

WHY INKTEC

InkTec provides customized printing services for customers' products using our superior printing facilities and our own electronic inks.

Advantages of InkTec Printing Service

- Mass production available
- Less cost than etching
- Fast production - Very short lead time
- Various substrates - Paper, PET, PI and so on

Printing facilities (2nd Factory in Pyungtaek)

InkTec has completed the 2nd Factory to respond quickly to the demands of our customers. Our 2nd production line is optimized for mass production in fastest time. For maximizing customer satisfaction, we have adopted various roll to roll printing facilities & intelligent environmental system.

Owing to the latest facilities, InkTec can meet customer's order in shorter lead time with much better quality than other printable electronic material manufacturers.



Intelligent Building Management System

- ISO 9001 & 14001 compliant facilities and processes
- All Printing Facilities in clean room

Ink Production, Printing Facilities (3 lines) and QM.

- Direct Gravure, Micro Gravure, Rotary Screen with inline inspection and alignment equipment
- Rotary Screen Plating Facility
- Laminating and Slitting Facilities

InkTec meets customer's order in shorter lead time with much better quality than other printable electronic material manufacturers by using our newest facilities.

Mass Production Line (2nd Factory)

| Spec | Mass Production Line | | |
|---|--|---|--|
| | Line1 | Line2 | Line3 |
| Max width of printing | 350mm | 1600mm | 1600mm |
| Annual production capacity (Working for 24 hours/ day) | 8,700,000m ² | 10,000,000m ² | 10,000,000m ² |
| Length of drying machine | 12m | 25m | 25m |
| Available printing | Direct Gravure Micro Gravure Rotary Screen 'S'-knife Coating(Comma) | Micro Gravure 'S'-knife Coating(Comma) | Direct Gravure Micro Gravure Rotary Screen |

Image of our facilities



Production Line 1



Production Line 2



Production Line 2, 3



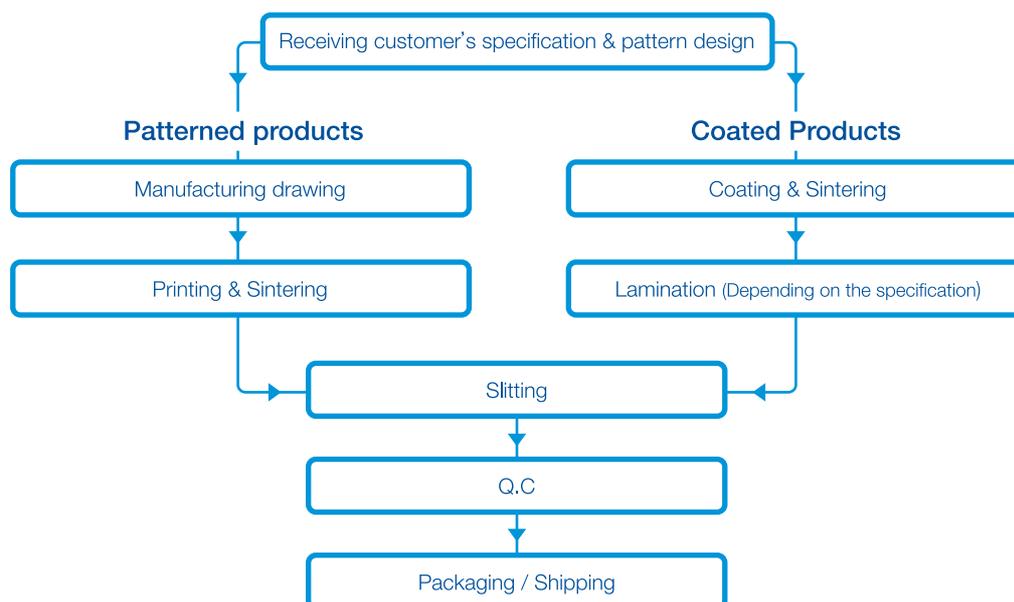
Slitter



Clean room facilitated entrance

※ All production lines are controlled under the clean room condition

Production Flow

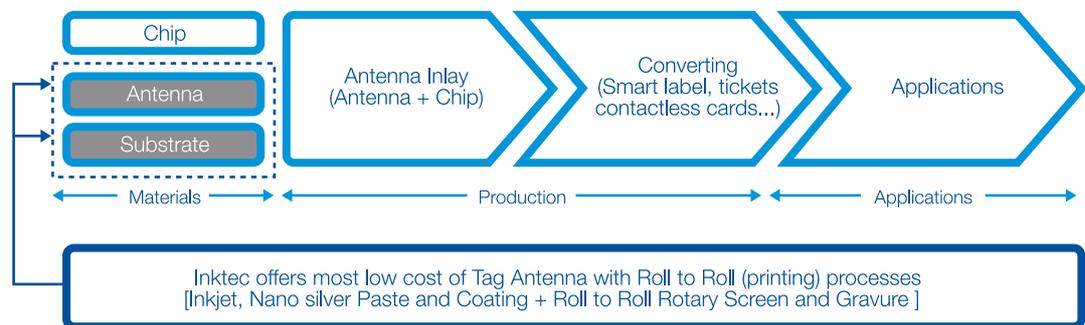


PATTERN PRODUCTS -ANTENNA

By the increasing market needs for Printed Electronics, the demands of customer are varying. Using our genuine electronic inks and superior printing line, we can materialize fine pattern & thin layer in mass production line. So, we are able to provide various printed electronic materials by matching our inks with facilities according to the specifications required by customers.

RFID Tag Antenna

RFIDs have already formed vast market and the related industries require mass production and qualified antenna for their commercialization of RFID. To this end, InkTec has developed the RFID TAG Antenna printing method and provides the best solution for RFID by considering the stability of quality and mass production.



Advantages of the InkTec RFID Tag Antenna

- **Less cost than etching** : Uniform thin layer (under 1 micron) on substrates & Minimum loss of raw material in production. (It is sometimes needed to modify pattern drawing to maximize cost saving effect.)
- **Applicable to various substrates** : Ink sintering in low temperature (under 130°C)
- **Fast production(Very short lead time)** : Simple process (Printing → Sintering)
- **Environment-friendly production** : Applicable to papers

Providing all specifications of RFID tag Antenna required by customers

: Possible to draw patterns & match inks with printing method according to customer's demands

Comparative Advantage of InkTec's RFID TAG Antenna

| | Roll to Roll Printing (InkTec) | Etched Tag | Aluminum Punched Tag |
|---------------------------------|---|---------------------------|----------------------|
| Price | Low | High | Low |
| Lead Time | Very Short | Not short | Not short |
| Substrate | PET, PI, Paper and so on | PET, PI | PET, PI |
| Resolution | Good | Very good | Not good |
| Environment-Friendly Production | Environmental friendly without wasted water | Generate much waste water | Environment-friendly |

Classified by Printing Method

| | Gravure printing | Rotary Screen printing | Printing + Plating |
|-------------------|---|--|---|
| Image |  |  |  |
| Material | Silver(Ag) | Silver (Ag) | Silver printing + Additional plating processing of Cu, Ni, and Au |
| Layer Thickness | Less than 1.0 μ m | Less than 2.0 μ m | Changeable according to customer's request |
| Resolution | 100~150 μ m | 100~200 μ m | Printed Tag's + α |
| Application Range | UHF | HF, UHF | HF, UHF, MF |

RF Loop Antenna



Mobile Communications & Internet are among the most high-growth industries in these days. In less than five years, the number of Internet users has grown from 16 million to over 190 million. With more than 500 million of worldwide mobile users today (predicted to reach 1 billion users by 2010), it is evident that wireless will become the predominant means of access to global telecommunications in the years to come.

A novel printed multi-turn loop antenna for contact-less RF system is one of the representative items by printed process. Using InkTec's R2R printing facilities, we can offer more competitive prices than etched process.

- Printed loop antenna for RF payable system
- M-commerce by Mobile, PDA at Subway, Bus, ATM, Bending Machine etc.
- **Structures : 3 Layers (Loop pattern + Insulator + Jumper pattern)**

※With R2R printing facilities, plating pattern after printing conductive ink as a seed layer.

InkTec provides various printed electronic materials by matching our inks with facilities according to the specifications required by customers.

PATTERN PRODUCTS- FLEXIBLE PATTERN APPLICATIONS

In accordance with the trend that the printable electronics & displays (PED) are on the stage, most people are concerned with and wondering when PED can be used in existing processes.

Besides negative aspects, however, PED continuously upgrades both facilities and materials and InkTec also actively seek for our role in PED industry on the basis of the continuous innovation and improvement of our technology.

Thin layer and cost saving is the main strength of InkTec. If you want to be a winner in the unlimited competition, InkTec is the right answer.

- Simplify printing process, Thin and Flexible with InkTec's novel conductive inks
- Competitive prices with R2R printing
- Various Plating silver seed layer available (Cu, Ni, Au etc.)
- Possible to expand application levels for multi-layer

Applicable items

>> FPCB (Flexible Printed Circuit Board)

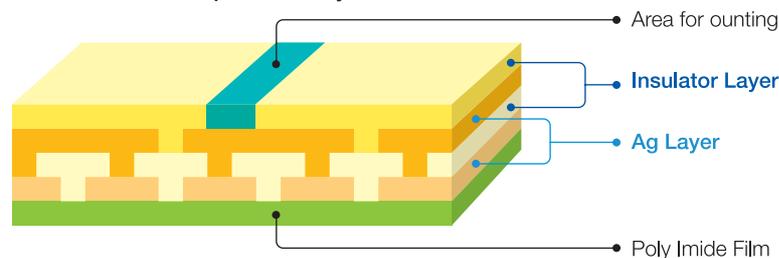
Many of electronic manufacturers have recognized that cost saving and design differentiation are the key ways to survive in the era of unlimited competition. FPCB market is also growing continuously with the growth of the electronics industry since thin and functional FPCB can play a major role in cost saving and design differentiation.

As we have mentioned before, thin layer and cost saving is the main strength of InkTec. We can provide thinner and more cost effective FPCB using our superior printing process with novel inks instead of generally used etching process.

Others >> Etching Process : Film → Dry film laminating → Exposure → Development → Etching → Clearance

InkTec >> Printing Process : (Printing → Sintering) → Repeat

※ Printed FPC Example : Multi-layer FPC



>> FCCL (Flexible Copper Clad Laminate)

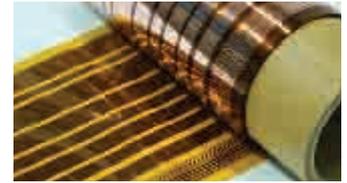
InkTec has been interested in research and development of FCCL, a main material for the Flexible Printed Circuit Board, using printing method. We make the maximum use of our printing facilities and strengths for printing thin conductive layer as the seed layer for plating.



*Thin layer and cost saving are the main strengths of InkTec.
We can provide thinner and more cost effective products. If you want to be a winner in this era of unlimited competition, InkTec is the right answer.*

**>> FFC
(Flexible Flat Cable)**

Laminated FFC is applied to loop applications for automotive, telecommunications, military, medical, consumer electronics and other industry sectors. Instead of laminating copper rolling material on the dielectric polyester film, R2R printing method is used for specific pattern printing, and then plating pattern after printing conductive ink as a seed layer. According to the requests, substrates can be selected from, for example, PET, PEN and Polyimide film.

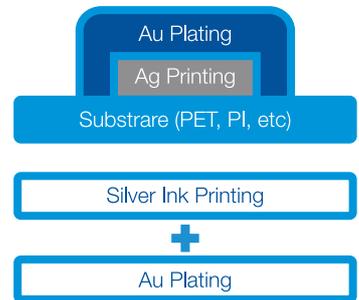


**>> COF
(Chip On Film)**

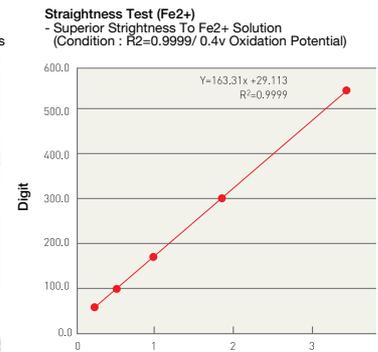
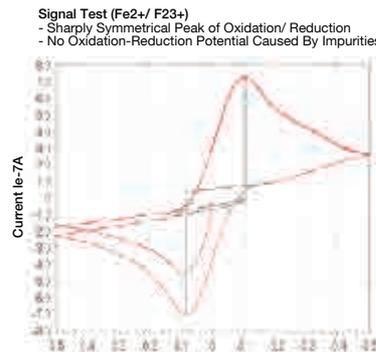
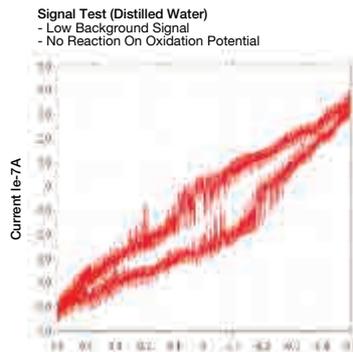
Initials of Chip On Film, one of tape carrier packages and one of the methods to connect LSI Chips with PCB ; the new packaging technology substituting TAB can be thinner, lighter, shorter, smaller, and have high performance. Its advantages are excellent fine pitch ($\leq 40\mu\text{m}$), flexibility, and reliability. When printing machine can materialize fine pitch, it will be easily applied to replace etching process and increase the selectivity for various substances by printing process and InkTec's conductive inks with low sintering temperature.

**Bio Sensor -
Blood Glucose Test Strip**

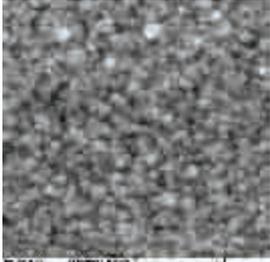
InkTec also developed a new application for biosensor industry with state-of-the-art Roll to Roll printing lines. As the first step to enter biosensor industry, InkTec is now cooperating with blood glucose sensor manufacturers. Thanks to its unique and advanced non-particle based transparent silver inks, InkTec's printed blood glucose strip has even finer patterning and also better performance in addition to great cost saving. With the growth of biosensor market, the demands for InkTec's fine glucose strips will be increasing.



Perfomace of our Blood Glucose Strip



COATED PRODUCTS



SEM Image of Reflective film

Coated products are the representative products which can show the unique characteristic of InkTec electronic inks.

After sintering printed products, our products have minimized gap between silver particles since our silver coating ink which is applied to the coated products has no particle (soluble cluster type).

And thanks to the simple process(Printing → Sintering), our prices of coated products are cheaper than conventional coated products and we can provide our products with very short lead time.

- Metallic & Reflective impact
- Environmental-friendly production
- Low cost
- Fast production
(Very short lead time)

Applicable Items

Reflective Film for LCD BLU



- High reflectivity

Materializing high reflectivity of the dense and uniformed surface of the reflective film

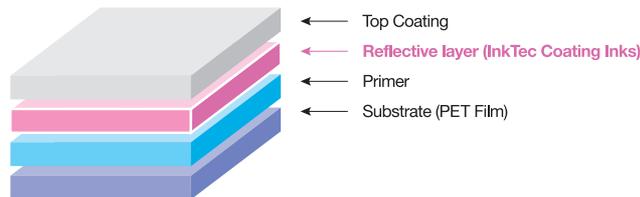
- Simple production of production

: Much simpler process than conventional silver evaporation process → Only 2 Steps (printing and sintering under high temperature and high pressure)

: Mass production in short time by Roll to Roll mass printing process

- High grade properties

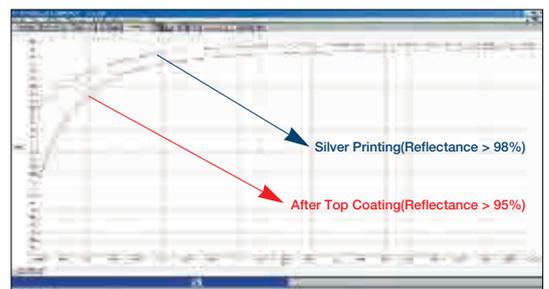
By a top coating, it can not only be controlled with the diffused reflection, pollution level and yellow stain, but reinforced with anti-scratch.



Reflect Film for Fluorescent Lamp

Fluorescent lamp is mainly used in relatively large buildings as office buildings, schools, hospitals, and factories due to its economic advantages that can gain brighter light at lower cost. Moreover, high illuminant reflector can reduce the number of lights within the same space and increase energy efficiency in the same condition.

InkTec supplies lamp reflect sheet as a silver film which is produced with thin film coating method in our own gravure printing line. InkTec's silver reflector film is the right solution for competitive prices and mass production.



Reflectivity Measurement of Reflective Film

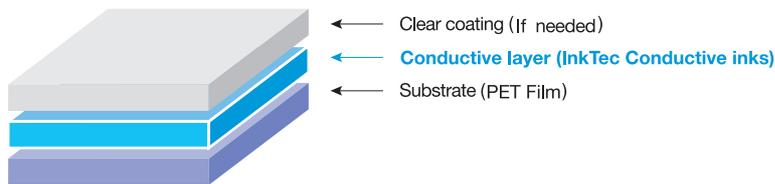
Thanks to simple process(Printing→Sintering), our prices of coated products are cheaper than conventional coated products and we can provide our products in very short lead time.

**Transparent
Conductive Film**



InkTec proprietary TEC ink (soluble complex compound) manufacturing technology has now made it possible to supply various types of transparent conductive film forming liquids for a wide range of applications. Using our novel conductive inks, InkTec has developed Transparent Conductive Film (TCF) which is generally used for EMI shielding, meeting static dissipation requirements or forming a conductive film for display industry.

- Structures



- Description

| | Transparency | Sheet resistivity | Thickness (Ag) | Substrate |
|----------|--------------|-------------------|----------------|-----------|
| Features | ~ 40% | 2~12Ω/sq. | 10~200nm | PET film |

※ InkTec TCF offers a variety of films designed specially for Ag nano coating onto plastic substrates

InkTec also endeavors to enhance the transparency and develop high quality conductive films with competitive prices for the promising industries such as EMI, FPD etc. Our fervent R&D activity will make it possible to apply our novel conductive materials with a new paradigm in various fields.