Recyclability of printed RFID tags

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Paper substrate

High-white gloss label paper

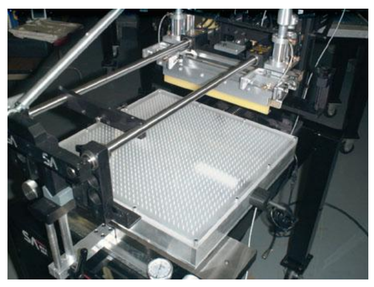
Property	
Grammage (g/m²)	80
Thickness (µm)	65
Brightness (%)	93
Opacity (%)	88
Gloss (%)	60
Smoothness Bekk (s) *	1200/300
Porosity (ml/min)	below 5
Cobb60 (g/m²) *	22/20
Tensile strength (N/15 mm) **	69/39

*coated side/reverse side **MD/CD

Printing UHF RFID antenna

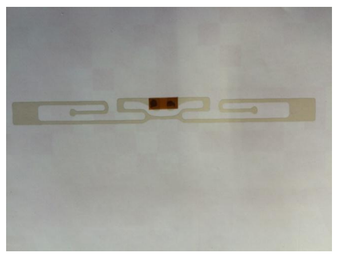
Offset printing

Semi-automatic screen printing + hot air drying in IR tunnel at 150°C



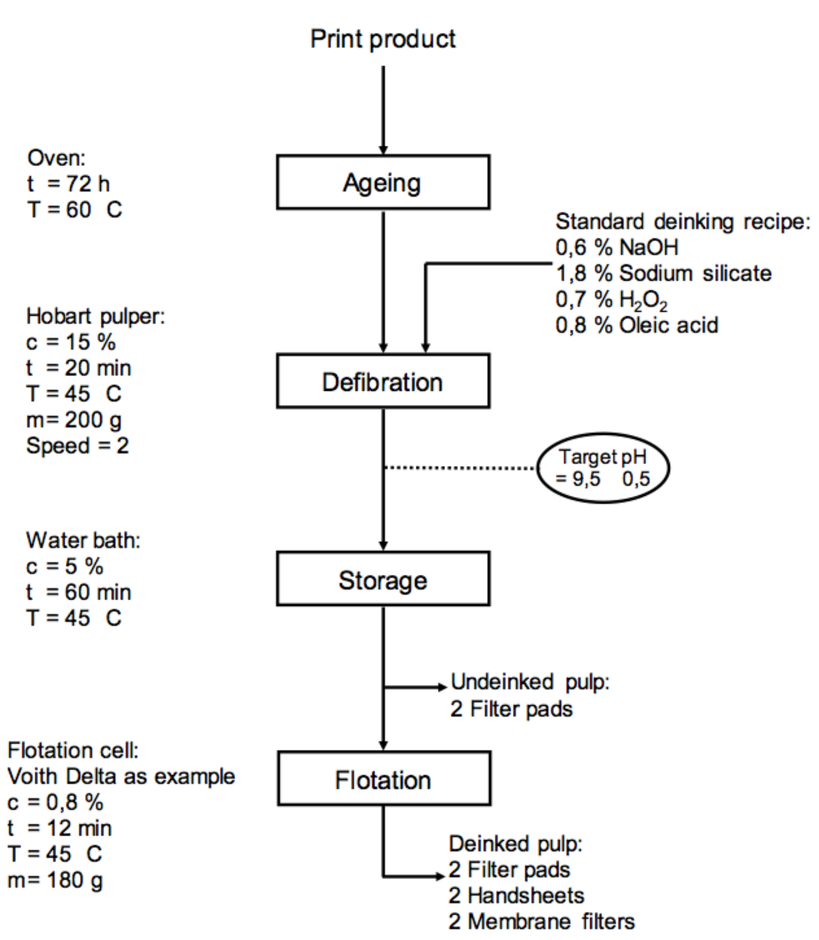
Magenta offset ink: coverage area with ink = 70 %
Functional ink: - Conductive Ag ink SunChemical CRSN2442
- Nanosilver ink ORGACON SI-P2000

coverage area with ink = 4 %

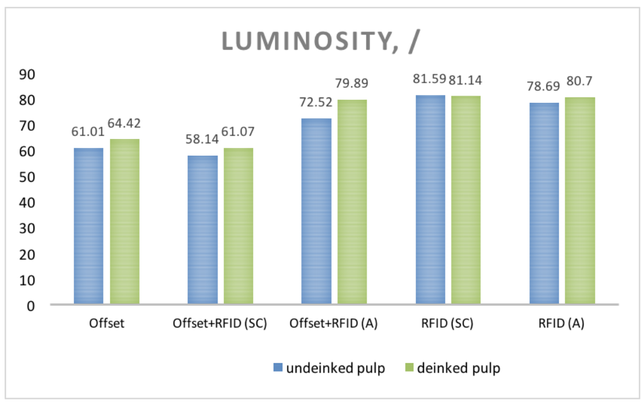


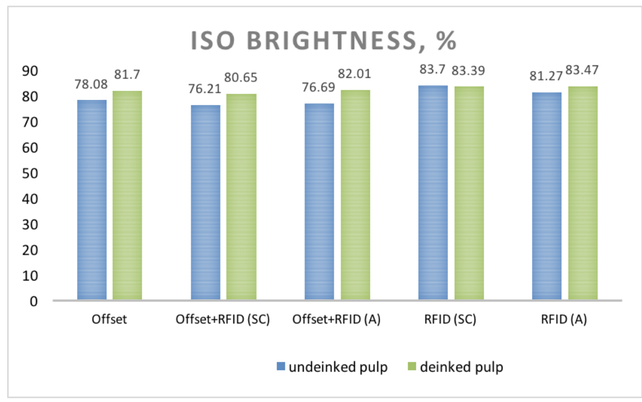
Evaluation of recyclability-deinkability

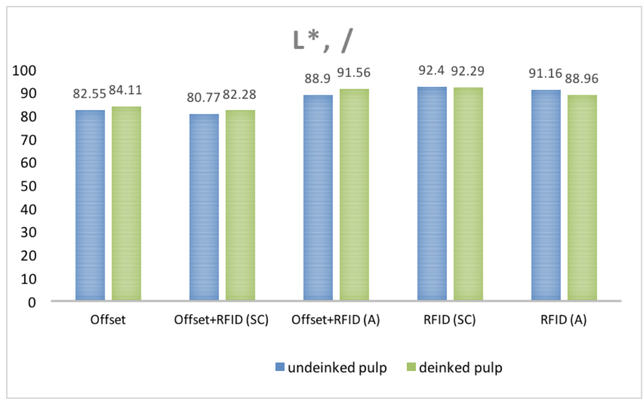
INGEDE method 11

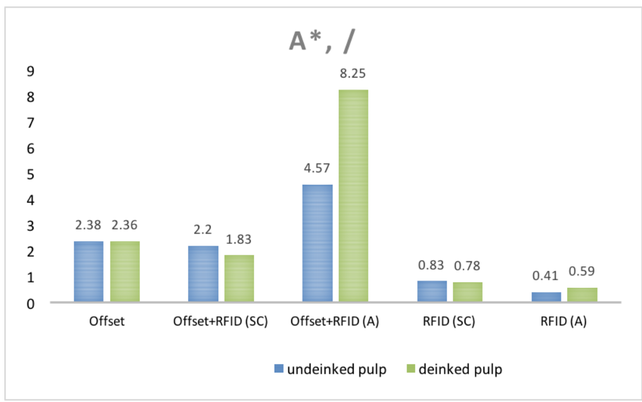


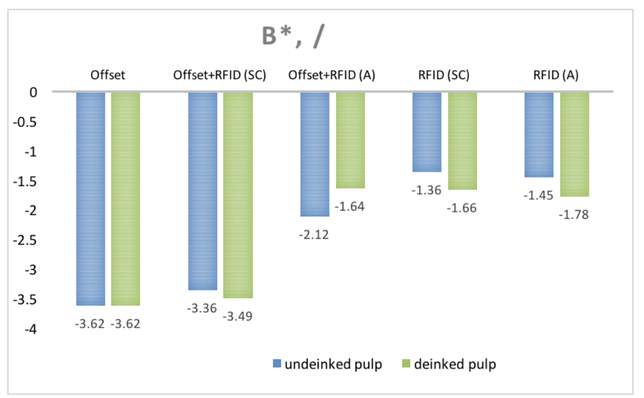
Results

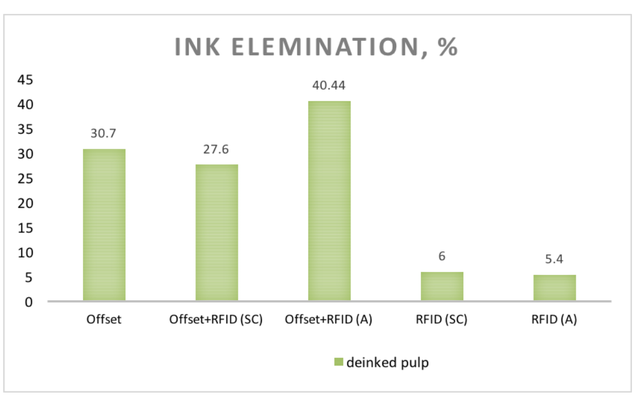


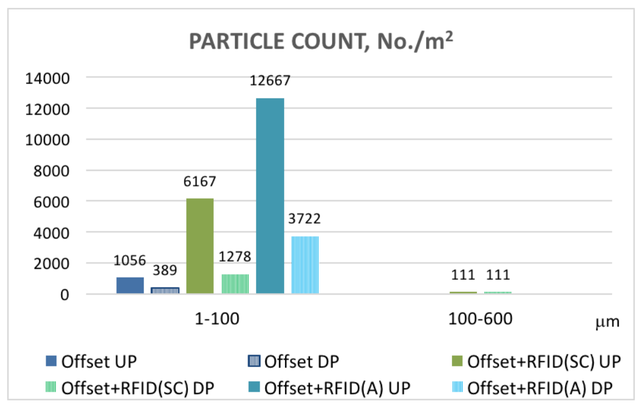


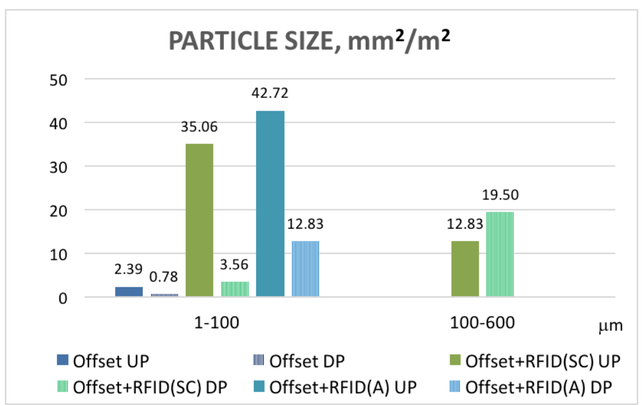












CONCLUSSION

The research has shown that the recycling process was not disturb much by the presence of printed UHF RFID tag.

Evaluation of deinkability parameters has revealed good deinkability for offset printed label paper with integrated UHF RFID tag.

Only a small decrease in optical properties was noticed, though higher number of small particles (up to 600 µm) and a few big particles (over 2000 µm) were still present after deinking.

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