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
- Medical devices: ISO 13485

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.


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.

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 RO3035 (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**

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**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

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**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

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**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
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 μm of copper on top layer
Material: FR4 High TG, copper foil 500 μm 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, length 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 embeded 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 avionic/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 : tipically 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 & R04003 (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
- **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 40 μm
- **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)

### Table: Symbol Parameter Value

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

Cu Filling Prefered Design parameter for Cu filling W=75μm /B=90μm
# Technical capabilities chart

## Classification

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Standard</th>
<th>Advanced</th>
<th>R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track &amp; Gap</td>
<td>min Track to Track (TT)/ Track to Pad (TP)/ Pad to Pad (PP)/ Thermal Line Width (TW)</td>
<td>150</td>
<td>125</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>min Track Width (MTW) / min Thermal Gap (GAP)</td>
<td>87</td>
<td>75</td>
<td>87</td>
</tr>
<tr>
<td>Ring Rigid pcb</td>
<td>min Outer Layer Annular Ring (OAR) on Production Hole Diameter (PHD)</td>
<td>150</td>
<td>125</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>min Inner Layer Annular Ring (IAR) / Thermal Annular Ring on PHD</td>
<td>175</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Hole Diameter</td>
<td>min Production Hole Diameter (PHD) for thickness 1.6 mm (Others: see table)</td>
<td>400</td>
<td>350</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>max aspect ratio PTH: see also table (Thickness / PHD)</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>μvia – Burried via</td>
<td>min blind μvia drill diameter - material with glass</td>
<td>150</td>
<td>125</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>max blind μvia aspect ratio - material with glass (Thickness / PHD)</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>min blind μvia drill diameter - material without glass</td>
<td>125</td>
<td>100</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>max blind μvia aspect ratio - material without glass (Thickness / PHD)</td>
<td>0.55</td>
<td>0.65</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>μvia top pad annular ring</td>
<td>100</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>μvia landing pad annular ring</td>
<td>100</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>μvia holewall distance to cu</td>
<td>200</td>
<td>175</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>max number of laser runs/side</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>max number of burried vias</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Drill /Cu Distance</td>
<td>PTH to cu on inner layers (means IAR + Value)</td>
<td>+75</td>
<td>+75</td>
<td>+75</td>
</tr>
<tr>
<td></td>
<td>NPTH to cu on inner layers / NPTH Routing always &gt; 250 μm (means IAR+Value)</td>
<td>+50</td>
<td>+50</td>
<td>+50</td>
</tr>
<tr>
<td></td>
<td>NPTH to cu on outer layers ( NPTH Routing always &gt; 200 μm)</td>
<td>250</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Cu Thickness</td>
<td>maximum total cu thickness that can be etched (no minimum)</td>
<td>70</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Solder Mask</td>
<td>solder mask annular ring (MAR) &amp; conductor overlap (MOC): typical</td>
<td>80</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>solder mask annular ring (MAR) &amp; conductor overlap (MOC): exceptional</td>
<td>60</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>solder mask min segment (MSM) (If Cistelaier creates SM, MSM &gt;= 100)</td>
<td>125</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>Build up</td>
<td>max pcb thickness (mm)</td>
<td>&gt;3.2</td>
<td>&gt;3.2</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>min pcb thickness tollerance (%)</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>max nr. Layers (for the Flex layer add 1 unit in complexity)</td>
<td>12</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

*Ring ML Flex & Flex-Rigid Flex layers (for rest = 0) should be 100 μm bigger then on rigid boards;*