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Polyester/cotton for pillow cases

C. R. Sivers

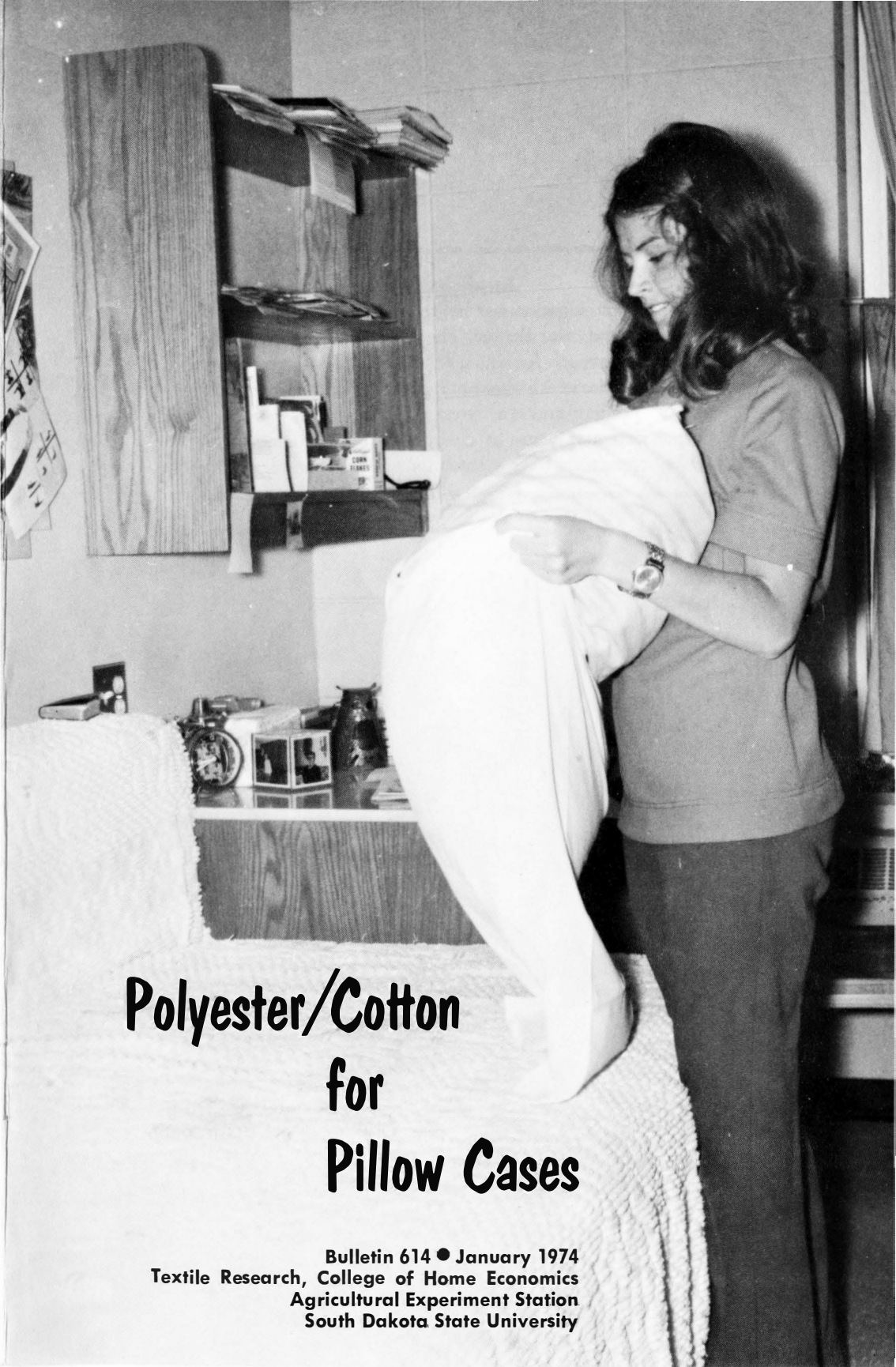
L. O. Lund

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Polyester/Cotton for Pillow Cases

**Bulletin 614 • January 1974
Textile Research, College of Home Economics
Agricultural Experiment Station
South Dakota State University**

Implications

This investigation was limited in scope to strength, appearance and color change. The polyester/cotton cases did maintain strength for this specified period but other physical properties which were not measured could be important such as pilling and tear strength after longer wear. The cases were not worn to destruction by 45 launderings. They apparently have a much longer wear period.

**COVER—Student casing
pillow in her dorm room.**

Polyester/Cotton for Pillow Cases

By
CORA R. SIVERS, associate professor, and LILLIAN O. LUND, professor,
Textile Research

Serviceability of polyester/cotton sheetings is important to the consumer who is concerned with initial cost versus wear-life. Although cotton sheetings are less expensive than polyester/cotton they usually need pressing for a smoother appearance. Since the polyester/cotton blend sheetings have been on the market but a short while, little is known about their performance and use.

The effect of wear and laundering, ease of maintenance, and loss of whiteness due to use are objectives of this research. Six types of white pillow cases of percale sheeting with a thread count of 180 to 190 per square inch were used in this study.

There were three 50/50 polyester/cotton blends with durable press finish and three all cotton percales. Pillow cases of these fabrics were purchased on the local market from mail order, chain and independent department stores. They ranged in price from \$1.39 to \$1.59 per pair for 100% cotton and \$2.19 to \$2.69 for the 50/50 polyester/cotton with a durable press finish.



Pillow cases
being delivered
to dorms by
student
assistant.



A pillow makes a good prop while studying.

Research Conditions

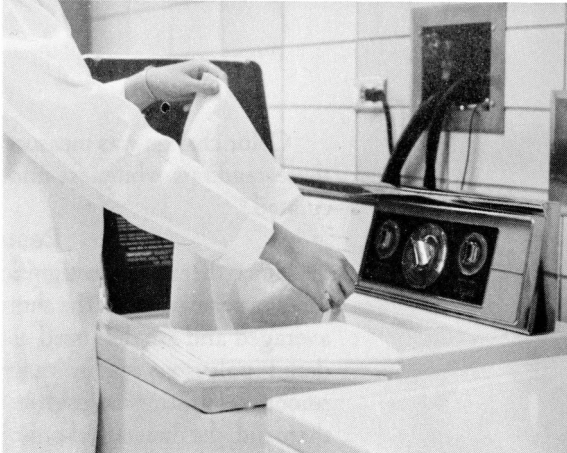
South Dakota State University coeds cooperated in the wear study. The cases were taken to the girls in the dormitory, collected after each week of use and returned to the laboratory for laundering. Cases were withdrawn for evaluating durable press, dimensional stability and physical analyses after 5, 15, 30 and 45 launderings.

For comparing the effect of laundered-only with the used and laundered cases, three cases of 100% cotton and three of 50/50 polyester/cotton from each type store were laundered and withdrawn after 5, 15, 30 and 45 launderings.

Three extra cases for each type were used and laundered and used as replacements for cases lost or stained with hair dye.

Home type automatic washing machine and dryer, softened water and a common built detergent were used for the laboratory laundering. A flat-bed press (set at 300° F.) was used to press the cotton cases. Durable press cases were never pressed. The flat-bed press was used to eliminate stretching the fabric with an iron. Laundering procedures were consistent with the American Association of Textile Chemists and Colorists (AATCC) recommended treatment for each type of fabric. The temperature of water was $140 \pm 5^\circ$ F. for the cotton cases and $105 \pm 5^\circ$ F. for the cotton/polyester cases. The wash cycle for both

**Laundering cases in
South Dakota State
University textile
research laboratory.**



fabrics was 12 minutes with a slow spin setting for the polyester/cotton cases only. Each load weighed 4 pounds.

All cases were placed in the automatic dryer. The cotton cases were withdrawn while damp and then pressed. The polyester/cotton cases were completely dried on a permanent press setting with a 5-minute cool period and were then removed immediately.

Visual evaluations for durable press ratings were done on both the used and the laundered-only polyester/cotton cases after 5, 15, 30 and 45 launderings. The AATCC three-dimensional plastic replicas were used for smoothness scale ratings of 1 (poorest smoothness retention) to 5 (best smoothness retention).

Dimensional change of the fabric was determined after each withdrawal period. These measurements were done on the laundered-only cases.

The laundered and used units withdrawn from service at specified intervals were analyzed for thickness, tear strength, breaking strength (grab) and weight.



**Drying durable
press cases.**

Color change was measured on the photovolt and from these readings whiteness and yellowness values were calculated.

Results

Since there was no significant difference among pillow cases purchased from the three types of stores, results were averaged and are discussed as a group. The used and laundered polyester/cotton cases received a slightly better smoothness rating both after the 5th and 45th laundering than did the laundered-only. However, both had acceptable smoothness ratings and maintained essentially the same ratings, averaging 3 to 3.4.

The used polyester/cotton cases maintained their whiteness slightly better than the all cotton which lost more than a fourth of their original whiteness after 45 launderings. The laundered-only cases had essentially the same whiteness as the original except for a loss of 4% to 6% in the polyester/cotton.

Yellowness was evident. All laundered and used 100% cotton cases showed between 6% and 7% yellowness by the 30th and 45th laundering. The original polyester/cotton cases appeared more blue than the original cotton cases. At the 45th laundering the polyester/cotton cases had a range of yellowness from 2.4% to 5.2%. The laundered-only cases showed more yellowness than the originals but were all under 3.0%.

All cases had greatest warp shrinkage during the first one to five launderings with the all cotton averaging 6.2% shrinkage and the polyester/cotton averaging 1.5%. A small amount of shrinkage continued through the 45th laundering for most cases; however, the cotton/polyester averaged only 1.8% total shrinkage while the all cotton group averaged 7.7%. These measurements were taken on the laundered-only cases.

Both the all cotton and polyester/cotton cases were slightly thicker than the original fabric after 45 periods of use and laundering. This is due to shrinkage.

Since the all cotton cases lost strength after 45 launderings and use and the polyester/cotton did not lose an appreciable amount, it may be assumed the polyester fiber contributed strength. A similar correlation was noted in the tear strength where the polyester/cotton cases maintained their original strength and the all cotton cases did not.



Pressing all-cotton cases on flat bed press.

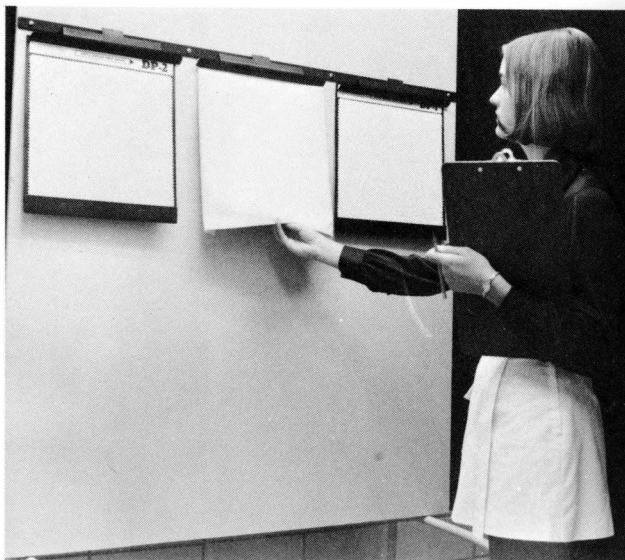
How It Was Done

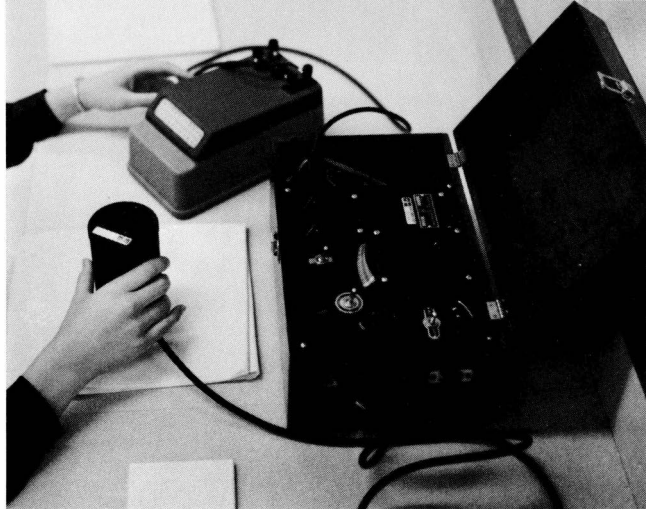
SDSU Textile Research laboratories use several types of special equipment for measuring, checking and comparing fabrics used in experiments. For example, some of the equipment is used to detect changes in whiteness more accurately than possible with the human eye alone. Other machines measure and record strength of fabrics.

Another important part of the research is the work done by undergraduate students under supervision of Textile Research staff members. This provides valuable training and experience.

Some of the various procedures and methods used in this polyester/cotton pillowcase research are shown in the following "How It Was Done" section.

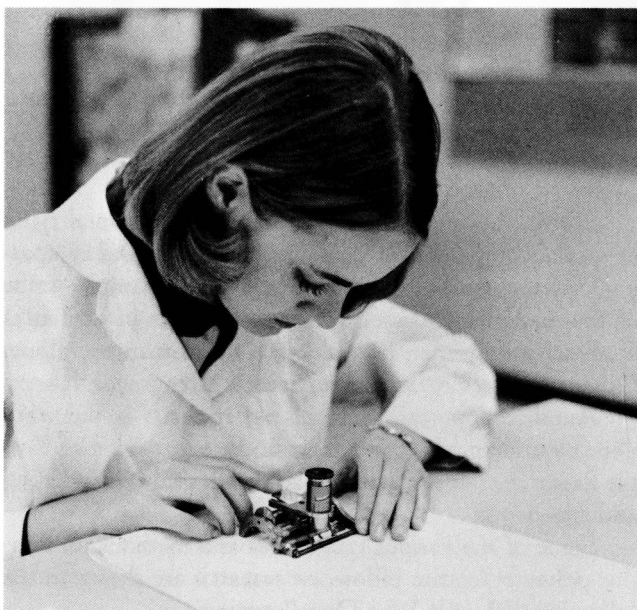
Visual
evaluation of
smoothness.
Durable press
rating from
1 (poorest) to
5 (best).



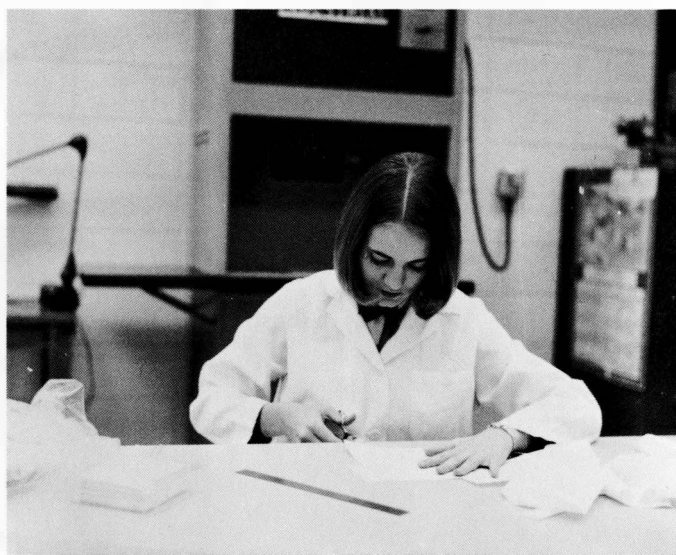


Using photo-volt
to detect change
in whiteness due
to use and
laundering.

Counting yarns
per inch.



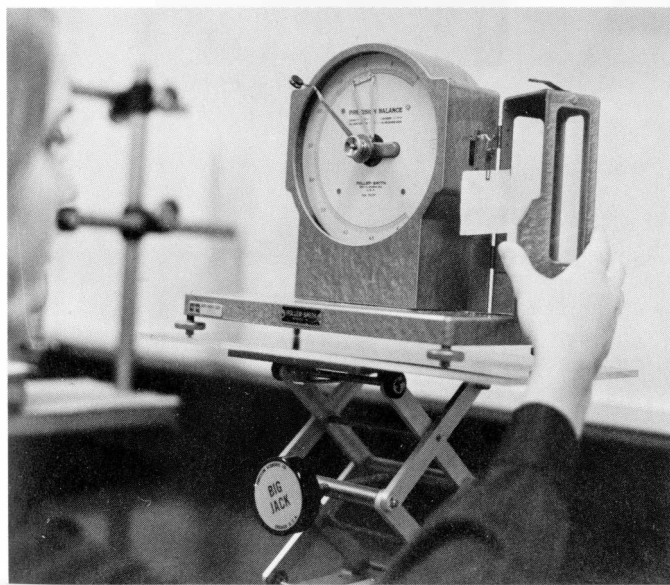
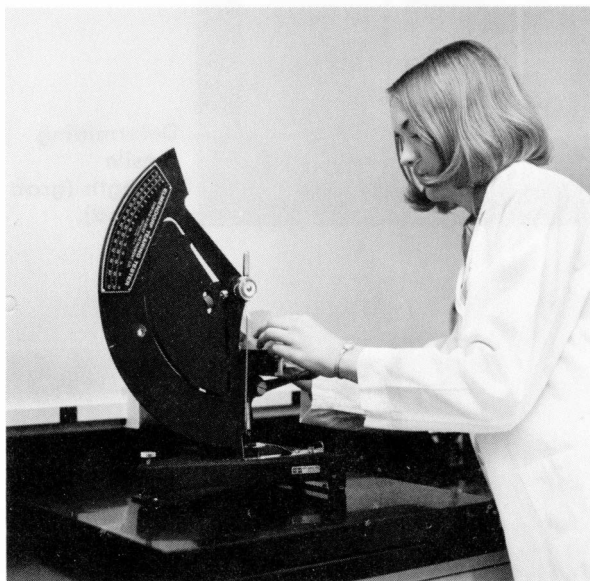
Sampling
cases for
physical
analyses.



Thickness
measurement.



Tear testing.



Weighing
2-inch square
piece of
fabric.



Determining
tensile
strength (grab
method).



Calculation
of data.

2.5M-1-74-1158