EN

Finmasi Group PCB Division

CISTELAIER
Italian PCB Manufacturer

TECHCI RHÔNE-ALPES
French PCB Manufacturer

EPN ELECTROPRINT
German PCB Manufacturer

# PCBs ARE ALL AROUND YOU

# European PCB manufacturers

Cistelaier S.p.A. in Italy, Techci Rhône-Alpes SA in France and EPN Electroprint GmbH in Germany are the three companies of the Finmasi Group's PCB Division. Together, they have over 100 years of experience in the field of printed circuit board production.

The PCB Division is an authoritative reference point in Europe for experience, technological know-how, comprehensive skill portfolio and production capacity.

ENDLESS APPLICATIONS

CONSTANTLY EVOLVING R&D

NO PRODUCTION LIMITS

EXPANDING POTENTIAL

# A single point of contact with all the answers

Being able to rely on the production capacity and synergies of three European companies, having the most advanced technologies at its disposal and having cross-industry knowledge in every market sector, makes the Finmasi Group's PCB Division the ideal partner for the production of printed circuit boards of all types and for every application.

CISTELAIER
Italian PCB Manufacturer

TECHCI RHÔNE-ALPES
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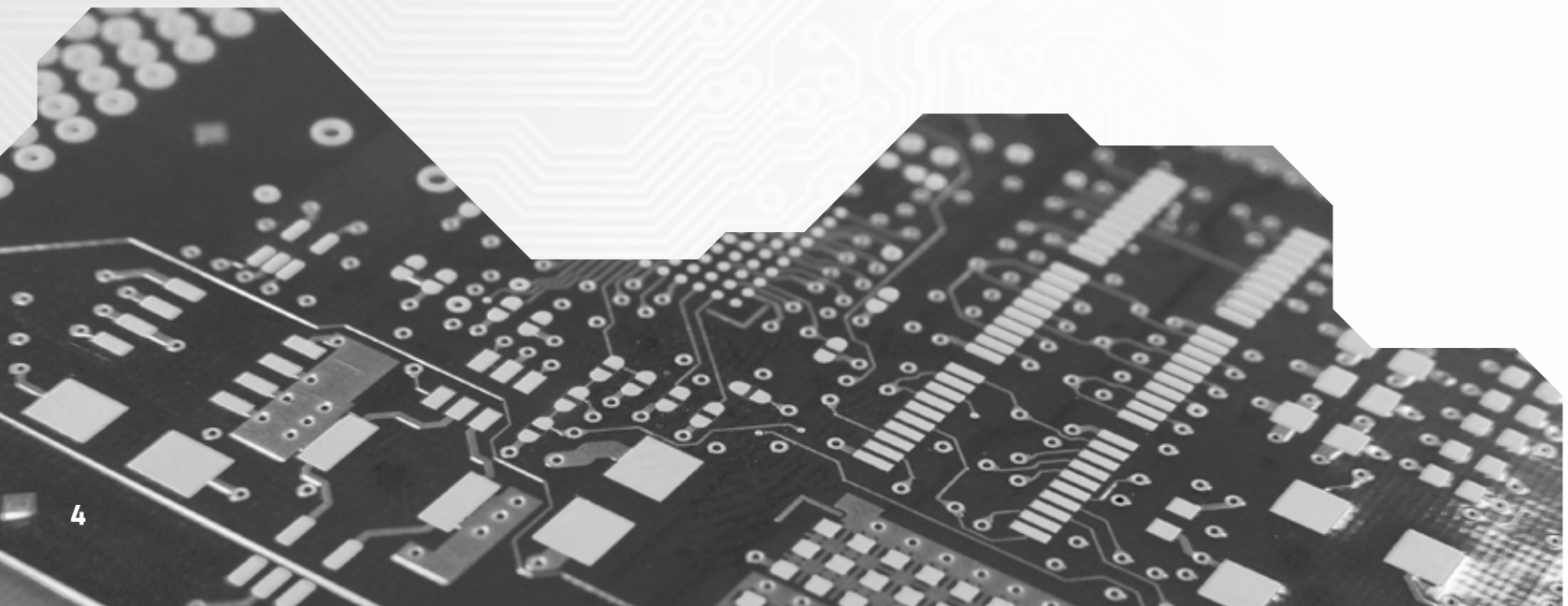


## VISION

To be leading manufacturers able to offer a global service to consumers in the European and neighbouring markets.

## MISSION

To continue investing in our European plants and develop know-how in order to offer our partners the widest range of printed circuit boards together with support for sampling prior to their serial production. To meet special needs in terms of quantity and economic competitiveness.

## BUSINESS MODEL

Building solid partnerships as a prerequisite for the development and continuity of the relationship.

# A qualified partner

**The PCB Division's experience is qualified by the numerous certifications it has achieved, making it a global player in the PCB production sector.**

Industrial
**ISO 9001**

Military Avionics
**EN 9100**

Space
esa

Civil Avionics
**NADCAP**

Automotive
**IATF**

Medical Devices
**ISO 13485**

Environment
**ISO 14001**

Energy
**ISO 50001**

Thanks to the know-how and accreditations obtained, as well as the flexibility of the service they provide, Cistelaier, Techci and EPN have become technology partners for customers operating in the most important market sectors.

Each product is manufactured according to international standards and, on request, in accordance with any different specifications provided by the customer.

- IPC-A-600, class 2, 3 also related to sector addenda
- IPC 6012 (Rigid and HDI), IPC 6013 (Flex and Rigid-Flex), IPC 6017 (Embedded) and IPC 6018 (Microwave) also related to sector addenda
- MIL-P-55110 (Rigid) and MIL-P-50884 (Rigid-Flex)
- ESA-ECSS-Q-ST-70-60C

Cistelaier, Techci and EPN are also IPC Members. Our Qualified IPC Trainers constantly strive to keep already qualified staff up-to-date and to qualify new IPC Specialists.

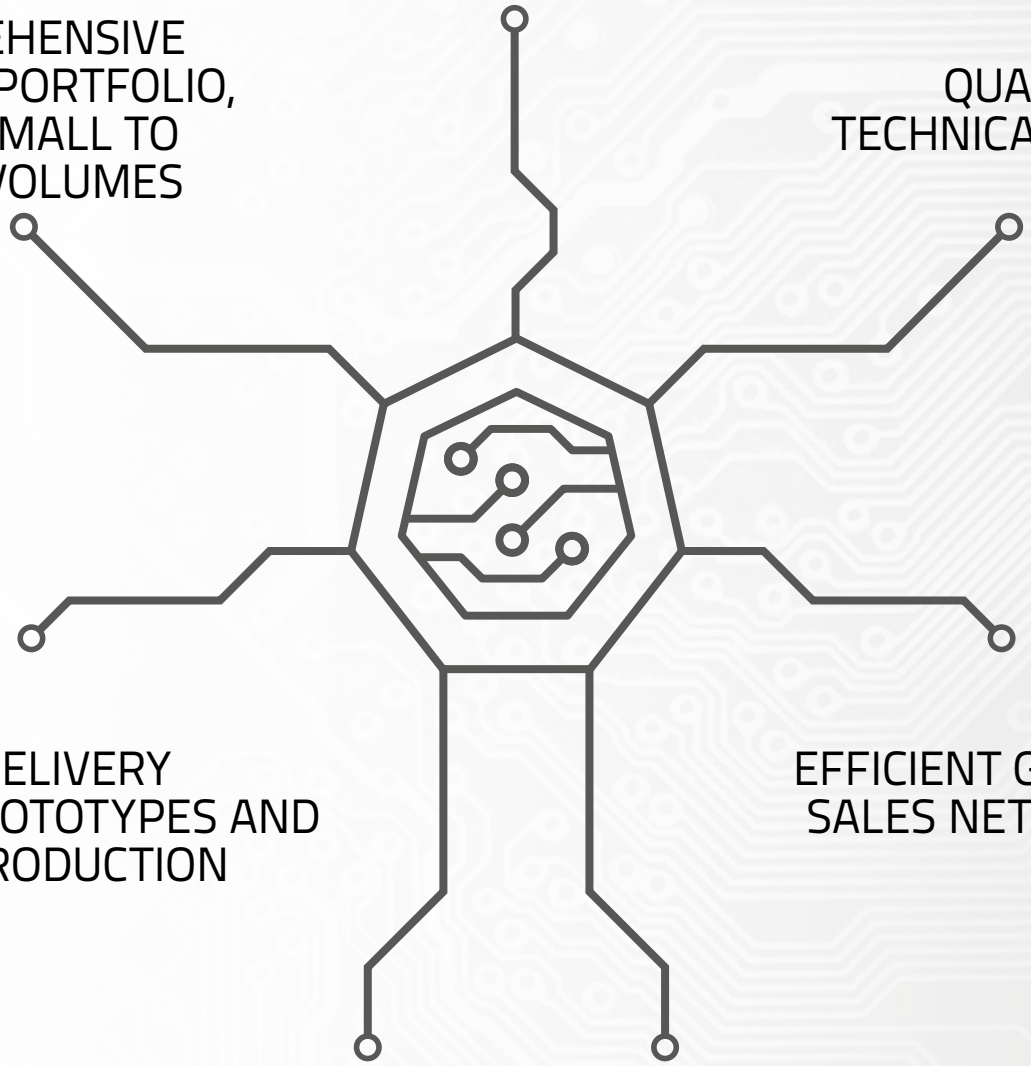
IPC

**IPC member**

INCREASED GUARANTEES BY THE SYNERGY BETWEEN THE COMPANIES OF THE PCB DIVISION

COMPREHENSIVE PRODUCT PORTFOLIO, FROM SMALL TO LARGE VOLUMES

QUALIFIED TECHNICAL SUPPORT



FAST DELIVERY FOR BOTH, PROTOTYPES AND SERIES PRODUCTION

EFFICIENT GLOBAL SALES NETWORK

STRONG ORIENTATION TOWARDS ETHICAL AND SUSTAINABLE PRODUCTION

INTEGRATION IN SOFTWARE AND CYBERSECURITY

# CISTELAIER

Italian PCB Manufacturer

**Cistelaier was founded in 1998 as the result of the merger of two Italian companies that were pioneers in the production of printed circuit boards: Cistel of Genoa established in 1976 and Laier established in Modena in 1986. For more than 40 years we have been servicing customers from all sectors.**

We produce, with over 100 different base materials, double-sided, multilayer, flexible, rigid and rigid-flexible, HDI circuits, circuits for power, radio frequency and microwave applications, IMS circuits and circuits for special applications.

We have unique skills in the production of printed circuit boards for the space sector that make us a strategic partner for the Italian and European Space Community.

We have had an Integrated Quality Management System in place since 2010, which now incorporates a wide range of certifications and accreditations. We adopt a Management System pursuant to Legislative Decree 231 and an Environmental Management System according to ISO 14001 for the main production unit.

Industrial
**ISO 9001**

Military Avionics
**UNI EN 9100**

Space
esa

Automotive
**IATF**

Medical Devices
**ISO 13485**

Environment
**ISO 14001**

BRONZE | Top 35%
ecovadis
Sustainability Rating
DEC 2024

IPC Member
**IPC member**

We have achieved UL94-V-0 certification with subsequent UL796 DSR extension for the flammability standard for plastics and UL certification with V-0 classification also for rigid-flexible products.

OVER 100 BASE MATERIALS

RIGID-FLEX BOARDS

HDI BOARDS

PROTOTYPING SERVICE

MULTILAYER BOARDS

## REFERENCE STANDARDS

IPC-A-600 (CLASS 2, 3) ALSO RELATED TO SECTOR ADDENDA
IPC 6012 (RIGID AND HDI), IPC 6013 (FLEX AND RIGID- FLEX), IPC 6017 (EMBEDDED)
AND IPC 6018 (MICROWAVE) ALSO RELATED TO SECTOR ADDENDA
MIL-P-55110 (RIGID) AND MIL-P-50884 (RIGID-FLEX)
ESA-ECSS-Q-ST-70-60C

NO MINIMUM BATCH SIZE

# TECHCI RHÔNE-ALPES

French PCB Manufacturer

**Techci Rhône-Alpes, founded in 1983, is based in Saint Genix Sur Guiers, France. It produces for numerous sectors and, in particular, is qualified and recognised for its expertise in the Civil Avionics, Defence and Railway sectors.**

Techci was acquired by the Finmasi Group in 2011 and was subsequently integrated into the PCB Division which, since then, has constantly promoted its development and growth through the implementation of an intensive investment plan. In our factory we produce double-sided, multilayer, flexible, rigid and rigid-flex HDI circuits, circuits for power and radio frequency applications and IMS circuits.

We were included by the French government in the framework of the Resilience Plan, a strategic programme in favour of French national independence in the defence sector.

We adopt a Quality Management System that incorporates the ISO 9001 and UNI EN 9100 schemes.
We also boast NADCAP accreditation, which is essential to produce for the civil avionics sector.

Industrial
**ISO 9001**

Military Avionics
**EN 9100**

Civil Avionics
**NADCAP**

IPC Member

**IPC member**

The company's Quality Management System is complemented by the achievement of the certification of compliance with flammability standards for both rigid and rigid-flexible printed circuit boards.

MULTILAYER BOARDS

HDI BOARDS

RIGID-FLEX BOARDS

PROTOTYPING SERVICE

NO MINIMUM BATCH SIZE

## REFERENCE STANDARDS

IPC-A-600 (CLASS 2, 3)

IPC 6012 (RIGID AND HDI), IPC 6013 (FLEX AND RIGID- FLEX), IPC 6017 (EMBEDDED) AND IPC 6018 (MICROWAVE)

MIL-P-55110 (RIGID) AND MIL-P-50884 (RIGID-FLEX)

# EPN ELECTROPRINT

German PCB Manufacturer

**EPN Electroprint, founded in 1990 in Neustadt an der Orla, Germany, was acquired in 2019 by the Finmasi Group, which has since promoted its technological and capacity development. EPN is the PCB Division's presidium on the German market.**

Specialising in the manufacture of standard technology printed circuit boards, we are structured and organised to produce single-sided, double-sided, rigid multilayer, power and IMS printed circuit boards at the most competitive conditions.

EPN Electroprint adopts a Quality Management System certified according to the ISO 9001 standard and follows the ISO 26000 guidelines. The company has been certified ISO 14001 for its Environmental Management System and ISO 50001 for its Energy Management System. These two additional ISO standards have been integrated into the company's Quality System.

Industrial
**ISO 9001**

Environment
**ISO 14001**

Energy
**ISO 50001**

**IPC member**

The company has also achieved UL94-V-0 certification and, subsequently, the UL796 DSR extension for the flammability standard for plastics

SINGLE-SIDED
BOARDS

DOUBLE-SIDED
BOARDS

MULTILAYER BOARDS

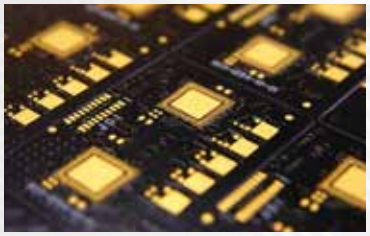
PROTOTYPING
SERVICE

REFERENCE STANDARDS
IPC-A-600 (CLASS 2), IPC 6012 (RIGID)

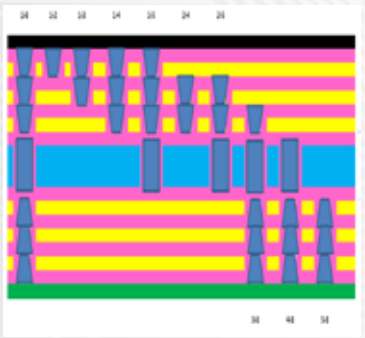
NO MINIMUM
BATCH SIZE

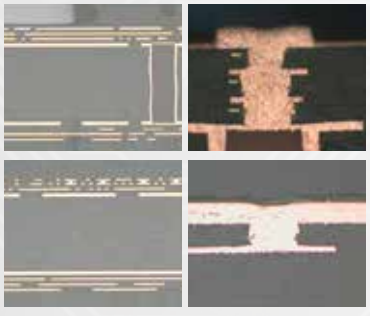
# Case histories

## Rigid / Rigid HDI
## RF - Microwave

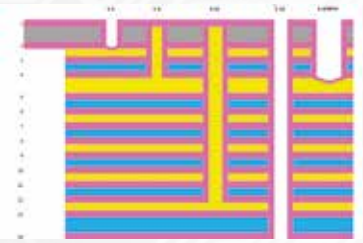


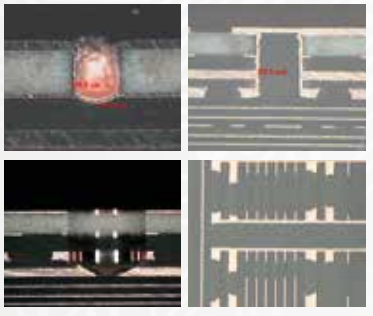
**Video Wall-Infotainment**
**Technology:** Multilayer SBU with 3+N+3 with Cu filled stacked vias burried filled & Capped vias
**Material:** FR4 High Tg with filler Iteq IT180A
**Finishing:** Black solder mask and Enepig

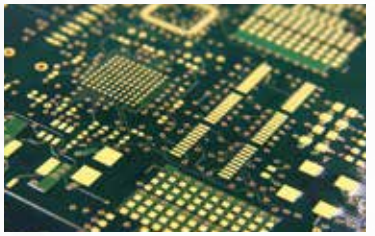




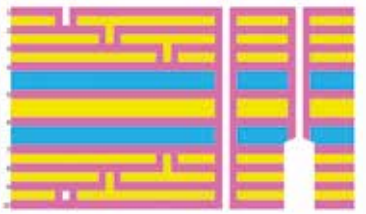
**Military radar**
**Technology:** Multilayer 14 layers mixed layup
**Material:** FR4 High Tg Iteq IT180 + Rogers RO3035 (Taconic RF35A2)
**Via sequence:** L1-L2, L1-L4, L1-L12, L1-L14 and cavity L2-L14
**Finishing:** Enig + Bondable 3 um plated gold

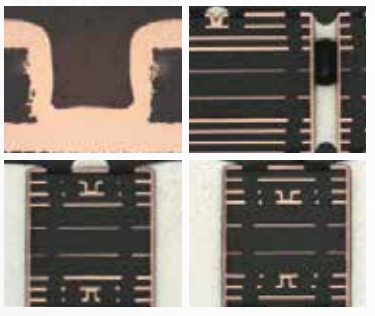




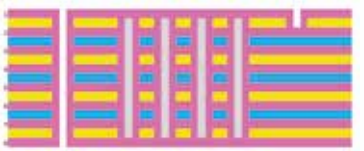


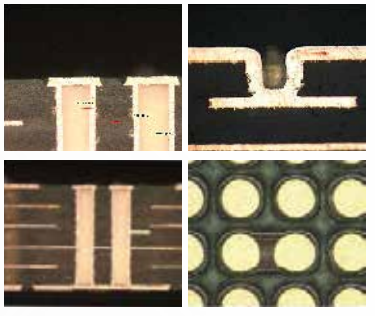
**Renewable Energy**
**Technology:** Multilayer 10 layers SBU with 3+N+3 with Laser vias
**Material:** Low DK & DF material Isola Fr408HR High
**Finishing:** Enig



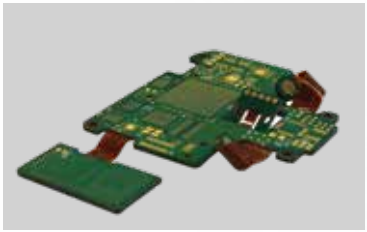


**Medical**
**Technology:** Multilayer 6 layers with laser via and UBGA pitch 0.4 mm via in pad resin filled
**Material:** FR4 High Tg with filler Nelco N4000-29
**Finishing:** Blue solder mask and Enig

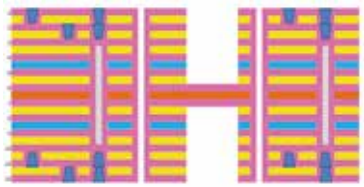


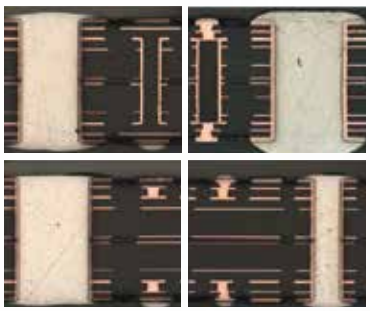


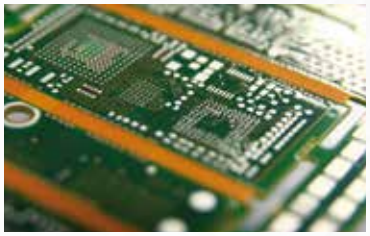
# Flex / Rigid-flex
# Rigid-flex HDI



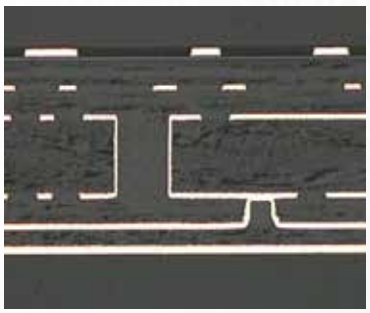
**Military – Wearable Device**
**Technology:** Multilayer 12L HDI 2+8+2 with laser via
**Material:** Polyimide Ventec Vt901+ Adhesive Less Polyimide film
**Finishing:** Enig and strain relief (EcoBond) application on the transition area



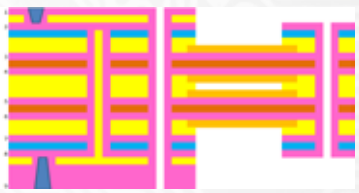


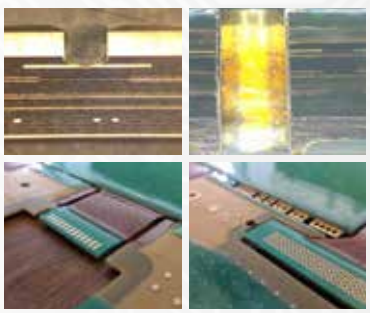


**Industrial Automation**
**Technology:** Multilayer 6 layers HDI 2+2+2 with laser via
**Build up:** asymmetrical Kapton® position
**Material:** FR4 High Tg Iteq IT180 + Adhesive Less Polyimide film
**Finishing:** immersion tin and partial coverlay on outer layer

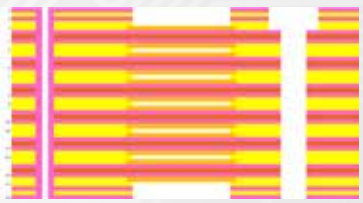


**Military Sea & Groud Radar**
**Technology:** Multilayer 9 layers with buried, blind Vias and impedance control, lenght 855 mm
**Build up:** buried terminals inside, two flex layer and bus bar with 500 µm of copper on top layer
**Material:** FR4 High Tg, copper foil 500 µm and Adhesive Less Polyimide film
**Finishing:** Enig on outer layer and internal layer



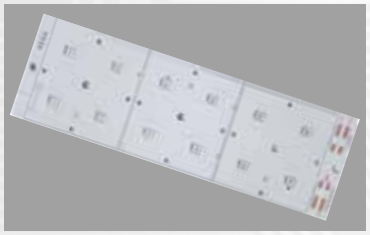


**Military - Pointing System**
**Technology:** Multilayer 16 layers with 6 flex layer for dynamic application
**Build up:** cavity from top side to layer 3 on flex for opening on wire bondable pads
**Material:** FR4 High Tg Iteq IT180 + Adhesive Less Polyimide film
**Finishing:** electrolytic Soft Gold inside cavity on flex + Enig and electrolytic hard gold on surface

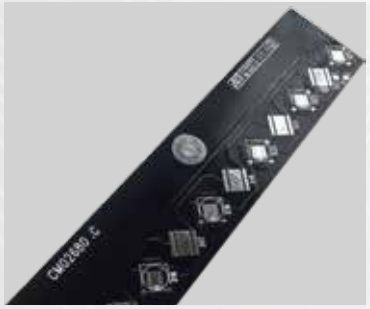


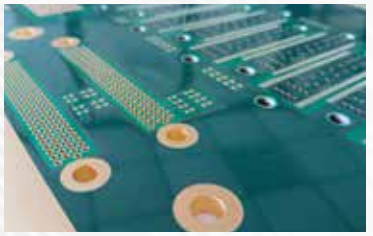
# Case histories

## Special / IMS / LED

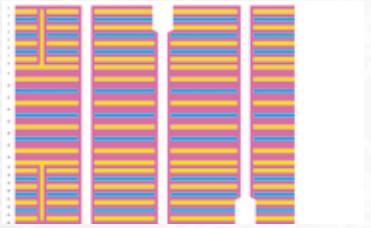


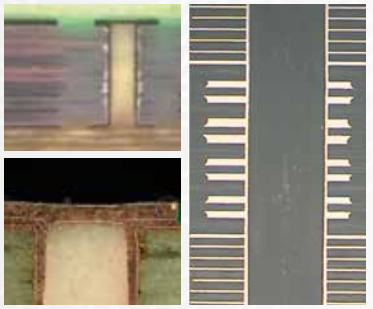
**Led Lightning and power Management**
**Technology:** IMS printed circuit board long up to 1.5 mt in SS, DS and Multilayer
**Material:** low, medium and high thermal dissipation capacity on aluminum or copper
**Mechanical:** Routed, V-scored and punched
**Finishing:** Enig, Enepig, Hasl and OSP

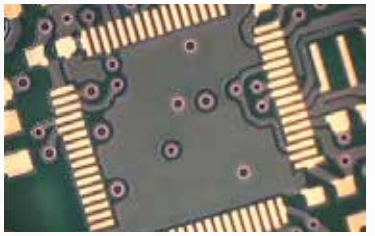




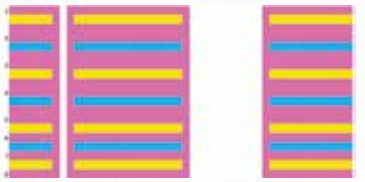
**Military Avionic Radar**
**Technology:** Multilayer 24 layers blind vias filled and capped, lenght 640 mm with 4.20 mm thickness
**Build up:** mixed build up, 17 µm and 105 µm for power management
**Material:** FR4 High TG with filler Iteq IT180A
**Finishing:** Green solder mask and Enig

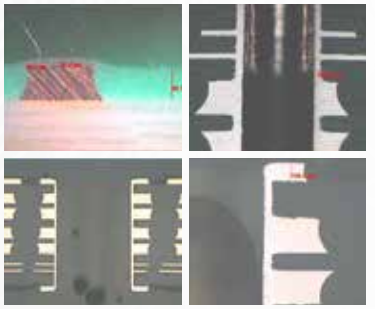


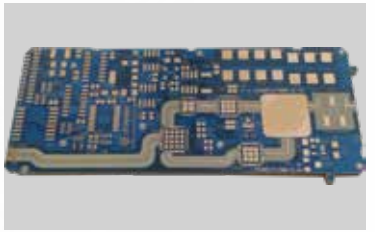




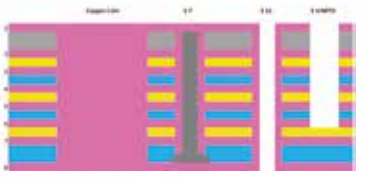
**Automotive hybrid car**
**Technology:** Multilayer MI8–Logic and power on same PCB with fine pitch
**Layup:** Mixed copper thickness 210 µm, 35 µm in the innerlayer and 105 µm on outer layer
**Material:** Fr4 High Tg with filler Iteq IT180A
**Finishing:** Enig

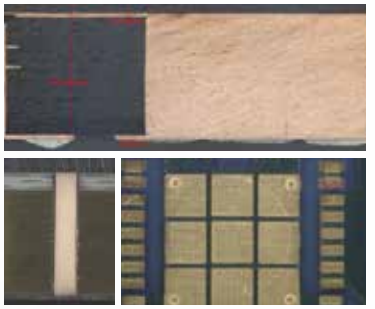






**Military Sea & Ground Radar**
**Technology:** Multilayer 8 layers with embeded copper coin
**Build up:** backdrilled vias filled and capped
**Material:** Fr 4 High Tg Iteq IT180 and Rogers Ro4350
**Finishing:** Enig + Electrolytic soft gold





# Base materials

## 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), I-Tera, Tachyon and Astra; Iteq IT200DK and IT150DA(SE), IT-968 (SE), IT-968G, 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: Iteq 25-50-75-100 µm; Panasonic 25-50-75-100-125-150 µm; ThinFlex 25-50-75-100-125-150 µm; UBE Upilex 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), RO4360G2 and RO4400 bondply
- Iteq "new generation" material for RF and Microvawe applications IT-88GMW, IT-8300GA, IT-8338G, IT-8338A, IT-8350G, IT-8350A, IT-8615G with Dk from 3,00 up to 6,15 (6,05)
- Isola: IS600(Series), Astra MT77, Tachyon, I-tera and TerraGreen
- 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 20 µm and solder mask land definition
- **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)

| Technical capabilities chart | | Classification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Item | Description (all relative measures are expressed in µm) | 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;

**Finmasi Group PCB Division**

CISTELAIER
Italian PCB Manufacturer

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