Project Objective

Develop a metric which can be used to consistently categorize apparel based on comfort features.

Create an industry standard which will allow a consumer to understand Active wear nomenclature and have confidence that their purchase will meet expectations.

Give the manufacturer a consistent scale of performance criteria for marketing and development.

Innovation

Define objective properties that affect or define the comfort of a garment and find cost effective and efficient ways of measuring these properties.

Determine the correlation between these objective properties and the subjective or personal evaluation of comfort.

Motivation

Corporation advertisement is a tremendous factor in the sales and success of any given garment, so customers are drawn by catch phrases with no current wear to compare the performance of different brands prior to purchasing.

Athletic apparel was chosen from the performance textile category because of the substantial profit margin it brings to the textile industry.

The estimated market size for athletic apparel in the U.S. is 6.4 billion dollars and is predicted to increase by 18.75% to 7.6 billion dollars in sales by 2014.

Methodology & Testing

Several of the measurable aspects of comfort need to keep the wearer comfortable and dry can be determined using the following properties and tests:

- Wicking ability: indicates how the fabric will remove moisture from the body. Measures how water moves through the fabric when in direct contact with water and the wettability of the fabric/absorbency rate.

- Absorbency capability: indicates how well the fabric retains the moisture that is removed from the body.
  - GATS (Gravimetric Absorbency Testing System)

- Absorbency rate: indicates how quickly the fabric picks up moisture from the body.
  - AATCC Test Method 79-2010, Absorbency of Textiles, and GATS (Gravimetric Absorbency Testing System)

- Evaporation rate: indicates how quickly the fabric removes moisture from/dries the fabric as to minimize wet fabric contact to the body.

- Breathability, to allow passage of moisture vapor, air, and heat through the fabric.

- Evaporative resistance and heat loss, to maintain the body at a constant cool temperature.

- IRB (Institutional Review Board) Testing: uses human volunteers to indicate the subjective value of comfort of the selected garments.

Results

The main finding in our research was that while there was a strong correlation between the evaporation ratio of a garment (as determined by the ratio of moisture absorbed to the moisture evaporated) and the absorbency rate of the fabric held a strong correlation, though no other factors defining comfort did on immediate examination.

Future work on this testing procedure would be more refined and specific tests and a better understanding of the procedures and data used, and a stronger analysis of thermal behavior and breathability of the fabric as it relates to moisture management.

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