

Industrial Atmospheric Pressure Plasma (APP) treatments – Grinp Technology

F. Parisi¹, C. Pavan¹, D. Daprà²

¹ *Grinp, R&D Department, Turin, Italy*

² *Power Device, Turin, Italy*

Low-temperature plasma has been used in various industrial applications (surface modifications, etching, deposition, polymerization, wettability enhancement, hydrophobicity enhancement, adhesion enhancement,...): it is evident how low-pressure plasma system impart additional costs to the system and limit size and amount of products. However, initial plasma systems for the industry were designed to overcome these disadvantages even using vacuum system, such as those commercialized by, among the others, H.T.P. Unitex (Italy) [1] and Europlasma (Oudenaarde, Belgium) [2]. Recently, there has been increasing interest in APP (glow discharge) for applications in textile industry and development of stable atmospheric pressure plasma sources is a current trend in industrial plasma engineering.[3]

Grinp designed and developed its own APP system, characterized by elevate modularity, feasible for industrial and large area applications. The source width can be scaled from 60 cm to 400 cm and introduced in a continuous process.



Figure 1. 60cm-wide APP machine for treatments of belts and tapes.

In winter 2006, Grinp has installed a 2 mt wide APP system in a finishing company (Preparazione Tessuti, Italy) that, after a satisfactory experience with low-pressure plasma, decided to invest in APP technology in order to avoid size limitations and to reduce production costs.



Figure 2. 2mt-wide machine for treatments of fabrics, installed in Preparazione Tessuti, Castelletto Ticino, Italy.

Employing the system installed by Preparazione Tessuti, Grinp has developed a number of industrial treatments for fabrics, that include:

- Permanent wettability enhancement of PET, Nylon, Kevlar, Nomex, Polypropylene.
- Dyebility enhancement of wool: dye uptake increased up to 60%.
- Adhesion enhancement of Polypropylene, PET, Kevlar and Nomex.
- Anti-shrinkage of wool.

Some of the most recent results will be presented.

References

- [1] H.T.P. Unitex, Plasma Division, <http://www.htpunitx.com>.
- [2] Europlasma, <http://www.europlasma.be>.
- [3] J.R. Roth *Industrial Plasma Engineering II Application to Nonthermal Plasma Processing*, Institute of Physics Publishing, Bristol - Philadelphia (2001).