Additive Process Technologies Ltd

RFID inlay/insert/tag manufacturers, converters and integrators.

- **The 1 cent tag could now be achieved.**
  - **Before we developed our patented process the tag antennae alone cost that price !**
    - **Now, the door is open.....**

Our fully developed production system will manufacture up to 400 million antennas a year on metre wide rolls at costs approaching 1/10 of a US cent on substrates that are not restricted to polymers - we can even put them on paper.

We are a process developer not a manufacturer. If you are a manufacturer, you are a potential customer of ours.

We have developed a cost-effective, patented manufacturing process solution for large-scale, high volume, reel-to-reel production of low cost RFID tag antennae based on copper, but at up to a tenth of the cost of copper tag antennae manufactured the conventional print and etch way.

These tag antennae, for both UHF and HF frequencies, are fabricated using an additive electroplating process, with a patent protected controlled thicknesses capability which will enable precisely controlled or even profiled, for example at the flip-chip or strap attach points, thicknesses to within ¼ micron across the 1 metre production width.

Our development machine in Market Harborough, UK

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These RFID tag antennas provide the superior electromagnetic properties of copper at price levels significantly below those of traditional 'Print and Etch' aluminium or copper, and also those printed using conductive inks - thus offering RFID tag inlay producers the opportunity to reduce costs without compromising on performance.

Our patented Focused Field Deposition (FFD) electroplating process is a fast, high volume production process for webs up to 1 metre wide electro-depositing copper at thicknesses from 3 to 25 micron, suitable for both HF and UHF application, and with those thicknesses controlled to within ¼ micron in 1mm steps across the web .

As the process can also be applied to any other electrodeposited metals we can also, for example, in-line plate gold or nickel contacts in specific areas.

Additive Process Technologies Ltd copper tag antennas offer the following advantages:

- High electromagnetic performance – they are pure copper
- Competitive pricing – 1/10 the cost of antenna manufactured conventionally by print and etch
- Produced on 1 metre wide substrates which can include coated paper
- Thickness appropriate for application
  - 5 micron or less for UHF
  - 15 micron or thicker for HF
- Good mechanical properties: flexibility, metal adhesion and overall durability
  - But can also be configured for security applications to produce very thin copper thickness on flimsy substrates and thus be deliberately destructible.
- Adhesiveless construction
- Consistency of production quality

High-performance tag antennas produced using our process help provide the cost-effective solution to low-price RFID tag production.

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RFID antennas manufactured using our patented processes compared to alternative products:

Print and Etch

Most RFID antennas on the market are produced by chemically etching Copper or Aluminium foils laminated to polyester films. The standard laminates films are 18 microns or 35 microns thick, and their production process is very expensive, wasteful, slow and environmentally unfriendly. Compared to traditional laminated copper substrates, our processes allow us to:

- Minimise the thickness of copper without affecting the performance of the antenna which is especially relevant in the UHF area.
- Use substrates other than polymers, such as paper, as antennae carriers.

Conductive Ink

A competitive technology is the printing of antenna patterns with conductive ink, based on pastes containing a high concentration of silver particles. This process is very costly, and its success is hindered by the low electrical conductivity of the inks, weak adhesion properties, lack of printing accuracy, and by reported corrosion of the silver particles. There is also the issue that silver is a biocide and thus, in the future, wide scale use may be legislated against.

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