

A Study on the Change of Physical Properties of Out Wear- Fabric by Washing

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본 연구는 면, 울, T/C, 면모, 울모, 면모울모 혼합물 등 다양한 소재의 의복 소재를 5회 세척 후 물리적 특성의 변화를 조사하였다. 연구 결과는 다음과 같다. 1. 면, 울, T/C의 인장강도는 5회 세척에 의해 변하지 않았으나 면모는 처짐 현상 때문에 인장강도가 증가하였다. 2. 면모의 주름 저항성은 세척을 반복함에 따라 감소하였다. 울의 경우 세척 후 탄성률이 감소하고 밀도가 증가하는 현상이 발생하였다. 3. 울의 마모 저항성은 세척 횟수가 증가함에 따라 증가하였다. 4. 세척을 반복함에 따라 모든 샘플에서 볼링이 발생하였고, 세척 횟수가 증가함에 따라 볼링의 양도 증가하였다. 특히 면모와 울의 볼링 현상은 두드러졌다. 5. 건조 세척된 울의 물리적 특성은 습윤 세척된 울보다 우수하였다.

Key words : shrinking, pills, tensile strength, crease recovery, dry cleaned wool

가

I.

(, 1979; , 1995; , 1980).

가

, T/C, ,

가

가

가

가

(, 1994).

3

II.

1.

T/C, ,

5

Table 1

가 가 가

Table 1. Characteristics of sample

Sample	Weaves	Fabric counts (picks and ends/inch)	Thickness (mm)
Cotton 100%	Plain	100 × 126	0.180
Ramie 100%	Plain	60 × 67	0.259
T/C(65/35)	Plain	79 × 115	0.217
Wool 100%	Twill	65 × 80	0.435
Cotton Knit 100%	warp knit	41 × 47	0.428

木, 1985).

(鈴

가

가

Bogaty et

al.(1950), Makinson(1960), 坂井史明(1964)

2.

가 cellulose 10-20% 가 가

1) 가 (: SEW-358A)

2) , : 35 (3)

3) :

4) 0.2%

(, , 1996).

5) 1-5

KS K 0601
KS K 0603

3)
(1) KS K 0520

(2) : Testometric 220D electronic
tensile tester

(3)

3.

1)

(1) KS K 0601

3.8 cm × 15 cm
가 2.5 cm 가
2.5 cm × 15 cm

①

20℃, 60℃, 100℃
0% 5

5

4)

1

(1) : (30 cm
× 65 cm × 50 cm)

②

0%, 0.25%, 0.5%, 0.75%, 1%
5

(2) 2.5 cm × 7.6 cm

5 emery paper(
paper #1000) 0.45 kg

1

(2) KS K 0603

가

0.5%, 50℃

5

5)

KS K 0550

(3)

(HS-047)

$$(\%) = \frac{L - L'}{L} \times 100$$

L : (20 cm x 20 cm)

L' :

$$(\%) = \frac{\alpha}{180^\circ} \times 100 \quad \alpha :$$

2)

(1) KS K 0502

III.

1.

(2) : pilling tester, 86 ± 3 rpm,

63 g/cm³(0.9 PST)

(3) : 12 cm

5

(4)

5

2

가

가

가

1)

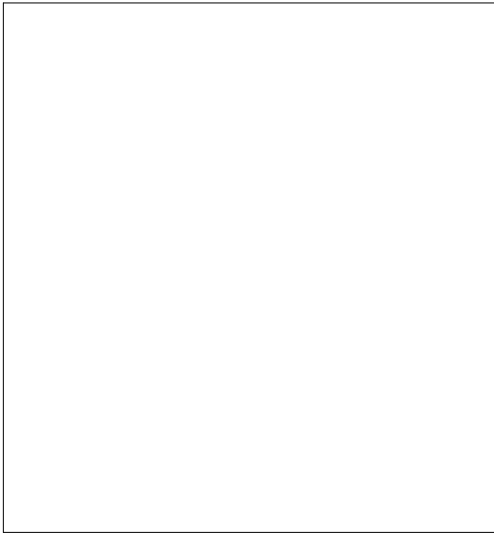


Fig. 1. Shrinkage vs. washing times at 20 °C.

Fig. 1

(0%) 5
, T/C 0-0.25%

(-)

5

2)

Fig. 2

가 가

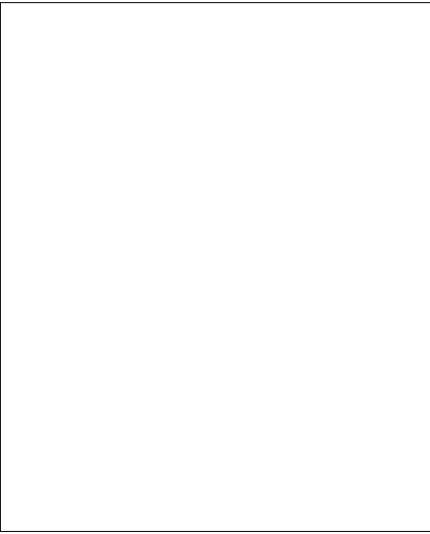


Fig. 2. Shrinkage vs. washing times in condition of 20°C, 60°C and 100°C.

, T/C 가 100°C

가

(-)

가 가

(+)

가

가

가

scale

3

1/10

가

가

3)

Table 2. The effect on shrinkage detergents concentration

Concentration(%)	0	0.25	0.5	0.75	1
Sample	Shrinkage in 5 times washing (picks/ ends, %)				
Cotton	1.0/0	0/0	1.0/0	1.5/0	1.0/0.5
Ramie	0.5/0	0.5/0	0.5/0	0.5/- 0.5	1.0/0
T/C	0.5/0	0/1.0	0/0.5	0/0.5	0/0.5
Wool	1.5/1.0	1.0/1.0	0.5/2.0	0.5/1.5	1.0/1.5
Cotton Knit	2.5/1.5	3.5/- 1.0	3.0/0.5	3.5/2.0	3.0/2.0

Table 2

Figure 3 is a line graph showing the relationship between detergent concentration and shrinkage for T/C fabric. The x-axis represents detergent concentration (0%, 0.25%, 0.5%, 0.75%, 1%) and the y-axis represents shrinkage (picks/ends, %). The graph shows that as detergent concentration increases, the shrinkage also increases. The data points are approximately: 0% (1.0/0), 0.25% (0/0), 0.5% (1.0/0), 0.75% (1.5/0), and 1% (1.0/0.5). The graph is labeled 'T/C' and includes a legend for '±1%' and '가'.

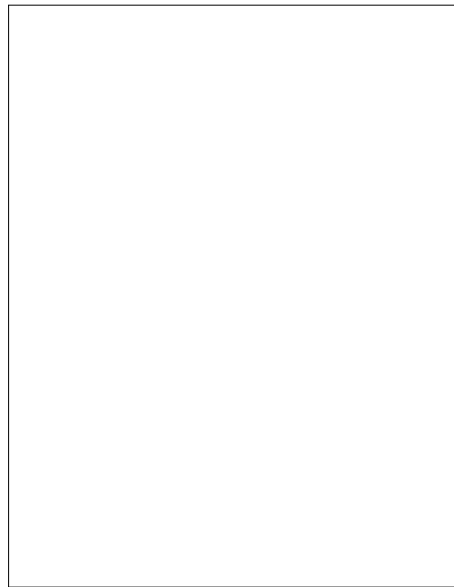


Fig. 3. Shrinkage vs. washing times by detergents method.

Figure 4 is a line graph showing the relationship between detergent concentration and shrinkage for T/C fabric. The x-axis represents detergent concentration (0%, 0.25%, 0.5%, 0.75%, 1%) and the y-axis represents shrinkage (picks/ends, %). The graph shows that as detergent concentration increases, the shrinkage also increases. The data points are approximately: 0% (1.0/0), 0.25% (0/0), 0.5% (1.0/0), 0.75% (1.5/0), and 1% (1.0/0.5). The graph is labeled 'T/C' and includes a legend for '±1%' and '가'.

Fig. 4 (0.25%)

Figure 5 is a line graph showing the relationship between detergent concentration and shrinkage for T/C fabric. The x-axis represents detergent concentration (0%, 0.25%, 0.5%, 0.75%, 1%) and the y-axis represents shrinkage (picks/ends, %). The graph shows that as detergent concentration increases, the shrinkage also increases. The data points are approximately: 0% (1.0/0), 0.25% (0/0), 0.5% (1.0/0), 0.75% (1.5/0), and 1% (1.0/0.5). The graph is labeled 'T/C' and includes a legend for '±1%' and '가'.

(, 1983)

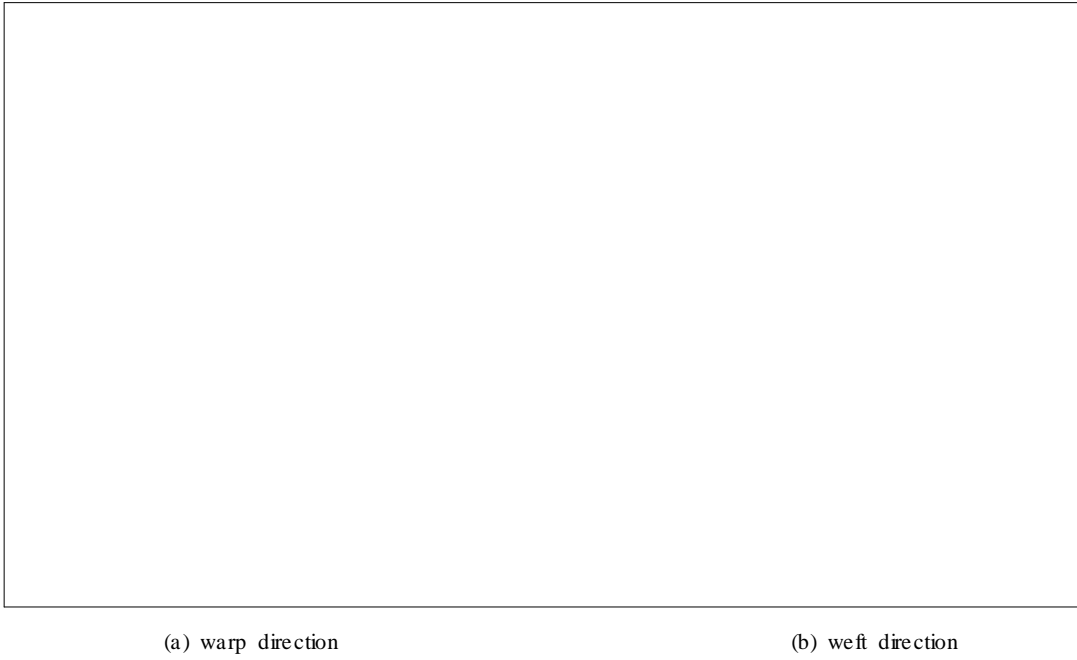


Fig. 4. Shrinkage vs. washing times in condition of 20°C, 0.25%.

2.

(Pilling)

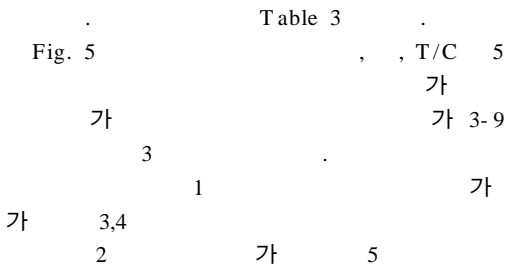


Table 3

Table 3. Grading of pill

Grade	Number of pill	Grading
4	0-2	no pilling
3	3-9	low pilling
2	10-19	moderate pilling
1	Over 20	high pilling

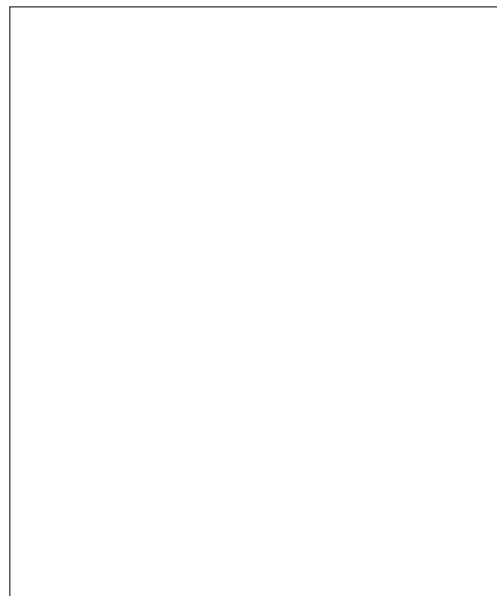


Fig. 5. Pilling vs. washing times

가 T/C Table I
 1 inch 100×126
 3 (/ :), T/C 1 inch 79×115 (/
 가 가 :), 65/35(polyester/ cotton)
 1 가 가 3 T/C
 가
 1 가
 (3 , T/C < (2) < (1) < (1)
 3.
 가 가 , 가
 (, 1975) 가



Fig. 6. Tensile strength vs. washing times

Fig. 6(a) . , 가 가 가
 0 >T/C> > 가
 T/C 가 Fig. 7(a)(b)
 가 가 가 가
 가 가 가 가
 가 (-) , 가 가
 가 가 가 가
 가 가 가 가
 Fig. 6(b) 0 4.
 >T/C> > > () Fig. 8
 5 가
 가 가 가 가
 가 가 20% 가 가
 (, 1996) 가

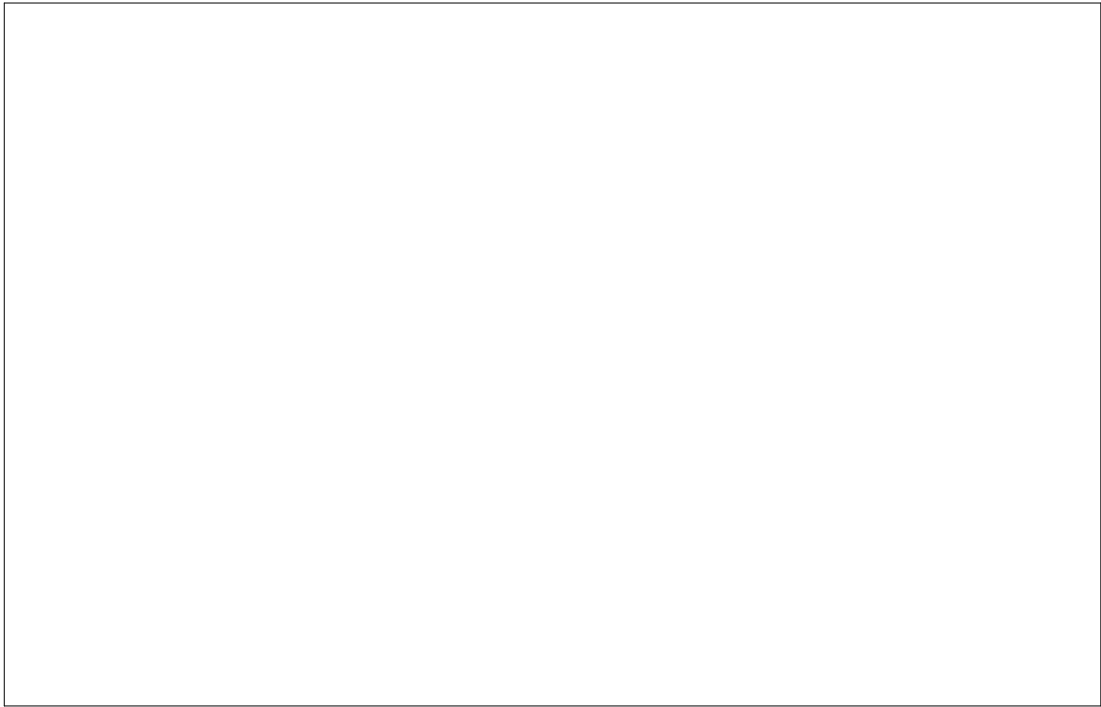


Fig. 7. Elongation vs. washing times.

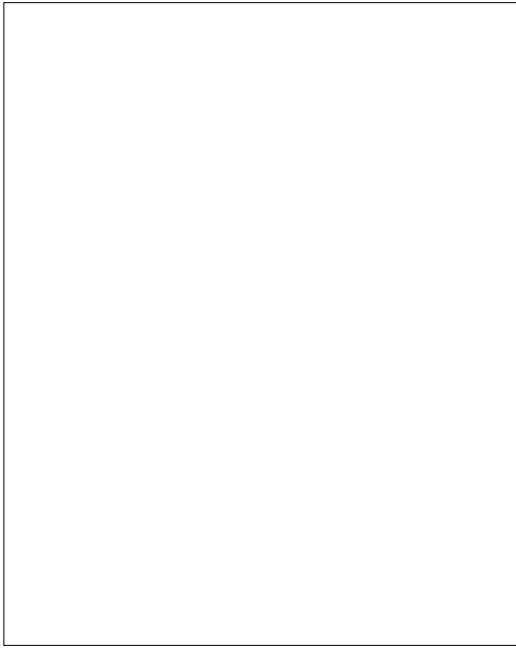


Fig. 8. Abrasion strength vs. washing times.



Fig. 9. Thickness vs. washing times.

가

가

가

가

가

가

가

Fig. 9

가

가

가

가

가

가

가

가

가

가

가

가

가

가

Fig.9

가

가

5.

가

가

Fig. 10

<T/C<

<

가

<

가

가

가

Fig. 10 (a)(b)

가

가 20% 가 2. . (1994) . , 1
 , 가 22- 141.
 3. , . (1996) . , 200.
 4. . (1983)
 2. 가 , 21(3): 17- 25.
 Cellulose 5. , , . (1980)
 , 4(1&2): 25- 33.
 가 6. , . (1995)
 , 8(1): 137- 143 .
 가 7. . (1975) pilling -
 가
 , 13(4): 427- 437.
 3. 8. . (1994) . , 280.
 가 9. . (1973)
 가 가 가 10. . (1979)
 가
 3(1): 49- 56.
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 가 가 가
 5. 가 가
 12. K.R.Makinson. (1960) Studies of the moveme
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 with particular reference to the permanency
 of pleats. ibid. 30: 598.
 6. Schwartz A.M., Perry J.W. and Berch J. (19
 58) Surface active agents & detergent inters
 cience publishers Inc. N. Y., 531- 540.
 , , T/C 0- 0.25%
 . , , T/C 100℃
 가 1% 가 ±1%
 , , T/C
 가 (-) 가
 가 (+) .
 1. , . (1978)
 , 2(1): 29- 33.