



Development of Viscose/Polyester Wipes and Evaluation of Properties of Shrinkage and Absorption

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Abstract –

Dry Industrial Wipes are a great way to keep hands germ-free, as well as helps to clean up spills. Wipes are made in a variety of different sizes and are made of many different materials. Mostly used material to develop the wipes include polypropylene, cotton, and latex. Here an attempt is made at developing industrial dry wipes using viscose and polyester fibres to evaluate better shrinkage and absorbency properties. In industries, huge amount of selvage viscose materials are being wasted. To make use of that here the wipes are made using selvage viscose and polyester. In order to achieve better shrinkage and absorbency properties, different blend ratios of viscose/polyester are implemented to develop the non-woven dry wipes. The samples with different blend ratios are compared with each other to discover which has the better shrinkage and absorbency properties.

Key Words: dry wipes, recycled fibres, viscose/polyester, biodegradable, environment, hygiene.

1. INTRODUCTION

Wipes are to rub lightly with or on a cloth, towel, paper, the hand, etc., in order to clean or dry the surface. Mostly wipes are made of materials such as polyester, polypropylene, cotton, wood pulp, or rayon fibres formed into nonwoven sheets. But the best fabrics are nonwovens made of synthetic fibres: polyester and polypropylene, which are strong, soft, and even match the quality of woven textiles, and cost as much as paper.

Dry wipes are used to clean surfaces, dry hands, scrub tools, and wipe off equipment. Wipes come packaged in disposable sheets and are commonly used instead of cloths, rags, or shop towels to reduce the spread of germs and eliminate the need for laundering.

Dry wipes are mostly used in industrial cleaning purposes and also in household cleaning purposes.

Industrial nonwovens wipes are used for a variety of applications in industry and institutions. These products can be wet or dry and may be impregnated with ingredients for specific purposes, such as polishing, cleaning, or removing bacteria.

Polyester fibres are used for developing the nonwoven wipes because, it is particularly important when cleaning electronic equipment, as lint can cause charges to accumulate and may damage the equipment.

But the shrinkage and absorbency rate of industrial wipes made of polyester is poor. In order to achieve better shrinkage and absorbency performance in industrial wipes, viscose fibres are planned to included n development of non woven wipes.

As, viscose fibres are with the properties of good Absorbency, Lightweight fibre, good breathability fibre.

2. POLYESTER

It is by far the most common fiber for carded technologies. As per the application and wipes categories the blend percentage varies. Normally the Industrial wipes are made from 100% Polyester. It is estimated at nearly 43% of the fiber consumed in spun lace.

Fig-1



3. VISCOSE

Viscose is another common fiber for wipes, especially for personal care. Personal care wipes are used on very sensitive parts – baby care, facial wipes etc. It has to be very soft, smooth and silky. Viscose fiber has all these properties and because of these properties viscose fiber is referred as “art silk” in the textile industry. Nonwovens industry producers have been working on developing wipes that will flush. To create a flushable nonwoven product, the right combination of strength, easy break up and dispersion is required. To be considered truly flushable the wipe must also be biodegradable. Wipes made from viscose fibers have all these properties and thus can be categorized as flushable products. Household wipes are generally made up of polyester and viscose blended fibers, polyester being the major component

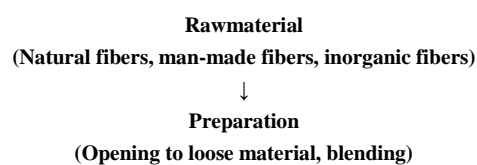


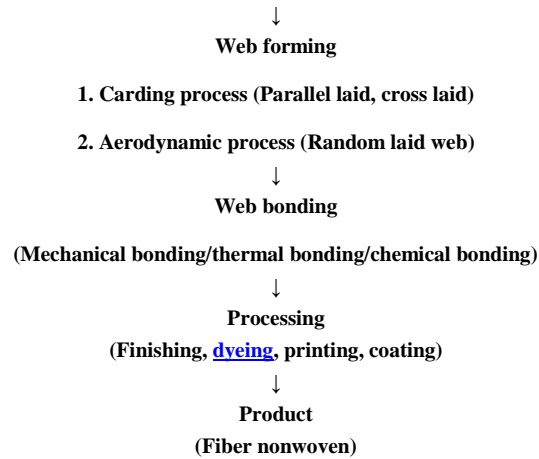
Fig-2

3.1 WEB FORMATION PROCESS

Dry Laid Nonwoven Process

Dry laid is a staple fiber based web laying process involves three major steps. They are fiber preparation (by opening and mixing), web formation (by carding processes) and finally web stacking (by parallel lay, cross-lay, and perpendicular-lay processes).





3.2 NEEDLE PUNCHING PROCESS

A physical method of mechanically interlocking fibres webs by using barbed needles to reposition some of the fibres from a horizontal to a vertical orientation. Thousands of needles interlock fibers in a web. Needle punch non-woven fabric production line is one kind of methods for producing non-woven fabrics. In the process of producing, instead of using the traditional weaving process of the fabrics, the needle punch bond method uses triangle needles averagely punching in the cotton web to make the fibers directly tangle each other together; controlling the density, intensity, and function of the fabrics by needle density, needle depth, needle number, and other physical elements.

3.3 METHODOLOGY

The viscose and polyester fibres are sourced. The fibre is tested for their physical and mechanical properties such as length, strength, GSM. Then the fibre was sourced from Innotech industry. After sourcing the fibre it is made into webs in the ratio of 50:50 and 85:15. From these webs, there are two samples of non-woven wipes are made by double-needle punching process. First sample is made using the web having 50:50 ratio and the second one is made using the web having 85:15 ratio. The two different samples are then compared to find out which is better in withstanding shrinkage and capable of having enough absorbency rate. The best sample thus determined will be produced in a mass scale as the final product.

3.4 TESTING

FIBRE LENGTH AND STRENGTH TESTER

Fibre length and strength tester used for direct measurement of all length parameters - 2.5% & 50% span lengths, uniformity ratio, Short Fibre Level, etc. Direct measurement of fibre strength in g/tex and Elongation measurement in percentage basis.

DIMENSIONAL STABILITY TESTER

Dimensional stability tester is used to measure the dimensional changes on wipes that is occurred due to soaking in water. That is measurement of shrinkage in length and width in percentage (%)

WATER HOLDING CAPACITY TESTER

The purpose of this test method is to provide a means of evaluating water holding capacity in nonwoven fabrics. Specimen is conditioned and weighed, saturated and re-weighed to determine water holding capacity. The water holding capacity is expressed as a percentage of increased weight after saturation. There are no known limitations to this test method.

4. CONCLUSION

Needle-punched non-woven wipes with two different fibres were developed. Here recycled viscose and recycled polyester were used and the length, strength and elongation of the fibres were evaluated. It is observed from results that the recycled viscose's length is 39.10 mm, strength is 79.63 g/tex and elongation is 17%. And the recycled polyester's length is 28.41 mm, strength is 53.25 g/tex and elongation is 16%. Two samples with different blend ratios {[50:50(50% Viscose and 50% Polyester)], [85:15(85% Viscose and 15% Polyester)]} were developed. The dry wipes with two different ratios were compared with each other and also with the commercial sample to evaluate which one is having better absorbency and shrinkage resistance properties. Sample with better absorbency rate and capacity to withstand shrinkage was selected to develop dry wipes in a mass scale.

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