Influence of Fibre Parameters on the Migration and Blend Characteristics of Rotor Spun Yarns

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Received 1 August 1980; revised manuscript received 26 November 1982

The influence of fibre length, fibre denier and fibre type on the migration and blend characteristics of rotor spun yarns has been studied. It is observed that differences in fibre length, fibre denier and fibre type do not affect the blending potential of the rotor spinning machine. The long fibres in a length difference blend and the coarse fibres in a denier difference blend showed tendency to concentrate at the surface of the yarn. However, no significant segregating tendency of the above constituents was observed when the length and denier differences in the respective blends were small. In a polyester/viscose blend, polyester fibre showed inward migration.

Results and Discussion

The results obtained are presented in Tables 1 and 2.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Sample particulars</th>
<th>Index of blend irregularity (I.B.I.)</th>
<th>Index of rotational blend irregularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2d, 1½ in polyester 3d, 1½ in polyester</td>
<td>0.52</td>
<td>0.94</td>
</tr>
<tr>
<td>2</td>
<td>1.5d, 1½ in viscose 2d, 1½ in viscose</td>
<td>0.56</td>
<td>0.90</td>
</tr>
<tr>
<td>3</td>
<td>1.5d, 1½ in viscose 1.5d, 1¼ in viscose 1.5d, 1¼ in viscose</td>
<td>1.21</td>
<td>1.07</td>
</tr>
<tr>
<td>4</td>
<td>1.5d, 1½ in viscose 1.5d, 1¼ in viscose 2d, 2 in viscose 2d, 2 in viscose</td>
<td>0.78</td>
<td>0.87</td>
</tr>
<tr>
<td>5</td>
<td>2d, 2 in polyester 2d, 2 in viscose</td>
<td>0.71</td>
<td>0.82</td>
</tr>
</tbody>
</table>

In an earlier communication, we reported the influence of process and machine variables on the blend characteristics of rotor spun yarns. It was observed that the rotor is a very efficient blender and a beater feed results in a better dispersion of fibres than a roller feed.

The present study is concerned with the effect of fibre characteristics like length, fineness and chemical identity on blend irregularity and radial migration behaviour of the components in a binary blend.

Experimental Procedure

Sample preparation—Polyester and viscose fibres differing in length and denier were used. Five yarn samples with different lengths, denier and fibre type were prepared on a Sussen OE spinning machine. The constituent compositions were 50/50 (by wt) in each sample. One of the constituents in each sample was dyed prior to blending. Direct and disperse dyes were used for viscose and polyester components respectively. The two constituents for each sample were hand mixed before carding on a Shirley miniature card. The carded materials were subjected to two passages of drawing before spinning.

The procedures adopted for preparation and examination of yarn cross-sections have been reported earlier.

Computational methods—Index of blend irregularity and index of rotational blend irregularity were computed using the procedures suggested by Coplan and Klein. The preferential migration of component fibres was assessed by calculating the 'Intensity of migration' following the method used by Townend and Dewhirst.
Acknowledgement

Financial assistance from the Council of Scientific and Industrial Research is gratefully acknowledged.

References