Thermal protective performance of outer layer of thermal protective clothing at different test angle

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Abstract

The fabric's structural properties, air gap, and testing orientation have a significant impact on the thermal protective performance of protective apparel[1], [2]. This study examines the effects of test orientation, air gap, and outer layer weft density on thermal protective performance using the Box-Behnken experimental methodology. A steady radiant heat flow of 15 kW/m^2 is used for testing. Stoll's curve is used to quantify thermal protection capability in terms of second degree burn time. The model's p-value of 0.0001 and F value of 73 indicate that the model is significant. Additionally, it is discovered that weft density, air gap, and orientation angle all significantly affect TPP (thermal protective performance). Weft density and air gap have a favourable impact, whereas orientation angle has a negative one. It has also been noted that Weft density has a greater influence as air gap grows. The development of thermal-protective apparel may benefit from the study.

Keyword: *thermal protective performance, thermal protective clothing, Stoll's Curve, Protective clothing*

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