

Measurement and assessment of sports wear fabric clinginess

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Abstract

Four main factors, cling force, wicking force, water retention and water transport, affecting the clinginess of the sportswear fabric have been identified and measured by combining a new equipment and a statistical analysis. A classification model based on those factors has been developed in order to evaluate and standardize fabric wear comforts during heavy physical acting. Ten sportswear fabrics assumed different in their wear characteristics have been employed to investigate the relationship between the measurements and actual performance. It has been shown that the subjective evaluation ratings were well agreed with the measurement.

Introduction

The objective of this research is to assess the performance of the fabrics with quick sweat absorbency and high speed drying. Two important requirements for those fabrics, low clinginess, have been chosen for the evaluating performance of the fabrics. Four main factors, cling force, wicking force, water retention, water transport, affecting the clinginess of the sportswear fabric have been identified and measured by combining a new equipment and a statistical analysis. Cling force, directly proportional to friction force, is highly related with surface properties such as roughness, contact area of textiles. [1, 2] Wicking force, water transmissibility, is of importance at the very first stage of the perspiration in particular. Water retention and drying time are factors determining the residual water contents at the later stage of the severe activity. [2] Four main factors mentioned above have been statistically weighted to build a classification and standardization model.

Ten sportswear samples belonging to four different performance groups have been used for the subjective evaluation on stickiness. The result showed that those subjective and objective methods are highly correlated, indicating the model developed are able to predict the fabric performance without any help of a time consuming subjective test.

Experimental

1. Materials

Ten samples belonging to four different performance groups are shown in table 1.

Table1. Samples used

Group	Properties	Sample No.
Group 1	100% PET	A,B
Group 2	100% cotton	D,G,H,J
Group 3	100% Coolmax®	C,K
Group 4	Hydrophilic (PET/cotton) double-layered fabric	M,Q

* G and H are very thin cotton fabrics for golf wears.

2. Methods

Samples with 1g of water have been placed flat on the skin of the evaluator. The samples were then pulled in a single direction with the same rate of cling force experiment. The fabrics have been evaluated by pairwise comparison method, which is ensuring high level of repeatability and reproducibility.

Results

The result is clinginess = $-1.0665 - 0.019 W.K + 0.7179 R.C + 1.032 I.C + 5.313 W.R + 3.015 W.T$ ($r^2 = 0.9945, P = 0.0001$). (W.K: wicking force, R.C: rate of cling force, I.C: initial of cling force, W.R: water retention, W.T: water transport)

Conclusions

The subjective results of clinginess estimated by the objective figure were able to be known the high speed drying and perspiration properties.

References

1. J.O.Ajayi, Textile Res. J., **62(1)**, 52~59 (1992)
2. Umbach, Hohenstein Institues (1988)