EXPERIMENTAL STUDIES OF THE DIMENSIONAL STABILITY OF SINGLE WEFT JACQUARD KNIT FABRICS

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ABSTRACT

The paper is devoted to the experimental investigation of the dimensional stability (shrinkage) of the knit structure of nine types of single jacquard fabrics and the plain knit structures. The main objective of this study is to analyze the influence of different stitch width repeats and the number of washing treatments on the dimensional change due to washing of the knit structure. The structures height repeat consists of a combination of two courses: plain and single float stitch with the different stitch width repeat, Rb = m + n (m – the number of needles of action, n – the number of needles out of action). The number of needles in action or the number of needles out of action varies from 1 to 3. The fabrics are produced by the 10 gauge flat bed-knitting machine using 31 x 2 tex half-wool yarn. This study demonstrates the importance of stitch width repeat Rb on the dimensional change due to washing treatments of the knit fabrics. This is due to a combination of a number of different elements of the jacquard stitch structure(loops and floats) in the single- jersey jacquard fabrics.

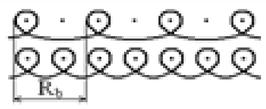
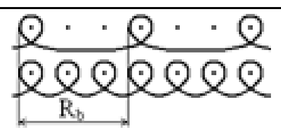
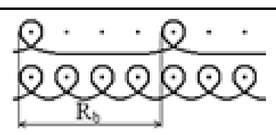
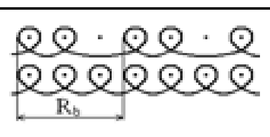
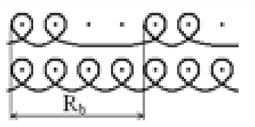
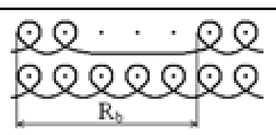
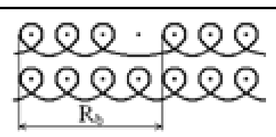
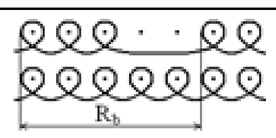
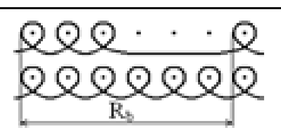
Key words: **jacquard, plain, single float stitch, needles of action, needles out action**

MATERIALS

Single fabrics were produced by on the 10-gauge flat bed-knitting machine using 31 x 2 tex half-wool yarn. The following parameters used in knitting were kept constant: loop length, yarn tension and take-downs.

Graphical representation and main characteristics of the knitted fabric structure of the nine types of single-jersey jacquard and plain are presented in table 1. The stitch width repeat Rb = m + n (m – the number of needles in action, m = 1, 2 or 3, n – the number of needles out of action, n = 1, 2 or 3).

Table 1. Type and main structural characteristics of the knitted fabrics

Variants of fabrics	The structure height repeat R_h	Graphical representation of single-jersey jacquard	m	n	$\frac{n}{m+n}$	D_k	D_c	l_1, мм	l_2, мм	l_4, мм	g_v, g/m²	t, mm
1.	1 - Plain		1	0	0/1	83	91	6,18	-	-	263,50	1,27
2.	2 -Single float stitch 1+1 1 - Plain		1	1	½	95	131	5,97	8,05	7,01	305,40	1,53
3.	2 - Single float stitch1+2 1 - Plain		1	2	2/3	99	137	6,64	9,68	8,16	380,00	1,97
4.	2 - Single float stitch 1+3 1 - Plain		1	3	¾	107	154	6,89	11,18	9,04	360,50	2,06
5.	2 - Single float stitch 2+1 1 - Plain		2	1	1/3	98	121	5,85	7,78	6,81	334,30	1,64
6.	2 - Single float stitch 2+2 1 - Plain		2	2	2/4	106	132	6,51	8,21	7,36	472,00	2,00
7.	2 - Single float stitch 2+3 1 - Plain		2	3	3/5	109	138	6,86	8,28	7,57	437,30	2,16
8.	2 - Single float stitch 3+1 1 - Plain		3	1	¼	100	112	5,65	6,60	6,12	320,20	1,79
9.	2 - Single float stitch 3+2 1 - Plain		3	2	2/5	108	126	6,45	6,94	6,70	406,00	2,02
10.	2 - Single float stitch 3+3 1 - Plain		3	3	3/6	111	131	6,83	7,19	7,01	369,50	2,20

RESULTS AND DISCUSSION

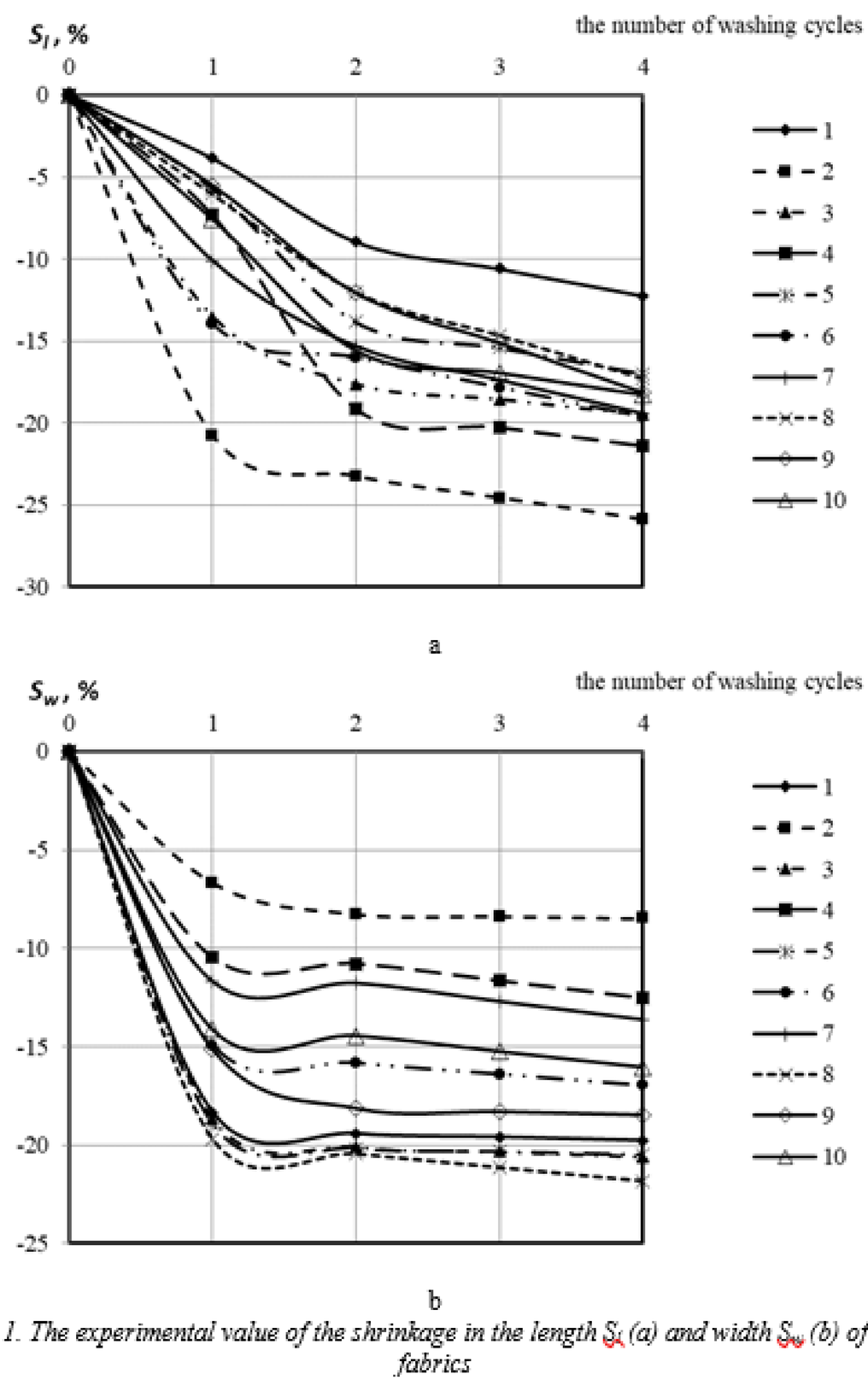


Figure 1. The experimental value of the shrinkage in the length S_l (a) and width S_w (b) of knitted fabrics

CONCLUSION

The analyses of investigations results about influence of the different stitch width repeat on the dimensional change due to washing of a single weft jacquard's structure has demonstrated the importance of the stitch width repeat Rb.