

SHRINKAGE 85

INFLUENCE OF MOISTURE CONTENT ON SHRINKAGE DEVELOPMENT
IN TUMBLE DRYING

PART 4 : 1 x 1 Rib Winch Bleach

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1. INTRODUCTION

In parts 2 and 3 of this series the behaviour of winch dyed 20G interlock and piece mercerised and gyrostock dyed 28G single jersey fabric was monitored during several five cycle washing/rinsing and tumble drying sequences in which the time in the tumble dryer was varied. Fabric shrinkage and moisture content was established for each test specimen, for each cycle both immediately after leaving the tumble dryer and after a period of conditioning in the laboratory. The results were compared with those obtained on samples of the same fabric which had been line dried under controlled conditions.

In this report, part 4, the results of a similar series of trials carried out on a 14G 1 x 1 rib fabric are discussed.

2. SAMPLE PREPARATION

2.1 Tumble dry sets

Five sets, each comprising 5 standard shrinkage specimens (50 x 50cm² template) were prepared from a piece of 14G 1 x 1 rib, knitted from Ne 1/30 combed cotton at 0.282cm nominal stitch length, which had been winch bleached and finished during a separate investigation at Martins Dyers and Finishers.

Each specimen was conditioned in the laboratory, marked, measured and weighed prior to laundering. Five standard loads of 2.75kg were made up, including the test specimens, with make-weight fabric of a similar construction.

Initial moisture content and % regain were determined from four separate samples taken from the same fabric piece.

2.2 Line Dry Sets

An additional set of 5 standard shrinkage specimens was prepared from the same fabric piece and the specimens conditioned, marked, measured and weighed. These were then included in a 6th standard load which was made up as before to 2.75kg with make-weight fabric of a similar construction.

3. EXPERIMENTAL PROCEDURE

3.1 Tumble Dry Sets

Each set of 5 shrinkage specimens plus make-weights was washed in a Hoover automatic, domestic washing machine at 60°C.

On completion of the washing cycle the test specimens were weighed and then the full load transferred to a Hoover domestic, continuous action, tumble dryer and tumble dried on the hottest temperature setting for a specified length of time. Tumbling was then continued for a further 10 minutes with the heat turned off, by using the cool down setting on the tumble dryer:-

- Set 1 40 mins hot tumble + 10 mins cool down
 Total time in tumble dryer = 50 minutes

- Set 2 50 mins hot tumble + 10 mins cool down
 Total time in tumble dryer = 60 mins

- Set 3 60 mins hot tumble + 10 mins cool down
 Total time in tumble dryer = 70 mins

- Set 5 80 mins hot tumble + 10 mins cool down
 Total time in tumble dryer = 90 mins

- Set 7 100 mins hot tumble + 10 mins cool down
 Total time in tumble dryer = 110 mins

On completion of the specified drying time, the test specimens were weighed and measured and then transferred to the laboratory for reconditioning in the standard atmosphere (65%RH, 20°C). Each specimen was allowed to recondition overnight (minimum 12 hours).

After reconditioning the specimens were reweighed and remeasured and then the complete load was re-wet-out in the washing machine using the rinse cycle. On completion of the rinse cycle the test specimens were weighed and the load transferred to the tumble dryer and dried for the appropriate length of time, i.e. set 1 (40 + 10) mins, set 2 (50 + 10) mins, etc.

On completion of the specified drying time, the test specimens were weighed and measured and then transferred to the laboratory for reconditioning, reweighing and remeasuring.

The rinse/tumble drying cycles were repeated a further 3 times for each set. Measurements being taken both straight from the tumble dryer and after reconditioning in the laboratory.

3.2

Line Dry Set

The line dry set was washed in a Hoover automatic, domestic washing machine at 60°C in the same way as the tumble dry sets.

On completion of the washing cycle the test specimens were weighed and then hung on a line in the laboratory in the standard conditioned atmosphere and left to dry for 24 hours. After 24 hours the test specimens were weighed and measured before being returned, with the make-weights, to the washing machine for rewetting using the rinse cycle.

On completion of the rinse cycle the specimens were reweighed and hung on a line in the laboratory for 24 hours before remeasuring and reweighing.

The rinse/line dry cycle was repeated a further three times.

4. RESULTS

The individual results for shrinkage, weight and moisture content for each set are given in individual appendices at the end of this report.

Tables 1 and 2, and Figures 1-14 summarise the average results obtained from all sets.

Tables 3-7 give the results of the statistical analysis which compares results obtained before and after reconditioning for each of the tumble dry sets.

5. DISCUSSION

5.1 Measured straight from the tumble dryer

5.1.1 Length shrinkage

In each of the tumble dry sets, length shrinkage increased progressively with the number of cycles. Generally, also, length shrinkage increased with the length of time in the tumble dryer. In particular, set 1 (40 + 10) and set 2 (50 + 10) did not develop the same amount of shrinkage as found in the other three sets. The differences in shrinkage found between sets 3 (60 + 10), 5 (80 + 10) and 7 (100 + 10) was, however, negligible. This would appear to indicate that the full shrinkage potential of a fabric during any one cycle can only be achieved if the average moisture content in the specimens falls below approximately 2%. Once the specimens are uniformly dry (between 0 and 2% residual moisture) tumbling for additional lengths of time does not appear to significantly increase the level of length shrinkage developed.

The shrinkage results recorded for set 1 (40 + 10) were similar to the results obtained from the line-dry set, which also showed progressive shrinkage with number of cycles. With the exception of set 1, the shrinkage recorded in tumble drying was significantly higher than that recorded after line drying.

Variation between specimens within a set improved over sets 1, 2, 3 and 5 but did not improve further with extended tumbling times. The variation between specimens for the line dry set was slightly better than set 1 and slightly worse than sets 5 and 7.

5.1.2 Width shrinkage

Width shrinkage was, on average, progressive with number of cycles, with the exception of set 7 (100 + 10) where there was no difference between cycles 1 and 5. Generally width shrinkage increased with length of time in the tumble dryer (reducing moisture content). In particular, width shrinkages recorded for set 1 were significantly lower than for the other sets, and set 2 showed a marked increase in width shrinkage after the first cycle when moisture contents were on average falling below 4%. There is, however, an indication that for 1 x 1 rib fabric, width shrinkage may be sensitive to extended tumbling times. The results obtained for set 7 (100 + 10) are significantly lower (approximately 2%) than those obtained for set 5 (80 + 10), although they are very similar to set 3 (60 + 10). In addition the results for set 7 are slightly more variable than those for set 5 and the average moisture content in the specimens slightly higher, although again in both cases they are similar to those obtained for set 3. Therefore, it may be that these results are simply reflecting the inherent variability in the rib construction and illustrating the difficulty of obtaining consistent results with this fabric type which has been apparent from previous studies. On the average, however, it is still true to say that the full width shrinkage potential of the fabric can only be achieved with any degree of consistency if residual moisture contents during tumble drying are reduced below approximately 2%.

The specimens which had been line dried developed a small width extension which generally increased progressively over number of cycles. On average (sets 3, 5 and 7) width shrinkage to tumble drying was approximately 8% immediately after drying and approximately 6.3% after conditioning, compared to an average width extension of +1.3% to line drying. A difference between tumble and line of 9% and 7.6% before and after conditioning.

A similar comparison for length shrinkage gives figures of approximately 7.7% and 6.3% for tumble dried fabrics before and after conditioning, compared to a length shrinkage of 4.1% to line drying. A difference between tumble and line drying of 3.6% and 2.2% before and after conditioning.

These differences are quite different from those obtained on interlock and single jersey. There is apparently a much greater difference between line and tumble drying in the width direction for rib fabrics, and a smaller difference in the length direction.

Variation between specimens within a set improved over sets 1, 2 and 3 but did not on average improve further with extended tumbling times. Variation in width shrinkage measurements was on average higher than for length shrinkage. The variation in width shrinkage measurements for the line dry set were better than sets 1 and 2 but worse than sets 3, 5 and 7.

5.1.3 Moisture content

Moisture content in the specimens reduced with length of time in the tumble dryer sets 1, 2 and 3 but on average did not fall below 1%. Consistent minimum levels of moisture (0-2%) were achieved with set 3 (60 + 10), set 5 (80 + 10) and set 7 (100 + 10).

Variation in moisture content between specimens also decreased with increased tumbling times sets 1, 2 and 3 but did not improve further in sets 5 or 7. With sets 1 and 2 in particular the variation in moisture content also generally reduced with number of cycles.

The variation in moisture content of the line dry samples was insignificant.

5.2 INFLUENCE OF CONDITIONING

5.2.1 Length shrinkage

Conditioning after tumble drying generally reduced the variability between specimens for sets 1 and 2 but had no effect on the other sets. Conditioning also caused a significant reduction in the levels of recorded length shrinkage between approximately 1 and 2% for sets 2, 3, 5 and 7 but had virtually no effect on set 1 although on average there was a slight increase in the absolute values.

5.2.2 Width shrinkage

On average conditioning reduced the variability in the measurements for all sets and with the exception of set 1 caused a significant reduction in the absolute values of width shrinkage between 1-2%. For set 1 conditioning caused an increase in width shrinkage although the difference was not on average significant.

5.2.3 Moisture content

Variation in moisture content after conditioning was negligible for each set although there was a small decrease in the absolute values corresponding to length of time in the tumble dryer.

The moisture content of the line dry set (set 8) was similar to that of set 1 after conditioning while the moisture content of set 7 was approximately 1.2% less.

Sets 1, 2 and 8 retained higher moisture contents after conditioning compared to the original moisture content, while sets 3, 5 and 7 had lower moisture contents on average after conditioning compared to the original.

6. CONCLUSIONS

- 6.1 For this fabric quality length shrinkage increases with length of time in the tumble dryer (reducing moisture content) but once the average moisture content of the specimens falls below 2% no additional shrinkage appears to develop.
- 6.2 Length shrinkage increases with the number of cycles but unless the specimens are dried below approximately 2% residual moisture content, maximum length shrinkage does not develop even after 5 cycles.
- 6.3 For this fabric quality width shrinkage generally increases with length of time in the tumble dryer and with number of cycles, although there is perhaps some evidence to suggest that width shrinkage may begin to decrease with extended tumbling times e.g. 100 + 10 mins.
- 6.4 Maximum width shrinkages are only achieved, on average, when residual moisture contents fall below 2%.
- 6.5 Moisture contents were generally reduced with length of time in the tumble dryer but did not on average fall below approximately 1%. For set 1 and 2 in particular the residual moisture contents reduced with the number of cycles.
- 6.6 Conditioning after tumble drying on average reduced the variability in both length and width measurements and with the exception of set 1 caused a reduction in shrinkage measurements by between 1 and 2%. For set 1 conditioning caused a slight increase in shrinkage measurements but the difference was not significant.
- 6.7 Less length shrinkage is developed in line drying compared to tumble drying, but the difference is smaller than has been previously observed on interlock and mercerised single jersey qualities; an average 3.6% measured before conditioning and 2.2% measured after conditioning of the tumble dry fabrics.
- 6.8 Line drying caused a small width extension in this fabric quality which increased progressively over cycles. The difference between line and tumble dry results was also found to be much larger than has been previously observed in interlock and mercerised single jersey qualities; an average 9% before conditioning and 7.6% after conditioning of the tumble dry fabrics.

SHRINKAGE 85

1x1 RIB Ne 1/30, Stitch Length 0.282cm, FINISH Winch Bleach

Average of 5 replications : Measured straight from the Tumble Dryer

Sample Reference	LS%	SD	WS%	SD	MC%	SD

Set 1 Tumble Dry 40+10 mins						
1	2.62	0.67	0.14	1.12	20.22	3.07
2	3.42	0.97	2.06	2.28	13.04	4.72
3	3.76	0.8	2.78	1.86	11.5	3.73
4	3.46	0.49	1.32	1.18	14.06	1.53
5	4.42	0.62	1.56	0.91	11.25	1.47
mean	3.54	0.71	1.57	1.47	14.01	2.9
sd	0.65	0.18	0.98	0.58	3.65	1.41

Set 2 Tumble Dry 50+10 mins						
1	4.18	1.51	3.1	1.96	10.45	3.36
2	6.94	0.27	8.06	0.88	2.46	0.19
3	5.86	1.05	6.66	1.39	6.9	2.3
4	7.1	0.23	8.12	1.02	3.45	0.22
5	7.54	0.22	7.82	0.82	2.51	0.48
mean	6.32	0.66	6.75	1.21	5.15	1.31
sd	1.35	0.59	2.13	0.47	3.47	1.44

Set 3 Tumble Dry 60+10 mins						
1	6.58	0.61	7.4	0.68	1.52	0.06
2	7.56	0.41	7.32	1.14	0.62	0.56
3	7.9	0.64	8.06	0.61	0.96	0.03
4	8.14	0.61	7.9	0.46	0.86	0.21
5	8.36	0.3	7.86	1.13	0.85	0.11
mean	7.71	0.51	7.71	0.8	0.96	0.19
sd	0.7	0.15	0.33	0.31	0.34	0.22

Set 5 Tumble Dry 80+10 mins						
1	6.86	0.42	8.48	0.61	1.33	0.13
2	7.5	0.26	8.84	0.71	1.17	0.2
3	7.52	0.28	9.5	0.53	1.29	0.33
4	8.2	0.32	9.58	0.16	0.78	0.11
5	8.18	0.18	9.58	0.3	0.77	0.15
mean	7.65	0.29	9.2	0.46	1.07	0.18
sd	0.56	0.09	0.51	0.23	0.27	0.09

Set 7 Tumble Dry 100+10 mins						
1	6.72	0.25	7.16	0.61	1.34	0.07
2	7.22	0.43	7.32	0.73	1.69	0.43
3	7.52	0.3	7.4	0.52	1.46	0.09
4	8.24	0.38	6.62	0.78	1.33	0.14
5	8.72	0.27	6.94	0.97	0.75	0.29
mean	7.68	0.33	7.09	0.72	1.31	0.2
sd	0.8	0.08	0.32	0.17	0.35	0.15

Set 0 Line Dry 24Hrs Conditioned Atmosphere						
1	3.84	0.27	-0.06	1.42	7.83	0.04
2	3.86	0.58	-1.28	1.45	7.75	0.03
3	3.7	0.48	-0.62	0.16	7.7	0.05
4	4.46	0.38	-2.1	0.36	7.87	0.31
5	4.7	0.68	-2.6	1.42	7.46	0.03
mean	4.11	0.48	-1.33	0.96	7.72	0.09
sd	0.44	0.16	1.04	0.64	0.16	0.12

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SHRINKAGE 85

1x1 RIB Ne 1/30, Stitch Length 0.282cm, FINISH Winch Bleach

Average of 5 replications : Measured after conditioning

Sample Reference	LS%	SD	WS%	SD	MC%	SD

Set 1 Tumble Dry 40+10 mins						
1	3.34	0.31	2.24	1.37	7.59	0.04
2	4	0.68	2.14	1.78	7.56	0.1
3	3.84	0.35	2.7	1.12	7.29	0.22
4	4.12	0.33	1.94	1.02	7.45	0.05
5	4.16	0.5	2.74	0.86	7.55	0.08
mean	3.89	0.43	2.35	1.23	7.49	0.1
sd	0.33	0.16	0.35	0.36	0.12	0.07

Set 2 Tumble Dry 50+10 mins						
1	4.56	0.51	3.3	1.31	7.48	0.12
2	5.74	0.36	6.46	0.54	6.48	0.07
3	5.34	0.44	4.92	1.6	7.21	0.33
4	6.02	0.26	6.38	1.02	6.63	0.05
5	6.62	0.36	6.16	0.54	6.44	0.15
mean	5.66	0.39	5.44	1	6.05	0.14
sd	0.77	0.09	1.35	0.47	0.47	0.11

Set 3 Tumble Dry 60+10 mins						
1	5.24	0.69	5.62	0.88	6.23	0.02
2	6.04	0.58	5.74	0.71	6.3	0.06
3	6.46	0.17	5.78	0.57	6.28	0.34
4	6.72	0.58	6.46	0.93	6.15	0.05
5	6.44	0.84	6.2	0.85	6.19	0.03
mean	6.18	0.57	5.96	0.79	6.23	0.1
sd	0.58	0.25	0.35	0.15	0.06	0.14

Set 5 Tumble Dry 80+10 mins						
1	5.46	0.27	7.86	0.61	6.55	0.09
2	5.84	0.5	6.96	0.8	6.56	0.07
3	6.44	0.3	7.14	0.26	6.31	0.02
4	6.78	0.26	7.64	0.41	6.24	0.01
5	7.2	0.16	7.98	0.44	6.21	0.05
mean	6.34	0.3	7.52	0.5	6.37	0.05
sd	0.7	0.12	0.45	0.21	0.17	0.03

Set 7 Tumble Dry 100+10 mins						
1	5.34	0.59	5.3	0.45	6.43	0.04
2	6.06	0.56	5.1	0.29	6.44	0.06
3	6.42	0.36	5.74	0.83	6.23	0.03
4	7.12	0.25	5.38	0.51	6.05	0.05
5	7.66	0.22	5.14	0.61	6.04	0.01
mean	6.52	0.4	5.33	0.54	6.24	0.04
sd	0.9	0.17	0.26	0.2	0.2	0.02

Set 0 Line Dry 24Hrs Conditioned Atmosphere						
1	3.84	0.27	-0.06	1.42	7.83	0.04
2	3.86	0.58	-1.28	1.45	7.75	0.03
3	3.7	0.48	-0.62	0.16	7.6	0.05
4	4.46	0.38	-2.1	0.36	7.87	0.31
5	4.7	0.68	-2.6	1.42	7.46	0.03
mean	4.11	0.48	-1.33	0.96	7.7	0.09
sd	0.44	0.16	1.04	0.64	0.17	0.12

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STUDENTS T STATISTIC

DEGREES OF FREEDOM = 4 (N = 5)

95% = 2.776 *

99% = 4.604 **

99.9% = 8.610 ***

SHRINKAGE MEASURED IMMEDIATELY / AFTER CONDITIONING

SET 1 : Tumble Dry 40mins HOT + 10mins COOL Down

	Mean Difference	t	r sq
FULL WASH LS	0.72	2.3934	0.1992
WS	2.1	2.8381 *	0.0913
1st RINSE LS	0.58	1.9692	0.6448
WS	0.08	0.0676	0.1161
2nd RINSE LS	0.08	0.2305	0.248
WS	-0.08	0.1017	0.2881
3rd RINSE LS	0.66	1.9505	0.1121
WS	0.62	1.6324	0.5966
4th RINSE LS	-0.26	0.9295	0.273
WS	1.18	3.5299 *	0.5097

STUDENTS T STATISTIC

DEGREES OF FREEDOM = 4 (N = 5)

95% = 2.776 *

99% = 4.604 **

99.9% = 8.610 ***

SHRINKAGE MEASURED IMMEDIATELY / AFTER CONDITIONING

SET 2 : Tumble Dry 50mins HOT + 10mins COOL Down

	Mean Difference	t	r sq
FULL WASH LS	0.38	0.6477	0.5755
WS	0.2	0.2913	0.5098
1st RINSE LS	-1.2	16.97 ***	0.8908
WS	-1.6	4.2954 *	0.292
2nd RINSE LS	-0.52	1.264	0.4552
WS	-1.74	5.1705 **	0.8258
3rd RINSE LS	-1.08	11.23 ***	0.4902
WS	-1.74	5.3507 **	0.6352
4th RINSE LS	-0.92	8.9783 ***	0.7254
WS	-1.66	4.6581 **	0.2614

TABLE 4

STUDENTS T STATISTIC

DEGREES OF FREEDOM = 4 (N = 5)

5% = 2.776 *

9% = 4.604 **

9.9% = 8.610 ***

SHRINKAGE MEASURED IMMEDIATELY / AFTER CONDITIONING

SET 3 : Tumble Dry 60mins HOT + 10mins COOL Down

	Mean	t		r sq
	Difference			
FULL WASH LS	-1.34	4.9094 **	0.4272	
WS	-1.78	7.472 **	0.7104	
1st RINSE LS	-1.52	9.7609 ***	0.7294	
WS	-1.58	6.2949 **	0.9191	
2nd RINSE LS	-1.44	4.3767 *	0.0022	
WS	-2.28	12.32 ***	0.6497	
3rd RINSE LS	-1.42	9.6285 ***	0.7729	
WS	-1.44	2.9816 *	0.0283	
4th RINSE LS	-1.92	6.0945 **	0.6273	
WS	-1.66	5.4361 **	0.718	

TABLE 6

STUDENTS T STATISTIC

DEGREES OF FREEDOM = 4 (N = 5)

95% = 2.776 *

99% = 4.604 **

99.9% = 8.610 ***

SHRINKAGE MEASURED IMMEDIATELY / AFTER CONDITIONING

SET 5 : Tumble Dry 80mins HOT + 10mins COOL Down

	Mean	t		r sq
	Difference			
FULL WASH LS	-1.4	8.0829 **	0.3143	
WS	-0.62	1.6324	0.0485	
1st RINSE LS	-1.66	9.1036 ***	0.5203	
WS	-1.88	3.8236 *	0.0259	
2nd RINSE LS	-1.08	16.57 ***	0.8081	
WS	-2.36	9.478 ***	0.1422	
3rd RINSE LS	-1.42	21.78 ***	0.8396	
WS	-1.94	13.08 ***	0.631	
4th RINSE LS	-0.98	23.43 ***	0.7812	
WS	-1.6	10.98 ***	0.574	

STUDENTS T STATISTIC
 DEGREES OF FREEDOM = 4 (N = 5)
 95% = 2.776 *
 99% = 4.604 **
 99.9% = 8.610 ***

SHRINKAGE MEASURED IMMEDIATELY / AFTER CONDITIONING

SET 7 : Tumble Dry 100mins HOT + 10mins COOL Down

	Mean	t		r sq
	Difference			
FULL WASH LS	-1.38	6.1409	**	0.4844
WS	-1.86	5.2452	**	0.0162
1st RINSE LS	-1.16	3.0783	*	0.0198
WS	-2.22	5.9226	**	0.014
2nd RINSE LS	-1.1	11	***	0.697
WS	-1.66	7.9821	**	0.8389
3rd RINSE LS	-1.12	4.3762	*	0.0916
WS	-1.24	3.069	*	0.0713
4th RINSE LS	-1.06	6.451	**	0.0104
WS	-1.8	4.2574	*	0.25

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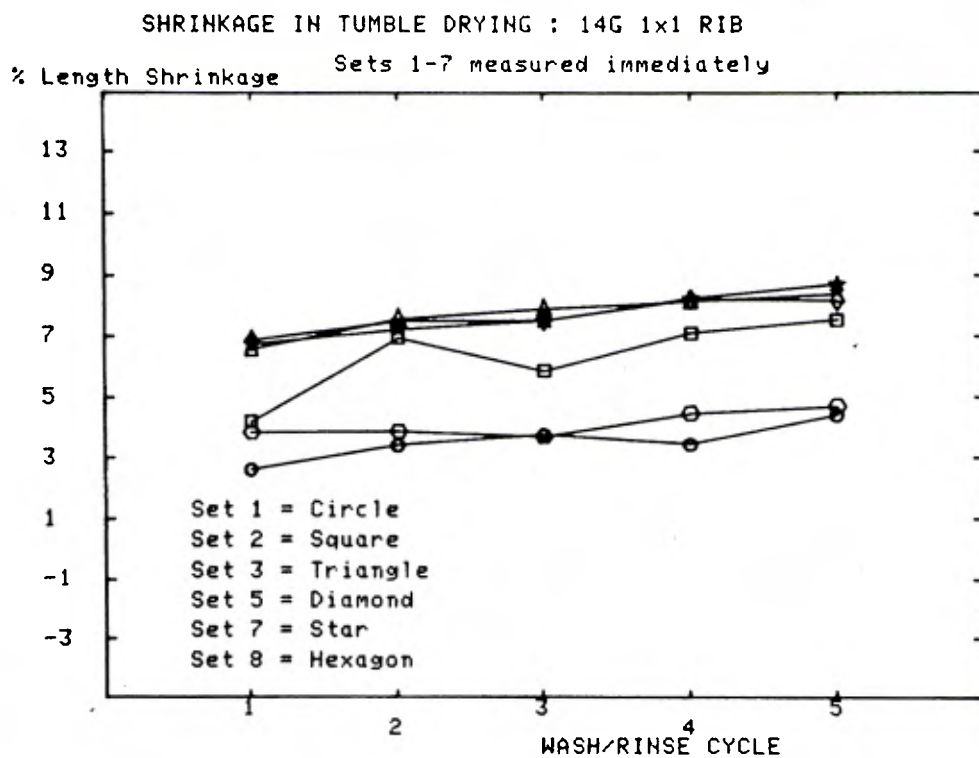
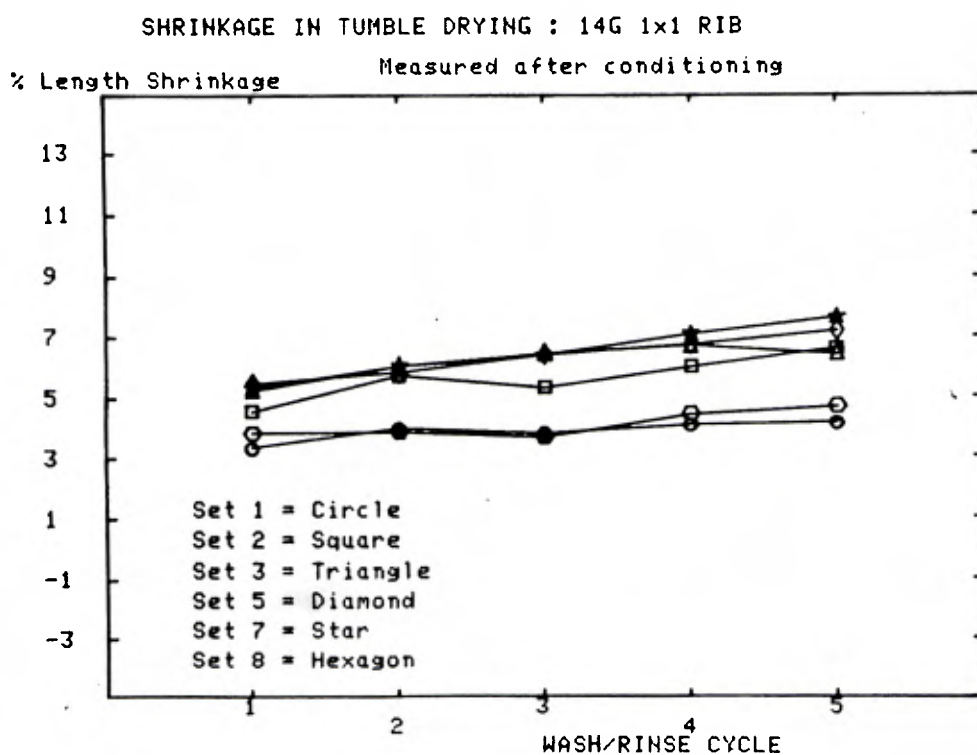


FIG. 2



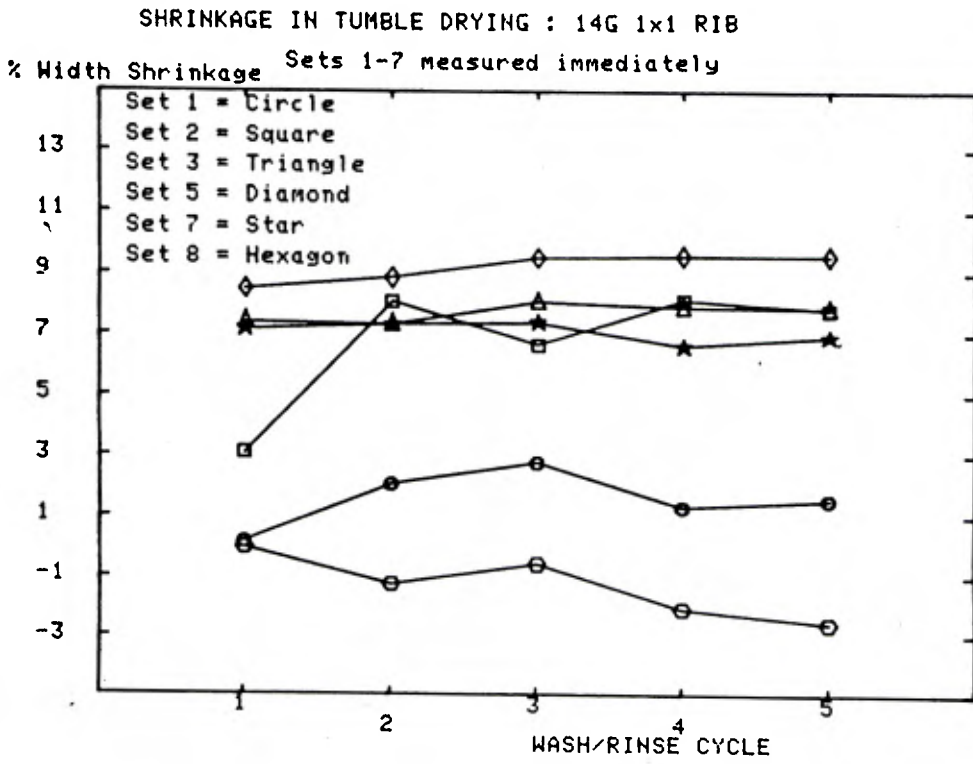
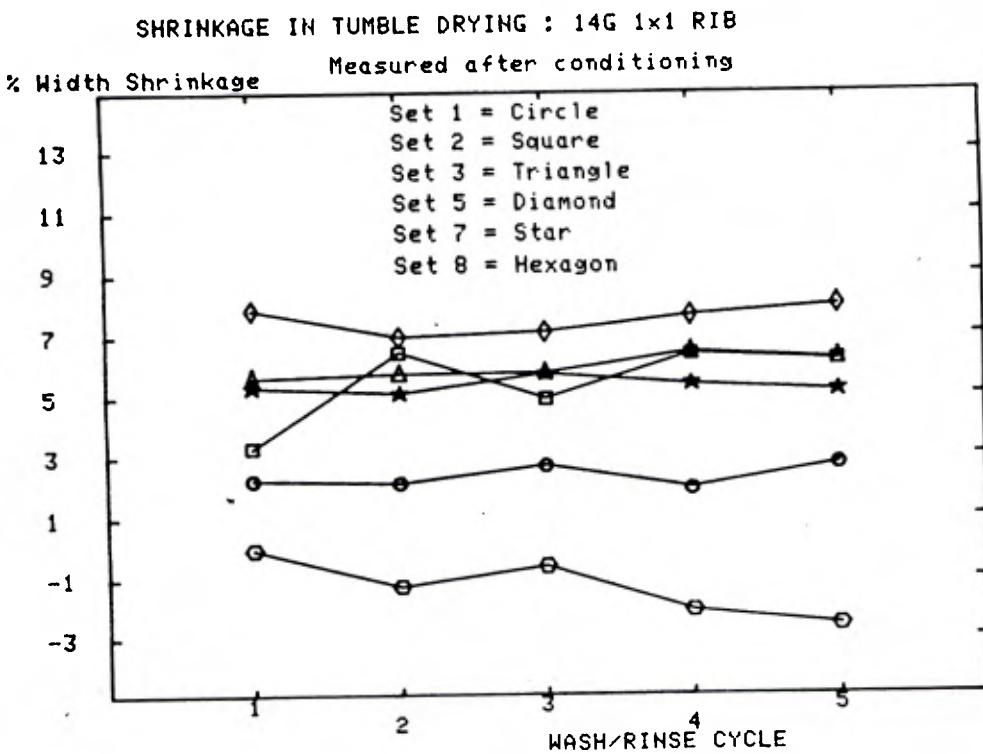


FIG. 4



LENGTH SHRINKAGE and MOISTURE CONTENT after DRYING
Tumble Dry Sets 1,2,3,5,7 measured immediately

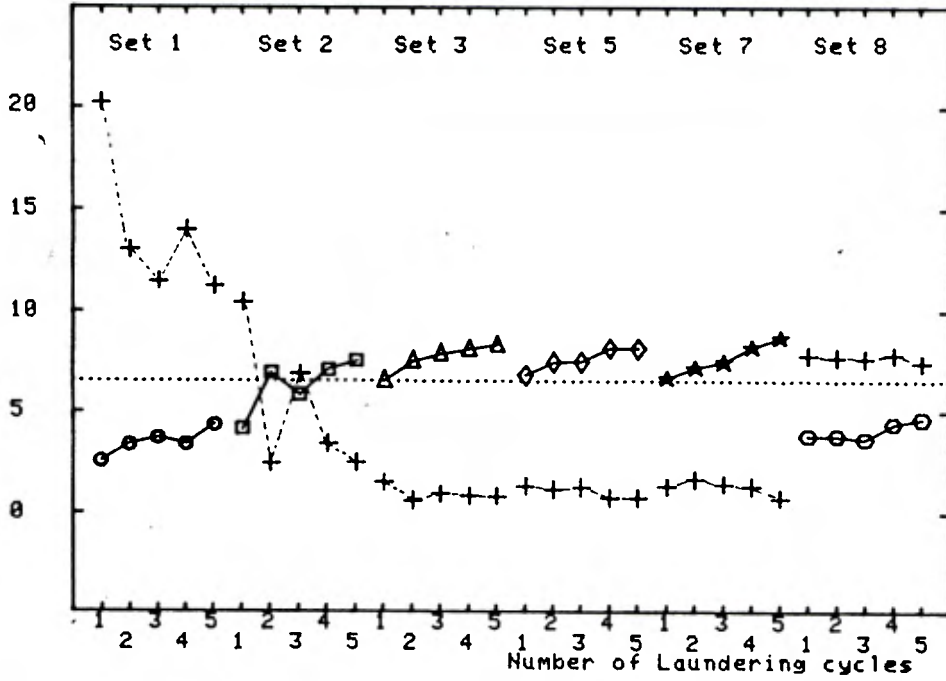
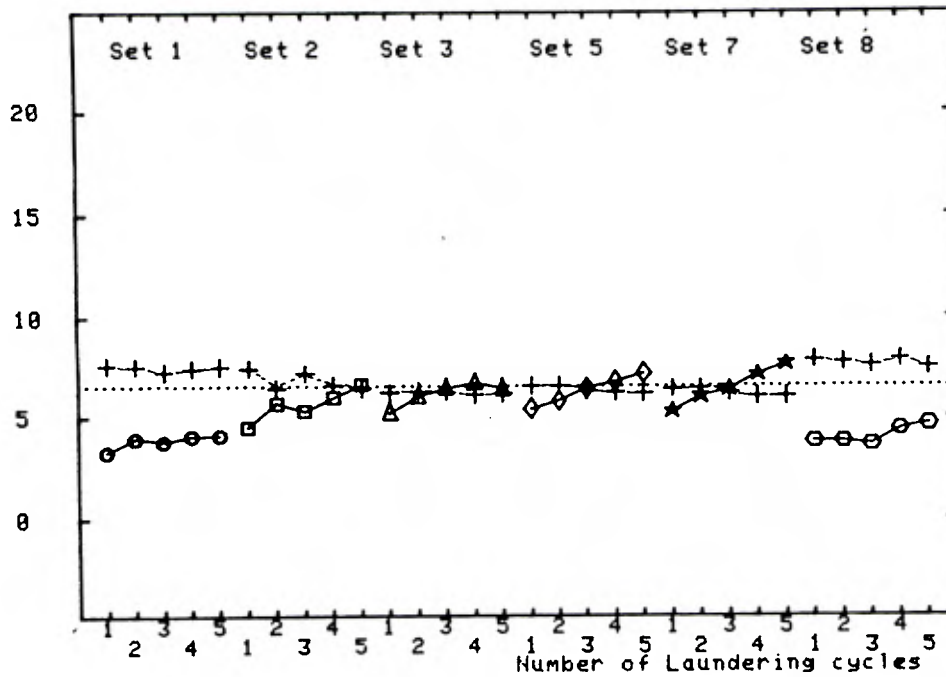


FIG. 6

LENGTH SHRINKAGE and MOISTURE CONTENT after DRYING
All sets measured after conditioning



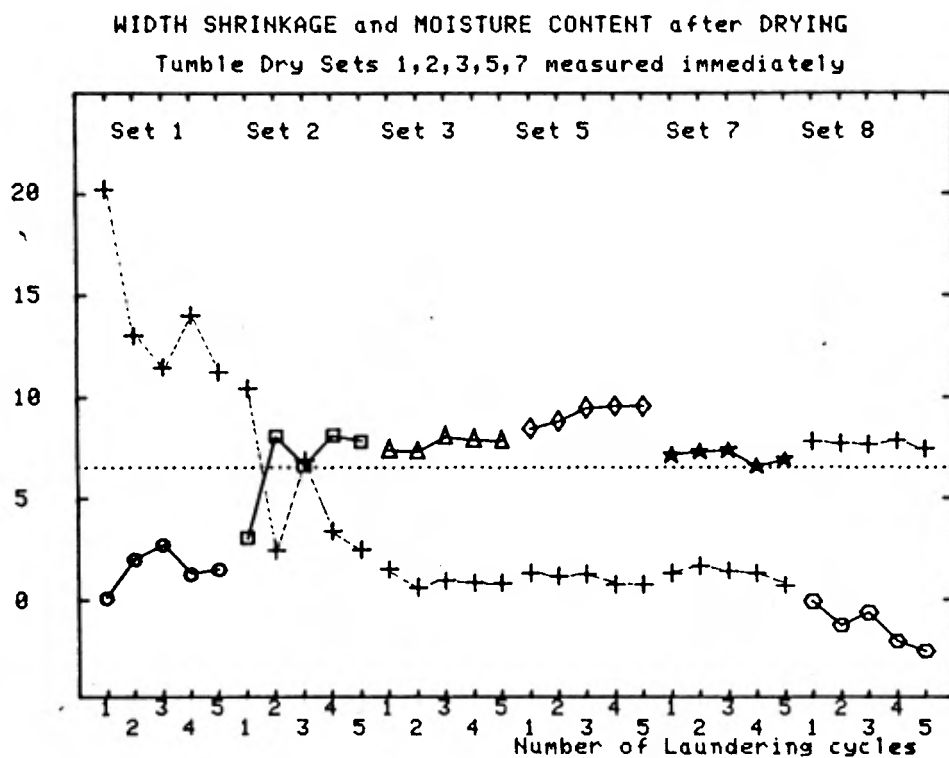
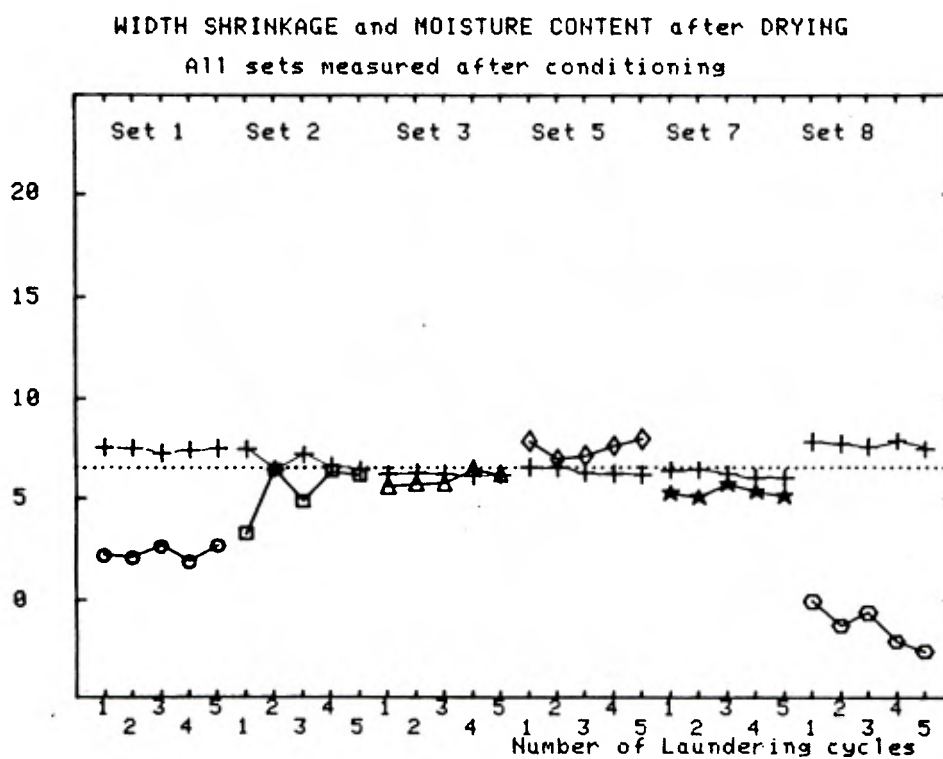


FIG. 8



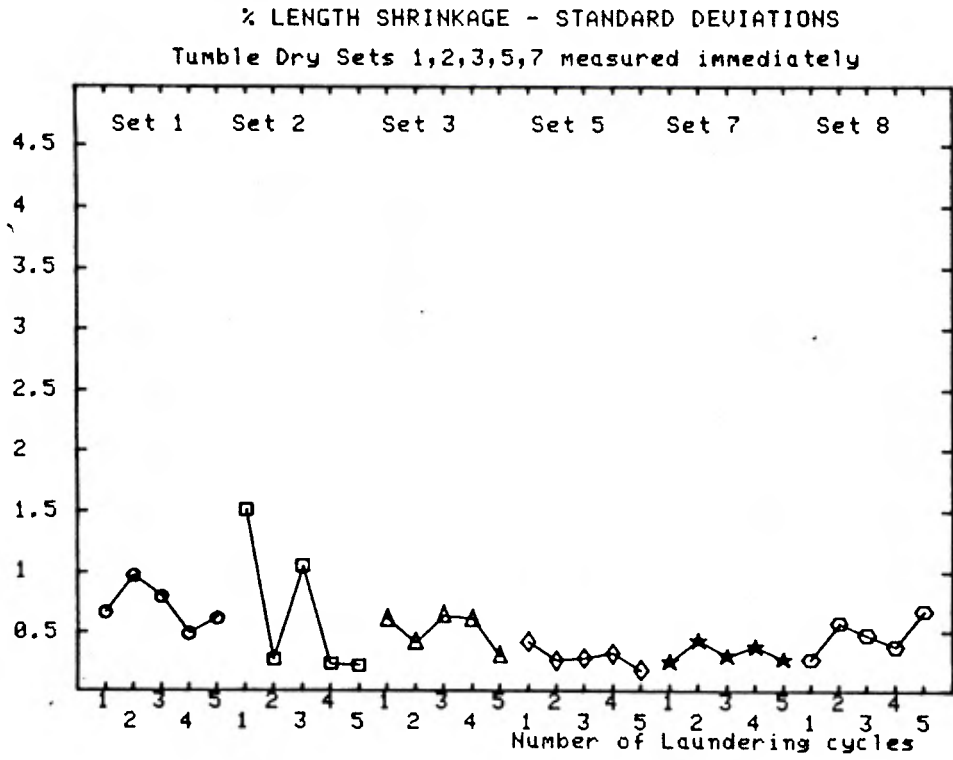
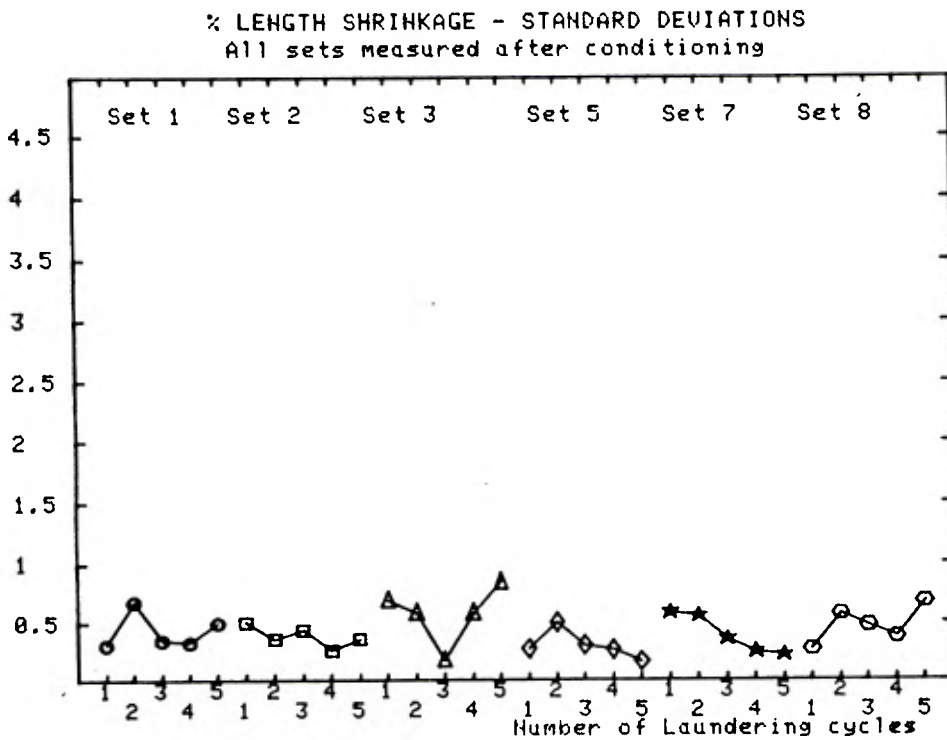


FIG. 10



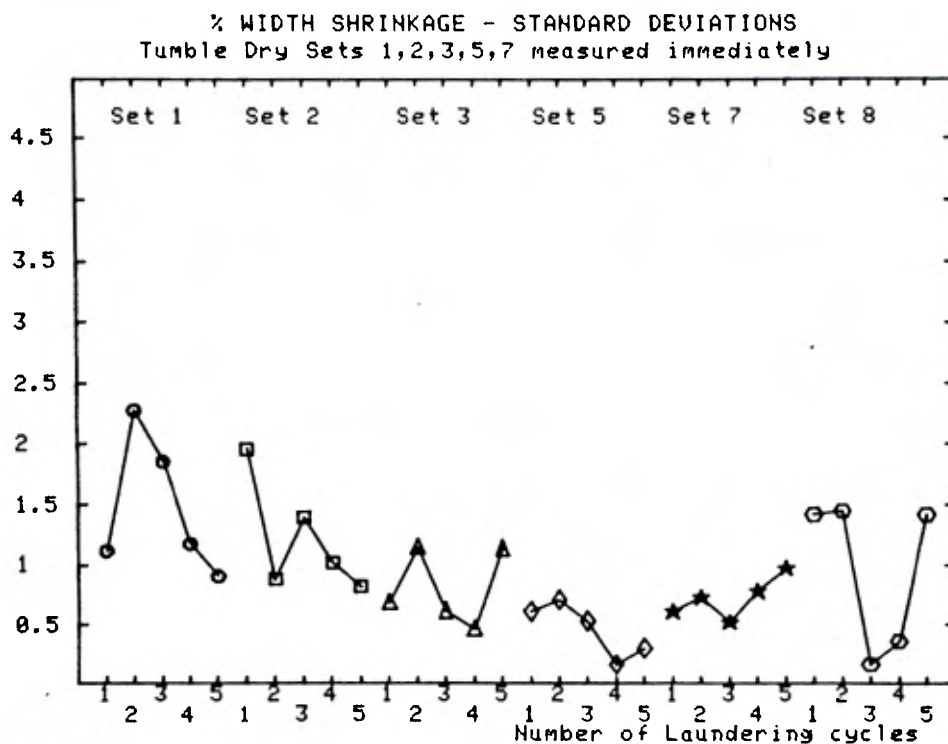
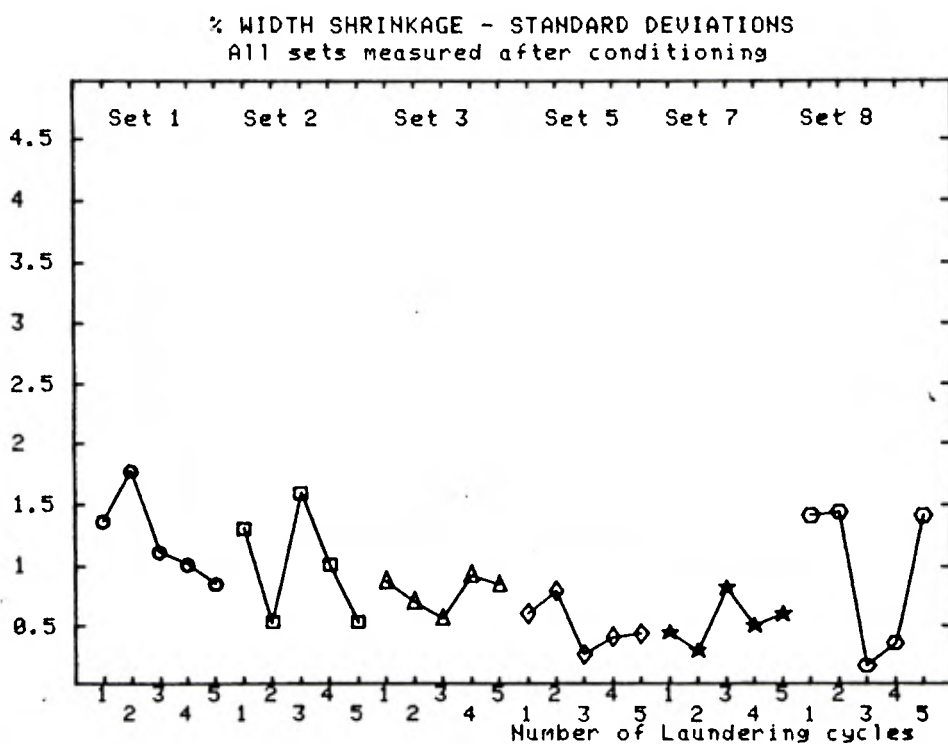


FIG. 12



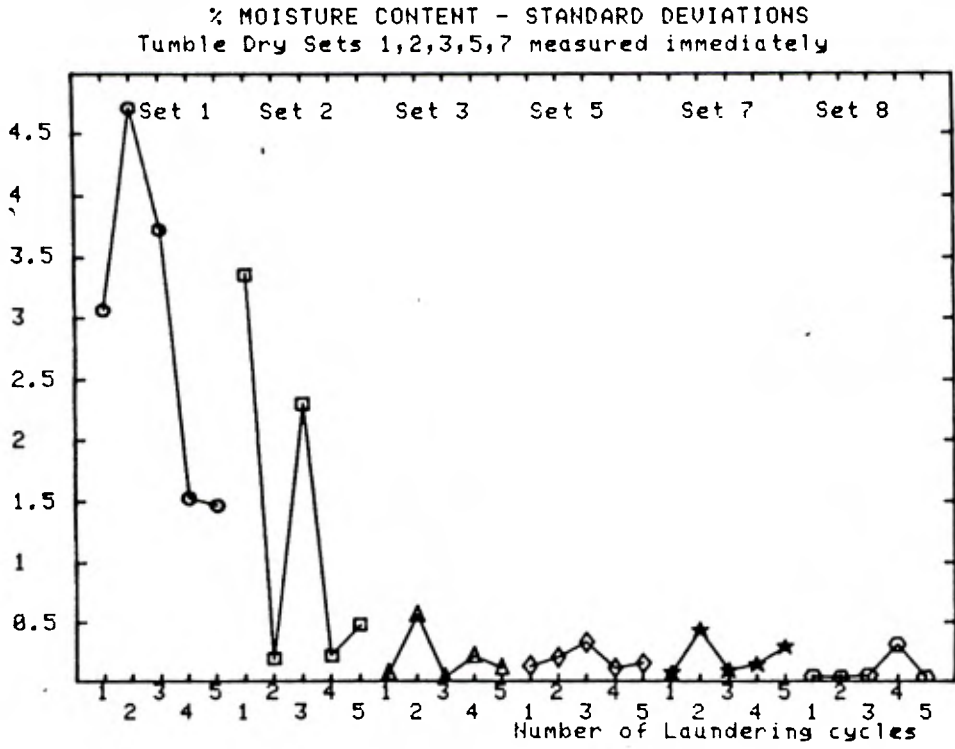
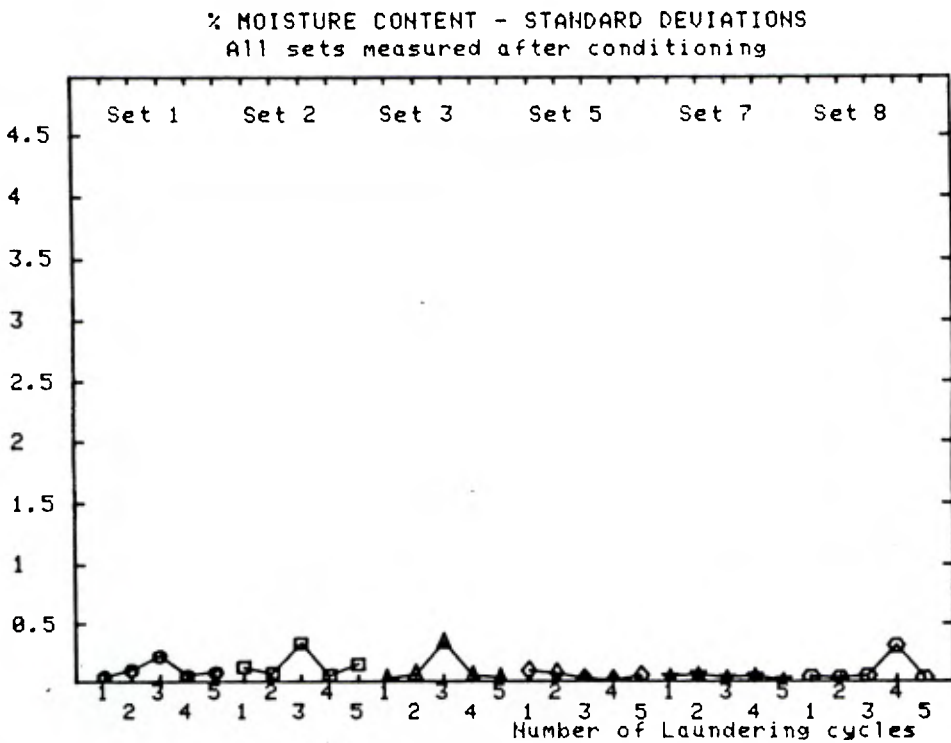


FIG. 14



SHRINKAGE IN TUMBLE DRYING

SET 1 : 40mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	1.8	2.1	5.1	5	2.7	3	3.1	0.7	4.6	0.8
B	3.2	-0.5	2.9	2.1	4.9	4.3	3.4	1.1	4.5	2.3
C	2.5	-0.6	3.4	2.9	3.7	-0.4	4.3	3.4	5.1	2.4
D	2.2	-0.1	3	1.6	3.5	3.9	3.1	0.5	4.5	1.9
E	3.4	-0.2	2.7	-1.3	4	3.1	3.4	0.9	3.4	0.4

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LS%	5	2.6200	0.6723	25.66
2.	WASH WS%	5	0.1400	1.1149	796.36
3.	1st LS%	5	3.4200	0.9731	28.45
4.	RINSE WS%	5	2.0600	2.2832	110.83
5.	2nd LS%	5	3.7600	0.7987	21.24
6.	RINSE WS%	5	2.7800	1.0593	66.88
7.	3rd LS%	5	3.4600	0.4930	14.25
8.	RINSE WS%	5	1.3200	1.1841	89.70
9.	4th LS%	5	4.4200	0.6221	14.07
10.	RINSE WS%	5	1.5600	0.9072	58.15

SHRINKAGE IN TUMBLE DRYING

SET 1 : 40mins HOT Tumble + 10mins COOL Down

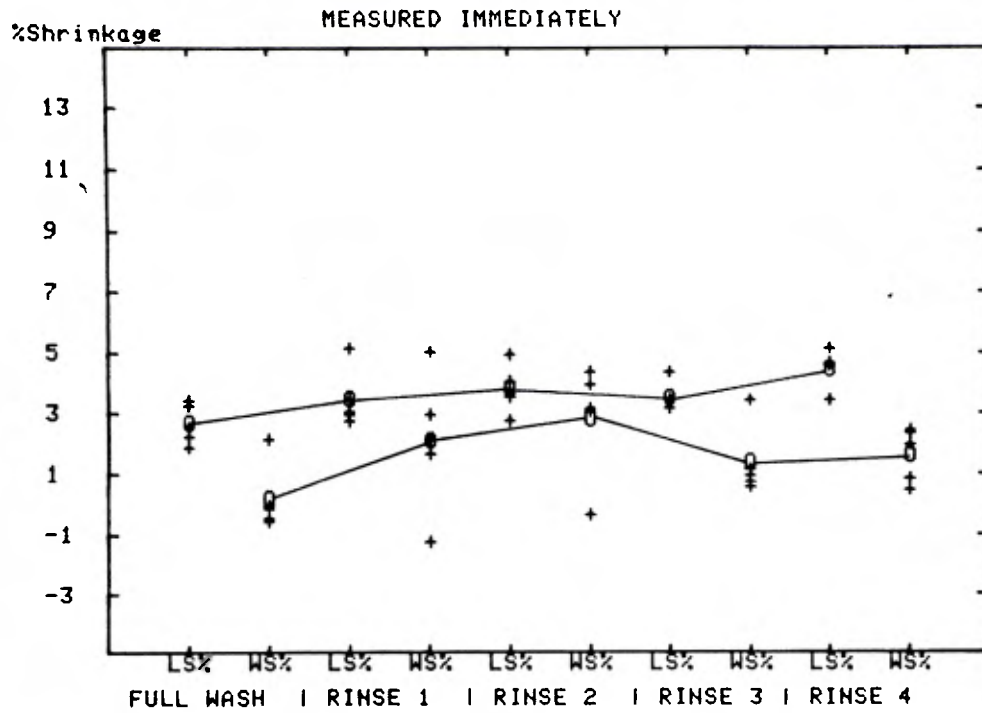
SHRINKAGE MEASURED AFTER CONDITIONING

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	2.9	3.3	4.8	2.8	3.8	1.2	4	1.4	3.9	2.1
B	3.5	2.3	3.2	3.9	4.2	4.1	3.8	2.6	3.7	3.8
C	3.2	3.1	4.6	0.1	3.3	2.1	3.9	3.3	5	2.4
D	3.7	-0.1	3.8	3.5	3.8	3.4	4.3	1.7	4.2	3.5
E	3.4	2.6	3.6	0.4	4.1	2.7	4.6	0.7	4	1.9

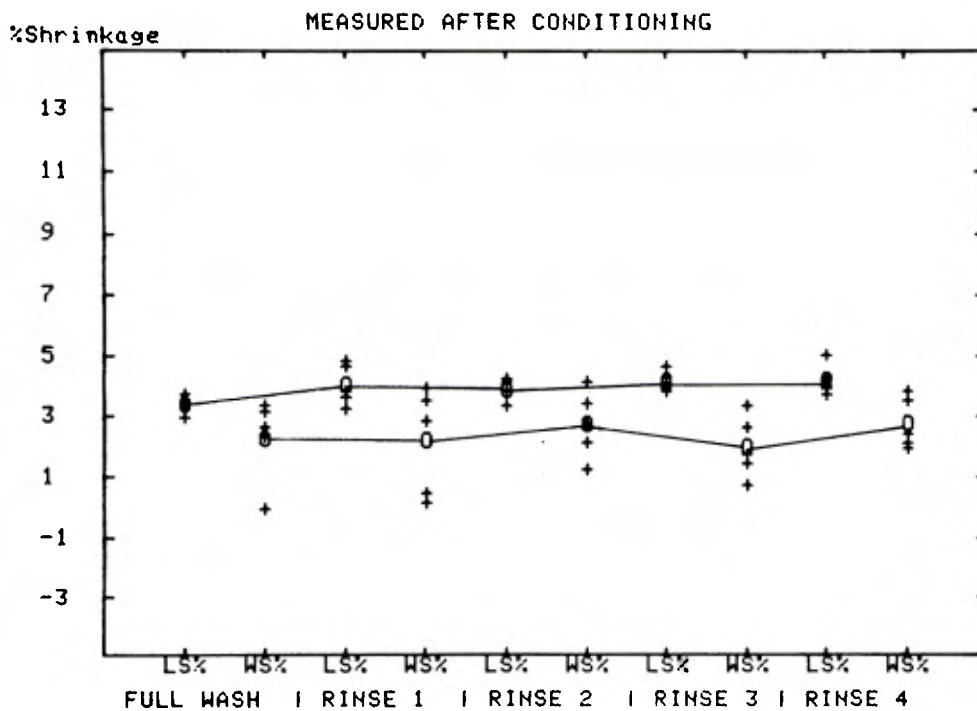
*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LS%	5	3.3400	0.3050	9.13
2.	WASH WS%	5	2.2400	1.3667	61.02
3.	1st LS%	5	4.0000	0.6782	16.96
4.	RINSE WS%	5	2.1400	1.7729	82.84
5.	2nd LS%	5	3.8400	0.3507	9.13
6.	RINSE WS%	5	2.7000	1.1247	41.66
7.	3rd LS%	5	4.1200	0.3271	7.94
8.	RINSE WS%	5	1.9400	1.0213	52.64
9.	4th LS%	5	4.1600	0.5030	12.09
10.	RINSE WS%	5	2.7400	0.8562	31.25

SHRINKAGE IN TUMBLE DRYING : SET 1 : ALL CYCLES

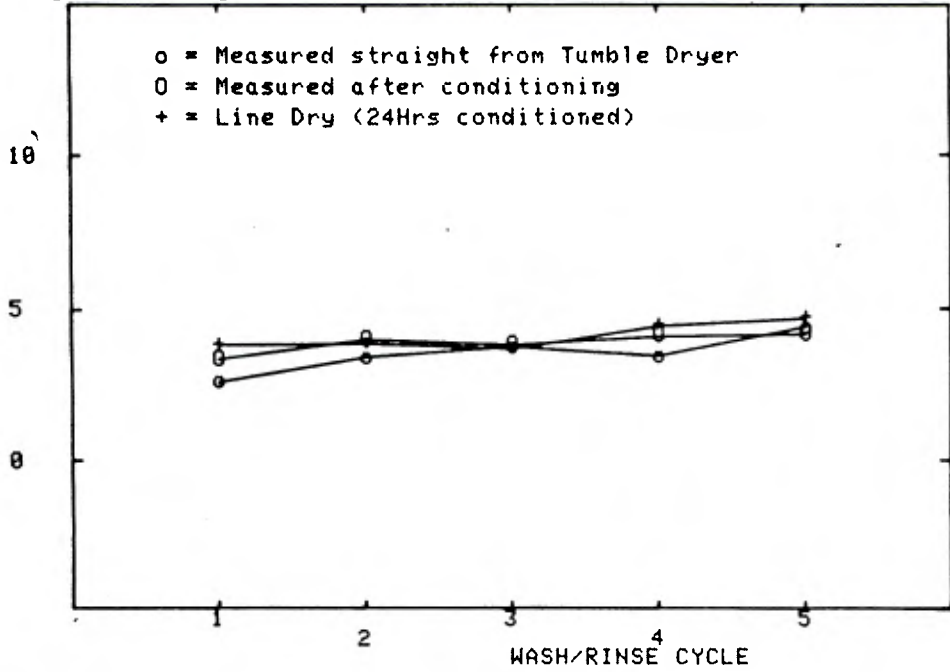


SHRINKAGE IN TUMBLE DRYING : SET 1 : ALL CYCLES



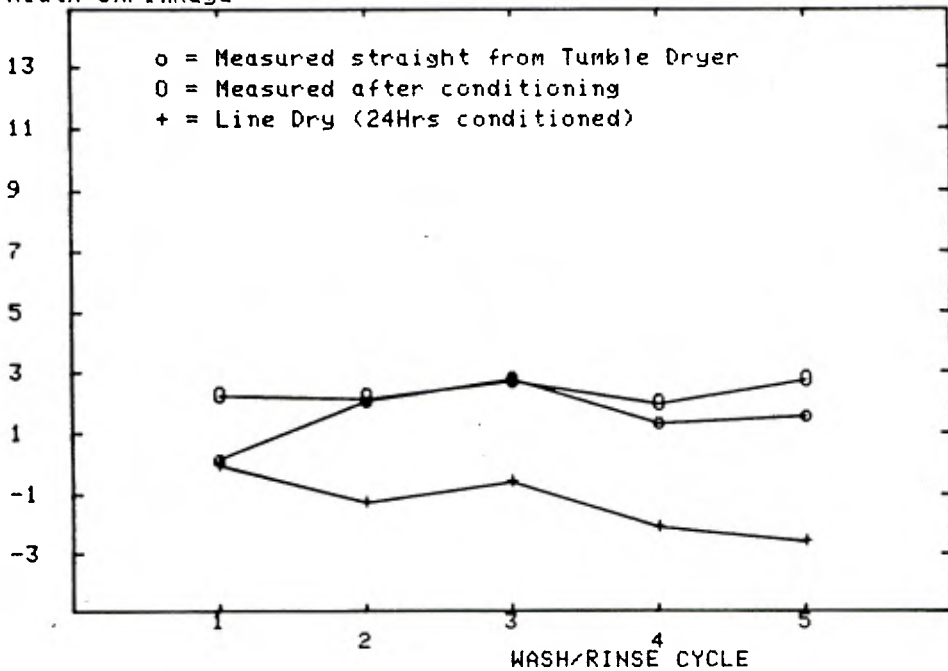
SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Length Shrinkage Set 1 Tumble (40+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Width Shrinkage Set 1 Tumble (40+10mins), Set 8 Line Dry



SET 1 : 40mins HOT + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	109.1	105.86	108.85	110.78	100.62
Orig Cond	116.77	113.3	116.5	118.57	107.7
1W+T Wet	214.72	192.66	208.86	210.53	190.21
1W+T Dry	143.57	127.41	134.83	143.57	122.84
1W+T Cond	118.03	114.57	117.77	119.96	108.86
2W+T Wet	191.48	194.63	204.14	188.62	196.76
2W+T Dry	117.47	120.3	125.21	126.86	126.28
2W+T Cond	117.82	114.45	117.83	119.9	108.97
3W+T Wet	176.12	186.74	193.61	191.54	177.25
3W+T Dry	128.7	113.33	128.32	122.39	113.1
3W+T Cond	117.8	113.72	117.65	119.47	108.64
4W+T Wet	191.61	196.45	184.86	200.14	174.36
4W+T Dry	128.36	126.17	124.21	128.78	115.47
4W+T Cond	117.86	114.31	117.71	119.69	108.74
5W+T Wet	187.65	181.31	183.84	192.63	169.6
5W+T Dry	122.72	121.3	119.43	125.98	113.68
5W+T Cond	118.05	114.35	117.74	119.83	108.94

=====
 N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	107.0409	4.0016	3.74
2.Orig Cond	5	114.5680	4.2830	3.74
3.1W+T Wet	5	203.3960	11.1592	5.49
4.1W+T Dry	5	134.4440	9.3655	6.97
5.1W+T Cond	5	115.8380	4.3540	3.76
6.2W+T Wet	5	195.1260	5.9116	3.03
7.2W+T Dry	5	123.2240	4.1280	3.35
8.2W+T Cond	5	115.7940	4.2861	3.70
9.3W+T Wet	5	185.0520	8.0442	4.35
10.3W+T Dry	5	121.1680	7.6796	6.34
11.3W+T Cond	5	115.4560	4.3558	3.77
12.4W+T Wet	5	189.4840	10.2068	5.39
13.4W+T Dry	5	124.5980	5.4218	4.35
14.4W+T Cond	5	115.6620	4.3299	3.74
15.5W+T Wet	5	183.0060	8.6238	4.71
16.5W+T Dry	5	120.6220	4.5602	3.78
17.5W+T Cond	5	115.7820	4.3078	3.72

SHRINKAGE IN TUMBLE DRYING

SET 1 : 40mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+T Wet	49.19	45.06	47.89	47.38	47.1
1W+T Dry	24.01	16.92	19.27	22.84	18.09
1W+T Cond	7.57	7.61	7.58	7.65	7.57
2W+T Wet	43.02	45.61	46.68	41.27	48.86
2W+T Dry	7.13	12.01	13.07	12.68	20.32
2W+T Cond	7.4	7.51	7.62	7.61	7.66
3W+T Wet	38.05	43.31	43.78	42.16	43.23
3W+T Dry	15.23	6.59	15.18	9.49	11.03
3W+T Cond	7.39	6.92	7.48	7.27	7.38
4W+T Wet	43.06	46.12	41.12	44.65	42.29
4W+T Dry	15.01	16.1	12.37	13.98	12.86
4W+T Cond	7.43	7.4	7.53	7.44	7.46
5W+T Wet	41.86	41.62	40.79	42.49	40.67
5W+T Dry	11.1	12.73	8.86	12.07	11.48
5W+T Cond	7.58	7.43	7.55	7.55	7.63

N.B. Moisture Content calculated from sample weights

$$\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	6.5700	0.0000	0.00
3.1W+T Wet	5	47.3221	1.5000	3.17
4.1W+T Dry	5	20.2247	3.0657	15.16
5.1W+T Cond	5	7.5937	0.0366	0.48
6.2W+T Wet	5	45.0887	2.9953	6.64
7.2W+T Dry	5	13.0389	4.7201	36.20
8.2W+T Cond	5	7.5603	0.1043	1.38
9.3W+T Wet	5	42.1086	2.3423	5.56
10.3W+T Dry	5	11.5037	3.7339	32.46
11.3W+T Cond	5	7.2875	0.2210	3.03
12.4W+T Wet	5	43.4472	1.9665	4.53
13.4W+T Dry	5	14.0620	1.5306	10.88
14.4W+T Cond	5	7.4536	0.0496	0.67
15.5W+T Wet	5	41.4861	0.7605	1.83
16.5W+T Dry	5	11.2488	1.4697	13.07
17.5W+T Cond	5	7.5502	0.0758	1.00

SHRINKAGE IN TUMBLE DRYING

SET 2 : 50mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX
A	5.7	3.9	7.2	7.6	5.7	5	7.2	7.5	7.8	7.2
B	2.1	0	7.1	8.7	4.1	6.5	7.3	8.6	7.6	7.2
C	5.5	4.8	6.6	9	6.7	8.3	7.2	9.3	7.5	8.9
D	3.3	4.4	7.1	8.2	6.5	7.8	6.7	8.5	7.6	8.5
E	4.3	2.4	6.7	6.8	6.3	5.7	7.1	6.7	7.2	7.3

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LSX	5	4.1800	1.5139	36.22
2.	WASH WSX	5	3.1000	1.9570	63.13
3.	1st LSX	5	6.9400	0.2702	3.89
4.	RINSE WSX	5	8.0600	0.8820	10.94
5.	2nd LSX	5	5.8600	1.0526	17.96
6.	RINSE WSX	5	6.6600	1.3867	20.82
7.	3rd LSX	5	7.1000	0.2345	3.30
8.	RINSE WSX	5	8.1200	1.0208	12.57
9.	4th LSX	5	7.5400	0.2191	2.91
10.	RINSE WSX	5	7.8200	0.8167	10.44

SHRINKAGE IN TUMBLE DRYING

SET 2 : 50mins HOT Tumble + 10mins COOL Down

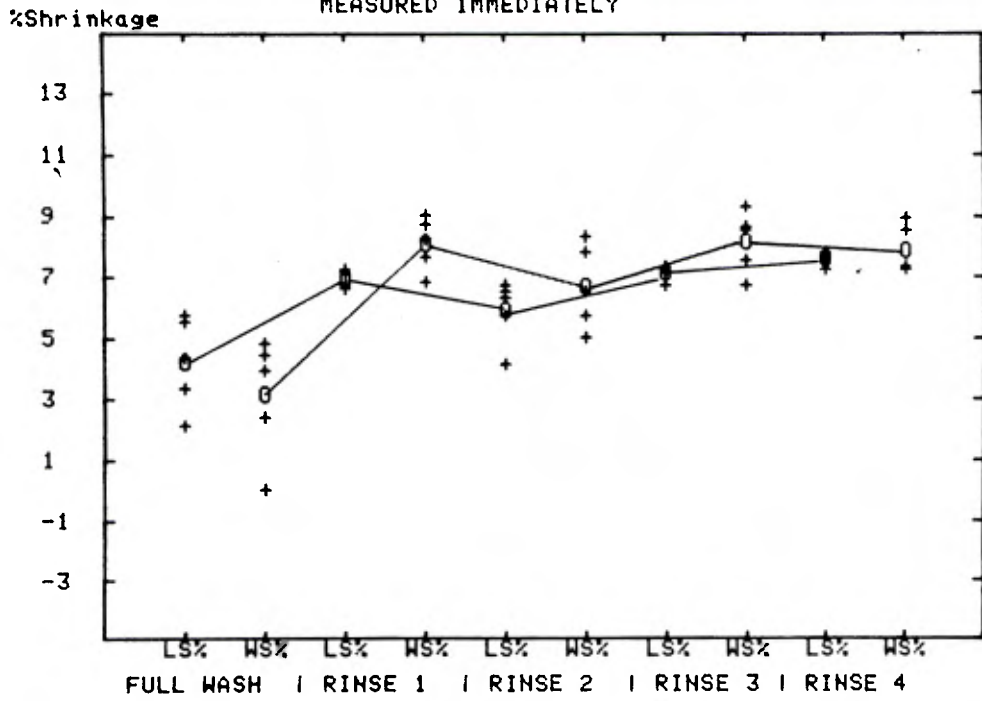
SHRINKAGE MEASURED AFTER CONDITIONING

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX
A	5.1	2.1	5.9	6	5.6	3.5	6.4	5	6.9	6.1
B	4.2	1.8	6	6.1	4.7	3.6	6.1	6.4	6.5	6.3
C	5.1	4.6	5.3	7	5.1	7.1	5.9	7.5	6.6	7
D	4.4	4.5	6.1	7.1	5.8	6.1	5.7	7.2	7	5.8
E	4	3.5	5.4	6.1	5.5	4.3	6	5.8	6.1	5.6

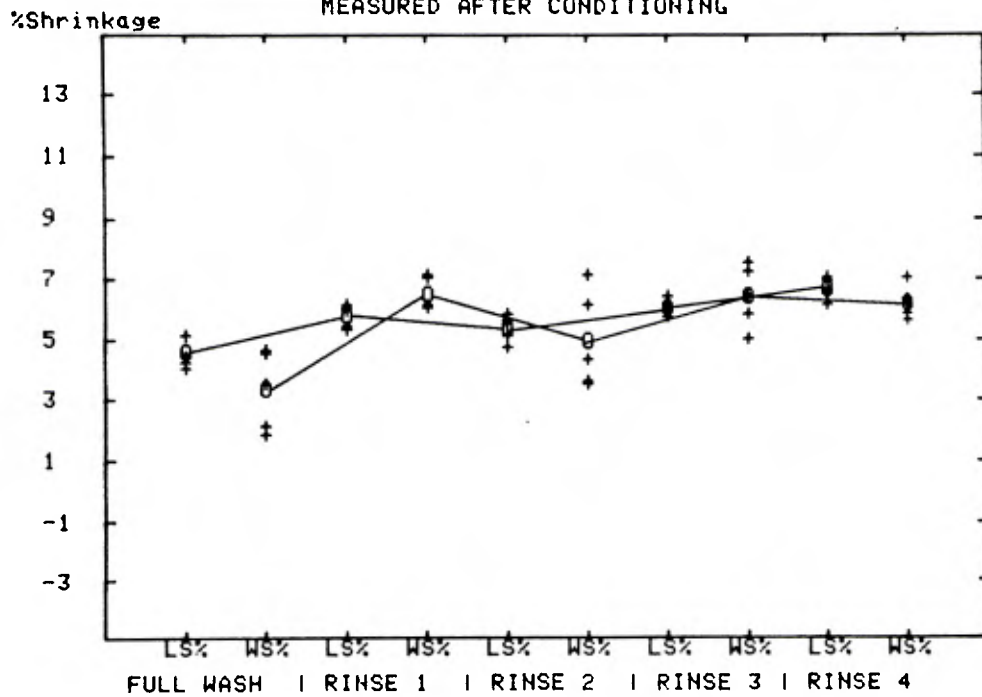
*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LSX	5	4.5600	0.5128	11.25
2.	WASH WSX	5	3.3000	1.3096	39.68
3.	1st LSX	5	5.7400	0.3647	6.35
4.	RINSE WSX	5	6.4600	0.5413	8.38
5.	2nd LSX	5	5.3400	0.4393	8.23
6.	RINSE WSX	5	4.9200	1.6037	32.60
7.	3rd LSX	5	6.0200	0.2588	4.30
8.	RINSE WSX	5	6.3800	1.0208	16.00
9.	4th LSX	5	6.6200	0.3564	5.38
10.	RINSE WSX	5	6.1600	0.5413	8.79

SHRINKAGE IN TUMBLE DRYING : SET 2 : ALL CYCLES
MEASURED IMMEDIATELY

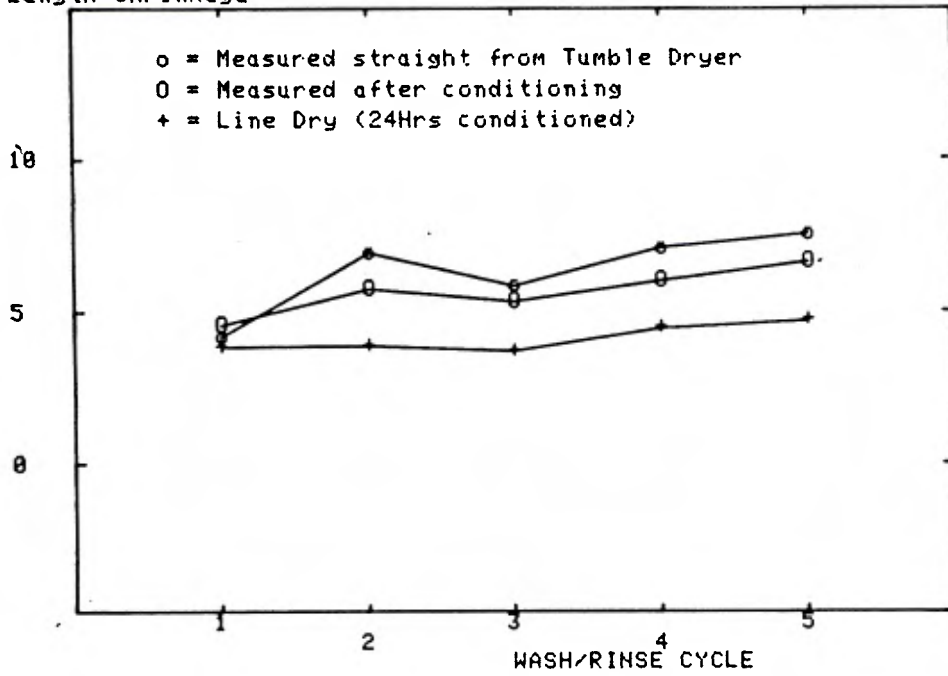


SHRINKAGE IN TUMBLE DRYING : SET 2 : ALL CYCLES
MEASURED AFTER CONDITIONING



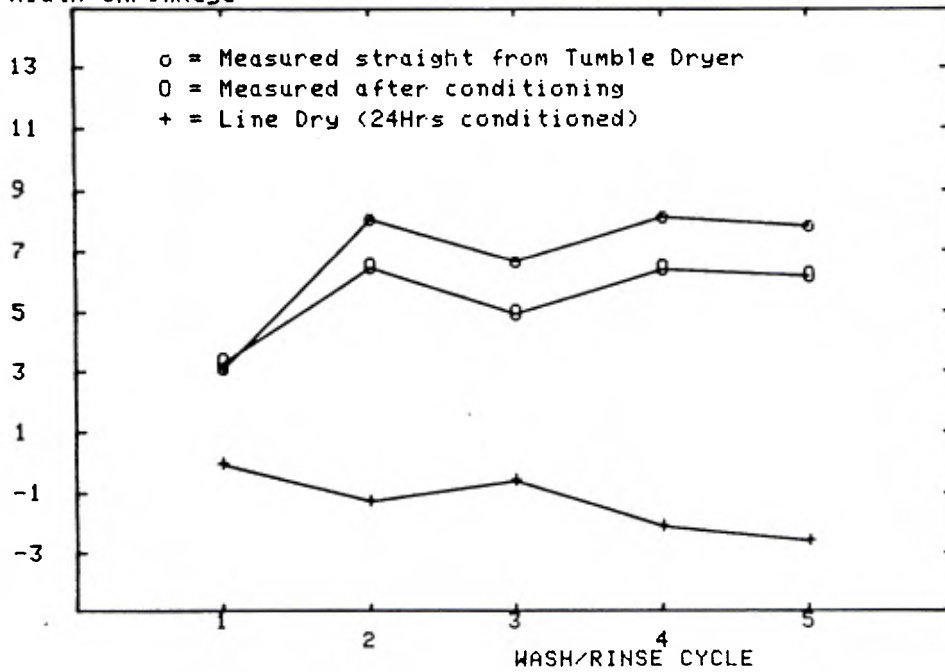
SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Length Shrinkage Set 2 Tumble (50+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Width Shrinkage Set 2 Tumble (50+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING

SET 2 : 50mins HOT + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	116.88	107.39	110.34	112.91	122.82
Orig Cond	125.1	114.94	118.1	120.85	131.46
1W+T Wet	226.25	215.13	198.93	213.52	235.03
1W+T Dry	127.94	120.35	120.2	124.06	136.58
1W+T Cond	126.41	116.25	119.08	121.9	132.85
2W+T Wet	212.37	190.98	185.7	194.63	215.6
2W+T Dry	119.93	110.35	112.82	115.62	125.99
2W+T Cond	124.93	114.94	117.89	120.67	131.42
3W+T Wet	217.23	201.07	196.72	207.42	244.32
3W+T Dry	127.41	119.5	115.67	118.93	131.28
3W+T Cond	126.39	116.11	118.39	121.35	132.45
4W+T Wet	196.53	179.39	190.53	209.32	209.74
4W+T Dry	120.85	111.2	114.14	117.41	127.11
4W+T Cond	125.1	115	118.15	121.04	131.57
5W+T Wet	192.77	193.91	182.65	196.85	221.63
5W+T Dry	119.55	110.53	112.43	116.5	126.01
5W+T Cond	124.83	114.92	117.68	120.89	131.3

N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	114.0687	6.0086	5.27
2.Orig Cond	5	122.0900	6.4311	5.27
3.1W+T Wet	5	217.7720	13.6912	6.29
4.1W+T Dry	5	127.4260	6.0922	4.78
5.1W+T Cond	5	123.2980	6.5258	5.29
6.2W+T Wet	5	199.8560	13.3319	6.67
7.2W+T Dry	5	116.9420	6.1844	5.29
8.2W+T Cond	5	121.9700	6.4386	5.28
9.3W+T Wet	5	213.3520	18.9520	8.88
10.3W+T Dry	5	122.5580	6.5110	5.31
11.3W+T Cond	5	122.9380	6.5617	5.34
12.4W+T Wet	5	197.1020	12.9057	6.55
13.4W+T Dry	5	118.1420	6.1746	5.23
14.4W+T Cond	5	122.1720	6.4380	5.27
15.5W+T Wet	5	197.5620	14.4779	7.33
16.5W+T Dry	5	117.0040	6.1376	5.25
17.5W+T Cond	5	121.9240	6.4127	5.26

SHRINKAGE IN TUMBLE DRYING

SET 2 : 50mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+T Wet	48.34	50.08	44.53	47.12	47.74
1W+T Dry	8.64	16.33	8.2	8.99	10.07
1W+T Cond	7.54	7.62	7.34	7.37	7.55
2W+T Wet	44.96	43.77	40.58	41.99	43.03
2W+T Dry	2.54	2.68	2.2	2.34	2.51
2W+T Cond	6.44	6.57	6.4	6.43	6.54
3W+T Wet	46.19	46.59	43.91	45.56	49.73
3W+T Dry	8.26	10.14	4.61	5.06	6.44
3W+T Cond	7.52	7.51	6.8	6.95	7.27
4W+T Wet	40.53	40.14	42.09	46.06	41.44
4W+T Dry	3.28	3.43	3.33	3.83	3.37
4W+T Cond	6.57	6.62	6.61	6.72	6.65
5W+T Wet	39.37	44.62	39.59	42.64	44.58
5W+T Dry	2.23	2.84	1.86	3.08	2.53
5W+T Cond	6.37	6.55	6.24	6.6	6.46

N.B. Moisture Content calculated from sample weights

$$\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	6.5700	0.0000	0.00
3.1W+T Wet	5	47.5632	2.0224	4.25
4.1W+T Dry	5	10.4475	3.3611	32.17
5.1W+T Cond	5	7.4845	0.1217	1.63
6.2W+T Wet	5	42.8667	1.6761	3.91
7.2W+T Dry	5	2.4562	0.1885	7.67
8.2W+T Cond	5	6.4777	0.0734	1.13
9.3W+T Wet	5	46.3978	2.1247	4.58
10.3W+T Dry	5	6.9020	2.3007	33.33
11.3W+T Cond	5	7.2114	0.3266	4.53
12.4W+T Wet	5	42.0502	2.3675	5.63
13.4W+T Dry	5	3.4491	0.2208	6.40
14.4W+T Cond	5	6.6326	0.0547	0.82
15.5W+T Wet	5	42.1599	2.5765	6.11
16.5W+T Dry	5	2.5087	0.4845	19.31
17.5W+T Cond	5	6.4431	0.1463	2.27

SHRINKAGE IN TUMBLE DRYING

SET 3 : 60mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX
A	6.8	7.6	7.6	8.4	8	8.5	8.3	7.8	8.1	8.1
B	7.3	6.4	8.2	6	8.9	7.2	9.1	7.5	8.7	6.4
C	6.9	7.4	7.6	7	7.5	7.7	8	7.5	8.5	7.2
D	5.8	7.3	7.2	6.6	7.2	8.2	7.5	8.1	8	8.2
E	6.1	8.3	7.2	8.6	7.9	8.7	7.8	8.6	8.5	9.4

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LSX	5	6.5800	0.6140	9.33
2.	WASH WSX	5	7.4000	0.6819	9.21
3.	1st LSX	5	7.5600	0.4099	5.42
4.	RINSE WSX	5	7.3200	1.1367	15.53
5.	2nd LSX	5	7.9000	0.6442	8.15
6.	RINSE WSX	5	8.0600	0.6107	7.58
7.	3rd LSX	5	8.1400	0.6107	7.50
8.	RINSE WSX	5	7.9000	0.4637	5.87
9.	4th LSX	5	8.3600	0.2966	3.55
10.	RINSE WSX	5	7.8600	1.1305	14.38

SHRINKAGE IN TUMBLE DRYING

SET 3 : 60mins HOT Tumble + 10mins COOL Down

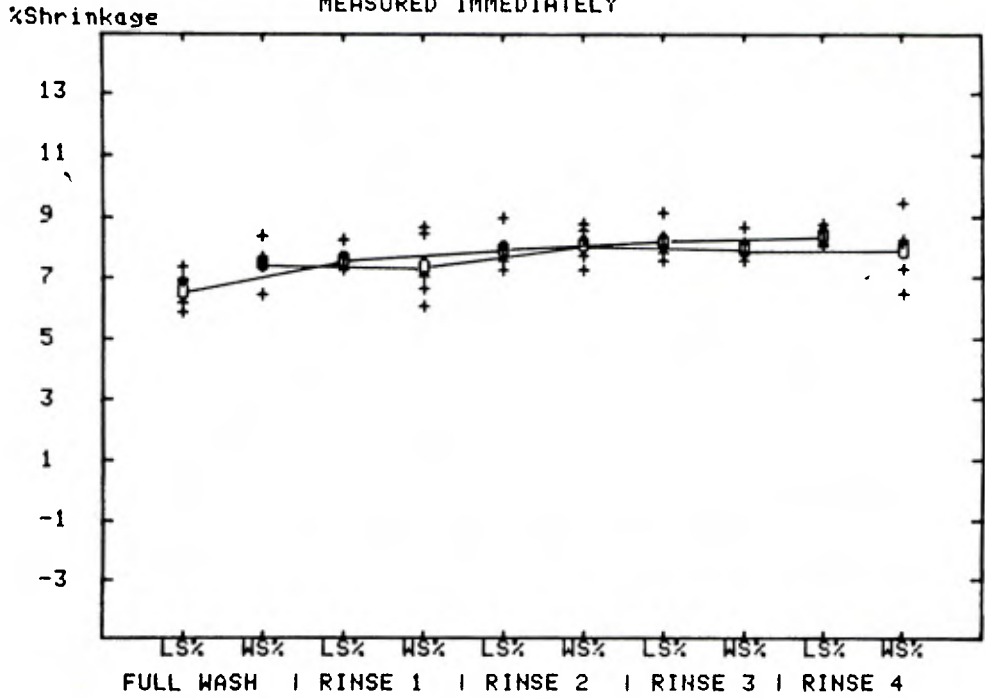
SHRINKAGE MEASURED AFTER CONDITIONING

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX	LSX	WSX
A	5.8	5.9	6.6	6.4	6.4	5.6	6.8	6.2	5.2	6.4
B	6.1	4.9	6.6	5.1	6.6	5.2	7.5	7.7	6.8	5.6
C	4.6	5.7	6.1	5.2	6.5	5.5	6.5	5.4	6.9	5.7
D	4.6	4.7	5.4	5.4	6.6	5.9	5.9	5.9	6	5.7
E	5.1	6.9	5.5	6.6	6.2	6.7	6.9	7.1	7.3	7.6

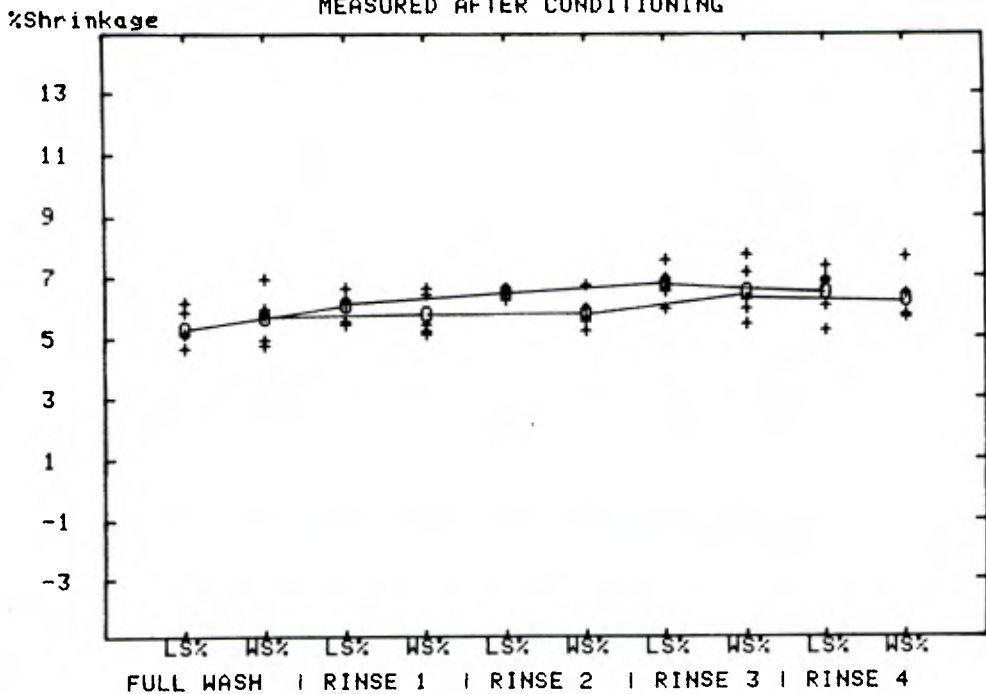
*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LSX	5	5.2400	0.6877	13.12
2.	WASH WSX	5	5.6200	0.8786	15.63
3.	1st LSX	5	6.0400	0.5771	9.55
4.	RINSE WSX	5	5.7400	0.7057	12.29
5.	2nd LSX	5	6.4600	0.1673	2.59
6.	RINSE WSX	5	5.7800	0.5718	9.89
7.	3rd LSX	5	6.7200	0.5848	8.70
8.	RINSE WSX	5	6.4600	0.9290	14.38
9.	4th LSX	5	6.4400	0.8385	13.02
10.	RINSE WSX	5	6.2000	0.8456	13.64

SHRINKAGE IN TUMBLE DRYING : SET 3 : ALL CYCLES
 MEASURED IMMEDIATELY

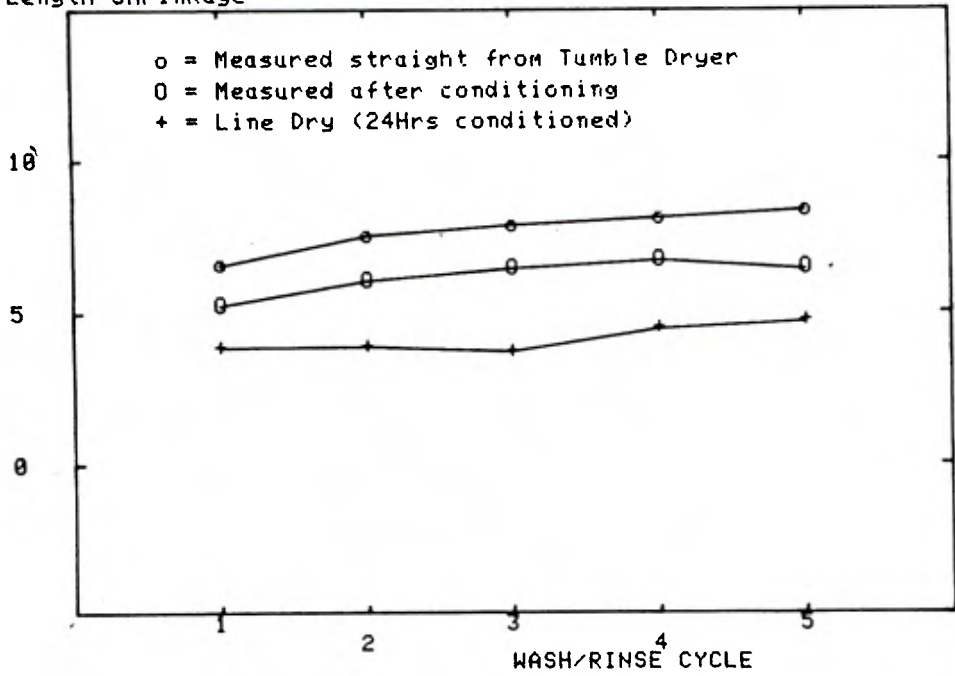


SHRINKAGE IN TUMBLE DRYING : SET 3 : ALL CYCLES
 MEASURED AFTER CONDITIONING



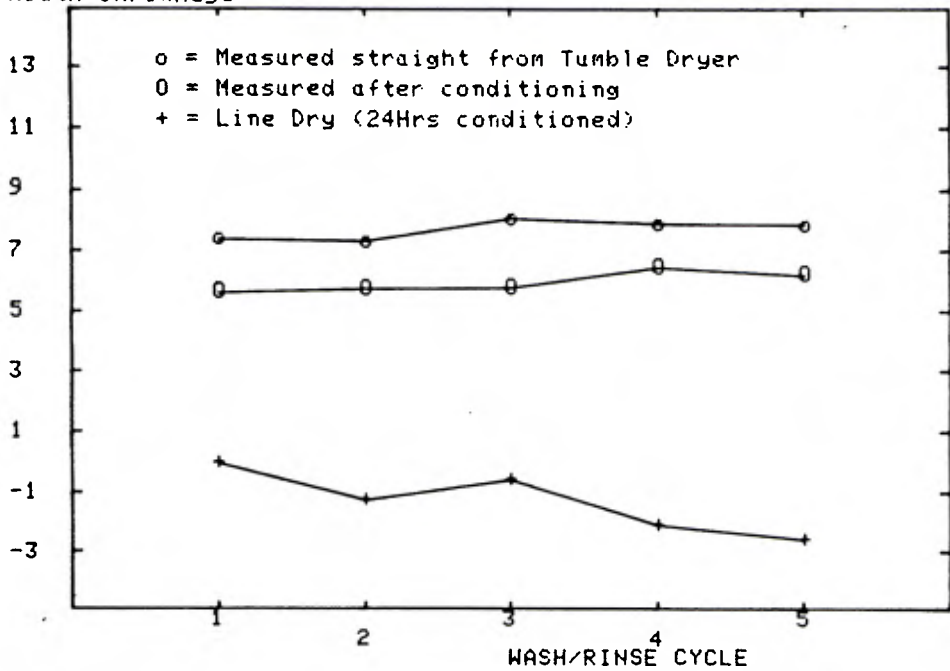
SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Length Shrinkage Set 3 Tumble (60+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Width Shrinkage Set 3 Tumble (60+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING

SET 3 : 60mins HOT + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	113.72	110.09	108.58	107.79	111.79
Orig Cond	121.72	117.83	116.21	115.37	119.65
1W+T Wet	214.29	210.61	203.86	208.73	214.05
1W+T Dry	115.47	111.73	110.35	109.38	113.56
1W+T Cond	121.28	117.41	115.78	114.91	119.26
2W+T Wet	207.76	200.13	200	200.35	215.34
2W+T Dry	113.4	111.41	109.62	108.47	112.51
2W+T Cond	121.31	117.55	115.95	115.02	119.22
3W+T Wet	193.76	194.79	187.01	184.34	195.87
3W+T Dry	114.83	111.16	109.67	108.83	112.82
3W+T Cond	121.4	117.45	115.85	114.94	119.29
4W+T Wet	195.69	204.41	190.29	201.08	201.63
4W+T Dry	114.89	111	109.39	109	112.45
4W+T Cond	121.23	117.28	115.67	114.94	119.04
5W+T Wet	212	197.01	189.09	196.85	198.92
5W+T Dry	114.71	111.04	109.62	108.78	112.54
5W+T Cond	121.17	117.38	115.76	114.93	119.17

N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	110.3932	2.4088	2.18
2.Orig Cond	5	118.1560	2.5782	2.18
3.1W+T Wet	5	210.3080	4.3017	2.05
4.1W+T Dry	5	112.0980	2.4539	2.19
5.1W+T Cond	5	117.7280	2.5885	2.20
6.2W+T Wet	5	204.7140	6.7910	3.32
7.2W+T Dry	5	111.0820	2.0298	1.83
8.2W+T Cond	5	117.8100	2.5273	2.15
9.3W+T Wet	5	191.1540	5.1443	2.69
10.3W+T Dry	5	111.4620	2.4196	2.17
11.3W+T Cond	5	117.7860	2.6117	2.22
12.4W+T Wet	5	198.6200	5.6260	2.83
13.4W+T Dry	5	111.3460	2.4098	2.16
14.4W+T Cond	5	117.6320	2.5568	2.17
15.5W+T Wet	5	198.7740	8.2997	4.18
16.5W+T Dry	5	111.3380	2.3664	2.13
17.5W+T Cond	5	117.6820	2.5367	2.16

SHRINKAGE IN TUMBLE DRYING

SET 3 : 60mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+T Wet	46.93	47.73	46.74	48.36	47.77
1W+T Dry	1.51	1.47	1.61	1.45	1.56
1W+T Cond	6.23	6.24	6.22	6.2	6.26
2W+T Wet	45.26	44.99	45.71	46.2	48.09
2W+T Dry	-0.28	1.19	0.95	0.63	0.64
2W+T Cond	6.25	6.35	6.36	6.29	6.23
3W+T Wet	41.31	43.48	41.94	41.53	42.93
3W+T Dry	0.96	0.96	1	0.96	0.91
3W+T Cond	6.32	6.27	6.28	6.22	6.29
4W+T Wet	41.89	46.14	42.94	46.39	44.56
4W+T Dry	1.02	0.82	0.75	1.11	0.59
4W+T Cond	6.19	6.13	6.13	6.22	6.09
5W+T Wet	46.36	44.12	42.58	45.24	43.8
5W+T Dry	0.86	0.86	0.95	0.91	0.67
5W+T Cond	6.15	6.21	6.21	6.21	6.19

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N.B. Moisture Content calculated from sample weights

$$\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	6.5700	0.0000	0.00
3.1W+T Wet	5	47.5066	0.6646	1.40
4.1W+T Dry	5	1.5207	0.0642	4.22
5.1W+T Cond	5	6.2301	0.0246	0.40
6.2W+T Wet	5	46.0505	1.2275	2.67
7.2W+T Dry	5	0.6244	0.5592	89.55
8.2W+T Cond	5	6.2962	0.0562	0.89
9.3W+T Wet	5	42.2371	0.9336	2.21
10.3W+T Dry	5	0.9591	0.0302	3.15
11.3W+T Cond	5	6.2759	0.0374	0.60
12.4W+T Wet	5	44.3847	1.9675	4.43
13.4W+T Dry	5	0.8559	0.2094	24.47
14.4W+T Cond	5	6.1539	0.0518	0.84
15.5W+T Wet	5	44.4204	1.4392	3.24
16.5W+T Dry	5	0.8496	0.1093	12.87
17.5W+T Cond	5	6.1941	0.0280	0.45

SHRINKAGE IN TUMBLE DRYING

SET 5 : 80mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	7.1	9.2	7.9	8	7.9	9.5	8.6	9.4	8.4	9.5
B	6.9	7.5	7.4	9.1	7.6	8.6	8	9.5	8.2	9.9
C	6.5	8.6	7.5	8.5	7.2	10	8.4	9.5	8.3	9.1
D	7.4	8.5	7.5	8.7	7.3	9.7	8.2	9.8	8	9.7
E	6.4	8.6	7.2	9.9	7.6	9.7	7.8	9.7	8	9.7

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	6.8600	0.4159	6.06
2.	WASH	WS%	5	8.4800	0.6140	7.24
3.	1st	LS%	5	7.5000	0.2550	3.40
4.	RINSE	WS%	5	8.8400	0.7127	8.06
5.	2nd	LS%	5	7.5200	0.2775	3.69
6.	RINSE	WS%	5	9.5000	0.5339	5.62
7.	3rd	LS%	5	8.2000	0.3162	3.86
8.	RINSE	WS%	5	9.5000	0.1643	1.72
9.	4th	LS%	5	8.1800	0.1789	2.19
10.	RINSE	WS%	5	9.5800	0.3033	3.17

SHRINKAGE IN TUMBLE DRYING

SET 5 : 80mins HOT Tumble + 10mins COOL Down

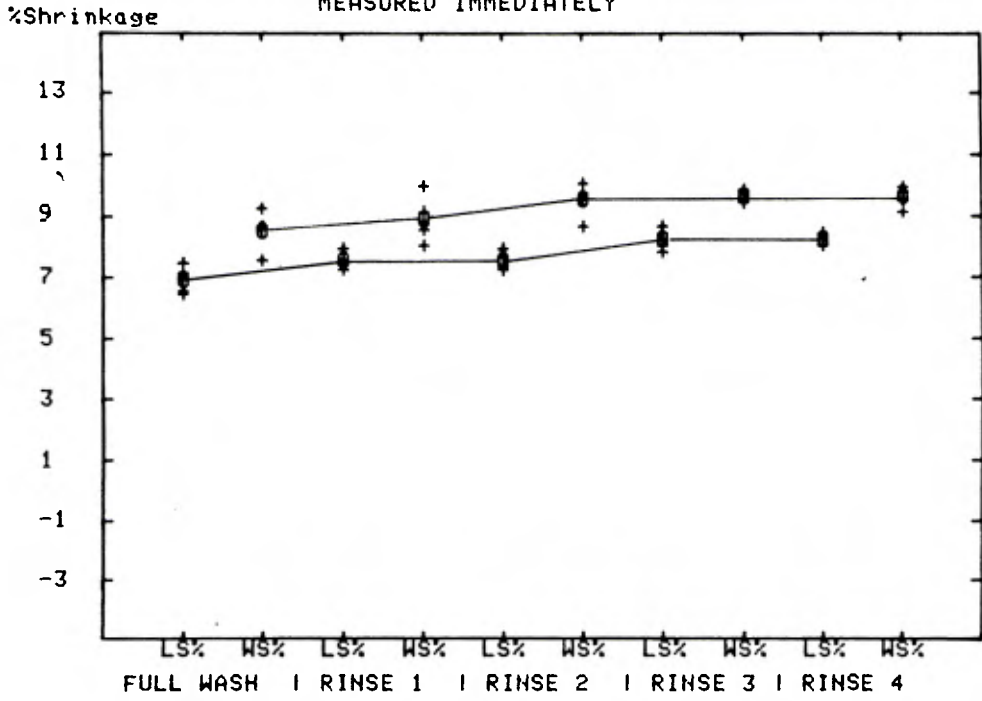
SHRINKAGE MEASURED AFTER CONDITIONING

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	5.9	8.2	6.7	5.8	6.9	6.8	7.1	7.1	7.3	7.7
B	5.5	7.8	5.7	6.8	6.4	7	6.8	7.9	7.2	8.6
C	5.3	8.7	5.6	7.9	6.3	7.1	6.9	7.3	7.4	7.6
D	5.4	7.3	5.4	7.5	6.1	7.4	6.7	8	7	8.3
E	5.2	7.3	5.8	6.8	6.5	7.4	6.4	7.9	7.1	7.7

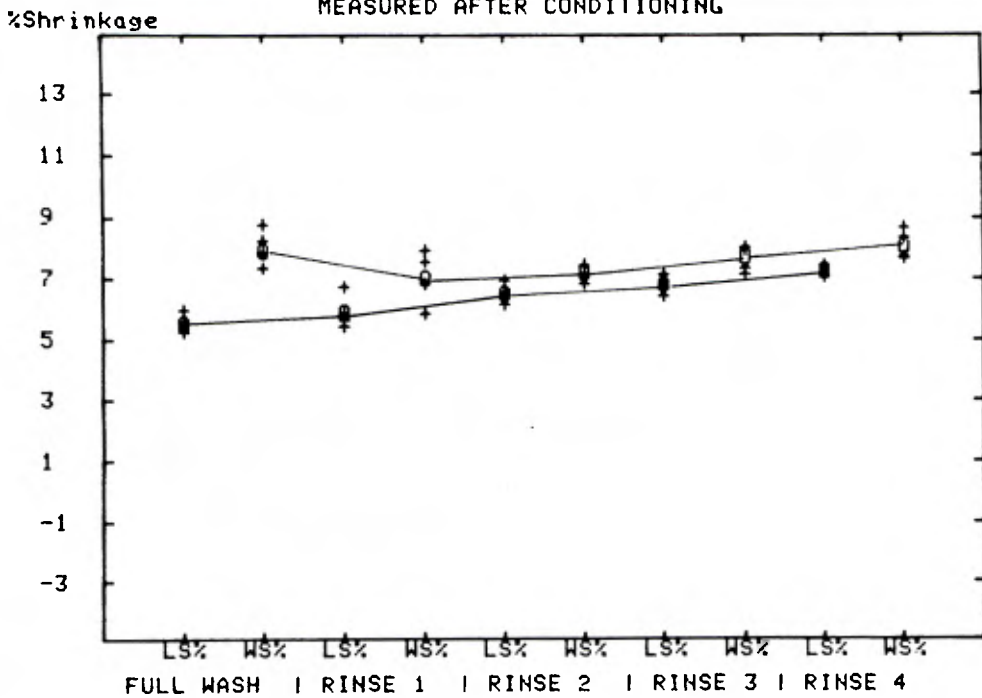
*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	5.4600	0.2702	4.95
2.	WASH	WS%	5	7.8600	0.6025	7.67
3.	1st	LS%	5	5.8400	0.5030	8.61
4.	RINSE	WS%	5	6.9600	0.8019	11.52
5.	2nd	LS%	5	6.4400	0.2966	4.61
6.	RINSE	WS%	5	7.1400	0.2608	3.65
7.	3rd	LS%	5	6.7800	0.2588	3.82
8.	RINSE	WS%	5	7.6400	0.4099	5.36
9.	4th	LS%	5	7.2000	0.1581	2.20
10.	RINSE	WS%	5	7.9800	0.4438	5.56

SHRINKAGE IN TUMBLE DRYING : SET 5 : ALL CYCLES
 MEASURED IMMEDIATELY

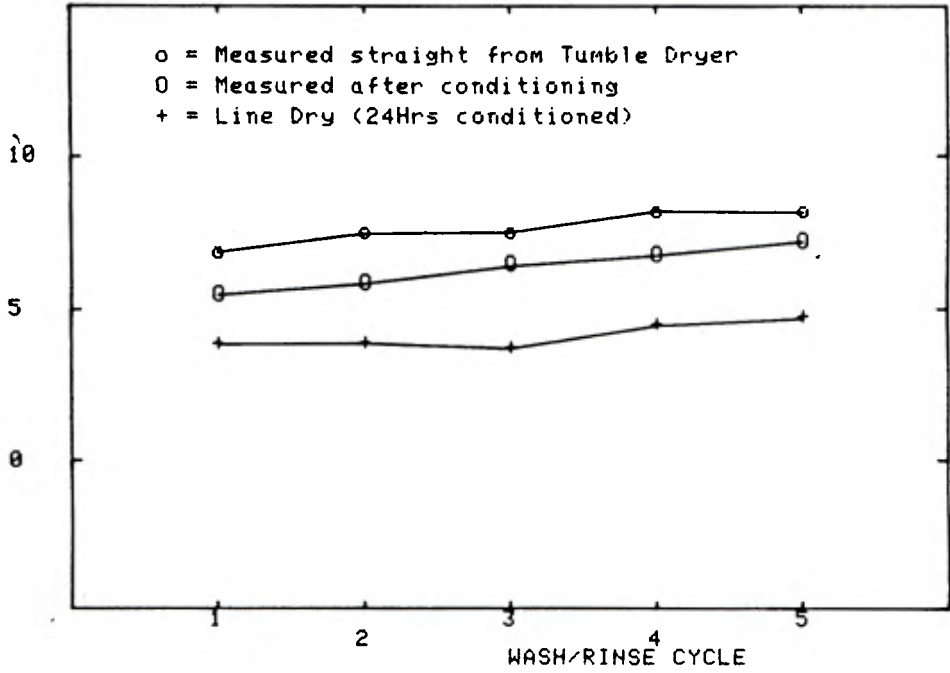


SHRINKAGE IN TUMBLE DRYING : SET 5 : ALL CYCLES
 MEASURED AFTER CONDITIONING



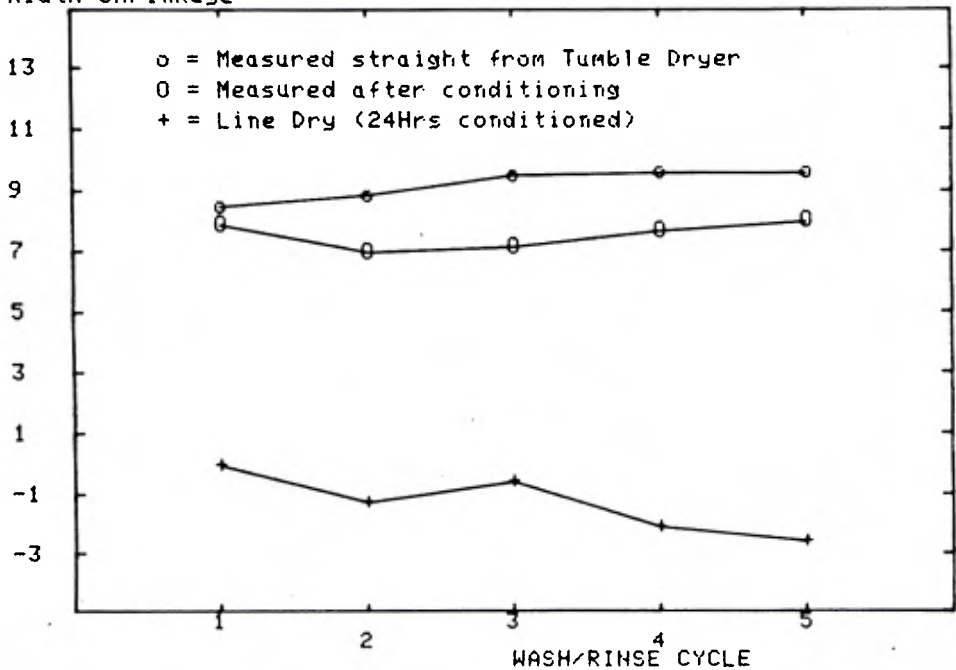
SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Length Shrinkage Set 5 Tumble (80+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Width Shrinkage Set 5 Tumble (80+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING

SET 5 : 80mins HOT + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	108.72	105.72	107.97	113.98	118.3
Orig Cond	116.37	113.15	115.56	121.99	126.62
1W+T Wet	201.59	199.25	196.43	217.01	226.18
1W+T Dry	109.92	107.2	109.49	115.59	119.95
1W+T Cond	116.27	113.1	115.47	122.18	126.57
2W+T Wet	206.01	206.96	196.96	206.25	215.18
2W+T Dry	109.87	106.96	108.99	115.39	120.06
2W+T Cond	116.27	113.18	115.52	121.93	126.74
3W+T Wet	184.18	178.39	183.62	205.69	199.53
3W+T Dry	110.2	106.92	109.21	116.11	119.48
3W+T Cond	116.04	112.81	115.23	121.68	126.29
4W+T Wet	181.8	177.2	184.88	195.06	197.51
4W+T Dry	109.67	106.66	108.63	114.88	119.19
4W+T Cond	115.95	112.77	115.14	121.58	126.19
5W+T Wet	181.66	186.94	191.76	194.27	197.73
5W+T Dry	109.59	106.64	108.75	114.6	119.41
5W+T Cond	115.9	112.68	115.21	121.48	126.16

N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1. Oven Dry	5	110.9369	5.1096	4.61
2. Orig Cond	5	118.7380	5.4689	4.61
3. 1W+T Wet	5	208.0920	12.8760	6.19
4. 1W+T Dry	5	112.4300	5.2161	4.64
5. 1W+T Cond	5	118.7180	5.5169	4.65
6. 2W+T Wet	5	206.2720	6.4538	3.13
7. 2W+T Dry	5	112.2540	5.3650	4.78
8. 2W+T Cond	5	118.7280	5.5127	4.64
9. 3W+T Wet	5	190.2820	11.6830	6.14
10. 3W+T Dry	5	112.3840	5.2186	4.64
11. 3W+T Cond	5	118.4100	5.4744	4.62
12. 4W+T Wet	5	187.2900	8.6974	4.64
13. 4W+T Dry	5	111.8060	5.1260	4.58
14. 4W+T Cond	5	118.3260	5.4566	4.61
15. 5W+T Wet	5	190.4720	6.3026	3.31
16. 5W+T Dry	5	111.7980	5.1615	4.62
17. 5W+T Cond	5	118.2860	5.4494	4.61

SHRINKAGE IN TUMBLE DRYING

SET 5 : 80mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+T Wet	46.07	46.94	45.04	47.48	47.7
1W+T Dry	1.09	1.38	1.39	1.4	1.37
1W+T Cond	6.49	6.53	6.5	6.72	6.53
2W+T Wet	47.22	48.92	45.18	44.74	45.02
2W+T Dry	1.04	1.16	0.94	1.23	1.47
2W+T Cond	6.49	6.59	6.54	6.52	6.66
3W+T Wet	40.97	40.74	41.2	44.59	40.71
3W+T Dry	1.34	1.13	1.14	1.84	0.99
3W+T Cond	6.3	6.29	6.3	6.33	6.33
4W+T Wet	40.2	40.34	41.6	41.57	40.1
4W+T Dry	0.86	0.89	0.61	0.79	0.75
4W+T Cond	6.23	6.26	6.23	6.25	6.25
5W+T Wet	40.15	43.45	43.7	41.33	40.17
5W+T Dry	0.79	0.87	0.72	0.55	0.93
5W+T Cond	6.19	6.18	6.29	6.18	6.23

N.B. Moisture Content calculated from sample weights
 $\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1. Oven Dry	5	0.0000	0.0000	0.00
2. Orig Cond	5	6.5700	0.0000	0.00
3. 1W+T Wet	5	46.6440	1.0973	2.35
4. 1W+T Dry	5	1.3268	0.1339	10.10
5. 1W+T Cond	5	6.5528	0.0928	1.42
6. 2W+T Wet	5	46.2175	1.8026	3.90
7. 2W+T Dry	5	1.1669	0.2002	17.15
8. 2W+T Cond	5	6.5609	0.0664	1.01
9. 3W+T Wet	5	41.6413	1.6596	3.99
10. 3W+T Dry	5	1.2056	0.3337	25.95
11. 3W+T Cond	5	6.3106	0.0179	0.28
12. 4W+T Wet	5	40.7621	0.7562	1.86
13. 4W+T Dry	5	0.7780	0.1095	14.08
14. 4W+T Cond	5	6.2445	0.0130	0.21
15. 5W+T Wet	5	41.7594	1.7254	4.13
16. 5W+T Dry	5	0.7699	0.1483	19.26
17. 5W+T Cond	5	6.2129	0.0459	0.74

SHRINKAGE IN TUMBLE DRYING

SET 7 : 100mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	6.8	6.8	7.8	7.1	7.7	7.8	8.5	5.8	9	8.5
B	6.5	8.1	6.7	8.4	7.8	7.9	7.6	6.1	9	7.1
C	6.7	7.3	6.9	7.5	7.7	6.8	8.5	7.4	8.4	6.1
D	7.1	6.5	7.4	6.4	7.3	6.9	8.2	6.3	8.6	6.8
E	6.5	7.1	7.3	7.2	7.1	7.6	8.4	7.5	8.6	6.2

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LS%	5	6.7200	0.2490	3.71
2.	WASH WS%	5	7.1600	0.6066	8.47
3.	1st LS%	5	7.2200	0.4324	5.99
4.	RINSE WS%	5	7.3200	0.7259	9.92
5.	2nd LS%	5	7.5200	0.3033	4.03
6.	RINSE WS%	5	7.4000	0.5148	6.96
7.	3rd LS%	5	8.2400	0.3782	4.59
8.	RINSE WS%	5	6.6200	0.7791	11.77
9.	4th LS%	5	8.7200	0.2683	3.08
10.	RINSE WS%	5	6.9400	0.9659	13.92

SHRINKAGE IN TUMBLE DRYING

SET 7 : 100mins HOT Tumble + 10mins COOL Down

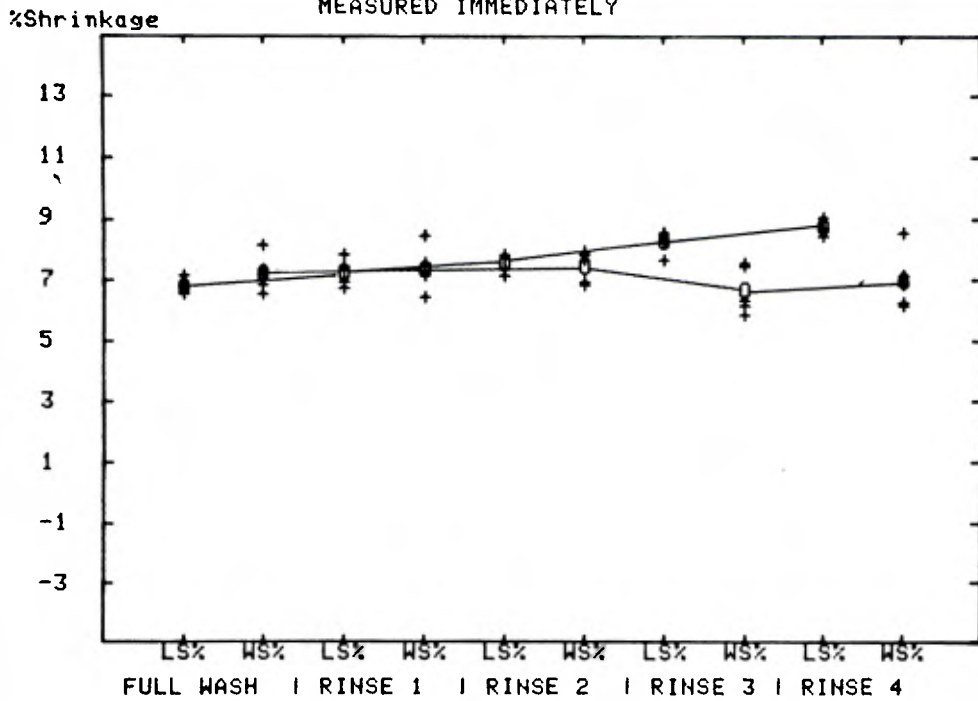
SHRINKAGE MEASURED AFTER CONDITIONING

Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	5.6	4.9	6.5	5.3	6.7	6.1	7.3	4.6	7.7	5.5
B	5.5	5.4	6.7	4.9	6.9	6.3	7.3	5.5	7.7	5.8
C	4.7	4.9	5.8	5.5	6.3	4.9	7.2	5.3	7.7	4.4
D	6.1	5.3	5.3	4.8	6.1	4.8	7.1	6	7.3	4.6
E	4.8	6	6	5	6.1	6.6	6.7	5.5	7.9	5.4

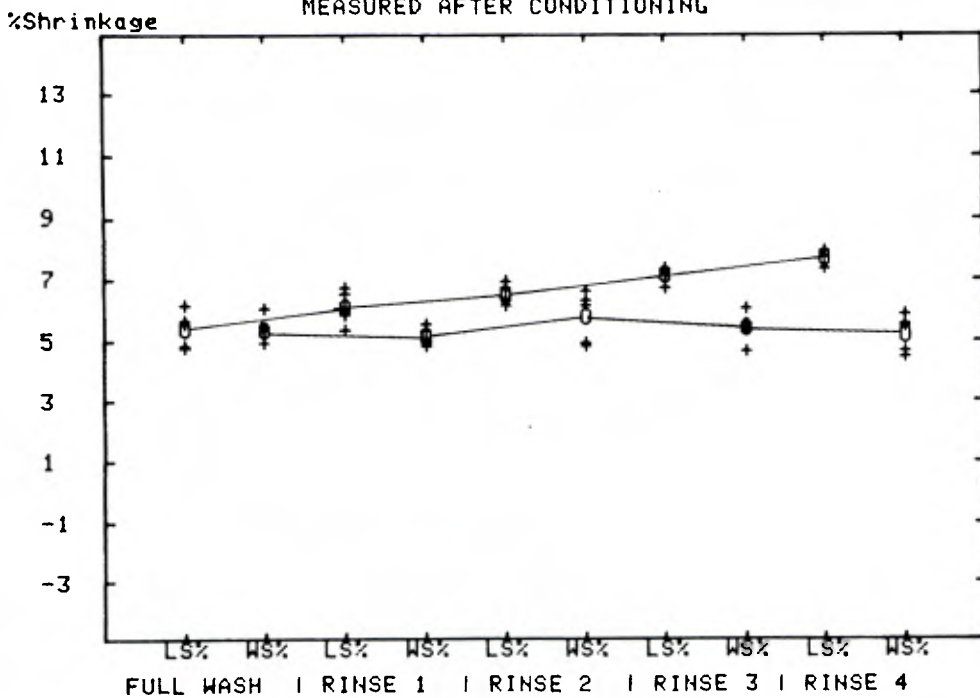
*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1.	FULL LS%	5	5.3400	0.5857	10.97
2.	WASH WS%	5	5.3000	0.4528	8.54
3.	1st LS%	5	6.0600	0.5595	9.23
4.	RINSE WS%	5	5.1000	0.2915	5.72
5.	2nd LS%	5	6.4200	0.3633	5.66
6.	RINSE WS%	5	5.7400	0.8325	14.50
7.	3rd LS%	5	7.1200	0.2490	3.50
8.	RINSE WS%	5	5.3000	0.5070	9.42
9.	4th LS%	5	7.6600	0.2191	2.86
10.	RINSE WS%	5	5.1400	0.6066	11.80

SHRINKAGE IN TUMBLE DRYING : SET 7 : ALL CYCLES
 MEASURED IMMEDIATELY

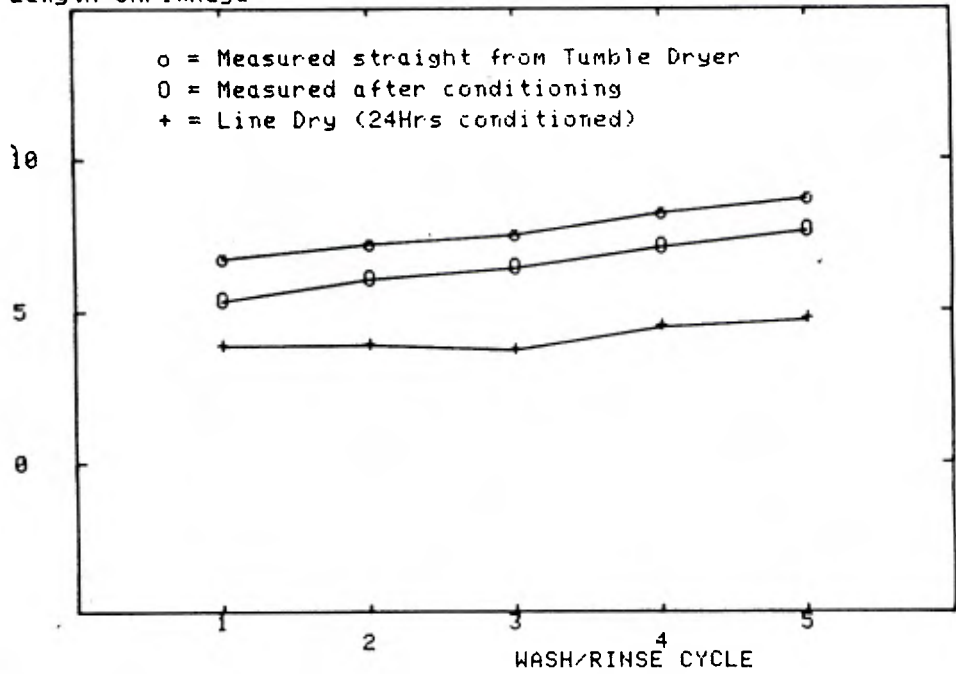


SHRINKAGE IN TUMBLE DRYING : SET 7 : ALL CYCLES
 MEASURED AFTER CONDITIONING



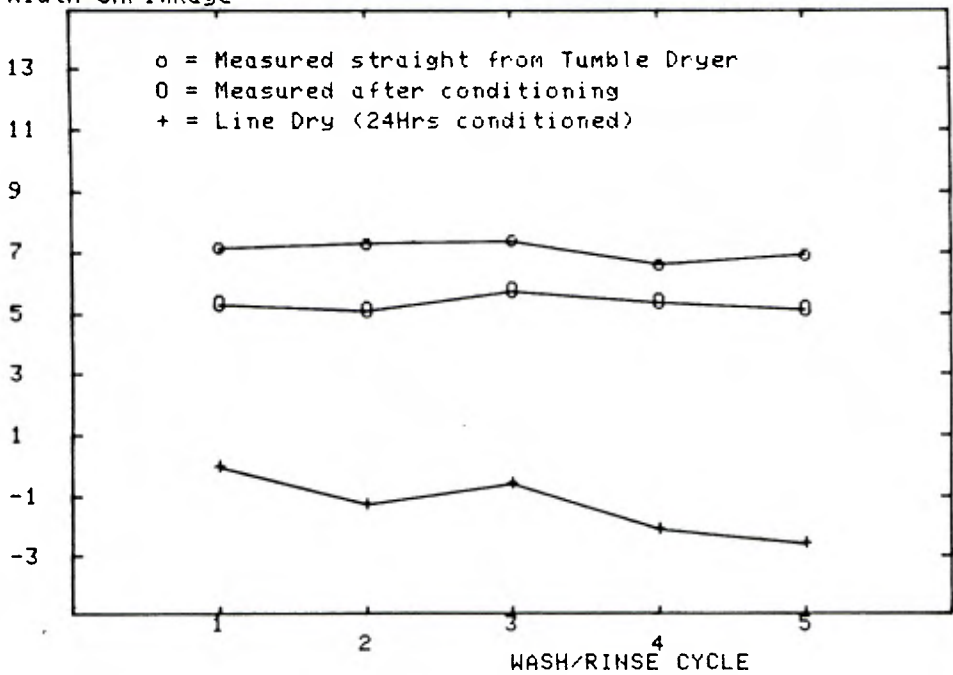
SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Length Shrinkage Set 7 Tumble (100+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING : 14G 1x1 RIB

% Width Shrinkage Set 7 Tumble (100+10mins), Set 8 Line Dry



SHRINKAGE IN TUMBLE DRYING

SET 7 : 100mins HOT + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	113.29	107.31	109.19	105.59	115.97
Orig Cond	121.26	114.86	116.87	113.01	124.13
1W+T Wet	212.24	210.27	205.01	191.82	227.57
1W+T Dry	114.72	108.76	110.7	107.03	117.65
1W+T Cond	121.03	114.69	116.76	112.8	124
2W+T Wet	199.3	193.42	202.57	192.01	198.72
2W+T Dry	114.9	108.97	110.82	107.34	118.89
2W+T Cond	121.22	114.7	116.66	112.86	123.9
3W+T Wet	196.77	183.14	188.56	183.36	204.26
3W+T Dry	114.87	109.06	110.82	107.07	117.68
3W+T Cond	120.83	114.48	116.43	112.64	123.63
4W+T Wet	208.3	191.57	203.19	190.82	217.22
4W+T Dry	115.02	108.88	110.59	106.98	117.33
4W+T Cond	120.54	114.25	116.3	112.3	123.48
5W+T Wet	207.61	182.44	196.15	196.23	197.9
5W+T Dry	113.57	108.22	110.28	106.54	116.88
5W+T Cond	120.55	114.22	116.21	112.37	123.42

N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	110.2717	4.2876	3.89
2.Orig Cond	5	118.0260	4.5891	3.89
3.1W+T Wet	5	209.3820	12.9161	6.17
4.1W+T Dry	5	111.7720	4.3574	3.90
5.1W+T Cond	5	117.8560	4.5992	3.90
6.2W+T Wet	5	197.2040	4.3813	2.22
7.2W+T Dry	5	112.1840	4.6905	4.18
8.2W+T Cond	5	117.8680	4.5879	3.89
9.3W+T Wet	5	191.2180	9.1513	4.79
10.3W+T Dry	5	111.9000	4.3241	3.86
11.3W+T Cond	5	117.6020	4.5414	3.86
12.4W+T Wet	5	202.2200	11.2504	5.56
13.4W+T Dry	5	111.7600	4.3059	3.85
14.4W+T Cond	5	117.3740	4.5816	3.90
15.5W+T Wet	5	196.0660	8.9768	4.58
16.5W+T Dry	5	111.0980	4.1614	3.75
17.5W+T Cond	5	117.3540	4.5547	3.88

SHRINKAGE IN TUMBLE DRYING

SET 7 : 100mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+T Wet	46.62	48.96	46.74	44.96	49.04
1W+T Dry	1.24	1.33	1.36	1.35	1.42
1W+T Cond	6.39	6.43	6.48	6.4	6.47
2W+T Wet	43.15	44.52	46.1	45.01	41.64
2W+T Dry	1.4	1.52	1.47	1.63	2.45
2W+T Cond	6.54	6.44	6.4	6.45	6.4
3W+T Wet	42.42	41.4	42.09	42.42	43.22
3W+T Dry	1.37	1.6	1.47	1.39	1.45
3W+T Cond	6.24	6.26	6.22	6.26	6.19
4W+T Wet	45.61	43.98	46.26	44.67	46.61
4W+T Dry	1.5	1.44	1.26	1.3	1.16
4W+T Cond	6.01	6.07	6.11	5.98	6.08
5W+T Wet	45.43	41.18	44.33	46.19	41.4
5W+T Dry	0.24	0.84	0.99	0.9	0.77
5W+T Cond	6.02	6.05	6.04	6.04	6.03

N.B. Moisture Content calculated from sample weights

$$\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	6.5700	0.0000	0.00
3.1W+T Wet	5	47.2633	1.7359	3.67
4.1W+T Dry	5	1.3420	0.0652	4.86
5.1W+T Cond	5	6.4348	0.0416	0.65
6.2W+T Wet	5	44.0838	1.7277	3.92
7.2W+T Dry	5	1.6949	0.4320	25.49
8.2W+T Cond	5	6.4446	0.0572	0.89
9.3W+T Wet	5	42.3115	0.6568	1.55
10.3W+T Dry	5	1.4558	0.0909	6.24
11.3W+T Cond	5	6.2339	0.0299	0.48
12.4W+T Wet	5	45.4262	1.0946	2.41
13.4W+T Dry	5	1.3326	0.1384	10.39
14.4W+T Cond	5	6.0505	0.0537	0.89
15.5W+T Wet	5	43.7063	2.3058	5.28
16.5W+T Dry	5	0.7478	0.2924	39.11
17.5W+T Cond	5	6.0352	0.0100	0.17

SHRINKAGE IN TUMBLE DRYING

SET B : Line Dried

SHRINKAGE MEASURED AFTER LINE DRYING (24HRS) IN CONDITIONED ATMOSPHERE

Sample Reference	FUL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	3.7	0.4	4.1	-1.5	3.2	-0.5	4.5	-2	4.8	-2.8
B	4	0.9	3.5	0.5	3.6	-0.5	5	-1.6	5.6	-4.9
C	3.8	-0.3	4.6	-2.8	3.5	-0.5	4.1	-2	3.7	-1.3
D	3.5	1.1	3.1	-0.1	3.7	-0.8	4.1	-2.4	4.6	-1.6
E	4.2	-2.4	4	-2.5	4.5	-0.8	4.6	-2.5	4.8	-2.4

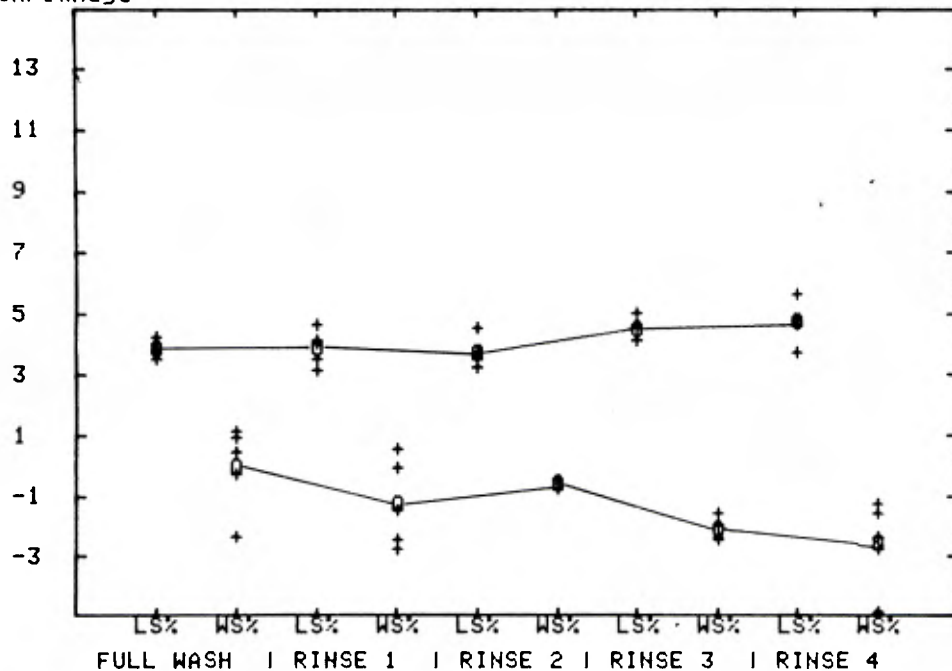
*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FUL	LS%	5	3.8400	0.2702	7.04
2.	WASH	WS%	5	-0.0600	1.4153	2358.79
3.	1st	LS%	5	3.8600	0.5771	14.95
4.	RINSE	WS%	5	-1.2800	1.4498	113.27
5.	2nd	LS%	5	3.7000	0.4848	13.10
6.	RINSE	WS%	5	-0.6200	0.1643	26.50
7.	3rd	LS%	5	4.4600	0.3782	8.48
8.	RINSE	WS%	5	-2.1000	0.3606	17.17
9.	4th	LS%	5	4.7000	0.6782	14.43
10.	RINSE	WS%	5	-2.6000	1.4195	54.60

SHRINKAGE IN TUMBLE DRYING : SET 8 : ALL CYCLES

MEASURED AFTER LINE DRY 24HRS CONDITIONED

%Shrinkage



SHRINKAGE IN TUMBLE DRYING

SET 8 : LINE DRY FOR 24HRS IN CONDITIONED ATMOSPHERE

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	111.14	105.02	110.2	108.01	115.65
Orig Cond	118.96	112.4	117.95	115.6	123.78
1W+L Wet	208.3	202.26	216.87	213.01	220.27
1W+L Dry	120.58	114.01	119.52	117.15	125.46
2W+L Wet	196.34	186.07	198.81	200.8	232.02
2W+L Dry	120.43	113.88	119.46	117.05	125.39
3W+L Wet	184.87	180.57	179.81	182.91	193.67
3W+L Dry	120.2	113.75	119.24	116.9	125.17
4W+L Wet	196.89	189.64	195.07	194.82	211.82
4W+L Dry	120.43	113.83	119.47	117.93	125.33
5W+L Wet	179.33	182.84	198.31	180.71	195.4
5W+L Dry	120.05	113.52	119.05	116.71	125

N.B. Oven Dry sample weights calculated from Original Conditioned sample weights using Average Moisture Content established on samples of the same fabric in a separate test.

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	110.0026	3.9393	3.58
2.Orig Cond	5	117.7380	4.2163	3.58
3.1W+L Wet	5	212.1420	7.0991	3.35
4.1W+L Dry	5	119.3440	4.2494	3.56
5.2W+L Wet	5	202.8080	17.2869	8.52
6.2W+L Dry	5	119.2420	4.2665	3.58
7.3W+L Wet	5	184.3660	5.5701	3.02
8.3W+L Dry	5	119.0520	4.2286	3.55
9.4W+L Wet	5	197.6480	8.3695	4.23
10.4W+L Dry	5	119.3980	4.1658	3.49
11.5W+L Wet	5	187.3180	8.8554	4.73
12.5W+L Dry	5	118.8660	4.2512	3.58

SHRINKAGE IN TUMBLE DRYING

SET 8 : LINE DRY FOR 24HRS IN CONDITIONED ATMOSPHERE

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	6.57	6.57	6.57	6.57	6.57
1W+L Wet	46.64	48.08	49.19	49.3	47.5
1W+L Dry	7.83	7.89	7.8	7.81	7.82
2W+L Wet	43.39	43.56	44.57	46.21	50.16
2W+L Dry	7.71	7.78	7.75	7.73	7.77
3W+L Wet	39.88	41.84	38.71	40.95	40.29
3W+L Dry	7.53	7.68	7.58	7.61	7.61
4W+L Wet	43.55	44.62	43.51	44.56	45.4
4W+L Dry	7.71	7.74	7.76	8.42	7.73
5W+L Wet	38.02	42.56	44.43	40.23	40.81
5W+L Dry	7.42	7.49	7.43	7.46	7.48

N.B. Moisture Content calculated from sample weights

$$\%MC = (\text{Sample Weight} - \text{Calc Oven Dry Weight}) / \text{Sample Weight} * 100$$

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	6.5700	0.0000	0.00
3.1W+L Wet	5	48.1400	1.1280	2.34
4.1W+L Dry	5	7.8278	0.0362	0.46
5.2W+L Wet	5	45.5784	2.7939	6.13
6.2W+L Dry	5	7.7485	0.0301	0.39
7.3W+L Wet	5	40.3346	1.1720	2.91
8.3W+L Dry	5	7.6020	0.0526	0.69
9.4W+L Wet	5	44.3291	0.8026	1.81
10.4W+L Dry	5	7.8709	0.3053	3.88
11.5W+L Wet	5	41.2130	2.4225	5.88
12.5W+L Dry	5	7.4568	0.0312	0.42