NON-CONTACT METHOD FOR FABRIC BASIS WEIGHT MEASUREMENT

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The fabrics designing by a given surface density as well as by a basis weight (gram per square meter) are the main methods of knitted materials production. The actual value of this parameters may differ from the given one. Today the actual basis weight of knitted fabrics is determined by weighing a sample of a certain width and length and subsequently performing the relevant conversion (ISO 3801:1977). This method involves a destruction of the material.

A non-destructive ultrasonic method for determining the basis weight of textile materials was developed at the Kyiv National University of Technology and Design, which is based on a determination of the amplitude ratio of ultrasonic waves falling on the fabric and the waves passing through it. This method allows to control a continuous operational process throughout the production cycle. However, a method has limitations in determining the basis weight of textile materials with variable porosity, such as knitted fabrics.

To improve the developed method, it is proposed to continue measuring of an amplitude of the reflected wave from the fabrics surface. In this case it is possible to monitor the fabric porosity changes. If the distance and pore size of the controlled fabric has increased or decreased relatively to the control sample, the amplitude magnitude of the reflected wave (part of the reflected ultrasonic signal) changes and the ultrasonic device will be adapted to the fabric structure.

The conducted studies have demonstrated the possibility of determining the fabric porosity by an amplitude of the reflected ultrasonic wave from the fabric surface, that allows adaptively to determine the basis weight by an amplitude of transmitted ultrasonic wave. Further development of ultrasonic non-contact methods and relative devises is very important for production control.