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: Testing on water repellency of different fabrics

1. Objective of the experiment

To determine the water repellency of different fabrics.

2. Introduction to the experiment and the theories covered

Water repellency refers to the resistance of fabrics to wetting and water penetration. It is different from water resistance and waterproofing. Water resistance is the ability of resisting the penetration of water to some degree but not entirely. It is the lowest level of water protection among three. On the other hand, waterproof means imperviousness to water entirely. It is the highest level of water protection among the three.

There are many factors for water penetrating through fabrics, including nature of fibres, yarn structure, fabric porosity, fabric finishing and water impact force.

Water resistant fabrics shed water because of their weave or because they have been treated. However, they will soak through in a heavy rain.

Water repellent fabrics are also very tightly woven or treated with a finish that causes the water to make little beads of water drop when it hits the fabric rather than going through. The finish may wear off over time or come off in dry cleaning.

Waterproof fabrics cannot be penetrated by water, and sometimes even air. Waterproof is generally done by treating fabric with a physical film or coating, such as PVC, olefin, silicone or rubber, etc.

Water repellency is an efficient protector against water vapour, moisture and water. On water repellent fabric, water will form spherical or hemispherical droplets on surface and simply run off, keeping the fabric dry and clean. It can protect the surfaces from changes in the weather like raining. Garments made from water repellent fabric will serves as an efficient weather protection. Therefore, it is meaningful to find out the suitability of fabric for outdoor garments by determining their degree of water repellency.

In industry, testing water repellency of fabric is can be done many methods. The following are some of them.

1. Spray test: in which a fabric sample is sprayed with water. Then the degree of wetness of the fabric sample is inspected and rated by comparison with a set of standard diagrams.

2. Cone test: in which a fabric sample is folded into the shape of a cone and is filled with water and suspended above a beaker for a period of time. Then the volume of water in the beaker is then measured.

3. Bundesmann test: in which a fabric sample is mounted over special cup and subjected to a shower of water ejected on it. Special wipers inside the cup rub the fabric, simulating a raincoat is worn. Volume of water is then measured for water penetration and weight of fabric is measured for water absorption.

In my experiment, I will take the principle of spray test/cone test/Bundesmann test as reference and make some modifications.

Sources:

1. Anju Singh (2021) “Water Repellent Finishes for Textiles” (https://textilelearner.net/water-repellent-finishes-for-textiles/#:~:text=In%20general%2C%20water%20repellent%20fabrics%20are%20those%20which,the%20dynamic%20force%20behind%20the%20impacting%20water%20spray), last access 29-11-2023.
2. Mazharul Islam Kiron (2022) “Bundesmann Water Repellency Test” (https://textilelearner.net/bundesmann-water-repellency-test/#:~:text=Water%20repellency%20test%20is%20done%20by%20Bundesmann%20test.,a%20rainstorm%20on%20a%20fabric%20in%20the%20laboratory), last access 29-11-2023.
3. “Water Repellency: Spray Test” *AATCC Technical Manual* (https://yiqi-oss.oss-cn-hangzhou.aliyuncs.com/aliyun/900102963/solution/529970.pdf), last access 29-11-2023.
4. “Textile fabrics — Method for determination of water repellency of fabrics by cone test” (https://members.wto.org/crnattachments/2021/TBT/KEN/21_7370_00_e.pdf), 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