

APPLICATION INFORMATION

Pretreatment of flexible textile products: Nonwovens

With Openair-Plasma® – quick, functional and thermally neutral

Synthetic nonwovens are high-tech products. Thanks to their diversity, they perform many important functions and make a valuable contribution to enhancing our quality of life, whether as filters, functional textiles or hygiene products. Nonwoven textiles may be designed for single or multiple use.

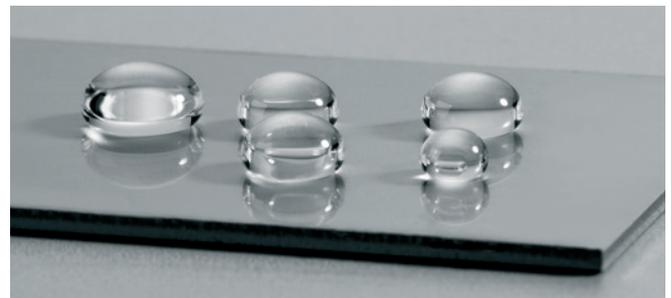
The raw materials and production processes available allow for a broad range of nonwovens with specific characteristics or for special applications, including:

- high absorption capacity (hydrophilic)
- reduced flammability, thermal or acoustic insulation
- protection against bacteria, fluid resistance (hydrophobic)

The Openair-Plasma® process can be used to selectively pretreat nonwovens. Due to its high degree of reactivity, the process can react short-chain hydrocarbons with air and break down long molecular chains to form functional groups. In addition, the surface energy often increases to over 72 mN/m, thereby substantially improving surface wettability and permeation – important preconditions for using water-based impregnation systems.



hydrophilic – wetting



hydrophobic – water-repellent

With the PlasmaPlus® process, coatings can be applied which reduce the surface tension to below 20mN/m, thereby rendering nonwovens non-adhesive. The high-energy content of the Openair-Plasma® combined with the coating material makes it possible to apply ultra-thin films to a wide variety of different materials which

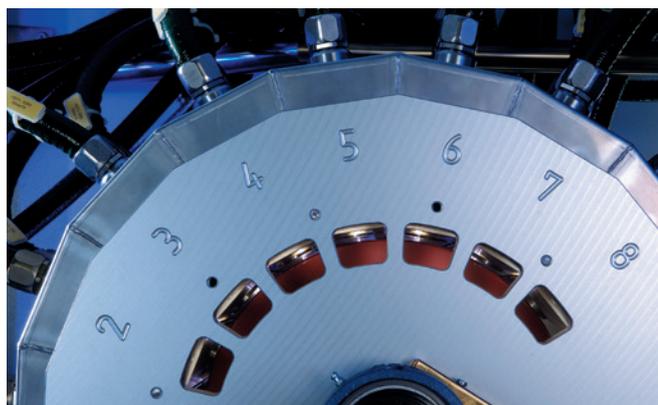
completely alter their surface characteristics. These new surface characteristics greatly extend the range of uses for these materials. Plasma-polymer coatings generate new surface characteristics by creating barriers to water, oxygen and CO₂ and making surfaces dirt-repellent.

Applications

- The plasma process is already used successfully in the production of diapers. By modifying the characteristics of the nonwoven fabric, plasma pretreatment reduces the amount of adhesive required by 40%, as well as improving absorption and distribution of the fluids taken up.
- Plasma pretreatment can also be used to improve the performance and durability of technical filters. The hydrophobic characteristics obtained through plasma treatment reduce particle adhesion and increase moisture resistance. Selected functionalization of medical filters to bind indicative enzymes.
- The process is particularly suitable for the deposition of oil-repellent (oleophobic) coatings, since the coating penetrates through the gaps deep into the matrix of the filter, thereby reliably preventing a chemical reaction with the pollutants generated by the engine.

Benefits

- Plasma achieves a very high level of surface activation.
- Over-intensive treatment and thermal effects are avoided due to the relatively low treatment temperature of the plasma.
- Partial activation and selective hydrophilization can very easily be achieved by targeting specific segments.
- Plasma is environmentally friendly – it is a physical, inline treatment which can replace chemical impregnation.
- Contactless treatment – the length and width of the material remain dimensionally stable and the original volume is retained.
- Inline atmospheric plasma systems can achieve treatment speeds of up to 50m/min, depending on the design, and 400 m/min for direct treatment with stationary plasma generators.

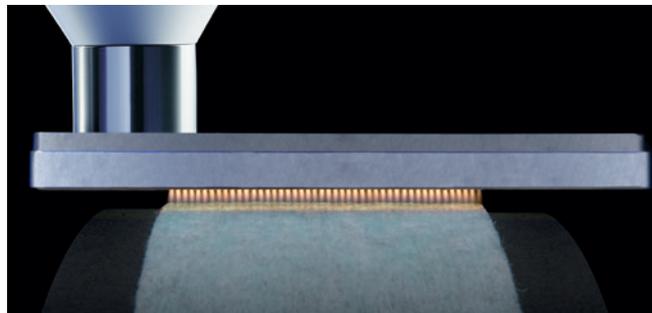


Plasma pretreatment with multiple nozzle system

Physical plasma pretreatment modifies textile nonwovens to achieve the required surface characteristics. This dry-chemical process is both energy-efficient and environmentally friendly.

Process engineering

Plasma systems for plasma activation consist of a generator, a high-voltage transformer and a plasma nozzle. Plasmatreat has developed a new plasma technology specifically for the pretreatment of foils, ADLs and nonwovens. The potential-free jet technology enables a homogenous coating to be applied to a flexibly scalable treatment width.



„Wide area multi orifice jet“

During the PlasmaPlus® process a process fluid (precursor) is injected into the plasma stream emitted from the nozzle via a vaporizing unit. To obtain homogenous, reproducible coatings, both plasma and precursor parameters are monitored within narrow tolerances. The digital control technology incorporated into the new 5000 series generators is ideal for this purpose. The entire process is entirely controlled by microprocessors.



Aurora Foil treatment – 60 inch Roll to Roll

Plasmatreat provides extensive test facilities and extensive test facilities and contract manufacturing capabilities. If you would like to put our plasma treatment to the test, please get in touch. We are happy to be of assistance.

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