Laboratory Report

Absorbency Test

Date:： ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Name： ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Class： ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Marks： ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Objectives

To compare water absorbency level of different fabrics

Introduction

Water absorbency means the ability of the fabric absorb water. Fabrics with good water absorbency can quickly absorb water, and also hold large amount of water.

Fibres which absorb water well are called hydrophilic, those only absorb a small amount of water are called hydrophobic. Water absorbency may be hindered by fabric finishing and industrial impurities. For examples, yarns may come with lubricants that contain oil-based substances. Fabrics that are hydrophilic can absorb more moisture and make wearers feel comfortable. Fabrics that are hydrophobic can absorb a small amount of moisture. The absorbency of fabric contributes to the comfort of the end-product. When moisture is absorbed by the finished product, the wearer will not feel wet. Besides, absorbency will also affect the reaction of fibres and fabrics to dyeing.

The water absorbency of fabrics is affected by the absorbency of fibres used. Whether there is sufficient space for fibres to absorb water and swell also affect the absorbency of fabrics. Different combination of fibres and fabric construction methods will produce fabrics with different water absorption rates.

Materials and Apparatus

1. Materials:

* 2 pieces of woven cotton fabric samples (20cm x 20cm each)
* 2 pieces of knitted cotton fabric samples (20cm x 20cm each)
* 2 pieces of non-woven fabric samples (20cm x 20cm each)

1. Apparatus:

6 measuring jugs / beakers, stopwatch, ruler, scissors, electronic scale, distilled water, marker, tongs, kitchen paper

Procedures

1. Measure the weight of each fabric sample.
2. Pour distilled water to measuring jugs / beakers.
3. Put samples in the measuring jugs / beakers for 10 minutes.
4. Pick up fabric samples by tongs, absorb excess water with kitchen paper. Measure the weight of fabric samples.

Precaution

1. Before conducting the test, fabric samples could be stored in an air-tight container with desiccant for a period of time to control the moisture content.
2. Same amount of time should be allowed for all fabric samples to absorb water. Place fabric samples into the measuring jugs / beakers with 3 – 5 minutes’ interval. Therefore, when the fabric samples are picked up and weighed one by one, the absorption time of each fabric sample will not be affected.
3. Place the fabric samples on kitchen paper lightly to avoid absorbing too much water and affecting the result.
4. Use fabric samples with same kind of fibre to reduce deviation.
5. Use fabric sample with same thickness. Thick fabrics will absorb more water.
6. Surface tension of water will affect water absorption of fabrics.

Results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Weight of fabric samples  (g) | Weight after soaking  (g) | Weight of water absorbed  (g) | Comparison between weight of fabric samples before and after soaking |
| Woven cotton fabric | Fabric sample 1 | 8.5 | 14 | 5.5 | +64.7% |
| Fabric sample 2 | 9.2 | 15 | 5.5 | +59.8% |
| Average: | | | 5.5 | +62.3% |
| Knitted cotton fabric | Fabric sample 1 | 6.2 | 20 | 13.8 | +222.5% |
| Fabric sample 2 | 6.6 | 22 | 15.4 | +239.4% |
| Average: | | | 14.6 | +231% |
| Non-woven  fabric | Fabric sample 1 | 8 | 8.2 | 0.2 | +2.5% |
| Fabric sample 2 | 8.3 | 8.5 | 0.2 | +2.4% |
| Average: | | | 0.2 | +2.5% |

Discussion

Among the three types of fabrics used in the test, knitted cotton one absorbs the greatest amount of water, followed by woven cotton one, whereas non-woven one is the worst. Woven and knitted cotton fabrics with same fibre but different construction methods have a great difference in water absorbency. Knitted cotton fabric with a loose structure can absorb three times more water than tightly woven cotton fabric. Non-woven fabric made of synthetic fibre has the worst water absorbency as synthetic fibre prevents water uptakes.

The result of the test reveals that knitted cotton fabric absorbs the greatest amount of water because cotton is used and cotton has good water absorbency. Besides, the construction of knitted fabric provides a lot of space for fibres to absorb water, to swell and lock in a great amount of moisture. Although cotton is also used for woven cotton fabric, the tightly woven structure allows very little space for fibres to swell. Therefore, a small amount of moisture is locked in. Synthetic fibre is used for the non-woven fabric sample. On one hand, synthetic fibre has very poor water absorbency. On the other hand, non-woven fabric is formed by compressing fibres together which does not have space for fibres to swell. Therefore, non-woven fabric is almost non-absorbent.

Conclusion

Fibre content, construction method and thickness of fabrics, and tension of yarns can affect the water absorbency. Woven and knitted cotton fabric with same fibre but different construction methods have a great difference in water absorbency. Non-woven fabric made of synthetic fibre has poor water absorbency as synthetic fibre prevents water uptakes. Knitted cotton fabric can absorb three times more water than woven cotton fabric. Different textile products have different requirements on water absorbency. Fibre content, construction method, thickness of fabrics and tension of yarns should be considered when choosing fabrics for textile products.

Products such as sportswear, underwear, bathroom towels and kitchen towels require fabrics that have good water absorbency. Knitted fabric with a loose structure can uptake a great amount of moisture is the most suitable fabric for these textile products. Water absorbency of knitted fabrics will be enhanced when fibres with good water absorbency is used, such as cotton. The water absorbency will be inhibited when fibres with poor water absorbency is used, such as nylon.

Non-woven fabrics can be made from synthetic, regenerated and natural fibres. The non-woven fabric used in the test is made from synthetic fibres and the water absorbency is the worst. Synthetic fibre is suitable for textile products which need to be water-proof, such as recycled bag and protective cover. This kind of non-woven fabric is not bio-degradable and should avoid excessive consumption. Water absorbency of non-woven fabrics is affected by the water absorbency of fibre used, space between fibres and flexibility of the structure. The water absorbency of non-woven fabrics will be enhanced if fibres with good water absorbency as well as those loosely packed together are used.

Reference

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