

COMPARISON OF THERMAL BARRIER PROPERTIES AND WEAR PERFORMANCE BETWEEN PROTECTIVE CHEMICAL BARRIER SUITING MADE OF POLYURETHANE COATED NYLON FABRIC AND SMS NONWOVEN FABRIC. Choi J. M.\*, Cho G. S., \*Department of Home Economics Education, Seowon University, Chongju, 361-742, Korea, Department of Clothing and Textiles, Yonsei University, Seoul, 120-749, Korea.

The purpose of this study was to compare the thermal barrier properties and wear performance of two types of chemical barrier suits used for protection against chemical agents such as pesticides.

Conventional garments are typically made from polyurethane coated nylon woven fabric (PUN) while the new garment was made from fluoro-chemical finished spunbonded/ melt-blown/ spunbonded nonwoven fabric (SMS). Both materials exhibited excellent resistance to penetration by both water and pesticides. Identical two piece suits complete with hoods were constructed from both materials for test and evaluation purposes.

In order to assay the thermal barrier properties of experimental garments, thermal resistance measurements for clo values and thermographic assessment were conducted using a surface temperature controlled thermal manikin. The manikin was dressed with underwear and the appropriate sample garments. The basic clothing insulation value (I<sub>cl</sub>) of underwear was 0.28 clo.

Four male subjects also participated in the experimental wear trials involving alternating periods of step walking and resting in chairs in a climate controlled environment at 28<sup>o</sup>c, 70% RH and a wind speed of 0.15 m/sec. The measurement of skin temperature, microclimate temperature and humidity of subjects was achieved using a thermohygrometer. The subjective judgements of subjects wearing each type of garment were also evaluated according to previously determined standards.

The thermal properties of the experimental garments varied according to the type of material used in construction. The basic insulation values for PUN and SMS were 0.94 clo and 0.74 clo respectively. Experimental clothing made of SMS resulted in higher surface temperatures than for clothing made of PUN with more yellowing spots being evident on the thermogram.

The mean skin temperature, microclimate and relative humidity of subjects wearing clothing made of PUN was higher than that of subjects wearing clothing made of SMS. Clothing made of SMS was perceived as being more comfortable in terms of thermal retention, humidity and overall wear values.

The results of our study indicate that protective clothing made of SMS deserves further study as it allows both heat and humidity to be transferred away from the skin of the subject more easily than with clothing made with PUN.