





1961



1971



1976



1983



1984



1985



1986



1990



1998



The strength of being a Group

Our strength is the result of a synergy which has developed over more than 50 years among companies performing in different industries and all belonging to Finmasi Group, which is made up of four Divisions:

- **Steel Division**

Metalsider in Ravenna, established in 1961

Sidermed in Mordano (Bologna), established in 1984

- **Sensor Division**

M.D. Micro Detectors, established in 1971

Micro Detectors Ibérica, established in 1991

M.D. Micro Detectors Tianjin, established in 2012

- **Service Division**

Hotel Executive and Restaurant Exé 1985 in Fiorano Modenese, established in 1985

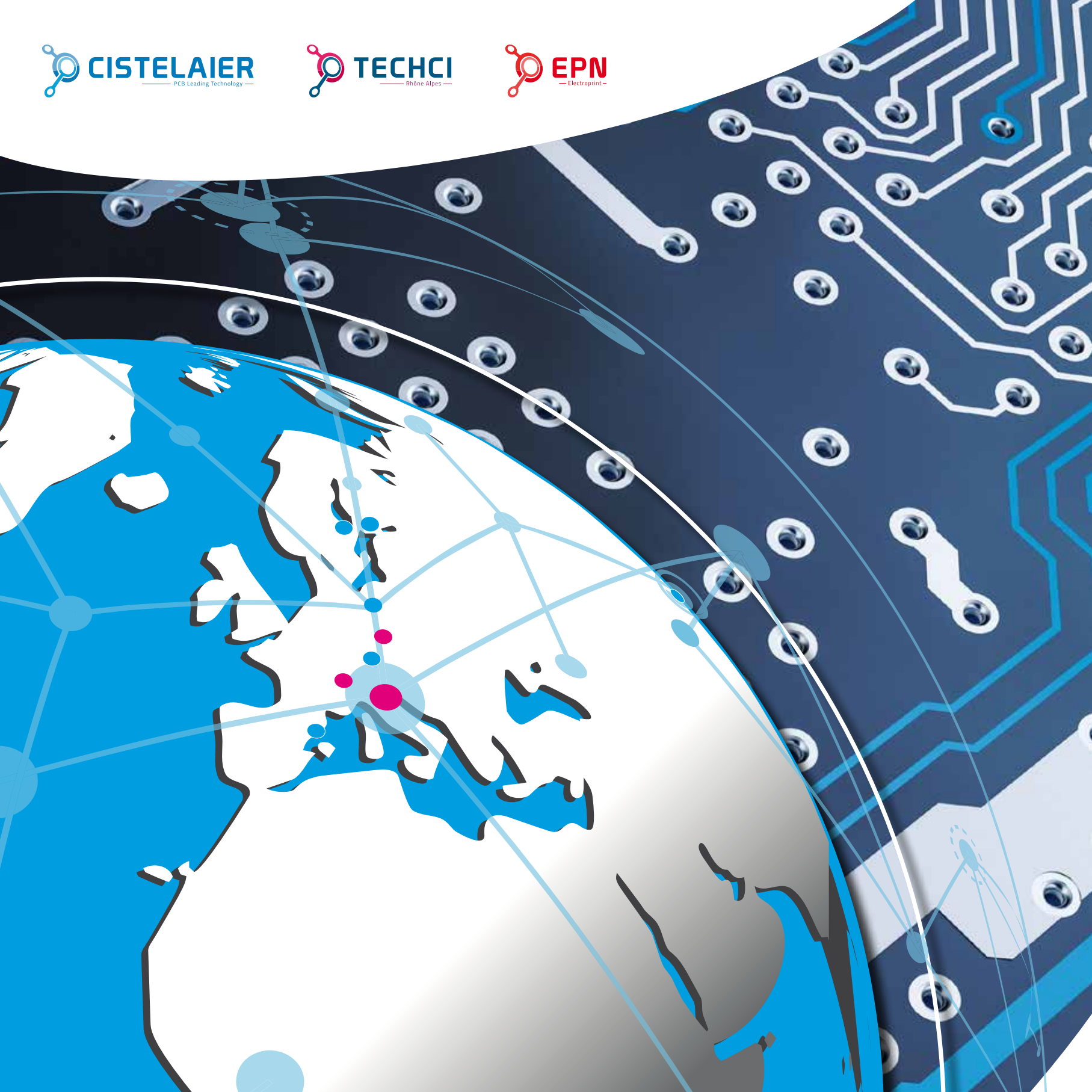
- **PCB Division**

Cistelaier, resulting from the merger, realised by Finmasi in 1998, of Cistel in Genua, established in 1976, and Laier in Modena, established in 1986.

Techci, based in France (Saint Genix sur Guiers), established in 1983 and acquired by Finmasi Group in 2011.

Following its Global Strategy, at the beginning of year 2019, Finmasi Group acquired the Company EPN Electroprint based in Germany.

Common thread of Finmasi Group companies is the constant renewal which allows to fulfil customers' growing needs. Finmasi Group is fully committed to guaranteeing the fundamental conditions to support the continuity of its companies.



Think global, act local

Vision

Our vision is to be leading manufacturers offering Global Services and Local Support to consumers of the European region.

Mission

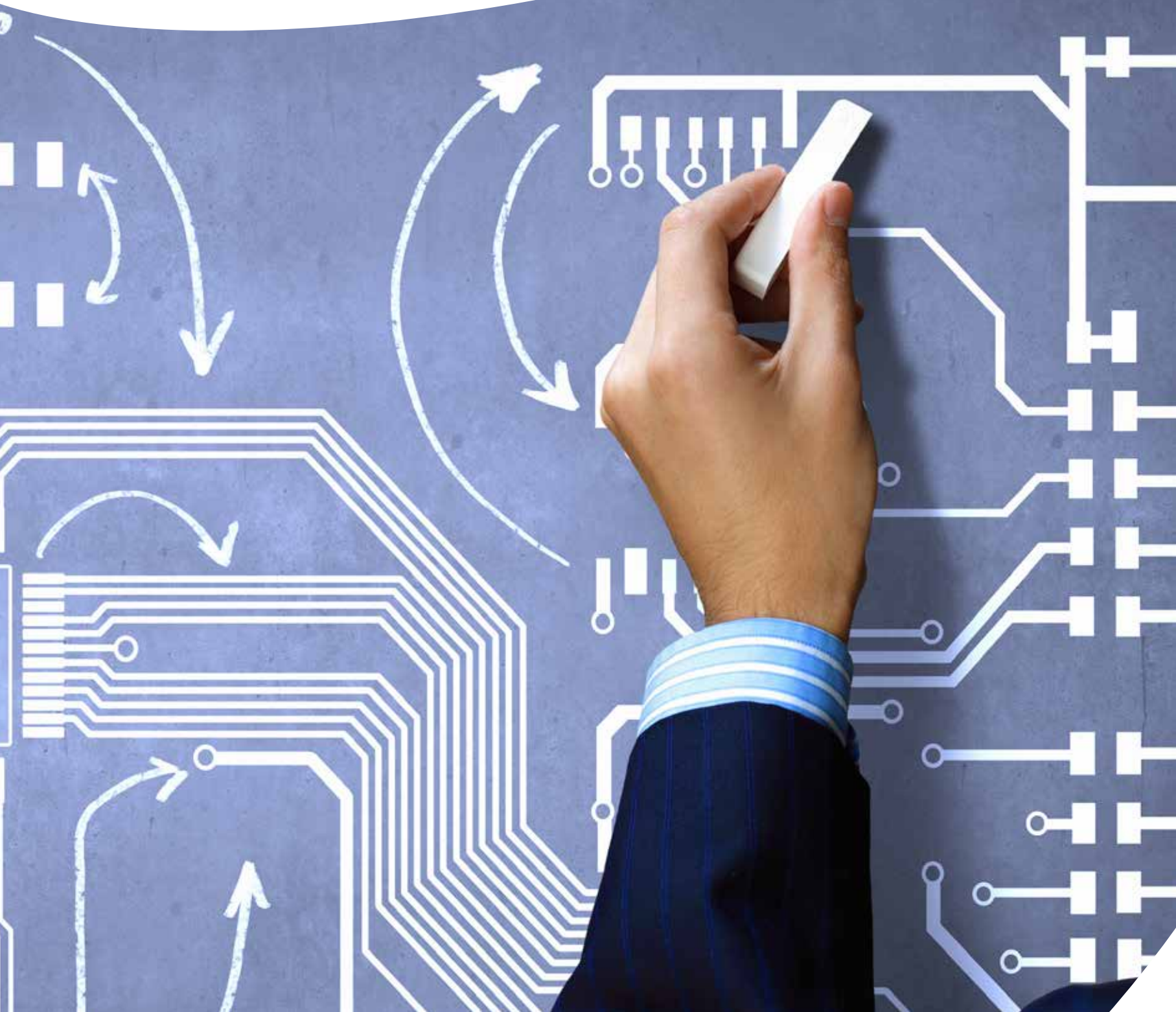
Our mission is

- to continue developing capabilities, services and know-how to guarantee with our own plants in Europe a one stop shop package of services and PCBs for all kind of technologies, from double sided PCBs to rigid and rigid-flex PCBs of high and very-high technology level, both, for serial production and for fast turnaround prototipations;
- and
- to complete our offer for high quantities through our fully controlled long standing sourcing-partnerships with highly-qualified Asian manufacturers.

Values

- Quality
- Reputation, Reliability & Continuity
- Leading edge technology
- Competence & Professionalism
- Passion, Commitment & Concreteness

Finmasi PCB Division has a Global presence with four Operative Plants in Europe - two in Italy, one in France, and one in Germany - and several sales offices all over Europe.



The projects of our customers, our PCBs

We offer our know-how in co-design, engineering and manufacturing of Printed Circuit Boards to realize the projects of our Customers.

The solution provider's vocation coupled with Cistelaier's, Techci's and EPN's long-standing skills to support our partners since the early stage of a new project with co-design activities make Finmasi Group's PCB Division an ideal partner for supplying printed circuits boards of any typology and for any application.

All information related to products are systematically analyzed (Key Point Analysis) in order to identify any risk factors (Risk Analysis) with the use of DFM and FMEA type evaluation techniques.

This working method perfectly supports our fast delivery (QTA) prototyping service and ensures utmost quality and service levels.

The PCB Division puts great emphasis on driving and analyzing the market's technological needs and on R & D activities.

This approach allows us to anticipate the needs of our Customers and to be ready to offer today technological solutions products for tomorrow's products.





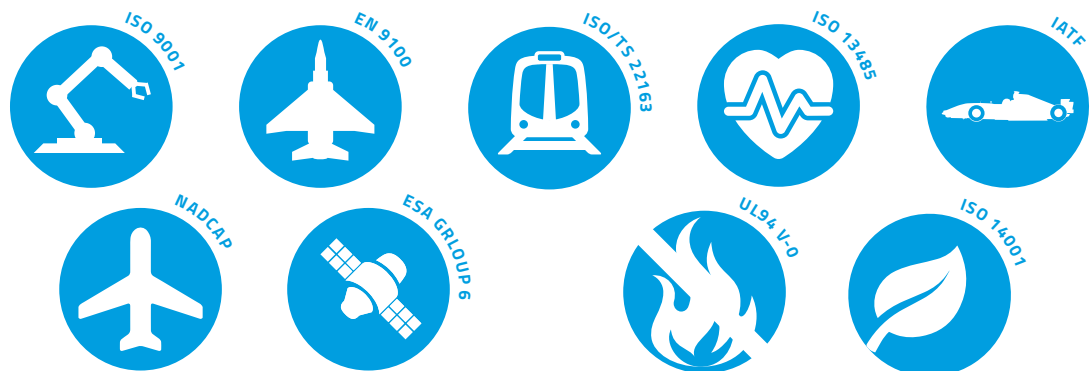
Our portfolio of certifications

The Quality Management System of the three manufacturing Companies of the PCB Division - Cistelaier, Techci and EPN - has been organised and applied according to ISO 9001 norm since several years. Our products could be realized according to UL94 V-0 certification and its extension UL796 DSR, released by the Underwriters Laboratories. UL certification for rigid-flex products (V-0 flammability standard) has been implemented in year 2013. What makes the PCB Division a "unique" interlocutor is to be homologated for

- Aeronautic, Space and Defence sector: UNI EN 9100:2016 and NADCAP
- Automotive sector: IATF:2016
- Medical devices: ISO 13485
- Railway sector: ISO/TS 22163.

Products are manufactured according to the following standards and specific control plans are agreed with our customers when needed:

- IPC-A-600, class 2, 3 or class 3DS(A)
- IPC 6012 (Rigid), IPC 6013 (Rigid-Flex), IPC 6016 (HDI) and IPC 6018 (Microwave)
- MIL-P-55110 (Rigid) and MIL-P-50884 (Rigid-Flex)
- ESA-ECSS - Q - ST - 70 - 10C / 11C / 12C
- ESA-ECSS - Q - ST - 70 - 60C
- Customized according to additional customer's specifications.



Our people are IPC certified:

- 4 of them are Qualified IPC Trainers
- 9 of them are Qualified IPC Specialists



Our manufacturing strengths

- Continuous investment in machineries and equipments at the state of the art technology and suitable for quick turn-around (QTA) for fast prototyping.
- Highly skilled people in PCB Engineering, in Manufacturing and in Production and Quality methods management.
- Production managed according to Lean principles enable Cistelaier, Techci and EPN to fulfil the needs of our Partners in terms of Technology, Quality and Service.



1

Inner layer Production supported by multiple Ldi machine , DES line for flex material and several AOI equipment.



2

Press department with 5 press machine with separated department for rigidflex in 10K class room, Vacuum laminator and ITC machine for via filling.



3

Drilling department with multiple state of art machines with, laser drilling, routing machine and laser cut machine.



4

Hole preparation with plasma for exotic material and Metallization with electroless copper and with Palladium Process.



5

Outer layer imaging department with multiple LDI machine and standard exposure supported by AOI department.



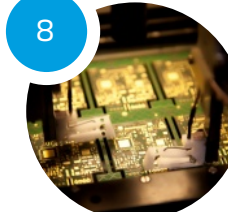
6

State-of-the-art plating equipment with pulse plating rectifier on all of our plating lines for a uniform copper plating for homogeneous etching process on our SES line.



7

All finishing supported internally with Enig, Enepig, Immersion Tin and special final treatment for improving cleanliness on gold, hot oil reflow, hasl lead and leadfree.



8

Multiple Electrical test equipment able to test pcb up to 900 mm with automatic loading and unloading. All operator are trained to control pcb according to IPC or Customer specification.



9

Laboratory Process Control and Product certification with cross section report, Automatic mechanical check and impedance control.



Service and product offer

Our target is to give to our partners a **“global service”** where “global” means that we are able and we want to provide our partners with:

All services

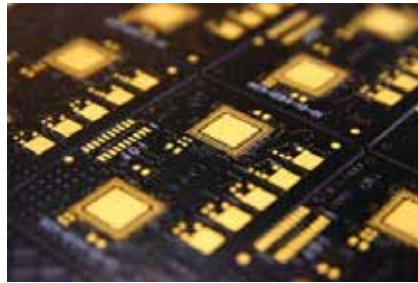
- Design Rule Check
- Design For Manufacturing
- Co-design support
- Fast Prototyping Service (QTA)

All technologies

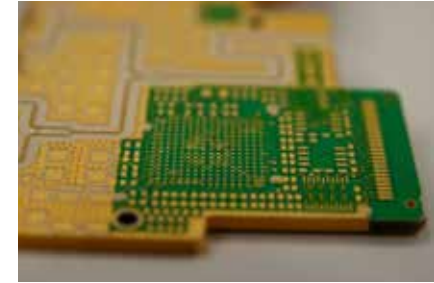
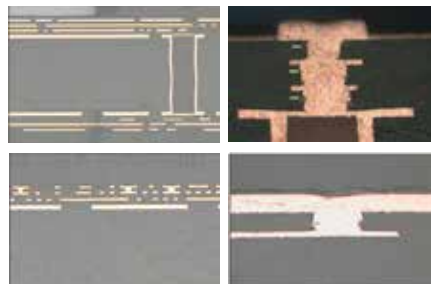
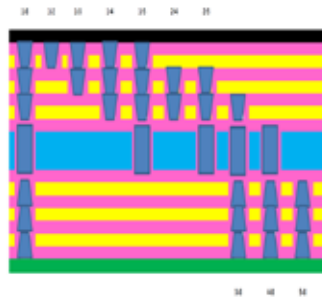
- Rigid, Rigid-Flex, HDI, Microwave and “special” products
- Length/width combination up to 855/464 mm
- Thickness up to 5 mm
- Copper thickness up to 0,5 mm
- Copper coins, Copper inlay and bus bar implementation
- More than 100 different kind of base materials
- ENIG, ENEPIG, chemical tin, lead and lead free HAL, silver, OSP, Electrolytic Nickel and Gold (Hard & Soft), tin-lead hot oil reflow finishes
- Green, red, blue, black, white, grey and specific RAL solder mask on request

All markets/applications

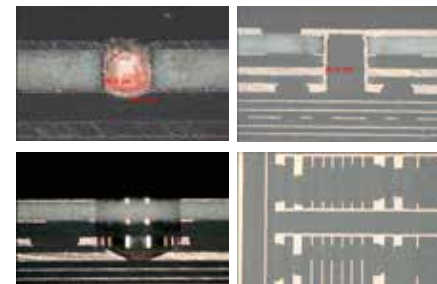
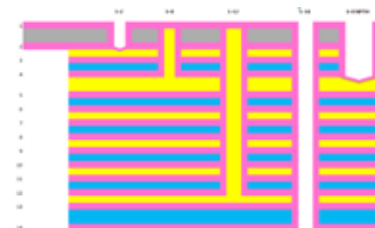
We are now certified for aerospace&defense, civil avionic, rail, medical and automotive and we are also operative in satellite applications for Space sector.



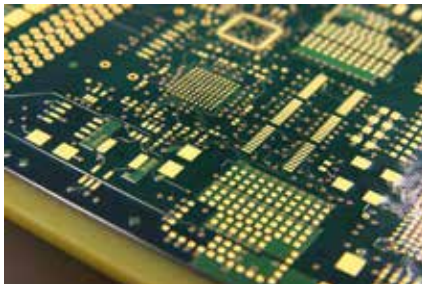
Application:
Video Wall-Infotainment
Technology: Multilayer SBU with 3+N+3 with Cu filled stacked vias burried filled & Capped vias
Material: FR4 High TG with filler Iteq IT180A
Finishing: Black solder mask and Enepig



Application:
Military radar
Technology: Multilayer 14 layer mixed layup
Material: FR4 High TG Iteq IT180 + Rogers R03035 (Taconic RF35A2)
Via sequence: L1-L2, L1-L4 L1-L12 L1-L14 and cavity L2-L14
Finishing: Enig + Bondable 3 um plated gold



Rigid / Rigid - HDI RF - Microwave

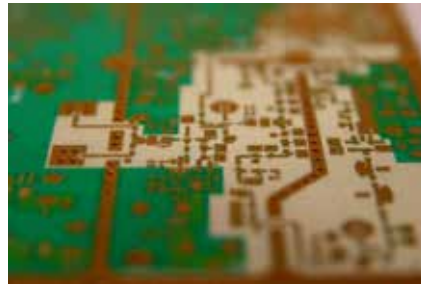
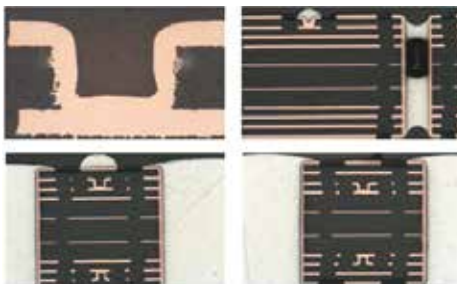
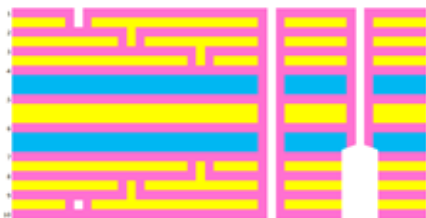

Application:

Renewable Energy

Technology: Multilayer 10 layer SBU with 3+N+3 with Laser vias

Material: Low DK & DF material Isola Fr408HR High

Finishing: Enig

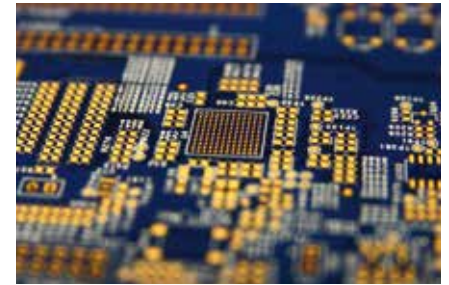
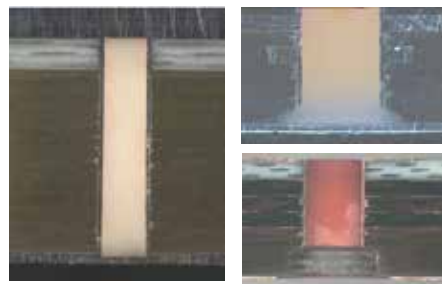

Application:

Telecom

Technology: Multilayer 8 layer mixed layup Via Filled and capped, back drilled hole

Material: FR4 High TG with filler + Rogers RO4350. Via Filled and capped, back drilled hole

Finishing: Enig

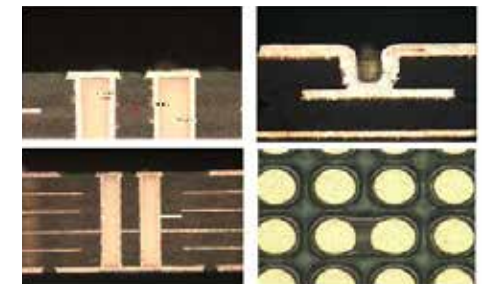
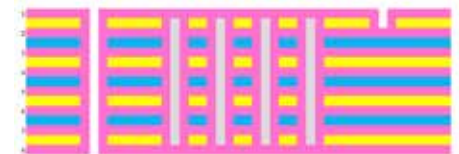

Application:

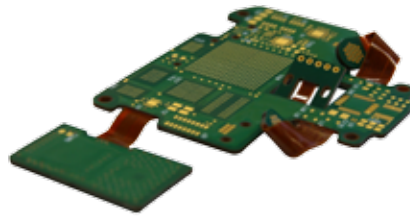
Medical

Technology: Multilayer 6 layer with laser via and UBGA pitch 0.4 mm via in pad resin filled

Material: FR4 High TG with filler Nelco N4000-29

Finishing: Blue solder mask and Enig





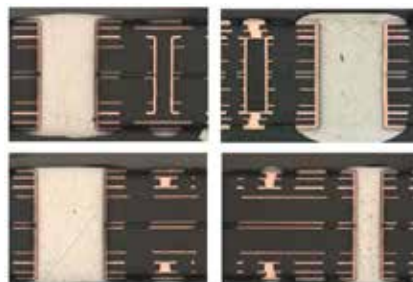
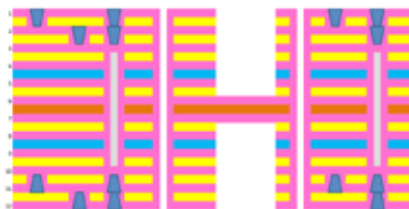
Application:

Military – Wearable Device

Technology: Multilayer 12L HDI
2+8+2 with laser via

Material: Polyimide Ventec Vt901+
Adhesive Less Polyimide film

Finishing: Enig and strain relief
(eccobond) application on the
transition area



Application:

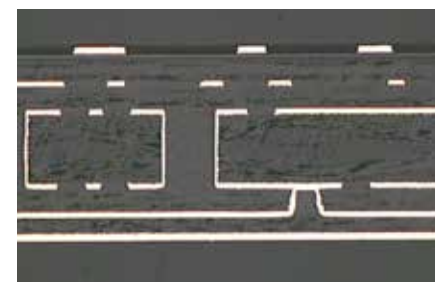
Industrial Automation

Technology: Multilayer 6 Layer HDI
2+2+2 with laser via

Build up: asymmetrical Kapton®
position

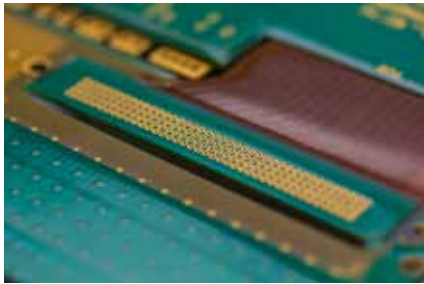
Material: FR4 High TG Iteq IT180 +
Adhesive Less Polyimide film

Finishing: immersion tin and partial
coverlay on outer layer



Flex / Rigid-flex

Rigid Flex HD


Application:

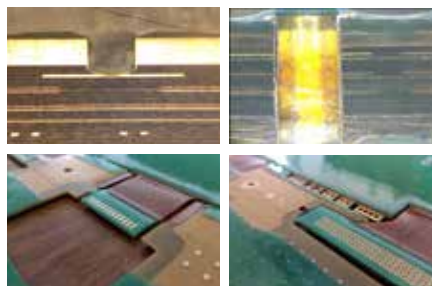
Military Sea & Ground Radar

Technology: Multilayer 9 layer with buried, blind Vias and impedance control, length 855 mm

Build up: buried terminals inside, two flex layer and bus bar with 500 μ m of copper on top layer

Material: FR4 High TG, copper foil 500 μ m and Adhesive Less Polyimide film

Finishing: Enig on outer layer and internal layer


Application:

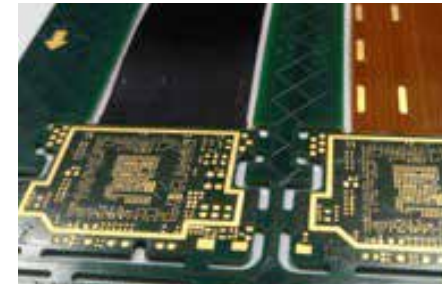
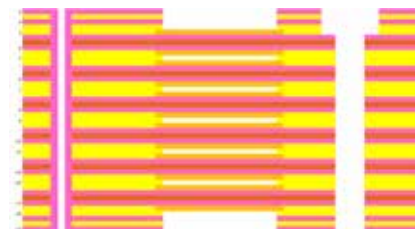
Military - Pointing System

Technology: Multilayer 16 layer with 6 flex layer for dynamic application

Build up: cavity from top side to layer 3 on flex for opening on wire bondable pads

Material: FR4 High TG Iteq IT180 + Adhesive Less Polyimide film

Finishing: electrolytic Soft Gold inside cavity on flex + Enig and electrolytic hard gold on surface


Application:

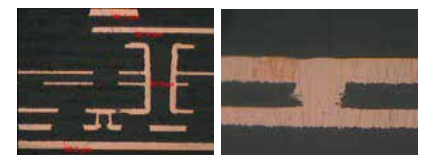
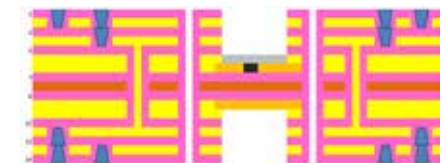
Infotainment – Sportive watch

Technology: Multilayer 10 layer HDI with buried and stacked blind vias

Build up: very thin layup with EMI Shielding on flex layer

Material: FR4 High TG Iteq IT180 + Adhesive Less Polyimide film

Finishing: Enig and matt solder mask





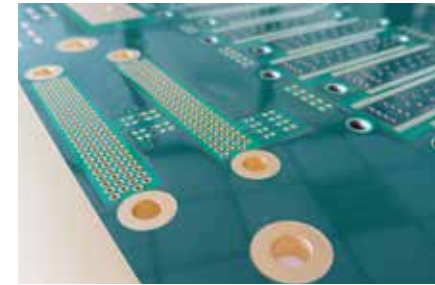
Application: Led Lightning and power Management

Technology: IMS printed circuit board long up to 1.5 mt in SS, DS and Multilayer

Material: low, medium and high thermal dissipation capacity on aluminum or copper

Mechanical: Routed, V-scored and punched

Finishing: Enig, Enepig, Hasl and OSP



Application:

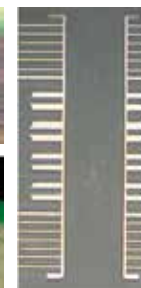
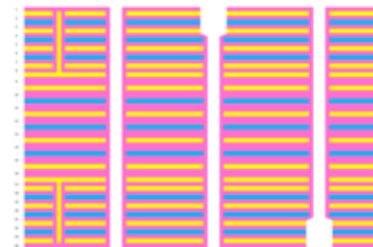
Military Avionic Radar

Technology: Multilayer 24 layer blind vias filled and capped, lenght 640 mm with 4.20 mm thickness

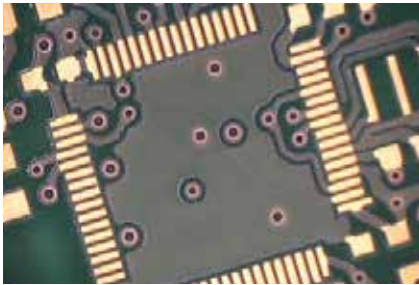
Build up: mixed build up, 17 μm and 105 μm for power management

Material: FR4 High TG with filler Iteq IT180A

Finishing: Green solder mask and Enig



Special / IMS / Led


Application:

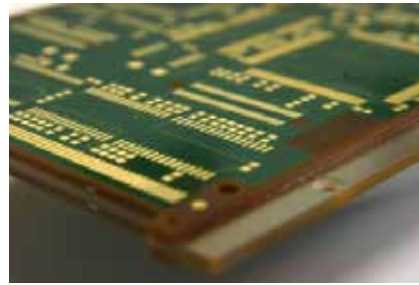
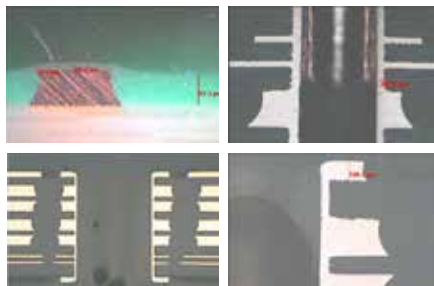
Automotive hybrid car

Technology: Multilayer MI8—Logic and power on same PCB with fine pitch

Layup: Mixed copper thickness 210 μm , 35 μm in the innerlayer and 105 μm on outer layer

Material: Fr4 High Tg with filler Iteq IT180A

Finishing: Enig

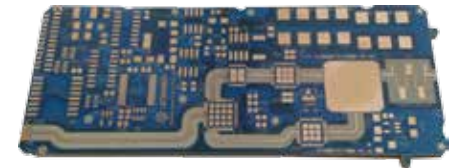
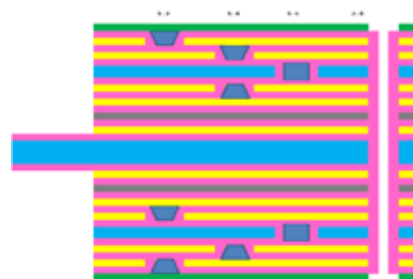

Application:

Military Sea & Ground Radar

Technology: Multilayer SBU with 5+N+5 with Cu filled vias

Material: Polyamide + CopperInvarCopper

Finishing: Enig + cavity with Electrolytic Nickel


Application:

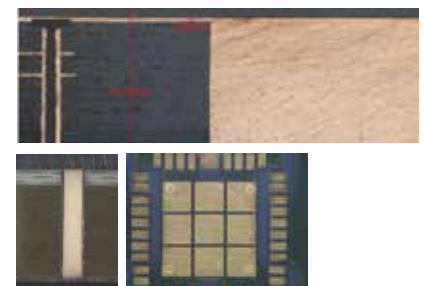
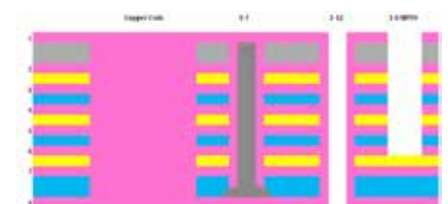
Military Sea & Ground Radar

Technology: Multilayer 8 layer with embedded copper coin

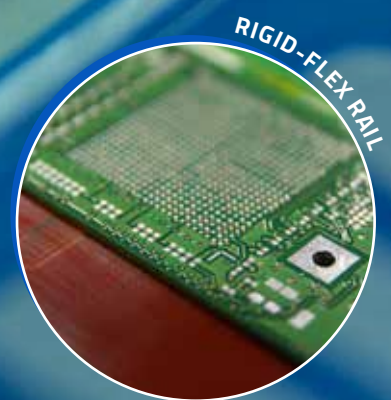
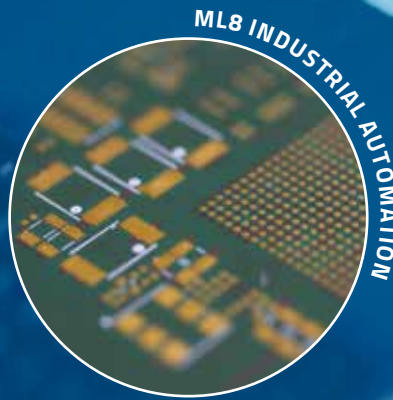
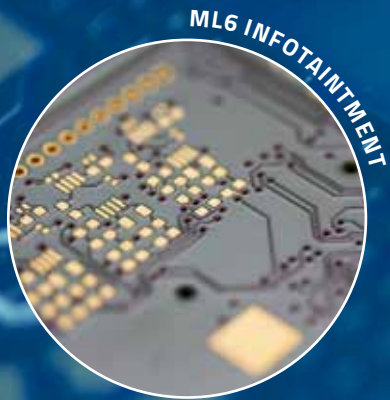
Build up: backdrilled vias filled and capped

Material: Fr 4 High Tg Iteq IT180 and Rogers Ro4350

Finishing: Enig + Electrolytic soft gold



The PCB Division offers a
"one stop shop package"
of services and PCBs ranging
from standard products to leading edge
technology products for any kind of volumes,
guaranteeing the highest quality level.



Our technical abilities

Base materials for PCBs

Standard FR4, high Tg Laminates also Halogen Free and specific for High Speed Digital:

- FR4 standard & Leadfree: Iteq IT140 & IT588; Isola Duraver ML104i - Tg 140 °C; Black FR4
- Mid Tg epoxy for Lead-free process: Iteq IT158 -Tg 160 °C ; Isola IS400 -Tg 150 °C
- Mid Tg- Halogen Free: Iteq IT40G -Tg 140 °C, IT150G;
- High Tg 180°C epoxy (without filler): Iteq IT180 (also No/Low flow Prepreg); Isola IS420& IS410; ARLON 45N
- High Tg 180°C epoxy (with filler): Iteq IT180A & IT180i; Isola PCL370HR; Nelco N4000-29 ; Hitachi 700GR; EMC 827 i
- High Tg 170°C epoxy – Halogen Free: Iteq IT170GRA1 & IT170G & IT180GN
- High speed application: Nelco N4000-13(Si) & N4800-20(Si); Isola Fr408HR, IS600(series), Astra and I-Tera; Iteq IT200DK and IT150DA(SE), IT-968 (SE), IT-988G, IT-988G SE; Panasonic Megtron6 and Megtron7
- Capacitance layer: OAK-Mitsui Faradflex

High-performances materials for avionics/military application:

- Polyimide Resin System: Arlon 33N, 35N, 84N, 85N, 85HP; Ventec VT901(also No/Low flow); Hitachi MCL-I-671; Isola 95P/96P; NELTEC N 7000VO
- Epoxy Resin System: Arlon® Kevlar 4NK (Tg 170 °C and 4.7 ppm/°C)
- Epoxy and Polyimide Thermount® & Para Aramid fiber: ARLON® 55NT/85NT
- Copper/Invar/Copper : typically 150 µm thick - 17/120/17 µm)
- Thick copper: up to 500 microns and over, for BusBar application and copper inlay&coin technology

Substrates for flexible circuits:

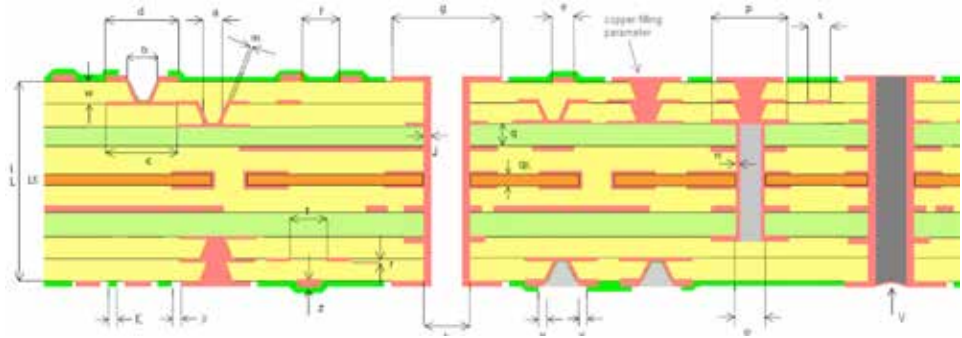
- Flexible Laminates-Polyimide film based: DuPont PYRALUX LF; PYRALUX FR;
- Flexible Laminates- Polyimide film based Adhesiveless: PYRALUX AP, PYRALUX AP-Plus & PYRALUX TK
- Flexible Laminates-Polyimide based Adhesiveless: UBE Upilex 25-50-75 µm; Iteq 25-50-75 µm
- EMI shielding layer: Tatsuta SF-PC6000 and TATSUTA SF-PC 3300

High Frequency materials Teflon® based and non-Teflon based:

- Rogers® / Arlon(also Copper/Brass supported) : RT/Duroid Family ; RO3000 Family; TMM Family; DiClad Family; Isoclad Family; Cuclad Family; AD Family; AR Family; TC Family
- Rogers® / Arlon®: RO4350 & RO4003 (Back up material for discontinued 25N & 25FR but partially applicable)
- Rogers® : ULTRALAM® 3850HT - Liquid Crystalline Polymer (LCP)
- Iteq "new generation" material for RF and Microwave applications IT-88GMW, IT-8300GA, IT-8338G, IT-8338A, IT-8350G, IT-8350A, IT-8615G with Dk from 3,00 up to 6,15(,05)
- Taconic®: RF25A2, RF35, RF35A2, RF45, RF60, TSM-DS3, Cer10, FastRise, TACLAM Plus and all teflon family (TLX, TLY, TLE) Nelco: Mercurywave series, Meteorwave (1000 & 4000 Series) and all teflon family
- Foam: Rohacel HF51

Technical details

- **Plated Through Hole:** minimum finished diameter 150 µm - Aspect Ratio for PTH: ≤ 12
- **Blind Microvia:** minimum drilled diameter 60 µm (laser drilled) - Aspect Ratio for blind vias: ≤ 1
- **µVias treatment:** Copper filled blind vias and Capped blind vias
- **Vias treatment:** Capped through vias with TAIYO THP- 100DX1, Prepreg EMC 827I or Ventec VT901 or Arlon 85N
- **Fine line:** minimum track/spacing is 50 µm, ±10 tolerance with 9 µm copper
- **Layer count:** standard up to 32, special requirement over this value after DFM evaluation
- **Flexible Layer count:** up to 6 inner layer in a Rigid-Flex build up, special requirement over this value after DFM evaluation
- **Sequential lamination:** up to 3+N+3 (SBU) , special requirement over this value after DFM evaluation
- **Cu thickness on layer:** Thin copper 5 µm; 9 µm; 12 µm, from 17 µm, 35 µm, 70 µm, 105 µm and heaviest up to 500 µm,special requirement over this value or selective thickness on same layer after DFM evaluation
- **Cu thickness on vias:** IPC class 2, class 3 and 3DS as standard, special requirement like plating up to 100 µm for power and heat management, also selectively, can be performed
- **Minimum Inner layer thickness:** 50 µm, , special requirement after DFM evaluation
- **Minimum Prepreg thickness:** 50 µm (1 x PP106) or lower but after DFM evaluation (PP1027 or PP1037)
- **Minimum Flexible layer thickness (Adhesive less):** 50-75-100-125- 150 µm as standard, lower and higher thickness as special requirement
- **Maximum PCB thickness:** 5.5 mm
- **Maximum PCB dimensions:** Standard: 464 x 566 mm, up to 855 x 464 mm after DFM evaluation
- **Solder Mask:** curtain coated (Green), spray coated or screen printed (special and colored)
- **Solder Mask capability:** Solder Dam 100 µm standard and 70 µm special; Clearance down to 40µm
- **Vias Treatment:** All process like per IPC4761 classification
- **Printing application:** legend, Peelable mask, graphite and resistive inks and serialization (numbering, 2D barcode, QR Code, Datamatrix, standard barcode)
- **Finishing:** Hasl with/without Lead; Enig (Al bondable); Immersion Tin & Silver; ENIPIG (Au bondable); Galvanic hard and soft gold, tin-lead hot oil reflow
- **Heat dissipator:** Aluminum & Copper Heat Sink, printed heat sink with Peters HSP2741 resin
- **Heat dissipation & Power management techniques:** copper inlay and copper coin techniques (Pressfit, Embedded and post bonded)



Symbol	Parameter	Value	Symbol	Parameter	Value
A/B	Min Vias laser	50 µm	J/N	Min. Cu Th.ss in Burried and Through vias	>20 µm
C/D	Min. Anular ring on laser via	>+100 µm	Q	Min. thickness rigid base material	50 µm
E/F	Min. line/space on base Cu9µm–Outer layer	68 µm	Qk	Min. thickness flexible base material	25 µm
G/P	Min. Anular Ring on Burried hole and PTH	>+150 µm	S/T	Min. line/space on base Cu17µm–Inner layer	68 µm
H/O min	Min. Mech. Plated Through Hole à I value	0.1 mm	R	Min. Copper Th.ss Inner layer	12 µm
H max	Max. Plated Through Hole	unlimited	Z	Min. Copper Th.ss Outer layer	9 µm
O max	Max. Plated Burried hole	1.2 mm	V	Dimple in resin filled plated Through hole	<18 µm
I min	Min. core thickness on DS - flex	25 µm	W	Min. prepreg core thickness	50 µm
I max	Max. pcb thickness on ML	5.20 mm	Y	Min. Solder mask Opening on vias	100 µm
L	Max. No. of Layers	40 layers	K	Minimum Solder mask dam	75 µm
LK	Max. No. of Flex Layers	12 layers	X	Min. solder mask clearance	50 µm
M	Min. Cu th.ss in laser/blind vias	> 12 µm	Cu Filling	Prefered Design parameter for Cu filling	W=75µm /B=90µm

Technical capabilities chart						Classification				
Item	Description (all relative measures are expressed in mm)	Standard				Advanced			R&D	
		5	6	7	8	9	10	10		
Track & Gap	min Track to Track (TT)/Track to Pad (TP)/Pad to Pad (PP)/Thermal Line Width (TW)	150	125	100	87	87	75	75	60	50
	min Track Width (MTW) / min Thermal Gap (GAP)				87	75	87	75	60	50
Ring Rigid pcb	min Outer Layer Annular Ring (OAR) on Production Hole Diameter (PHD)	150	125	100	100	100	100	100	87	75
	min Inner Layer Annular Ring (IAR) / Thermal Annular Ring on PHD	175	150	150	125	125	100	87	75	75
Hole Diameter	min Production Hole Diameter (PHD) for thickness 1.6 mm (Others: see table)	400	350	300	250	250	200	150	125	100
	max aspect ratio PTH: see also table (Thickness / PHD)	4	5	6	8	10	11	12	14	16
µvia – Burried via	min blind µvia drill diameter - material with glass				150	125	100	75	50	50
	max blind µvia aspect ratio - material with glass (Thickness / PHD)				0.5	0.6	0.7	0.8	1.0	1.0
	min blind µvia drill diameter - material without glass				125	100	87	75	67	50
	max blind µvia aspect ratio - material without glass (Thickness / PHD)				0.55	0.65	0.75	0.85	1.0	1.0
	µvia top pad annular ring				100	75	60	50	50	50
	µvia landing pad annular ring				100	75	60	50	50	50
	µvia holewall distance to cu				200	175	150	150	140	130
	max number of laser runs/side			1	1	1	2	3	4	4
	max number of burried vias			1	1	2	4	6	8	10
Drill /Cu Distance	PTH to cu on inner layers (means IAR + Value)	+75	+75	+75	+75	+75	+75	+68	+60	+50
	NPTH to cu on inner layers /NPTH Routing always>250 µm (means IAR+Value)	+50	+50	+50	+50	+50	+50	+50	+50	+50
	NPTH to cu on outer layers (NPTH Routing always >200 µm)	250	200	200	200	200	150	125	100	75
Cu Thickness	maximum total cu thickness that can be etched (no minimum)	70	50	40	25	20	20	15	15	12
Solder Mask	solder mask annular ring (MAR) & conductor overlap (MOC): typical	80	75	75	75	60	60	50	40	30
	solder mask annular ring (MAR) & conductor overlap (MOC): exceptional			60	60	50	40	30	25	25
	solder mask min segment (MSM) (If Cistelaier creates SM, MSM >= 100)	125	110	100	100	90	90	80	70	60
Build up	max pcb thickness (mm)						>3.2	>3.2	5.00	5.20
	min pcb thickness tollerance (%)	10	10	10	10	10	8	7.5	5	5
	max nr. Layers (for the Flex layer add 1unit in complexity)	12	16	18	20	22	24	26	32	40
Ring ML Flex & Flex-Rigid Flex layers (for rest = 0) should be 100 µm bigger then on rigid boards;										



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