

## RFID tags on paper substrate eliminate plastic – January 23, 2023

**Toppan in Japan has developed a process for using paper rather than plastic as a substrate for its RFID tags.**

The company expects Europe to be a promising market due to the high level of environmental awareness says the company. Using paper also enhances the use of the tags for fraud and counterfeit protection as they cannot be easily transferred.

The near-field communication (NFC) tag label uses paper material as the substrate for the antenna instead of conventional polyethylene terephthalate (PET) film. The aluminium foil antenna is produced on a roll-to-roll process and provides the same performance as the PET version.

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- [EVG, Toppan team for nanoimprint photonics lithography](#)

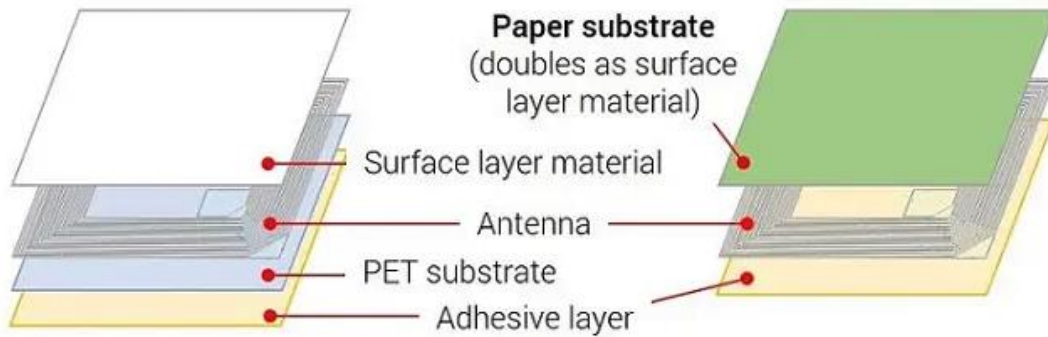
The NFC tag label is also designed to break when it is removed, making communication impossible and preventing fraud by reattaching labels.

A new circuit fabrication technology that combines laser edge technology with a roll-to-roll web handling process allows aluminum foil with low electrical resistance rather than a conductive ink to be used to form the antenna on the paper substrate.

This eliminates plastic from the NFC tag while maintaining the required communication performance. If a paper substrate is used instead of a PET film substrate for a million standard size NFC tag labels measuring 80 mm x 45 mm, consumption of plastic resin can be reduced by approximately 110 kilograms.

### *Paper RFID tag thickness*

Using paper also helps to reduce the thickness of the tag by 30%, allowing easier integration into labels. This comes from using the paper substrate as the surface layer material. While the cost of the basic paper version is the same as PET, lamination of a separate printed layer is required when applying colour printing to the label surface and this increases the cost.



The value of the global NFC tag market was US\$3.8 billion in 2020 and is expected to reach US\$15.5 billion by 2030, says Allied Market Research.

“Toppan’s new NFC tag label meets growing demand for more eco-friendly solutions as the NFC market expands globally,” said Takamitsu Nakabayashi, general manager of RFID/IoT and security development in Toppan’s DX Design Division. “We will expand sales globally, focusing particularly on the European market, where measures focused on reducing environmental impact are gathering pace.”

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