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# Effects of Staining and Laundering on Cotton and Rayon-Cotton Damasks



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# Effects of Staining And Laundering on Cotton And Rayon-Cotton Damasks

By Dorothy Saville

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Table damasks once were made only of flax or other bast fiber, or of cotton. Now they are also made of man-made fibers; most frequently of a mixture of rayon and cotton. These damasks containing man-made fibers are available in a wide range of prices—some being as low as cotton damasks—and they may appeal to the consumer for various reasons.

Undoubtedly improvements in rayon fiber are reflected in table damasks as well as in other types of fabrics, but homemakers not familiar with damasks of a rayon-cotton mixture may be in doubt as to the effect of use and care on the appearance and length of service of damasks of this fiber combination.

The research reported herein was undertaken to obtain information that might help homemakers in selecting damasks and in getting better service from them.

## THE FABRICS

Ten damasks, five of cotton and five of a fiber mixture having rayon filling and cotton warp, were obtained as finished napkins except for one cotton, number C-5, which was made from yardage. The cotton fabrics are referred to in the discussion by numbers C-1 to C-5 and the mixed fabrics as RC-1 to RC-5.

### Appearance of the New Fabrics

All of the cotton damasks were white. All except C-2 were highly calendered, a finish which gives high luster to a fabric by a process of pressing. Although some cotton damasks are given a permanent finish to produce a linen-like effect, none of these damasks were known to have such a finish. Fabrics C-1, C-3 and C-4 appeared to be similar in quality. The fabric C-2 was thicker and firmer than the other cot-

tons, and C-5 appeared to be a lower grade fabric than any of the other damasks.

The rayon-cotton damasks were noticeably different in appearance from one another. These differences were due to color, design, type of hem, closeness of weave and size of yarn. The fabrics varied in color from white in RC-3, ecru in RC-1 and eggshell or ivory in the others. Because of the contrast in luster of the cotton and rayon yarns, the design was more prominent in all the rayon-cotton damasks than in the cottons. Of the rayon-cotton damasks, RC-1 and RC-5 appeared to be the most highly calendered; RC-1 being very highly calendered.

From observations, the napkins of fabrics RC-2 and RC-5 would probably be considered lower quality than the others. Fabric RC-4, which was made from finer yarns and with a more elaborate design, gave the appearance of being the most expensive damask.

Some of the differences in the fabrics may be seen in Figure 1.

### Construction of the Napkins

The cotton napkins were all an 18" x 18" size. The rayon-cotton napkins RC-1, RC-2 and RC-5 were 16" x 16"; those of RC-3 were 18" x 18"; and those of RC-4 were 20" x 20". The actual dimensions of the napkins varied more than one inch from the designated length or width; some being larger and others being smaller.

The cotton napkins were hemmed on two sides with selvages on two sides. All the rayon-cotton napkins were hemmed or finished on four sides. The hems varied in width and in length of hemming stitch, but as may be seen from Table I, the hems on the rayon-cotton napkins

Table I.—The Width and Stitching of Hems on the Napkins Tested.

Fabric No.	Width of hems (inches)	Number of stitches per inch in hemming
C-1	3/16	8
C-2	3/16	11
C-3	1/4	7-8
C-4	1/4	7-8
C-5	3/16	10
RC-1	1/8	13
RC-2*	---	---
RC-3	3/16	7-10
RC-4	1/4	9-10
RC-5	5/8	8-9

\* The four edges of napkins RC-2 were finished with an overcasting type of stitch 1/4 inch in width.

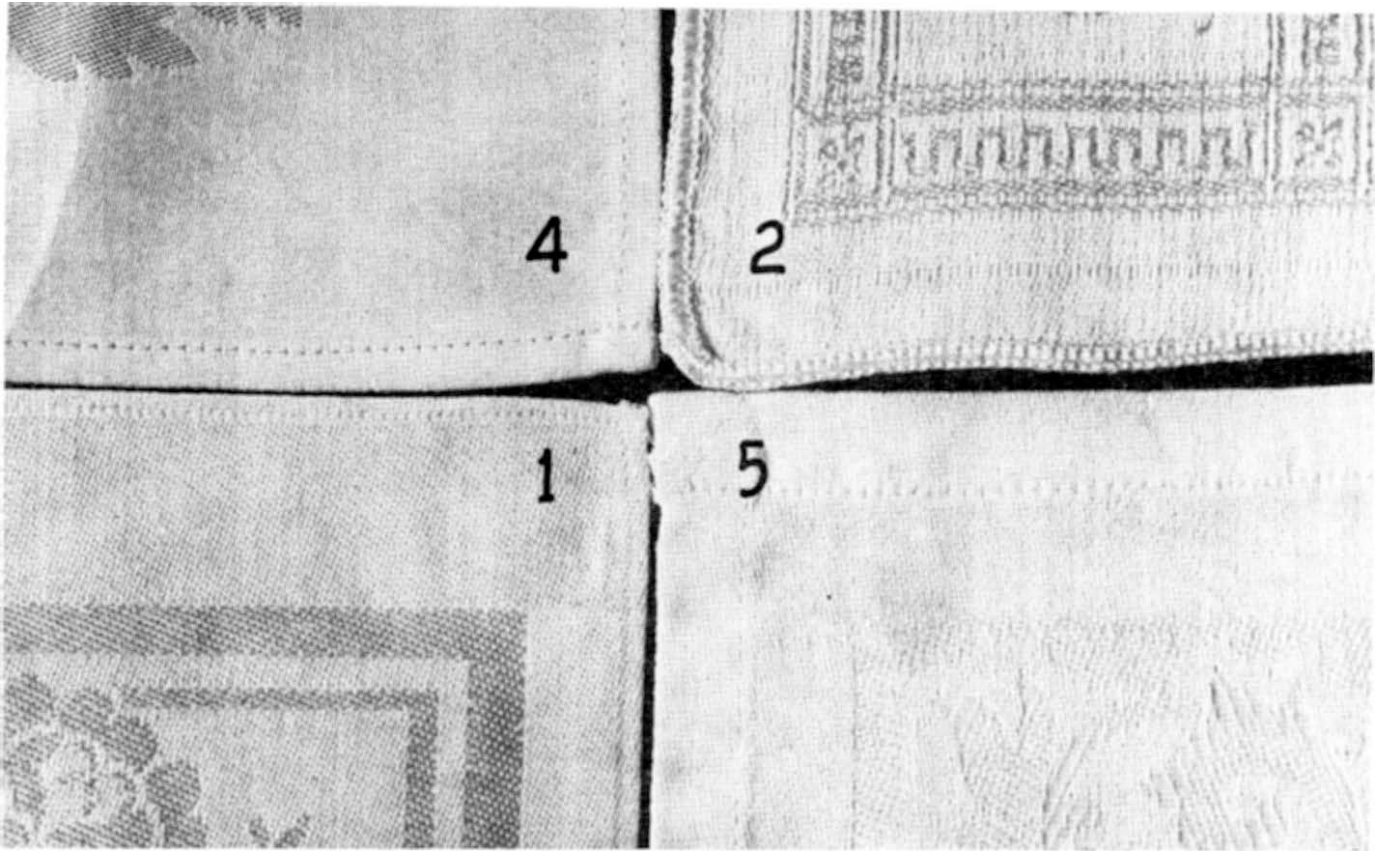


Fig. 1.—These four damasks show differences in design, closeness of weave, yarn and fiber. The napkins have a variety of edge finishes. The hem on RC-4 and the stitching on RC-2 required repair during the launderings. Neither RC-1 nor RC-5 needed any repair, but the hem on RC-1 gives a neater effect than the wide hem with the unmitered corners on RC-5. The hem on RC-1 was not only the narrowest of all, but it was sewed with the shortest stitch.

differed more than those on the cotton napkins. Only in napkins of C-3 and RC-3 were the hems not reinforced at all four corners. The hems of RC-1 were narrow and those of RC-5 were wide. Both were durable hems, but because the hems on RC-5 were not mitered, they were bulky at the corners.

## **PROCEDURES**

### **Home Use and First Laundry Procedure**

A first set of napkins of the ten damasks received home use and laundering over a period of two years. The napkins were used from one to three times only between launderings so that none would become heavily soiled. The same number of napkins of each fabric were uniformly laundered each time. They were washed within one to four days after use.

The laundry procedure was as follows. The napkins were put through a tepid water rinse, squeezed by hand and put into an agitator type machine filled with water at 120° F. A detergent was used, additional detergent being rubbed on spots of heavy soil (such as lipstick) before napkins were put into the suds. Napkins were washed eight minutes, spun, rinsed twice at the same temperature water for one minute each rinse and spun again. They were dried indoors on a rack. Napkins were dampened for ironing with approximately the same amount of moisture each time and ironed by hand. The maximum number of washings was 75.

The napkins were bleached with a chlorine bleach once in each 15 washings. The fabrics were rinsed twice after bleaching. No special stain removal treatment or spotting agent was applied to the fabrics.

### **Artificial Staining and Second Laundry Procedure**

Observations and results of tests on the first set of napkins lead to the study of a second set. Four fabrics of cotton and four of rayon-cotton were included (C-4 and RC-5 were omitted). These napkins were artificially stained and were laundered by a different procedure. Since the hems of napkins RC-2, RC-3 and RC-4 frayed in laundering, napkins of these fabrics were re-hemmed on two sides or restitched. This prevented loss of yarn which might nullify some test results.

Fabrics were stained with substances that are among the types of stains on napkins, and the napkins washed about 24 hours after being stained. (See page 9 for staining substances).

For this set of fabrics the tepid water rinse was omitted, the temperature was increased to 127° F. and the wash period to 10 minutes. The two rinses were at the same temperature as the wash suds. The napkins were dried and dampened as before but were ironed on an ironer. Each napkin was put through the ironer twice; the first with the warp direction lengthwise and the second time with the filling direction lengthwise.

The napkins were bleached in the same way as before except more frequently (once in each five washings) and the bleaching was followed by only one rinse. The length of time between the first washing and the last test period was about 11 months.

The development of a recommended washing procedure for damasks was not included in this study.

### **Observations and Tests**

Observations of damage to hems in the laundering, staining, change in hand and texture of the fabrics were made since such factors are important in serviceability but could not be or might not be detected in the tests made on the fabrics.

Tests were made on both new and laundered fabrics. The new (unlaundered) fabrics were tested for number of yarns per inch, shrinkage, weight, thickness, breaking strength, size of yarn and yarn twist. Laundered fabrics were tested for number of yarns per inch, weight, thickness, breaking strength, and shrinkage which occurred in laundering. Results of the tests are given in Tables II and III.

To get the actual shrinkage due to laundering, measurements were made on the napkins at each laundering up to and including 10 launderings and at each interval of 15 launderings. Other tests were made on the fabrics at periods of 15 launderings except in the second set of napkins where breaking strength was made only after 75 launderings.\*

Loss of weight was determined by weighing the same napkins when new and at each wash period.

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\* During the time the second set of fabrics was being tested following 60 launderings, the napkins of C-3 were taken from the laboratory. This accounts for the omission of C-3 in some tests at 60 washings and in all tests at 75 washings.



Thickness was measured by two different instruments. In both cases the compressor foot was one inch in diameter, but with one instrument a pressure of 1.5 pounds was applied to the fabric, and in the other the pressure was five pounds.

Results on shrinkage and weight of laundered fabrics are given for only the second set of fabrics.

## RESULTS

**Effect of Laundering on Hems.**—The hems on the rayon-cotton napkins were found to have a much greater bearing on serviceability of the napkins than hems on the cotton damasks. After 75 launderings, the hems on the cotton napkins were in good condition, but after only three washings the hems on some napkins of RC-3 had begun to fray. Eventually all napkins of RC-3 had to be re-hemmed on two sides. The warp yarns (cotton) slipped on the filling yarns (rayon) and this, together with the long stitch used in the hemming, permitted the lengthwise hems to fray badly. The stitched edge of RC-2 napkins also started to pull loose early in the washings. By reinforcing the edge with two rows of machine stitching the edges on these napkins were made to hold satisfactorily throughout the launderings. The hems of RC-4 napkins were better than those on RC-3, but they also had to be repaired. Figure 2 shows the effect of laundering on hems of napkins of two rayon-cotton damasks. The only hems on the rayon-cotton damasks that were satisfactory with respect to wear from laundering were those on RC-1 and RC-5. (As previously stated, hems on RC-5 were bulky at the corners and did not present a neat appearance.)

From the effects of laundering on the hems of napkins of all the fabrics, it is apparent that the quality of the hems on rayon-cotton

**Table II.—Some Characteristics of Five Cotton and Five Rayon-cotton Damasks.**

Fabric No.	Number of yarns per inch		Weight per square yard (ounces)	Breaking strength (pounds)		Thickness in inches at 1.5 lb. pressure	Shrinkage (percent) (shrinkage test)	
	Warp	Filling		Warp	Filling		Warp	Filling
C-1	69	69	4.91	66.3	74.2	.01102	3.39	3.45
C-2	67	60	5.93	111.1	84.9	.01542	5.57	7.64
C-3	65	66	5.17	61.4	70.9	.01259	3.73	3.78
C-4	64	68	5.12	64.5	71.2	.01232	3.89	4.47
C-5	64	43	4.31	35.3	32.7	.01146	6.27	1.04
RC-1	76	53	4.75	75.6	54.3	.01120	8.30	3.49
RC-2	66	78	6.70	65.8	90.7	.02395	5.14	+1.64
RC-3	73	78	6.69	109.3	76.8	.01834	3.65	3.33
RC-4	104	85	6.23	83.6	98.2	.01460	4.25	0.91
RC-5	88	42	5.74	91.7	44.7	.01754	7.51	4.61



Table III.—Characteristics of the Yarn in Ten Damasks.

Fabric No.	Yarn number (size) Grex system*		Number of twists per inch		Direction of twist		Number of ply in yarn	
	Warp	Filling	Warp	Filling	Warp	Filling	Warp	Filling
C-1	251	350	10.7	13.7	Z**	Z	single	single
C-2	391	377	15.6	16.1	Z	Z	single	single
C-3	273	336	11.1	13.3	Z	Z	single	single
C-4	277	366	14.7	13.0	Z	Z	single	single
C-5	260	442	19.7	15.6	Z	Z	single	single
RC-1	316	283	19.0	2.0	S***	S	2-ply	single
RC-2	365	335	16.3	2.3	Z	S	single	single
RC-3	392	348	11.9	1.1	S	S	2-ply	single
RC-4	197	340	23.6	2.2	S	S	2-ply	single
RC-5	372	337	13.7	2.0	Z	S	single	single

\* The larger the number the coarser the yarn.

\*\* Twist is in a clockwise or right hand direction.

\*\*\* Twist is in a counter-clockwise or left hand direction.

damasks is important to their serviceability. Because fabrics RC-2, RC-3, and RC-5 were thicker than RC-1 and RC-4, they might require wider hems. *However, the length of the machine stitch is probably more essential to the durability of the hem than the width.* The hems on RC-1 napkins (which were substantial) were the narrowest of any, and they also had the highest number of stitches (see Table I).

**Staining, Discoloration and Fading.**—The effect of staining, fading, and yellowing were judged by observation; yet some results were readily apparent. In a comparison of the napkins used by families, those of rayon-cotton appeared less stained than the all-cotton ones. When the fabrics were stained in the laboratory, however, no difference in resistance to staining was observed over a period of washings either between the rayon-cotton and all-cotton fabrics or between the fabrics of each fiber group. It is likely that the persons using the napkins were unconsciously more careful in their use of the rayon-cotton ones.

In the laboratory staining treatment, the fabrics were spotted with lipstick, vegetable oil, grape juice, prepared mustard, and a liquid containing protein. Although some kinds of lipstick wash out of a fabric readily, others are among the most persistent stains to remove. Not all stains were completely removed in one washing; however, except for the oil stain, they were removed by bleaching once in every five washings. The vegetable oil made a stain which became increasingly brownish with washing and which appeared to be unaffected by the general bleaching of the fabrics.

The napkins which received home use and were bleached once in every 15 washings became badly stained and discolored. Bleaching

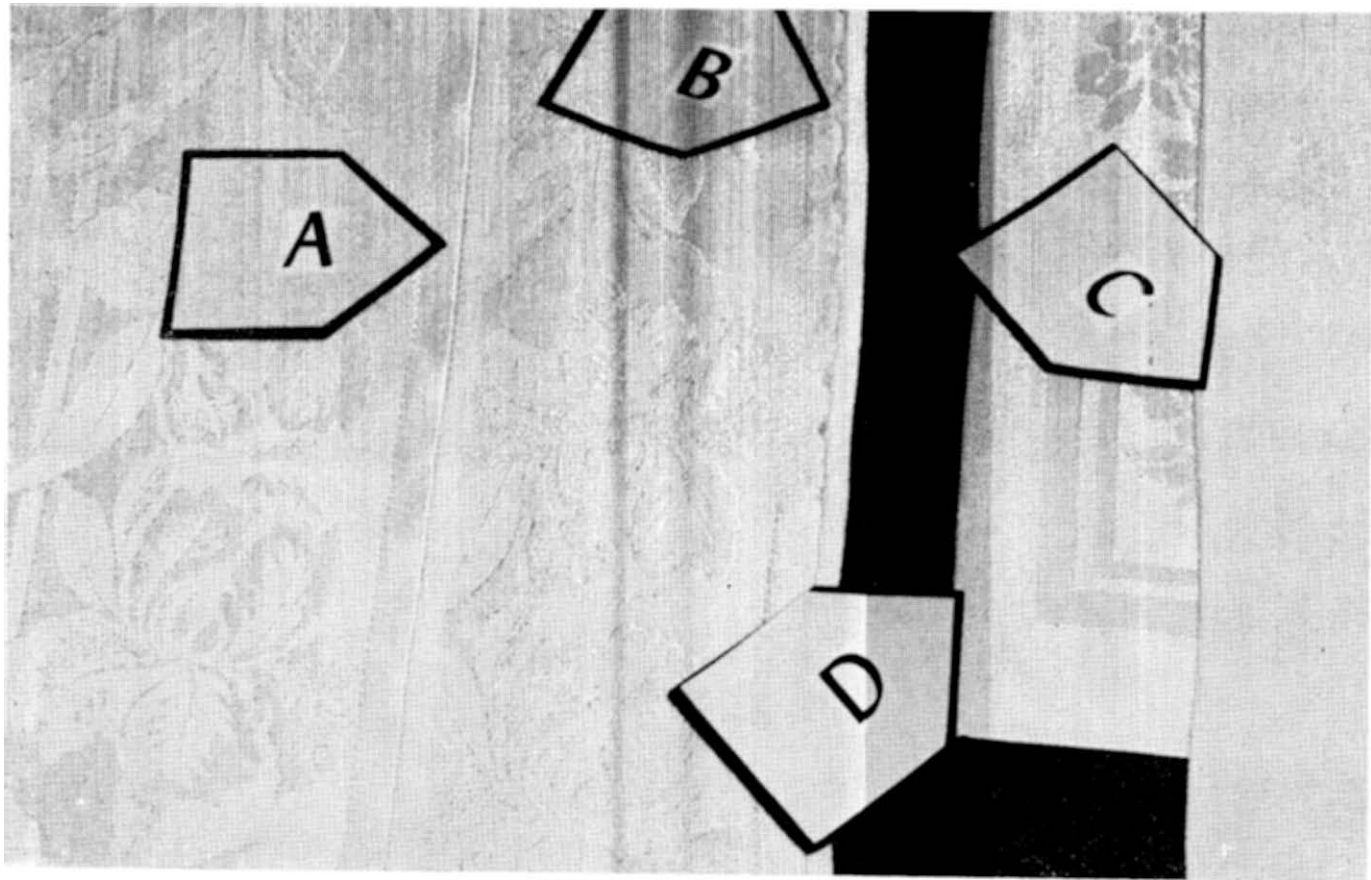


Fig. 2.—The durability of hems is important in the serviceability of napkins of rayon-cotton damask. The napkins labeled A and D are new (unlaundered) napkins of RC-3 and RC-1, respectively. The napkins B and C are the same fabrics after three launderings. Hems on napkins B (RC-3) show bad fraying whereas those on napkin C (RC-1) are in as good condition as when new. Hems on napkins RC-1 remained in good condition throughout 75 launderings. Two sides of napkins RC-3 had to be completely rehemmed.

the fabrics as often as once in every five washings was not sufficient to prevent yellowing although at least part of the discoloration was due to the water. A more severe laundry treatment such as using a higher temperature water, a bleach more often, or using a stronger bleach and some spotting of stains or a combination of these laundry procedures would undoubtedly result in a product more acceptable in appearance. In much home laundering there is generally some bleaching action from sunlight, but these fabrics were dried indoors and received no such bleaching.

The contrast in texture produced by the cotton and rayon yarns made stains less prominent on those fabrics than on the all-cotton damasks. In addition, the fabrics which were ecru or off-white showed stains less than those which were white. The fabrics with some color, especially RC-1 and RC-4, retained their color well throughout the many washings.

**Appearance and Hand of the Laundered Fabrics.**—Fabrics RC-1, which had been very highly calendered, RC-5, and all of the cotton damasks except C-2 had much less luster after the first 15 launderings than when they were new. The prominence of design in all fabrics was reduced by laundering because the ironing did not give the fabrics as flat a surface as they had received in the finishing process. Luster which is due to calendering may be misleading to the consumer who does not distinguish it from the permanent luster resulting from mercerization of cotton yarns or fabrics. Luster due to difference in the fiber (as rayon and cotton in the rayon-cotton damasks) is not affected by laundering.

All fabrics showed some fuzziness on the surface of the cotton yarns after repeated washing, but this change was most extensive on RC-3, C-1 and C-3. Differences in smoothness can be seen between RC-3 and RC-4 in Figure 3.

Although not measured by tests, the hand of most of the rayon-cotton damasks appeared to be little affected by laundering. The crispness of C-1, C-3 and C-4 which was undoubtedly due to sizing was lost in laundering.

**Closeness of Weave and Characteristics of the Yarn.**—Except for C-5, the cotton damasks each had a close balance between the number of warp (lengthwise) and filling (crosswise) yarns (see Table II). The rayon-cotton damasks RC-1, RC-4 and RC-5 had a much higher num-

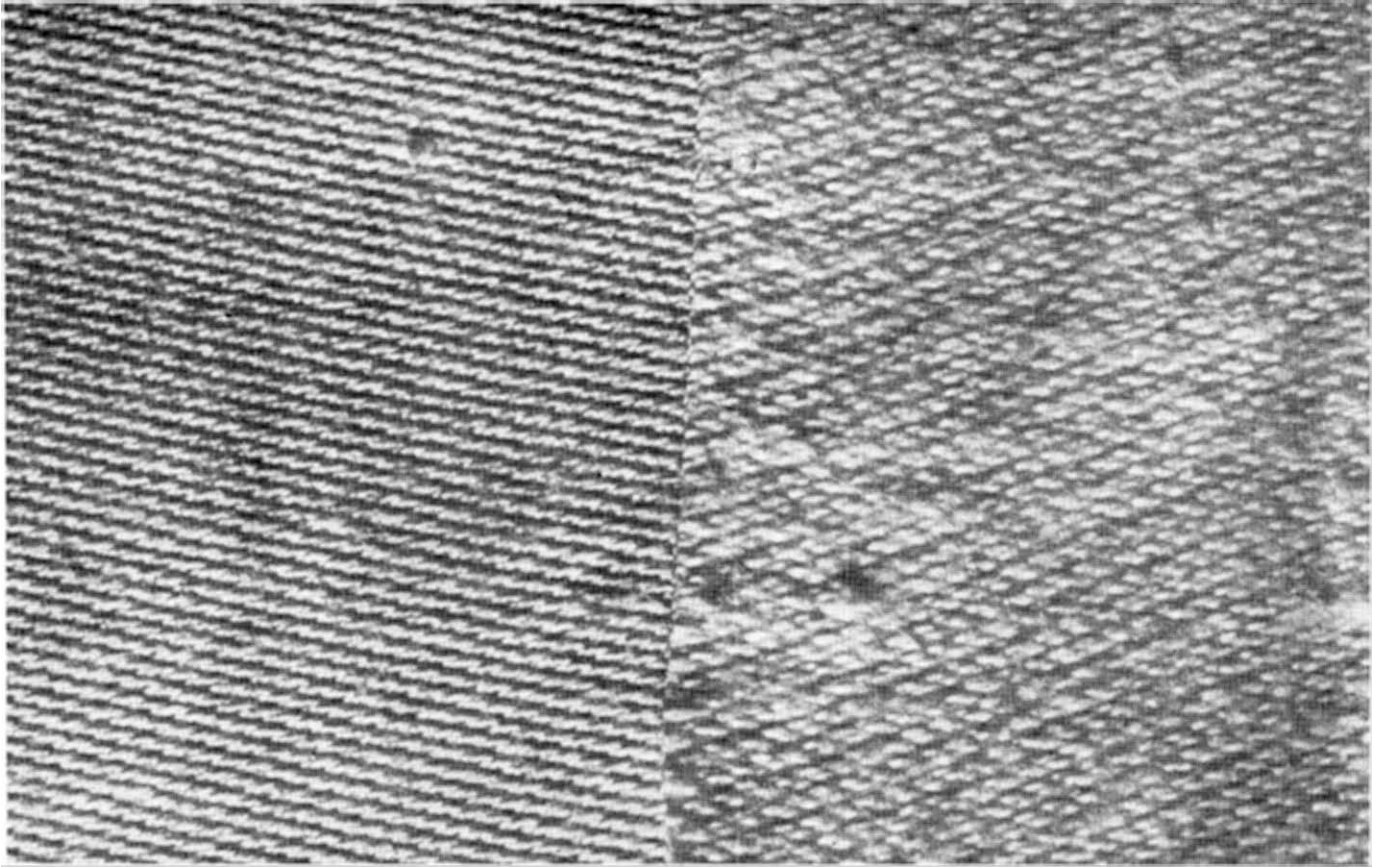


Fig. 3.—There two fabrics—RC-3 (right) and RC-4 (left)—are shown after being laundered 75 times. When new, they appeared similar in smoothness. The roughened surface on RC-3 not only reduces the attractiveness of the fabric, but may also result in changes in other properties. Among the characteristics that affect the retention of a smooth surface is the twist in the yarn. A higher twist tends to hold fibers together in a yarn and keep the fabric from becoming abraded through wear and cleaning

ber of warp than filling yarns. The cotton damask C-5 had a much lower total count than the other fabrics and RC-4 a much higher count.

Although closeness of weave (number of yarns per inch) has a bearing on appearance and quality of the fabric, it should be considered in relation to the nature of the yarn. It may be seen from Table II that C-2 had fewer yarns per inch than C-1 or C-3, but it weighed more and was thicker and stronger than the other two. Fabric RC-4 had the highest number of yarns of all fabrics, but it did not have a correspondingly higher weight, thickness and strength.

Some of these differences can be explained by differences in yarns. Although the number of yarns per inch in C-2 was less than in C-1 and C-3, the yarn was coarser (Table III) and it had more twist. Fabric C-5 had a low filling count but a coarse filling yarn, whereas RC-1 had a low filling count and the finest filling yarn of any of the fabrics. The filling yarn in RC-5 was the same size as that in three other rayon-cotton damasks, but the count was much lower. It is apparent, therefore, that the lower number of filling yarns in RC-1 and RC-5 was due to spacing the yarns farther apart than was the case in the other fabrics. The high number of yarns in RC-4 without accompanying increases in other properties was possible because the warp yarns were much finer than those in any other fabric.

The rayon yarns which were of filament fiber had very little twist. The cotton (warp) yarn in RC-4 was not only the finest yarn, but it had the highest twist. Although the characteristics of the fiber play an important role in the wear of a fabric, the higher twist in the yarn of RC-4 may have helped to make this fabric retain its smooth surface after many washings. All of the cotton damasks were made of single-ply, but the warp yarn in those damasks appearing to be of higher quality—RC-1, RC-3 and RC-4—was two-ply.

**Shrinkage.**—The amount of shrinkage differed within both the cotton and the rayon-cotton groups. Also, the amount of shrinkage in the shrinkage test and in laundering was not the same for both warp and filling directions.

A comparison of results on shrinkage in the test and in laundering shows the shrinkage test was a better indication of crosswise shrinkage (Fig. 4) than of lengthwise shrinkage (Fig. 5). Except for two fabrics—C-5 and RC-2—which got wider in laundering (RC-2 increased in width in the test, also), the other fabrics after 60 launderings were within or near the crosswise shrinkage obtained by the test. However, the decrease in length of the fabrics in the shrinkage test was not as

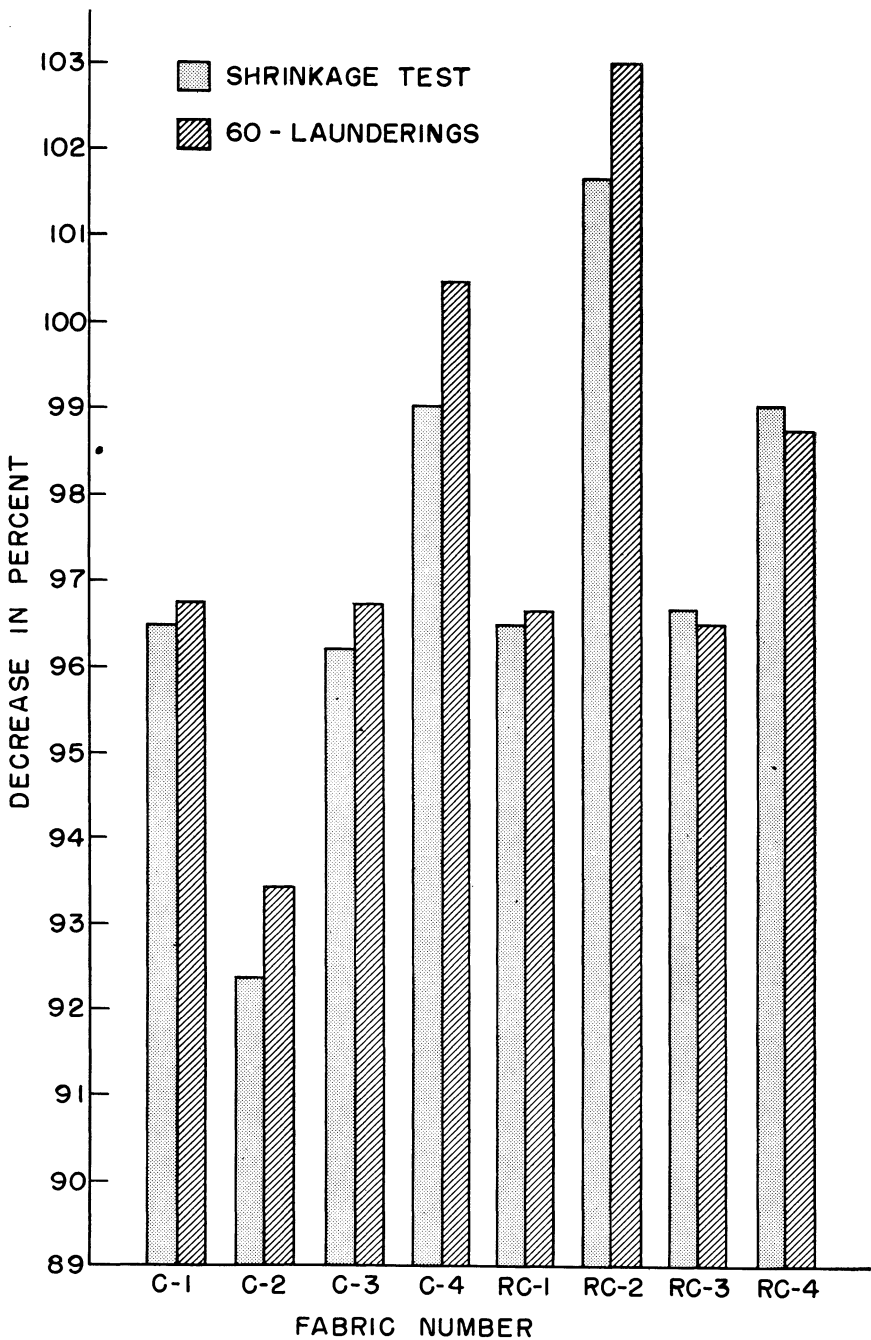


Fig. 4.—The lengthwise (warp) shrinkage of four cotton and four rayon-cotton damasks following the test for shrinkage and after 60 launderings.

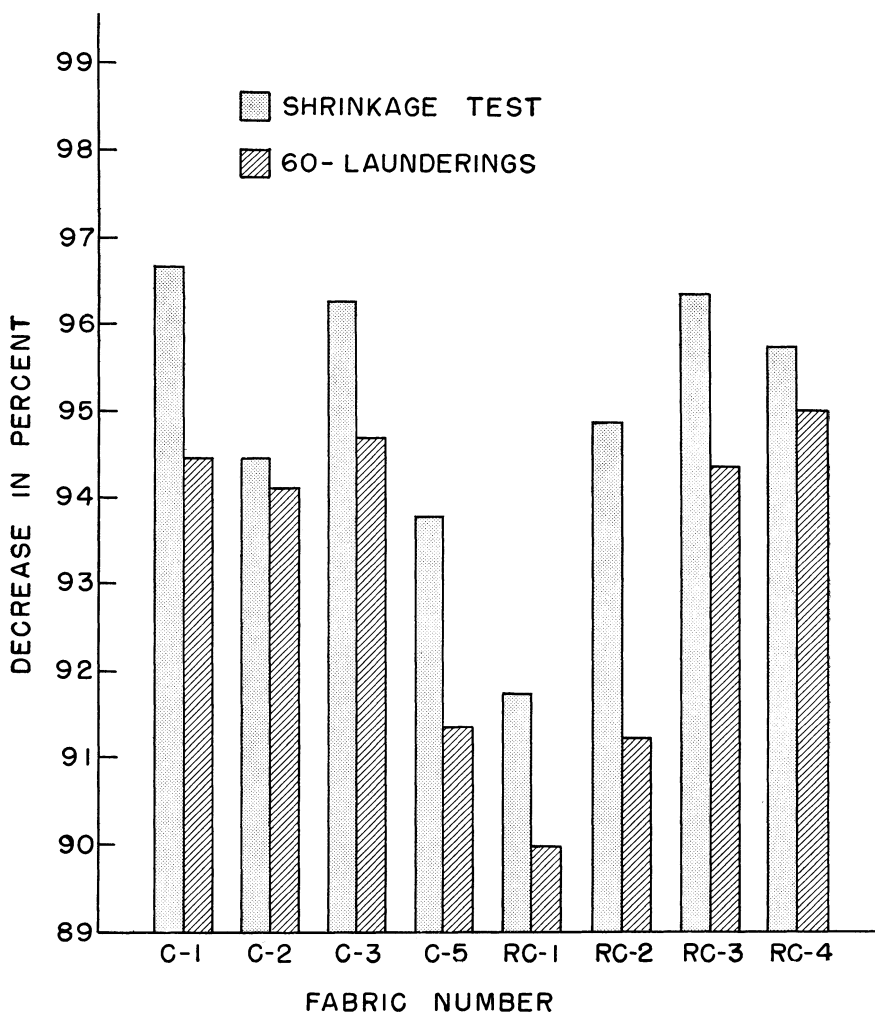


Fig. 5.—The crosswise (filling) shrinkage of four cotton and four rayon-cotton damasks following the test for shrinkage and after 60 launderings.



great as that in the fabrics laundered 60 times. In fact, by the ninth laundering, all fabrics except RC-4 had already shrunk more lengthwise than the amount obtained in the shrinkage test.

Crosswise shrinkage leveled off early in the launderings, but lengthwise shrinkage continued gradually throughout the launderings. The ironing technique undoubtedly affected shrinkage results at the different wash periods to some extent, thus accounting for fluctuations. Since the trend in shrinkage was the same for both the cotton and the rayon-cotton fabrics, difference in fiber was apparently not a factor in over-all shrinkage.

**Weight and Thickness.**—Decrease in weight and thickness of the fabrics was small. Table damasks—and napkins in particular—do not receive the wear from abrasive or rubbing action such as occurs on fabrics in many other uses and which may materially reduce both weight and thickness. Since the napkins were not subjected to a long wash period, there was little cause for a wearing away of the fabrics.

The cotton damasks lost more weight than the rayon-cotton fabrics, but the much greater loss of weight by three of the cottons (C-1, C-3, and C-5) and one rayon-cotton fabric (RC-1) in the first wash period may be attributed to loss of finishing material rather than to loss of fiber (see Figure 6). After the first wash period, C-5 and RC-2 continued to lose weight more rapidly than the other fabrics. Fabrics C-2, RC-3 and RC-4 lost the least weight.

The thickness of all fabrics increased in the first wash period over that of the new materials, and it increased most in the damasks which had been highly calendered. The results on thickness at the different wash periods were considered to be more of an indication of a lowered resistance to compression or loss of “body” due to laundering than to loss of fiber. (See Appendix for further comment on thickness.)

**Breaking Strength.**—A comparison of the effects of the two laundry methods on strength of the fabrics cannot be made due to differences in time between washings. However, the results in Tables I-A and II-A in the Appendix would suggest that at least where a bleach is used, the time between launderings may affect strength even when thorough rinsing follows the bleaching.

With strength as with weight and thickness, there is little wear on table damasks except that from the laundering and the deterioration resulting from the use of a bleach. Other tests in addition to breaking

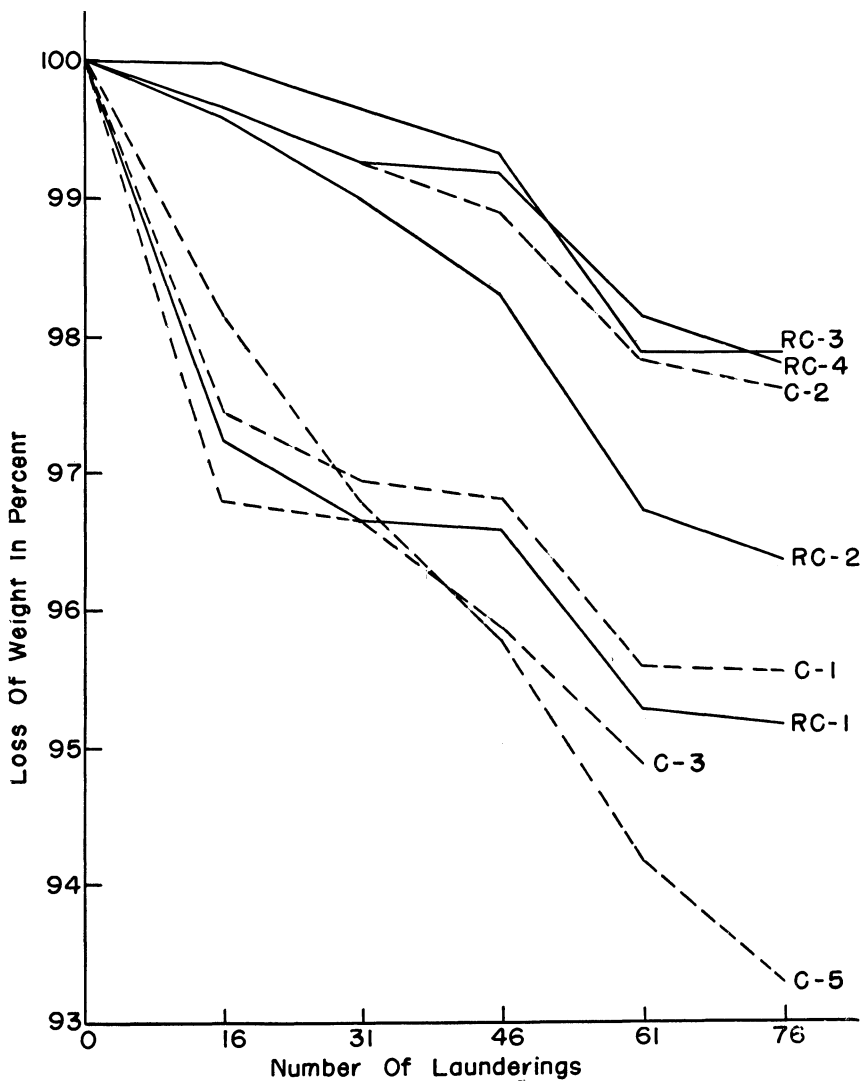


Fig. 6—Loss of weight of napkins of four cotton and four rayon-cotton damasks at five wash periods.

strength might give a more complete measure of fiber changes, particularly those due to the action of a bleach.

Strength in the filling direction (rayon yarns) of RC-2 varied more between napkins than that of any other fabric.

Under the conditions of laundering and bleaching in both laundry procedures, the strength in the filling direction was reduced less than that in the warp direction (cotton) of the rayon-cotton damasks. Other investigators using a different laundry procedure found that rayon yarns in rayon-cotton damasks became less weakened than the cotton yarns.\* To get a more accurate picture of the actual change in strength of yarns, one must consider the increase or decrease in number of yarns per inch due to shrinkage. The breaking strength divided by the number of yarns per inch gives a calculated yarn strength sometimes referred to as breaking strength index. But on this basis also, the rayon yarns lost less strength than the cotton ones. This lower loss of strength of the rayon yarns should not be interpreted to mean that under any washing and bleaching conditions the rayon would retain its strength better than cotton. However, the results on strength of the five rayon-cotton damasks reported here would indicate loss of strength of rayon yarns may not be of major importance in the serviceability of rayon-cotton damasks in home use.

### SUMMARY

Napkins made from five cotton and five rayon-cotton damasks were tested (a) as new fabrics; (b) for the effects of staining and laundering on appearance, and (c) for several physical properties of the fabrics. One set of napkins received home use and was laundered by a set procedure a maximum of 75 times. Another set was artificially stained and laundered by a second uniform procedure the same number of times.

Tests for the number of yarns per inch, shrinkage, weight, thickness, breaking strength, and size of yarn and twist of yarn were made on the new fabrics. All of these tests, except those on yarn, were made on the laundered fabrics. In addition, certain observations were made on the new and laundered fabrics.

The rayon-cotton damasks differed more than the cottons in appearance and in the construction of hems on the napkins.

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\* L. E. Sumner and D. Roseberry. "Serviceability of Linen, Cotton with a Permanent Finish and Rayon-Cotton Table Napkins." *Rayon Textile Monthly* 25:377-380. August 1944.

The hems of the cotton napkins were satisfactory throughout the launderings, but napkins of three of the rayon-cotton damasks had hems which frayed in laundering. A short hemming stitch appears to be an important characteristic for durability of hems on rayon-cotton damasks.

The fabrics appeared similar in susceptibility to stains. However, due to difference in texture of the rayon and cotton yarns, the rayon-cotton fabrics did not show the stains as readily as the all-cotton damasks. Also, the ecru and off-white damasks showed stains less than the white ones. Color in the dyed damasks faded little in washing and bleaching.

Of the five staining substances applied—lipstick, vegetable oil, grape juice, prepared mustard, and a liquid containing protein—only vegetable oil was not removed by the laundry procedure involving a bleach every five washings. This study did not include the development of a laundry procedure which might produce the best results in appearance and in length of service of table damasks made of cotton or rayon and cotton.

Laundering produced some fuzziness on the surface of the cotton yarns, particularly in fabrics RC-3, C-1 and C-3, which detracted from the appearance of the napkins.

The shrinkage test was a better indication of crosswise shrinkage than of lengthwise shrinkage occurring in the laundered fabrics. The test gave a crosswise shrinkage result near that of the laundered fabrics. In the lengthwise direction, laundered fabrics shrank more than they did in the test, and the shrinkage was continuous. The fabrics within each fiber group differed in amounts of shrinkage.

The loss of weight in the fabrics was small since the napkins did not receive much wear except that resulting from laundering; and this was a minimum due to the short washing time.

Thickness of all fabrics increased in laundering over that of the new fabrics. Changes after the first launderings were considered more a matter of lowered resistance to compression than to actual loss of fiber.

Under both conditions of laundering, rayon yarns lost less strength than cotton ones. From the results, it is likely that loss of strength is not as important as some other characteristics in the serviceability of damasks made from cotton and rayon. Other tests in addition to breaking strength might give a more satisfactory measure of fiber deterioration.

**APPENDIX**

Although recommended procedures were followed in making measurements of thickness of the damasks, the results are not considered entirely reliable. In measuring the fabrics at 1.5 pounds pressure, the thickness was apparently affected by the compressibility of the fabrics and not entirely by loss of thickness with corresponding loss of weight. When a five pound pressure was applied to the fabrics, the thickness varied less between measurements than when a smaller weight was used, but fluctuations resulted from change in workers.

The damasks varied in thickness between the design portion and the plain portion of the fabrics. Because of this difference, and the fact that the area of fabric included in each measurement was only one inch in diameter, sampling of a section of each napkin might have given more accurate measurements of changes in thickness at the test periods during the launderings.

Appendix Table I-A.—Average Breaking Strength of Damasks When New and After 75 Launderings—First Laundry Procedure.

Fabric No.	Warp						Filling					
	No. of yarns per inch		Breaking strength (pounds)		Calculated yarn strength (Brkng. str. ÷ yarns/in.)		No. of yarns per inch		Breaking strength (pounds)		Calculated yarn strength (Brkng. str. ÷ yarns/in.)	
	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.
C-1	69.2	73.4	66.3	43.2	0.958	0.589	68.7	73.7	74.2	54.1	1.080	0.734
C-2	67.5	72.9	111.1	83.6	1.646	1.147	60.2	66.6	84.9	67.8	1.410	1.018
C-3	64.9	68.6	61.4	42.7	0.946	0.622	66.2	71.8	70.9	54.0	1.071	0.752
C-4	64.3	69.2	64.5	48.0	1.003	0.694	68.3	72.1	71.2	63.4	1.043	0.879
C-5	64.4	64.4	35.3	23.5	0.548	0.365	43.4	47.4	32.7	23.0	0.754	0.485
RC-1	76.1	78.7	75.6	46.4	0.993	0.590	53.2	59.1	54.3	59.0	1.021	0.998
RC-2	66.4	63.9	65.8	41.9	0.991	0.656	77.7	87.2	90.7	83.2	1.167	0.954
RC-3	73.4	76.1	109.3	83.5	1.489	1.097	78.0	81.9	76.8	80.6	0.985	0.984
RC-4	104.6	105.9	83.6	65.9	0.799	0.622	85.1	90.7	98.2	102.4	1.154	1.129
RC-5	87.7	92.7	91.7	69.3	1.046	0.748	41.7	46.5	44.7	45.6	1.072	0.981

**Appendix Table II-A.—Average Breaking Strength of Damasks When New and After 75 Launderings—Second Laundry Procedure**

Fabric No.	Warp						Filling					
	No. of yarns per inch		Breaking strength (pounds)		Calculated yarn strength (Brkng. str. ÷ yarns/in.)		No. of yarns per inch		Breaking strength (pounds)		Calculated yarn strength (Brkng. str. ÷ yarns/in.)	
	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.	New	75 wash.
C-1	69.2	71.7	66.3	50.7	0.958	0.707	68.7	73.1	74.2	64.4	1.080	0.881
C-2	67.5	73.3	111.1	87.0	1.646	1.187	60.2	65.5	84.9	75.3	1.410	1.150
C-5	64.4	64.6	35.3	27.4	0.548	0.424	43.4	45.7	32.7	27.7	0.754	0.606
RC-1	76.1	79.0	75.6	53.4	0.993	0.676	53.2	59.6	54.3	56.6	1.021	0.950
RC-2	66.4	65.1	65.8	44.1	0.991	0.677	77.7	85.4	90.7	61.9	1.167	0.725
RC-3	73.4	76.7	109.3	79.6	1.489	1.038	78.0	82.9	76.8	81.7	0.985	0.986
RC-4	104.6	105.3	83.6	71.9	0.799	0.683	85.1	90.0	98.2	94.5	1.154	1.050