Hong Kong Examinations and Assessment Authority
Hong Kong Diploma of Secondary Education Examination

Technology and Living -- (Fashion, Clothing and Textiles)

School-based Assessment: Prescribed Task

Experiment: To investigate the breathability of different fabrics

1. Objective of the experiment

To compare the breathability of _____ and _____ fabrics

2. Introduction to the experiment and the theories covered

Breathability of fabric refers to the ability of moisture passing through the fabric. The moisture passes through the fabric with lesser resistance from the fabric means the value of the resistance is smaller/lower. The more breathable of the clothing the high comfortability it is.

The fabric breathability is highly dependent on the air permeability property of fabric. There are many parameters determining air permeability of a fabric, including yarn twist, yarn crimp, fabric construction and finishing. These factors affect the size of air space in the fabric. On a garment, the air space allows sweat to pass through and evaporate, thus makes wearers comfortable. Thus, breathability is an essential indicator on the performance of sportswear.

Air permeability is measured by determination of amount of air current passing through perpendicularly under the standard area, pressure and time, e.g., volume of air measured in cm3 which pass per second through 1 cm2 of fabric at a pressure of 1cm of water.

In industry, there are many tests to measure the breathability of fabric. The following are some of them.

1. Upright Cup Method - uses a cup of water, sealed with a fabric, which is weighed before and after to determine how much liquid has been lost. The weight of water lost per area of fabric per period of time gives a breathability rate in $g/m^2/24hrs$.

2. Inverted Cup Method - works in the same way but the cup is inverted so that the water sits against the fabric. This produces a higher breathability figure, as the fabric isn't buffered by an air gap, which can absorb a surprisingly large amount of moisture.

Inspired by these tests, I design my experiment with some modifications to the industrial test.

Sources:

1. 'ULTITEC' (https://ultitec-protection.com/dc-lp4/how-to-measure-the-breathability-of-a-coverall/) (last access 29-11-2023)。
2. 'eurofins' (https://www.eurofins.com/textile-leather/articles/fundamental-textile-testing-performance-testing/) (last access 29-11-2023)。
3. 'FurTech Science' (https://furtech.typepad.com/furtech/2006/10/breathability_t.html) (last access 29-11-2023)。

3. Apparatus and materials used in the experiment

A. Fabric samples

Fabric sample (i)	Fabric sample (ii)	Fabric sample (iii)	Fabric sample (iv)
Photo	Photo	Photo	Photo

B. Apparatus

Name	Quantity
(i)	
(ii)	
(iii)	
(iv)	
(v)	

4. Procedures of the experiment

Procedure	Photo
(i)	
(ii)	
(iii)	
(iv)	
(v)	

5. Collection of experiment data

Fabric sample	
Sample(i)	
Sample(ii)	
Sample(iii)	
Sample(vi)	

6. Display of experiment results

(For example, bar graph, pie chart, etc)

7. Interpretation of findings for the experiment

8. Discussion on the experiment results

9. Conclusion of the experiment