm	0,05 mm
Board thickness	0,4-2,4 mm	0,1-7,0 mm
Board thickness tolerance	+/-10%	+/-10%
Board size max	500x600 mm	600x1000 mm
COPPER & PATTERN	Standard	Special- Advanced
Track & gap ( $\leq 35 \mu\text{m}$ cu)	0,1/0,1 – 0,15/0,15 mm	0,05/0,05 – 0,075/0,075 mm
Copper thickness innerlayer	Nom. 18 $\mu\text{m}$ , 35 $\mu\text{m}$ , 70 $\mu\text{m}$	Nom. 105 $\mu\text{m}$ , 120 $\mu\text{m}$ , 140 $\mu\text{m}$
Copper thickness outerlayer	Nom. 35 $\mu\text{m}$ , 70 $\mu\text{m}$ , 105 $\mu\text{m}$	Nom. 120 $\mu\text{m}$ , 140 $\mu\text{m}$ , 210 $\mu\text{m}$
Min. BGA pitch	0,65 mm	0,4 mm
FINAL FINISH	Standard	Special- Advanced
Final finish	HASL, OSP, ENIG, Hard gold, Immersion tin, Immersion silver	ENEPIG, Flash gold, Carbon ink Selective ENIG+OSP, Ni-Pa
SOLDERMASK	Standard	Special- Advanced
Soldermask	Green, black, white	Yellow, red, blue, matte/glossy
Soldermask thickness	8-40 $\mu\text{m}$	8-40 $\mu\text{m}$
Soldermask bridge/dam	0,1 mm	0,05 mm
Legend/ silk screen	White, black	Yellow
Hole plugging	Soldermask plugging	Epoxy resin plugging
Temporary masking	Kapton tape, peelable mask	Kapton tape, peelable mask

Get in touch with us if you have other specific requirements

More information about our products and technical support can be found at [www.mmabgroup.com](http://www.mmabgroup.com)

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VIAHOLES	Standard	Special- Advanced
Via through hole finished	0,2-0,3 mm	0,15 mm
Via through hole tolerance	+/-0,1 mm	+/-0,05 mm
Aspect ratio through hole	8:1	12:1
Blind & buried vias	Yes	Staggered, stacked
HDI microvia rigid boards	2 + n + 2	4 + n + 4
Microvia diameter	0,1 – 0,15 mm	0,075-0,05 mm
Cap plated vias – via in pad	No	Plugged overplated IPC type VII
Copper filled microvia	No	Yes
MECHANICAL	Standard	Special- Advanced
Routing tolerance	+/-0,15 mm	+/-0,1 mm
Routing radius	1,2 mm (2,4 mm router bit)	0,4 mm min (0,8 mm router bit)
V-cut tolerance	+/-0,15 mm	+/-0,1 mm
V-cut angle	30°	20°, 30°, 45°, 60°
Edge plating and slots	Yes	Min. 0,45 mm width
Z-axis routed cavities	Yes	Yes
Countersunked holes	Yes	Yes
Bevelled edges	Yes	Yes
FLEX & FLEX-RIGID	Standard	Special- Advanced
Flex layer count	1-2 layers	4-10 layers
Flex-rigid layer count	4-6 layers	14 layers
Flex & flex-rigid microvia	No	Yes
Flex thickness minimum	0,1-0,3 mm	0,05 mm
TEST & APPROVALS	Standard	Special- Advanced
Impedance control	+/-10%	+/-5%
UL-approval	Yes	UL Canada
IPC	Class 2	Class 3
Quality management	ISO9001, 14001, TS16949	ISO9001, 14001, TS16949,13485

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