



AIGLE



Flocking on textile: origin, evolution, innovation

Origins of flocking can be traced back to a very remote past. Some sources are speaking about first applications in China 1000 BC. In more recent time flock curtains dated 1750 are conserved at Victoria & Albert museum in London.

First industrial use of textile flocking can be found in the USA around 1910. Electrostatic flocking machines are already described in a USA patent dated 1933. In the patent description we can find some ideas, which anticipated some of the concepts that, nowadays, are considered very important in roll to roll flocking lines like the air conditioning system for keeping constant humidity and temperature.

“The conductivity, at least the surface conductivity, of the fibers is increased by the sorbed moisture and this alters the rate of distribution of the charges upon the fibers and the manner in which they are moved and oriented in the electric field. It has been found that when the relative humidity of the air carrying the fibers is below 40 percent, the fibers are noticeably slower in depositing and forming a pile. A relative humidity above 45% percent, on the other hand, tends to cause rapid deposition, but not in an orderly manner; treeing and undesirable massing of the fibers result.”

After this, many patents followed on the story of flocking equipment some of them with real innovations that entered into the technical standards of flocking machines manufacturers.

In America flock started to be more and more used on several sectors, finally in Europe flock started to be a textile finishing system in the 50's.

Aigle started producing flocking machines initially only via mechanical flock sieving systems; through R&D investments, the company was able to develop and produce an electrostatic generator that allowed AIGLE to achieve reliability and high performance, all in a relative low weight machine. This happened in the mid of the 60'. Main applications were decorations for curtains and women polyamide stockings. In these and following years machinery market demand was really high: customer were paying additional money for each week the manufacturer, Aigle in our case, managed to anticipate the delivery of the machine (unfortunately these time are really passed).

Evolution of flock, adhesive and flocking process technology allowed the use of flock on textile not only for decoration but also for functional use like crushed velvet for garments, sofa covering and car sits covering. Then the higher precision cut of the tow in the flock manufacturing process was allowing better results in terms of quality of the flock pile. On the other side adhesive originally were not breathable as a conventional fabric is. Upholstery cushions could not easily release air and stayed puffed up like a balloon. Reformulating flock adhesives, by air injection just before application, allowed for breathability. Formulators created ways to maintain physical properties, while allowing air to pass through the flocked fabric. In this way it was achieved



another great improvement: to maintain the flock fabric washability as far as resistance to washing chemicals.

These important improvements combined with better machine's quality brought a higher speed and a better quality production. Also diversified finishing technology of the flocked fabric highly improved the possible use of flocked fabric especially in garments

One of the more famous and popular finishing systems were the so called "Pig": a viscose flock fabric passed through a special foulard and an open tumbler that became very popular for garments and interlining fabric; on another hand, finishing of nylon flocked fabrics was mainly obtained by air embossing and by traditional printing system, giving a large variety of designs and special effects, particularly appreciated for upholstery application.

At the end of the '90, flock manufacturers started to offer on the market more sophisticated fibres so-called microfibres that were capable to give to the finished textile a better hand in terms of softness touch.

Speed of flocking textile process in Europe was reaching around 15 mt/m', in the US up to double; the reason of the speed gap stays in the technology: D.C. electrostatic system used in Europe is much safer and is giving a more vertical results on the dipping of the millions of fibres on the adhesive but above a certain speed defects are very evident: in this way the velvet effect was higher with softer touch. On the other hand, USA A.C. electrostatic system is more dangerous due to higher power necessary, but is allowing higher speed due to the extremely low defect problem in presence of higher pile. Softening of the fabric is obtained by special finishing treatment of the flocked fabric. Other important sector of textile flocking is design flocking: in this case adhesive is coated by rotary screen, and the flocking machine is be fixed on the printing machine structure.

Flocking machine is equipped with a very efficient suction system, in order to keep clean the environment.

Both in Europe (as well as in Turkey) and USA number of lines increased relevantly. In the mid of the mid of '90 the number of textile roll to roll application reached its pick. In Europe we could count 80-90 flocking lines, in USA about 50, then 10 years later new textile process using polyester and polyamide micro-fibres started to substitute flocked fabric in many fields (mainly low budget upholstery and garment products), so production drastically decreased. In USA now we count 15 lines, in Europe about the same (the double if we consider flocking units for flock patterning). In counter tendency what happened in China where now there are 250 running textile flocking lines.

Last developments in flocking line for textile could be summarized in:

- Better performing and more safe electrostatic generators
- More accurate dosing systems
- Automatic systems for cleaning the hoppers and the sieves
- Cleaning system for achieving faster colour change
- Precise coating system for adhesives
- Weight control of adhesives and flock with feed back on both coating and flocking machines
- Up-dated recycling flock systems with automatic feeding systems
- Pre-cleaning systems for recovery maximum quantity of flock before drying oven
- Brushing system at the end of the line for extracting the unfixed fibres from the finished fabric.



Another interesting flock technical textile is the application for blackout curtains. Up to three meters wide range flocking lines were mainly dedicated to this sector. Recently new demand for even wider textile flocked fabrics came into the market and Aigle is now developing machines for even wider width. Recently company Dhj from Chargerus group has studied with Aigle an exclusive flocking machine for curtains 5,6 meter width. The machine has particular and new systems for guaranteeing the correct flock dosing along the so wide width.

Two relevant innovations are the particular recycling flock system and the exclusive extraction system of the electrostatic sieves that we'll introduce also as an optional on the standard Aigle flocking machines of shorter width.

Thanks to the mentioned developments nowadays flocking on textile is worldwide recognised as advanced and well performing finishing process. So is used for technical as well as functional fabrics: technical garments, high performing floor and sofa covering, fabrics for special uses (for example the Vileda product presented by Freudenberg).