

Non woven fabric and the difference between Bonded and Needle punched non woven fabrics

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Abstract: Nonwovens has covered a huge area in industrialization, medical, sports, home furnishing, garments, paper maker etc. but it itself has differences in the way of manufacturing it for various fields. The purpose is to show the applications with their difference in various aspects and to summarize about nonwovens and its categories

Keywords: application, bounded non woven fabric, differentiation, needle punched non woven, non woven fabric

I. INTRODUCTION

It is known that there was no role of draping fabrics or covering body at the starting age of human life unless the invention of clothing, but yes, it started the covering of body with tree leaf, animal skin, fur, grass to protect it from outer elements. Further other many changes came in making fabrics with the help of weaving, knitting from various animal, vegetable or natural fibers.

When we talk about non woven, it is definitely sure about those materials which are made without weaving process. This was the oldest way of making fabrics and was discovered around 3000-3500 BC back with construction of various animal hair. Non woven fabric consists of fibers which are laid together by various bonding processes instead of weaving and knitting. It can be laid parallel, cross wise or randomly with different applications of adhesive or thermoplastic fibers and under application of heat and pressure, hence non woven-s can be indicated as a fabric made with a web like finish with various applications of adhesive under various heat and pressure.

II. HISTORY

History says that making felts, there is a big role of SAINT FEUTRE of CEAN, FRANCE, the patron saint of the felt industry who always put wool fibers in his sandals for his long walking trips, so that he could feel comfortable while walk, apparently it was found that the fibers was formed in to a matted layer because of foot pressure and of course today felt is made from wool with or without admixture of different other animal fibers, vegetable fibers or manmade fibers. Definitely to get the absolute goal of nonwoven manufacturing should have art of choosing the right fiber to combing with the right application of binder and the efficient process for it. In 1965, USA developed new principles and the term "Nonwoven fabrics", which was applied to new modern techniques to innate new other experimental fabrics of nonwoven.

The classic example of nonwoven is felt, either it is wool felt or fur felt, where wool felt comprises of the combination of at least one half of wool fiber with kapok, rayon etc. The short staple fibers are used, the felt is degraded "but the finer the grade of staple used, the stronger the felt." Wool felt's shrink property can be controlled by blending it with acetate, nylon, and acrylic fibers, and about fur felts, such short fibers like rabbit, muskrat or beaver are blended.

III. MANUFACTURING PROCESS OF NONWOVEN FABRICS

Virtually all the types of fibers, either it is natural, vegetable or manmade fiber, can be use for manufacturing nonwovens but since it always has to achieve some specific requirements, the fiber choice with the appropriate application of bonding becomes essential. This can be achieved by comparing the requirements to be met together with their obtained results from individual fiber. The rapid uses of fibers which are in greatest volume in industries are cotton, rayon , acetate, nylon, wool including with increasingly usage of synthetic fibers like polyester, acrylics. The below table 1 shows the resultant properties of various fiber blending:-

IV. FIGURES AND TABLES

Table 1

FIBERS	RESULTANT PROPERTY	
	POSITIVE	NEGATIVE
POLYESTER	Good recovery	High pilling tendency

	Good heat setting property	Formulation of static charge
	High elasticity	
	Good drape	
	High wet strength	
ACETATE	Good handle	Low wet strength
	No pilling	Low abrasion resistance
	Good recovery	Low softening point
	Good drape	
	Easy bonding	
	Low price	
POLYAMIDE	Good wet strength	Bad handle
	Good resistance to soiling	Bad light fastness
	Quick drying	High pilling tendency
	Good chemical resistance	High price
	Good elasticity	
	Good processability	
COTTON	Good abrasion resistance	No elastic recovery
	Good bulk	Low resistance to soiling
	High wet strength	Low uniform of fiber
	Soft hand	
	Easy bonding	
	Excellent absorption power	
	Low price	
WOOL	Good bulk	Tendency to pilling
	High elasticity	Low abrasion resistance
	Soft warm handle	High shrinkage
	Quick recovery	Low strength
	Good absorption power	Unstable price
VISCOSE FILAMENT	Good strength	Low wet strength
	High bulk	Low abrasion resistance
	Good drape	Slow drying
	High pilling	Hard needle
	Easy cleaning	
	Low price	

4.1 The manufacturing vary with the fiber methods of laying fibers and use of bonding agent, such as the staple fiber ranges from 1/2 to 6 inches(2 to 150mm) in length or the manmade fiber which is generally

1.5 to 6 denier or some other industrial purpose. The range of fiber may vary. The fibers are processed then through opening, conditioning and blending operations, and then layers of fiber webs are formed accomplished with fiber friction heat adhesion application of bonding agent. Nonwoven fabric bonding can be defined as:

1. Mechanical bonding,
2. Chemical bonding and
3. Thermal bonding
4. Bonding of spun laid webs

A bonding agent works as glue, as it binds the fiber laid web firmly together to make bonded nonwoven fabric. There are several methods of using bonding agents according to the characteristics of required fabric quality. As German standard committee describes “Fabrics made from a combination of fibers and bonding agent is defined as a nonwoven bonded fabric.” Whereas needle punching fabrics are produced when spiny needles are pushed together and through a fibrous cross laid web forcing some fibers through the web, where they remain, when the needles are withdrawn. The requirement of a fabric determines the type of bonding agent which executes the characteristic features of nonwoven fabrics, such as

1. Strength
2. Drapeability
3. Elasticity
4. Resistance to chemicals
5. Air, Oxygen
6. Light
7. Heat
8. Hydrophilic or Hydrophobic
9. Flame resistance etc.

