YOUR BUSINESS
OUR KNOW-HOW
Our vision, our mission

Vision

Our vision is to become leading manufacturers offering a “Global Distribution” in order to support consumers on the European continent.

Mission

Our mission is to continue to develop capabilities and know-how to guarantee with our own plants in Europe a complete offer for any kind of PCB – high-tech products included – in small and medium quantities with fast delivery.

And to complete our offer for high quantities through sourcing-partnerships with highly-qualified Asian manufacturers.
The projects of our customers, our PCBs

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

The solution provider's vocation coupled with Cistelaier's and Techci's long-standing skills to support their partner 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 method to work perfectly supports our fast delivery (QTA) prototyping service and ensures quality and service levels in all market segments in which we are present.

The PCB Division puts great emphasis on analyzing the market's technological needs and on R & D activities. This approach allows to anticipate the needs of our Customers and to be ready to offer today technological solutions products for tomorrow's products.
The Quality Management System of the two manufacturing companies of the PCB Division - Cistelaier and Techci - has been organised and applied according to ISO 9001 norm since nearly 20 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 9100:2009 and NADCAP
- Medical devices: ISO 13485:2003
- Railway sector: IRIS.

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

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

- Machineries and equipments with state of the art technology and suitable for QTA management
- Highly skilled people in PCB manufacturing and Production and Quality methods
- Production managed according to Lean principles enable Cistelair and Techci to fulfill the needs of their Partners in terms of Technology, Quality and Service

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

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

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

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.

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.

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.

Laboratory Process Control and Product certification with cross section report, Automatic mechanical check and impedance control.
Rigid / Rigid - HDI
RF - Microwave

**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

**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
**Technology:** Multilayer 10 layer SBU with 3+N+3 with Laser vias  
**Material:** Low DK & DF material Isola Fr408HR High  
**Finishing:** Enig

**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

**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
Flex / Rigid-flex
Rigid Flex HDI

Technology: Multilayer 12L HDI
2+8+2 with laser via
Material: Polyimide Ventec Vt901+
Adhesive Less Kapton®
Finishing: Enig and strain relief
(eccobond) application on the transition area

Technology: Multilayer 6 Layer HDI
2+2+2 with laser via
Build up: asymmetrical Kapton® position
Material: FR4 High TG Iteq IT180 +
Adhesive Less Kapton®
Finishing: immersion tin and partial coverlay on outer layer
**Technology:** Multilayer 9 layer with buried, blind Vias and impedance control

**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 Kapton®

**Finishing:** Enig on outer layer and internal layer

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**Technology:** Multilayer 16layer with 6 flex layer

**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 Kapton®

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

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**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 Kapton®

**Finishing:** Enig and matt solder mask
Special / IMS / Led

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 aluminium or copper
Mechanical: Routed, V-scored and punched
Finishing: Enig, Enepig, Hasl and OSP

Technology: Multilayer 24 layer blind vias filled and capped
Build up: mixed build up-, 17 μm and 105 μm for power management
Material: FR4 High TG with filler Iteq IT180
Finishing: Green solder mask and Enig
**Technology:** Multilayer M8–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 IT180  
**Finishing:** Enig

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**Technology:** Multilayer SBU with 5+N+5 with Cu filled vias  
**Material:** Polyamide + CopperInvarCopper  
**Finishing:** Enig + cavity with Electrolytic Nickel

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**Technology:** Multilayer 8 layer with embedded copper coin  
**Build up:** via filled and capped, back drilling  
**Material:** Fr 4 High Tg Iteq IT180 and Rogers Ro4350  
**Finishing:** Enig + Electrolytic soft gold
The PCB Division completes its offer with standard technology products for any kind of volumes and service, 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 epoxy for Lead-free process - Halogen Free: Iteq IT40G -Tg 140 °C (also Noflow Prepreg), IT150G (also Noflow Prepreg);
- 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 IT170GRA & IT170G
- High speed application: Nelco N4000-13(Si) & N4800-20(Si); Isola Fr408HR, IS600(series), Astra and I-Tera; Iteq IT200DK and IT150DA(SE); Panasonic Megtron6

High-performance materials for avionic/military application:

- Polyimide Resin System: Arlon 33N, 35N, 85N; 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®: ARLON® 55NT/85NT
- Copper/Invar/Copper : tipically 150 μm thick - 17/120/17 μm)
- Thick copper: up to 500 microns, for BusBar application also

Substrates for flexible circuits:

- Flexible Laminates-Kapton® based: DuPont PYRALUX LF; PYRALUX FR; PYRALUX AP & AP-Plus (Adhesiveless)
- Flexible Laminates-Polyimide based: UBE Upilex (Adhesiveless); Iteq (Adhesiveless)
- 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 ; R03000 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)
- 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**: 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 after DFM evaluation
- **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 Kapton® thickness**: (Adhesive less): 50 μm, 25 μm special requirement
- **Maximum PCB thickness**: 5.5 mm
- **Maximum PCB dimensions**: Standard: 464 x 566 mm
- **Advance**: 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 100μm 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
- **Finishing**: Hasl with/without Lead; Enig (Al bondable); Immersion Tin & Silver; ENIPIG (Au bondable); Galvanic hard and soft gold
- **Heat dissipation techniques**: Aluminum & Copper Heat Sink, printed heat sink with Peters HSP2741 resin and copper coin techniques (Pressfit, Embedded and post bonded)

<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>
</tbody>
</table>

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

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