

Anti-Pilling Plasma Treatment

等離子抗起毛球

Pilling of garments has been a long-standing problem for apparel industry, especially for luxury protein-based fibres knitwear. Pills are formed by the entanglement of loose fibres that protrude from fabric surface. During wearing and washing, loose fibres develop into fluffy tiny balls hooked to the fabric. The developed plasma treatment is an effective physical means to reduce pills formation on cashmere knitted fabric. By modifying the surface structure of fibres, plasma treatment will increase the co-efficient of inter-fibre friction and leads to reduction in fibre migration. Therefore, the pilling grade can be significantly improved.

The treatment is a dry, pollution-free, effective and low cost process for protein-based knitwear. This anti-pilling plasma treatment is a successful industry-scale plasma system available for knitwear treatment.

紡織品，尤其是用蛋白質纖維製成的高檔針織品出現起毛球情況，是紡織業長期存在的難題。毛球是由織物表面突出的纖維互相糾纏所形成，隨著穿著或清洗過程，這些糾纏的纖維會形成細小的毛球依附於衣物上。「等離子抗起毛球系統」可有效減少茄士咩羊毛針織品起毛球。透過改變纖維表面結構，等離子處理程序可以增加纖維之間的磨擦系數，從而減低織物表面的纖維移動，顯著提升織物的抗起毛球程度。

這個等離子處理系統是一個零污染、合乎成本效益的乾法處理程序，現已可作工業應用。



Application 應用

A designed industrial scale clothing plasma treatment system provides a green approach for functionality finishing and minimising the pilling for wool and cashmere knitwear.

工業級的等離子成衣處理裝置能夠提供一個環保工序可用於功能性處理，減少在毛衣及茄士咩羊毛衣上起毛球。

Industry Benefits 業界效益

Pills are formed by the entanglement of loose fibres that protrude from fabric surface. Loose fibres will develop into fluffy tiny balls hooked to the fabric during wearing or washing. This treatment is based on the generation of the ionized gas plasma composed of ions and argon gas particles to interact with the garment. By modifying the surface structure of fibres, plasma treatment will increase the co-efficient of inter-fibre friction and thus reducing fibre migration. Therefore, the pilling resistance can be significantly enhanced with the pilling grades improved by 1 to 2.

毛球是由織物表面突出的纖維末端互相糾纏所形成，隨著穿著或清洗過程，這些糾纏的纖維會形成細小的毛球依附於衣物上。這個處理程序透過離子及氬氣粒子所形成的等離子體和衣物磨擦而產生物理作用。藉著改變纖維表面結構，等離子處理程序可以增加纖維之間的磨擦系數，從而減少織物表面的纖維移動，令織物的抗起毛球程度顯著提升一至兩級。

Technological Breakthrough 技術突破

Most of the plasma treatment system on anti-pilling available in the market is for fabric scale production. Engineering of this newly developed system has achieved significant industrial breakthrough.

In the systems 10 garment racks are installed which are large enough to hold 20 pieces of knitwear to be treated at the same time. The treatment process is controlled by a linear motion unit which will rotate during the treatment process, making the treated effects more even on the garment surface. The whole treatment system contains two vacuum chambers which operate alternatively. This design helps increase production efficiency. For example, the treatment process is carried out in one chamber while the after treatment process can be done in another chamber.

Besides, a touch-screen panel is designed for the control of the system. The application is user-friendly and easily operated by workers.

現時市場上大部分抗起毛球等離子處理系統只適用於紡織品生產線上，新系統的設計就突破了這個局限、為製衣業界開拓更廣闊的應用範疇。

系統設有10行掛架，可以同時放置20件針織品作同步處理。處理過程是由直線移動組件所主導，組件更會在過程中自行轉動，令衣物表面的處理效果更為均勻。整個系統共有兩個真空艙交替運作，當一個艙進行等離子處理時，另一個艙就可以進行後期工序，從而提高生產效率。

此外，系統設有專用的觸控螢幕，內置操作簡易的應用程式，方便員工使用。

Licensing Details 獲取專利

A non-exclusive licence of carrying out further R&D, manufacturing and sale of the Anti-Pilling Plasma Treatment System.

非獨家專利授權許可包括就「等離子抗起毛球系統」進行進一步開發、生產及銷售。

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