ABSTRACT

Textiles are manufactured as per the end product requirements like strength, elasticity, extension, handle, resistance to abrasion, appearance and aesthetic appeal as to have quality fabrics that perform well in actual service. In this study woven and knitted fabrics with 3% elastane incorporated in widthwise direction were studied with their different geometry. Four fabrics, two under each category of woven and knitted were tested for their physical properties for performance. With elastane, the performance based tests for strength, elongation, growth and elastic recovery properties of fabrics were studied. Further, garments were designed and constructed for female of 81.2 cm standard bust size. On the basis of test results of elastic recovery property, these garments were subjected to wear trials on bust sizes larger and smaller than the standard size. The results were interpreted photographically and also noted from the datum lines at various landmarks on the garments. The growth and recovery of garment and dimensional stability was studied.

The fabrics for the research were selected with 3% elastane and 97% cotton in their construction. Woven fabrics were having plain 2x2 basket and 2x2 twill weave construction. Knitted fabrics were having single jersey and Rib knit (double jersey) construction. All four fabrics showed very good resistance to pilling and abrasion properties. Shrinkage behavior was also within tolerable limit. Woven fabrics showed no shrinkage even after 3 laundry wash cycles in the warp direction due to their close compact structure. Knitted fabrics initially showed shrinkage after two washes and at third wash slight elongation was observed in the wale direction. In widthwise direction shrinkage was observed due to presence of elastane which is responsible for shape retention after laundry washes. Air permeability of the fabrics was also average for all four fabrics. There was slight reduction in air resistance which could be due to removal surface finish from the fabrics. Results of growth and recovery showed that with elastane the fabrics had moderate recovery value. Strength and elongation properties of fabrics showed that woven fabrics with only cotton in warp direction show minimum elongation at break. Weft direction showed more elongation than warp direction with presence of Lycra, bias showed highest elongation value. Knitted fabrics with their looped structure exhibited higher elongation values. Coarse direction for both single and double jersey showed higher elongation value than wale

direction. On the basis of strength elongation curves, yield point at which maximum recovery obtained was found to study recovery properties of fabrics after stress is released. The fabric samples subjected to cyclic loading in lengthwise, widthwise and bias direction showed that even with Lycra woven fabrics could give recovery range within very lower limits of stress due to compact interlaced structure of the fabrics. Knitted fabrics exhibited very good recovery in course direction with the looped structure and presence of Lycra.

The garments were constructed from the four selected fabrics for the research. The standard size garment and paper pattern developed for the dress form in the pilot study was used with adaptation of style and fit as per model's measurements. Garment length was increased as per fashion and front opening with zip was provided for ease of wear. Adapted paper pattern was used for final construction garments from all four fabrics. Original design was without sleeves. The final garments were made in two sets without and with sleeves for comfort and aesthetic purpose.

On the basis of recovery behavior of fabrics, the constructed garments were tried on live models of various sizes to visualize fit of the garments with benchmarks marked at various girth levels. The garment fit was also recorded photographically.

It was found from the study that woven fabrics for garment construction need to be cut rightly to fit the body contour as Lycra did not give much satisfactory results of recovery with firm, compact woven constructions. They could give 'just comfort' rather than 'stretch comfort'. Lycra solves the deformation problem of knitted fabrics and fitted better maintaining body contour with various sizes constructed. Style of the garment with proper selection and placement of seam lines also gave effective results with stretch property of the fabrics. Cotton fabrics exhibit limited wear properties of being elastic and deformed under stress when used in pure form. 3% Lycra added stretch which was enough to get the right fit and comfort especially with knitted fabrics.