Configuration of thick places in rotor-spun polyester yarn

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A new technique for classifying thick places by their configuration is proposed. Using this technique the thick places in a 24 tex polyester yarn have been classified into four categories. The technique has been found to be very useful in determining the stage at which thick places increase and in correcting the situation.

Keywords: Configuration, Polyester yarn, Rotor-spun yarn, Thick places

Each yarn contains, here and there, places which deviate to quite a considerable extent from the normal yarn cross-section. These can be thick places, neps and thin places. Although such imperfections seldom occur, they represent a potential disturbance in the appearance of the fabric or can negatively influence the subsequent processing of the yarn. By analysis and type of these seldom-occurring imperfections, the reason for their occurrence during the spinning process can be analyzed and corrective measures introduced. It is very important to rectify the reason from the source of the fault because faults, though cleared in winding, are replaced by knots which also can be quite disturbing in the finished material. We have classified the neps of ring- and rotor-spun yarns made from man-made fibres. But very little published information is available on the factors

Fig. 1—Scanning electron micrographs of thick places: (a) Surface clustered, (b) Abraded, (c) Unopened, and (d) Belt
affecting thick places in the yarns spun from man-made fibres. The factors affecting the generation and formation of thick places have, therefore, been a subject of considerable research. Some workers have postulated that different processes and causes result in different kinds of thick place. If this is true, then the thick places in yarn from polyester fibres would have more than one configuration. We, therefore, investigated the configuration of thick places in a 24 tex polyester yarn, rotor-spun from polyester fibres (1.2 denier, 38 mm length) with a twist factor ($A_m$) of 46.32.

Thick places were recorded by an Uster evenness tester using the imperfection selector with a sensitivity level of 3. Examination of over 1000 thick places from polyester yarn sample on a projection microscope showed that all the thick places could be divided into four kinds, depending on their configuration.

Fig. 1 shows the scanning electron micrographs of the four types of thick place: (a) surface clustered thick place—a cluster of fibres adhered to the surface of the yarn, (b) abraded thick place—a bunch of fibres protruding on one side of the yarn body, indicating the yarn has been abraded somewhere, (c) unopened thick place—an unopened mass of fibres form the nucleus of the thick place, and (d) belt thick place—fibre wrapping the main body of the yarn.

The distribution of thick places by types of configuration was as follows: surface clustered thick places, 19.37%; abraded thick places, 23.56%; unopened thick places, 32.46%; and belt thick places, 24.61%.

This new technique for classifying thick places by their configuration has been very useful in determining the stage at which thick places increase and in correcting the situation.

References