Research Record No. 229

SHRINKAGE 85

INFLUENCE OF MOISTURE CONTENT ON SHRINKAGE DEVELOPMENT IN TUMBLE DRYING

Part 5: Single Jersey, Twofold yarn, Gyrostock dyed

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CONTENTS

1. INTRODUCTION

Previous parts of this series of trials have monitored the behaviour of winch dyed 20g interlock, piece mercerised and Gyrostock dyed 28g single jersey, and winch bleached 14g 1 x 1 rib fabrics 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.

Im this report, part 5, the results of a similar series of trials carried out on a 28g Gyrostock dyed single jersey fabric are discussed.

This completes the individual reports on the series of trials carried out under the general title Shrinkage 85. A summary of the results from the whole series will be prepared.

2. SAMPLE PREPARATION

2.1 Tumble Dry Sets

Six sets, each comprising 5 standard shrinkage specimens (50 x 50 cm^2 template) were prepared from a piece of 28 gauge single jersey fabric, knitted from Ne 2/72 combed cotton yarn at 0.287 cm nominal stitch length, which had been piece dyed in a Gyrostock machine during trials which had been carried out at TEBE in Portugal.

Each specimen was conditioned in the laboratory, marked, measured and weighed prior to laundering. Six standard loads of 2.75 kg 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 Set

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 7th standard load which was made up as before to 2.75 kg 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 0. 30 mins Hot tumble + 10 mins Cool down.
Total time in tumble dryer = 40 mins.

Set 1. 40 mins Hot tumble + 10 mins Cool down.
Total time in tumble dryer = 50 mins.

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 0 30 + 10 mins, Set 1 40 + 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 3-8 give the results of the statistical analysis which compared shrinkage 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

On average, length shrinkage increased progressively with the number of cycles but the differences are small and after the second cycle are probably not significant.

Generally also length shrinkage increased with length of time in the tumble dryer. In particular, Set 0 (30 + 10 mins) and Set 1 (40 + 10 mins) developed less shrinkage than the other sets. On average the differences between Sets 2, 3, 5 and 7 are not significant, although the overall variability in the results from Sets 5 and 7 is probably slightly improved.

In all cases maximum length shrinkage was only developed when residual moisture content fell consistently below 1.5 - 2.0%.

On average the difference in length shrinkage between Set 0 and Set 1, and Set 1 and Sets 2, 3, 5 and 7 is approximately 2%, overall 4%.

The specimens which had been line dried (Set 8) developed less length shrinkage than any of the tumble dried sets and, although the differences between cycles is probably not significant, the average results increase progressively with number of cycles.

Variation between specimens within a set improved between sets 0, 1, 2 and 3 but did not improve further with extended tumbling times. The variation between specimens in the line dry set was similar to Sets 0 and 1.

5.1.2 Width shrinkage

Generally width shrinkage appears to be progressive with number of cycles, but in Sets 0 and 1 in particular variability is high, and in Sets 3, 5 and 7 the differences between cycles are probably not significant.

Width shrinkage increased with length of time in the tumble dryer, in particular between Sets 0 and 1, approximately 4%, and between Sets 1 and 2, approximately 3½%. The differences between Sets 2, 3, 5 and 7 are on average probably not significant.

Maximum width shrinkage was only developed when residual moisture content in the specimens fell consistently below 1.5 - 2%.

The specimens which had been line dried developed more width shrinkage on average than Set 0, slightly less than Set 1, and significantly less than the other tumble dry sets. Width shrinkage was not progressive over cycles in line drying.

Generally variation between specimens within a set improved with increased tumbling times. The variation between specimens in the line dry set was similar to Set 3.

5.1.3 Moisture content

Residual moisture content in the specimens generally reduced with length of time in the tumble dryer. However, consistent minimum levels of residual moisture content were only achieved with Set 7, although Set 5, after the first cycle, was returning residual moisture contents below 1.5% immediately on leaving the tumble dryer. In Sets 0, 1, 2 and 3 there was an increase in residual moisture content after the fifth cycle compared to cycles 3 and 4.

Variation in moisture content between specimens decreased with increased time in the tumble dryer between Sets 0, 1, 2 and 3, but did not improve further with extended tumbling times. There was apparently little improvement with number of cycles.

The variation in moisture content in the line dry set was insignificant.

5.2 Influence of Conditioning

5.2.1 Length shrinkage

Conditioning after tumble drying on average reduced the variability between the specimens and with the exception of Set 0 caused a reduction in the levels of length shrinkage recorded by approximately 1½%. The improvement

in Set 1 was minimal. In the vast majority of cases the reduction in shrinkage due to conditioning was statistically significant.

For Set 0 length shrinkage increased with conditioning by on average almost 1%.

5.2.2 Width shrinkage

Conditioning after tumble drying on average reduced the variability between specimens and with the exception of Sets 0 and 1 caused a reduction in the recorded levels of width shrinkage. Similarly to length shrinkage, the improvement was on average approximately 1.5%, and in the majority of cases the differences are statistically significant.

For Set 0 shrinkage increased with conditioning by over 2% on average and by 0.5% for Set 1.

5.2.3 Moisture content

Variation in moisture content after reconditioning was negligible for each set, although there was a 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 on average higher than all the tumble dried sets by approximately 0.5% for Sets 0 and 1 and 1.5% for Set 7.

Sets 0, 1 and 8 retained higher moisture contents after conditioning compared to the original, whilst Sets 2, 3, 5 and 7 tended to have lower moisture contents after conditioning compared to the original.

5.3 Comparison Line Dry/Tumble Dry

Previous trials have indicated that there is a larger difference between line and tumble dry shrinkage for fabrics which have been mercerised when compared to fabrics of similar quality which have not been mercerised.

The fabric examined in Part 3 of this series was knitted from the same yarn, Ne 2/72, at the same stitch length, 0.287 cm, on the same knitting machine. Both fabrics were dyed in the same dyeing machine, a Gyrostock, to a similar depth of shade. The only difference between the two fabrics is therefore that the fabric examined in part 3 had been tubular piece mercerised in a Dornier machine prior to dyeing, and the fabric examined in this series of experiments had not.

To obtain average shrinkage values for tumble drying the results for Sets 3, 5 and 7 were averaged for both sets. The difference was then calculated from this average value and the average value obtained from the line dry sets.

Mercerised Single Jersey Ne 2/72 0.285 cm.

	Tumble Dry		Line Dry		Difference
	Mean	SD	Mean	SD	
Length Shrinkage					
Before Conditioning	-5.03	0.8	+1.16	0.56	6.2
After Conditioning	-3.78	0.6	+1.16	0.56	4.9
Width Shrinkage					
Before Conditioning	-20.43	0.8	-14.04	1.22	6.4
After Conditioning	-18.85	0.6	-14.04	1.22	4.8

Unmercerised Single Jersey Ne 2/72 0.285 cm.

	Tumble Dry		Line Dry		Difference
	Mean	SD	Mean	SD	
Length Shrinkage					
Before Conditioning	-9.28	0.53	-3.99	0.32	5.3
After Conditioning	-7.79	0.47	-3.99	0.32	3.8
Width Shrinkage					
Before Conditioning	-10.63	0.57	-5.32	0.53	5.3
After Conditioning	-9.10	0.42	-5.32	0.53	3.8

NB: minus (-) = shrinkage, plus (+) = extension.

For both fabrics less shrinkage is developed in line drying than in tumble drying, although the difference is reduced by reconditioning the tumble dried samples.

On average the difference between line and tumble drying is reduced by approximately 1% in both directions for the unmercerised single jersey compared to the mercerised quality.

6. CONCLUSIONS

6.1 For this fabric quality length shrinkage generally increases with length of time in the tumble dryer, but once the average residual moisture content of the specimens consistently falls below approximately 1.5-2% no significant increase in length shrinkage appears to occur.

6.2 Length shrinkage generally increases with number of cycles but the differences are small and after the second cycle are probably not

significant. However, maximum length shrinkage is only developed when residual moisture contents consistently fall below 2%.

6.3 For this fabric quality width shrinkage generally increases with length of time in the tumble dryer, but once the average residual moisture content of the specimens consistently falls below approximately 1.5-2% no significant increase in width shrinkage appears to occur.

6.4 Width shrinkage shows a tendency to increase with number of cycles, but once residual moisture content falls consistently below 2% the differences are insignificant. Maximum width shrinkage is only developed at low residual moisture contents.

6.5 Residual moisture content reduced with length of time in the tumble dryer, but consistent minimum levels were only achieved in Set 7 although Set 5, after the first cycle, was returning residual moisture contents below 1.5%.

For sets 0, 1, 2 and 3 there was an apparent increase in residual moisture content after the fifth cycle, compared with cycles 3 and 4.

6.6 Variation between specimens in each set improved with increased tumbling times between Sets 0, 1, 2 and 3, but did not improve further with extended tumbling times.

Variation in the line dry set was comparable with the level of variation found in the tumble dry sets with shorter tumbling times.

6.7 Conditioning after tumble drying reduced the variability in both length and width measurements and reduced shrinkage in both directions by approximately 1.5% for Sets 2, 3, 5 and 7. Shrinkage increased in both directions for Set 0 but the effect on Set 1 was marginal.

6.8 Less shrinkage is developed during line drying compared to tumble drying for length shrinkage and, with the exception of Set 0, for width shrinkage also. When the length of time in the tumble dryer is sufficient to develop the full potential shrinkage of the samples, the difference between line and tumble shrinkage is approximately 5% in both directions which reduces to approximately 4% after the tumble dry samples have been reconditioned.

The difference between line and tumble shrinkage for the equivalent mercerised single jersey quality examined in Part 3 of this series was approximately 6% in length and width before conditioning, approximately 5% after conditioning.

TABLE 1

SHRINKAGE IN TUMBLE DRYING

28G SINGLE JERSEY. Ne 2/72. S.L. 0.287. FINISH Gyrostock dved

Average of 5 replications : Measured straight from the tumble dryer.

Cycle No.	LS%	SD	WS%	SD	MC%	SD
Set 0 Tumble Dry 30+10 mins						
1	4.38	1.39	2.76	0.84	16.16	1.65
2	4.8	1.16	0.72	1.25	32.73	3.03
3	5.68	1.06	4.4	1.97	14.14	5.13
4	5.1	0.75	3.14	1.81	17.24	2.67
5	5.22	0.66	1.3	0.93	21.74	5.68
mean	5.04	1	2.46	1.36	20.4	3.63
sd	0.48	0.3	1.47	0.51	7.43	1.71
Set 1 Tumble Dry 40+10 mins						
1	5.14	0.66	3.28	1.12	16.12	2.4
2	7.18	0.83	7.52	3.18	9.08	2.91
3	7.78	0.46	7.5	1.41	8.45	1.19
4	9.48	0.49	9.64	1.42	4.17	0.3
5	7.06	1.38	6.64	3.28	11.54	3.96
mean	7.33	0.76	6.92	2.08	9.87	2.15
sd	1.56	0.37	2.31	1.06	4.39	1.44
Set 2 Tumble Dry 50+10 mins						
1	8.36	0.57	9.96	0.65	2.48	0.13
2	9.54	0.52	10.78	0.51	1.21	0.15
3	9.72	0.75	10.78	0.62	1.42	0.09
4	9.88	0.41	11.3	0.67	1.04	0.16
5	8.7	0.49	9.36	0.53	7.38	1.14
mean	9.24	0.55	10.44	0.6	2.71	0.33
sd	0.67	0.13	0.77	0.07	2.67	0.45
Set 3 Tumble Dry 60+10 mins						
1	8.84	0.19	10.26	0.88	1.1	0.15
2	9.4	0.4	10.52	0.97	0.88	0.17
3	9.4	0.66	10.48	1.61	1.25	0.19
4	9.22	0.89	10.46	1.27	1.49	0.25
5	9.24	0.36	10.38	0.97	2.78	0.13
mean	9.22	0.5	10.42	1.14	1.5	0.18
sd	0.23	0.28	0.1	0.3	0.75	0.05
Set 5 Tumble Dry 80+10 mins						
1	8.12	0.47	9.3	0.86	2.36	0.14
2	9.24	0.38	10.74	0.92	1.17	0.16
3	9.12	0.64	10.32	0.89	1.43	0.34
4	9.78	0.7	11.02	1.24	0.92	0.19
5	10.04	0.47	11.28	1.05	0.87	0.16
mean	9.26	0.53	10.53	0.99	1.35	0.2
sd	0.74	0.13	0.78	0.16	0.61	0.08
Set 7 Tumble Dry 100+10 mins						
1	8.52	0.52	10.14	0.62	1.22	0.17
2	9.36	0.61	11.26	0.58	0.56	0.16
3	9.08	0.3	10.54	0.34	0.92	0.07
4	9.82	0.58	11.12	0.73	0.99	0.16
5	10.02	0.63	11.64	0.56	0.36	0.18
mean	9.36	0.49	10.94	0.57	0.81	0.15
sd	0.6	0.14	0.6	0.14	0.35	0.04
Set 8 Line Dry 24Hrs Conditioned Atmosphere						
1	3.62	0.93	5.64	0.99	7.21	0.08
2	3.8	0.45	5.4	0.89	7.2	0.07
3	3.9	1.1	5.92	0.82	7.13	0.14
4	4.28	0.99	4.54	1.5	7.26	0.04
5	4.36	0.69	5.08	0.82	6.62	0.09
mean	3.99	0.83	5.32	1	7.08	0.08
sd	0.32	0.26	0.53	0.29	0.26	0.04

TABLE 2

SHRINKAGE IN TUMBLE DRYING

286 SINGLE JERSEY, Ne 2/72, S.L. 0.287, FINISH Gyrostock dyed

Average of 5 replications : Measured after conditioning

Cycle No.		LS%	SD	WS%	SD	MC%	SD
Set 0 Tumble Dry 30+10 mins							
1		5.34	0.95	5.58	1.27	7.2	0.11
2		5.32	0.97	4.3	1.11	6.49	0.1
3		6.28	0.89	5.74	1.26	6.57	0.1
4		6.42	0.6	4.8	1.21	6.51	0.07
5		6.18	0.55	3.68	1.55	6.45	0.1
	mean	5.91	0.79	4.82	1.28	6.64	0.1
	sd	0.53	0.2	0.87	0.16	0.31	0.02
Set 1 Tumble Dry 40+10 mins							
1		6.38	0.8	5.66	0.76	6.66	0.04
2		6.96	0.44	7.42	2.06	6.54	0.28
3		7.34	0.4	7.88	1.62	6.54	0.14
4		7.6	0.54	8.42	1.42	5.75	0.06
5		7.16	0.57	7.68	1.84	6.23	0.07
	mean	7.09	0.55	7.41	1.54	6.34	0.12
	sd	0.46	0.16	1.05	0.5	0.37	0.1
Set 2 Tumble Dry 50+10 mins							
1		7.12	0.53	9.02	0.44	5.65	0.06
2		7.92	0.57	9.32	0.44	5.59	0.05
3		8.18	0.46	9.44	0.58	5.14	0.05
4		8.36	0.54	9.52	0.63	5.23	0.04
5		8.16	0.6	8.9	0.58	6.19	0.19
	mean	7.95	0.54	9.24	0.53	5.56	0.08
	sd	0.49	0.05	0.27	0.09	0.42	0.06
Set 3 Tumble Dry 60+10 mins							
1		7.46	0.44	8.54	0.78	5.61	0.01
2		7.76	0.65	8.98	1.12	5.37	0.09
3		8	0.57	9.4	1.22	5.63	0.03
4		7.78	0.5	9.06	1.31	5.6	0.04
5		7.84	0.59	8.86	1.1	5.51	0.09
	mean	7.77	0.55	8.97	1.11	5.54	0.05
	sd	0.2	0.08	0.31	0.2	0.11	0.04
Set 5 Tumble Dry 80+10 mins							
1		6.86	0.55	8.2	0.66	5.61	0.07
2		7.62	0.28	8.84	0.9	5.62	0.06
3		7.9	0.46	8.72	0.87	5.71	0.05
4		8.16	0.44	9.32	0.98	5.64	0.04
5		8.24	0.55	9.64	1.47	5.44	0.02
	mean	7.76	0.46	8.94	0.98	5.6	0.05
	sd	0.56	0.11	0.56	0.3	0.1	0.02
Set 7 Tumble Dry 100+10 mins							
1		6.96	0.31	9.06	0.38	5.63	0.08
2		7.42	0.33	9.3	0.45	5.45	0.08
3		8.02	0.3	9.54	0.47	5.49	0.11
4		8.16	0.33	9.68	0.44	5.35	0.05
5		8.64	0.43	9.4	1.03	5.35	0.06
	mean	7.84	0.32	9.4	0.55	5.45	0.08
	sd	0.66	0.07	0.24	0.27	0.12	0.02
Set 8 Line Dry 24Hrs Conditioned Atmosphere							
1		3.62	0.93	5.64	0.99	7.21	0.08
2		3.8	0.49	5.4	0.89	7.2	0.07
3		3.9	1.1	5.92	0.82	7.13	0.14
4		4.28	0.99	4.54	1.5	7.26	0.04
5		4.36	0.69	5.08	0.82	6.62	0.09
	mean	3.99	0.83	5.32	1	7.08	0.08
	sd	0.32	0.26	0.53	0.29	0.26	0.04

TABLE 3

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 0 : Tumble Dry 30mins HOT + 10mins COOL Down

		Mean Difference	t		r sq
FULL WASH	LS	0.96	1.9985		0.5256
	WS	2.82	9.7155	***	0.8614
1st RINSE	LS	0.52	0.7016		0.0018
	WS	3.58	8.936	***	0.6024
2nd RINSE	LS	0.6	1.5965		0.5099
	WS	1.34	2.3478		0.7057
3rd RINSE	LS	1.32	4.804	*	0.4706
	WS	1.66	3.4371	*	0.752
4th RINSE	LS	0.96	1.8535		0.2017
	WS	2.38	2.8285	*	0.0242

TABLE 4

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	1.24	5.5043	**	0.6864
	WS	2.38	3.9167	*	0.0429
1st RINSE	LS	-0.22	0.6983		0.434
	WS	-0.1	0.169		0.9773
2nd RINSE	LS	-0.44	2.1157		0.2952
	WS	0.38	2.654		0.9836
3rd RINSE	LS	-1.88	17.3436	***	0.8411
	WS	-1.22	18.7139	***	0.9916
4th RINSE	LS	0.1	0.2005		0.6065
	WS	1.04	1.411		0.9841

TABLE 5

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	-1.24	4.5816	*	0.2634
	WS	-1.1	3.4785	*	0.3016
1st RINSE	LS	-1.62	10.403	***	0.7085
	WS	-1.46	14.0815	***	0.8341
2nd RINSE	LS	-1.54	8.9662	***	0.903
	WS	-1.34	16.0161	***	0.9272
3rd RINSE	LS	-1.52	14.0225	***	0.8653
	WS	-1.78	9.4473	***	0.6955
4th RINSE	LS	-1.54	2.0483		0.3031
	WS	-0.46	1.9059		0.3909

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

		Mean Difference	t		r sq
FULL WASH	LS	-1.38	5.4443	**	0.023
	WS	-1.72	6.0622	**	0.5948
1st RINSE	LS	-1.64	8.526	**	0.7068
	WS	-1.54	9.1624	***	0.9197
2nd RINSE	LS	-1.4	7.3532	**	0.672
	WS	-1.08	3.6668	*	0.9036
3rd RINSE	LS	-1.44	4.5941	*	0.5382
	WS	-1.4	10.9825	***	0.962
4th RINSE	LS	-1.4	9.6039	***	0.8484
	WS	-1.52	9.5186	***	0.9226

TABLE 7

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 Difference	t		r sq
FULL WASH	LS	-1.26	5.2206	**	0.3132
	WS	-1.1	7.1377	**	0.9081
1st RINSE	LS	-1.62	7.8123	**	0.0616
	WS	-1.9	16.2033	***	0.9348
2nd RINSE	LS	-1.22	8.2724	**	0.8098
	WS	-1.6	8.7093	***	0.8341
3rd RINSE	LS	-1.62	6.1561	**	0.432
	WS	-1.7	8.5	**	0.9231
4th RINSE	LS	-1.8	9	***	0.4956
	WS	-1.64	3.8575	*	0.6759

TABLE 8

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 Difference	t		r sq
FULL WASH	LS	-1.56	13.5524	***	0.9301
	WS	-1.08	4.2608	*	0.3389
1st RINSE	LS	-1.94	5.2898	**	0.0252
	WS	-1.96	11.4116	***	0.6465
2nd RINSE	LS	-1.06	6.6057	**	0.1804
	WS	-1	7.8446	**	0.7137
3rd RINSE	LS	-1.66	9.2797	***	0.1491
	WS	-1.44	9.1998	***	0.9528
4th RINSE	LS	-1.38	5.4981	**	0.3702
	WS	-2.24	4.1453	*	0.0331

FIG.1

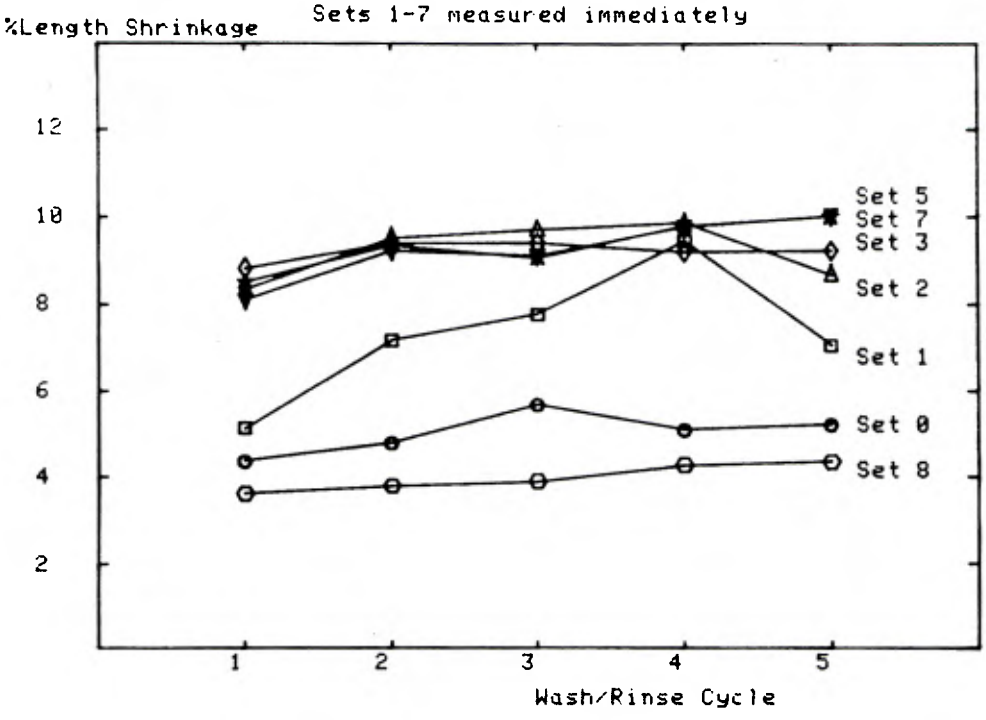

SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY
Sets 1-7 measured immediately
%Length Shrinkage
12
10
8
6
4
2
1
2
3
4
5
Wash/Rinse Cycle
Set 5
Set 7
Set 3
Set 2
Set 1
Set 0
Set 8

FIG.2

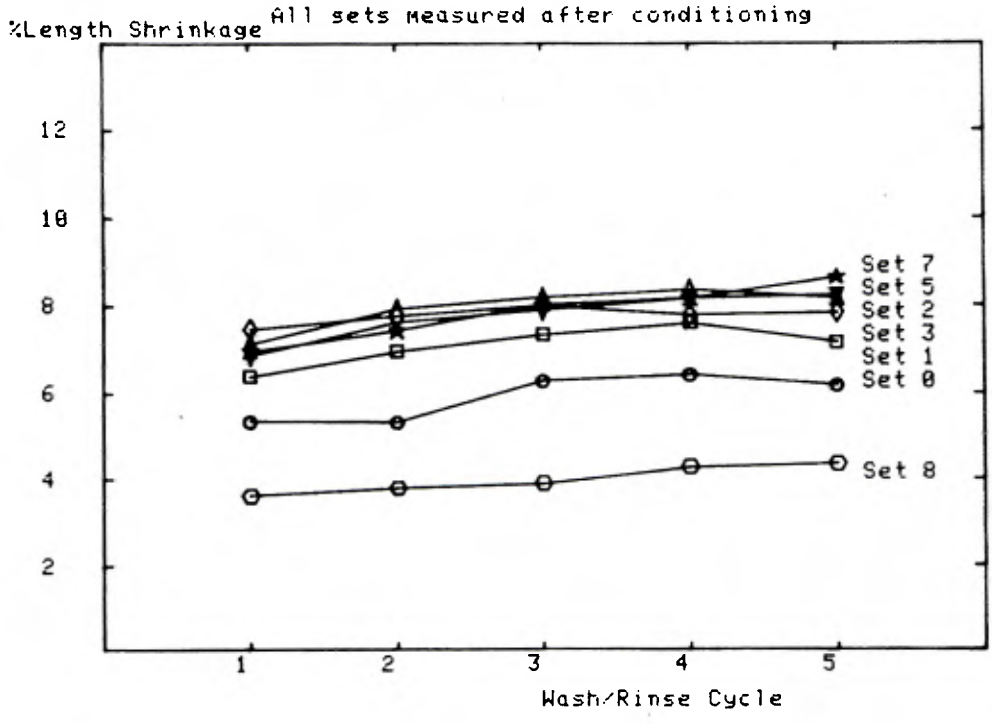

SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY
All sets measured after conditioning
%Length Shrinkage
12
10
8
6
4
2
1
2
3
4
5
Wash/Rinse Cycle
Set 7
Set 5
Set 2
Set 3
Set 1
Set 0
Set 8

FIG.3

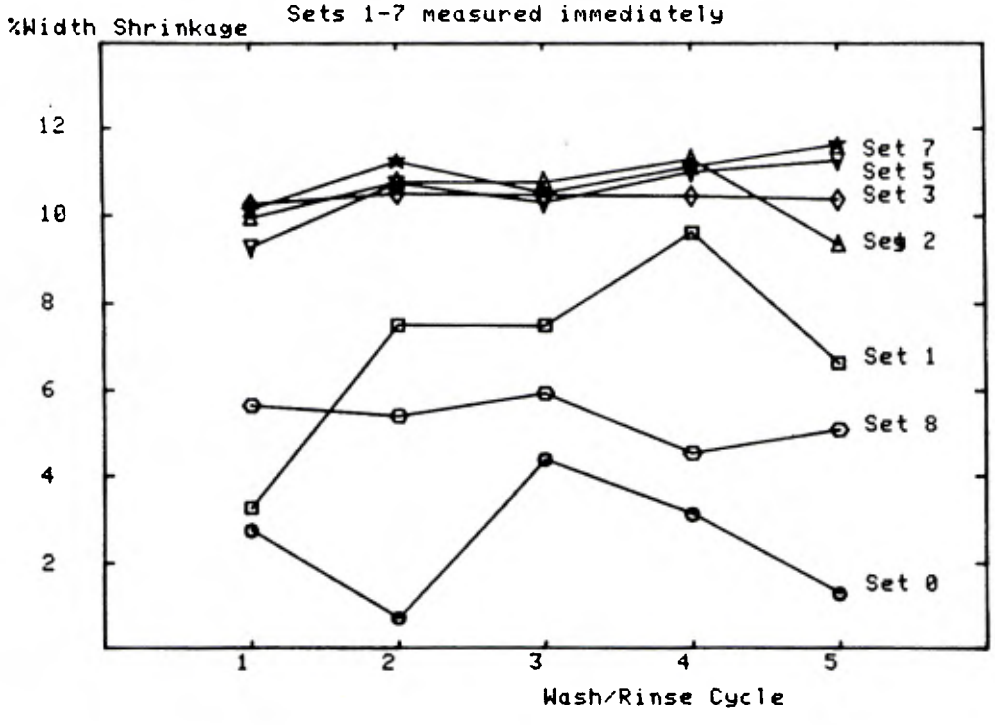
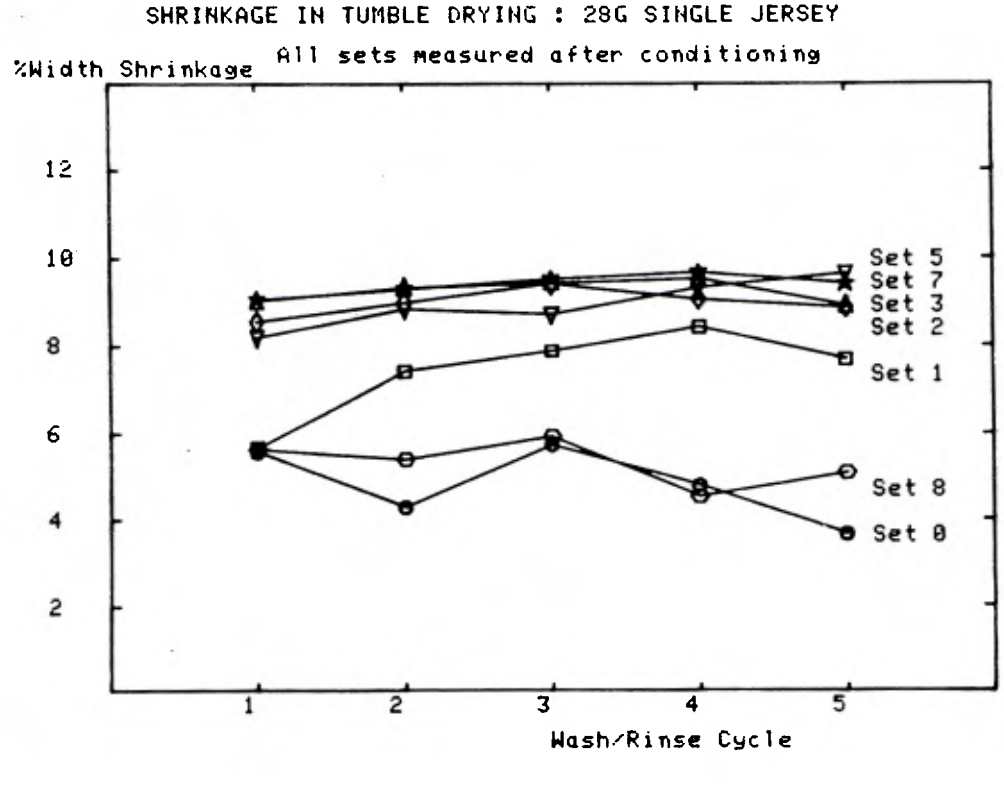

SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY
Sets 1-7 measured immediately
%Width Shrinkage
12
10
8
6
4
2
1
2
3
4
5
Wash/Rinse Cycle
Set 7
Set 5
Set 3
Set 2
Set 1
Set 8
Set 0

FIG.4


SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY
All sets measured after conditioning
%Width Shrinkage
12
10
8
6
4
2
1
2
3
4
5
Wash/Rinse Cycle
Set 5
Set 7
Set 3
Set 2
Set 1
Set 8
Set 0

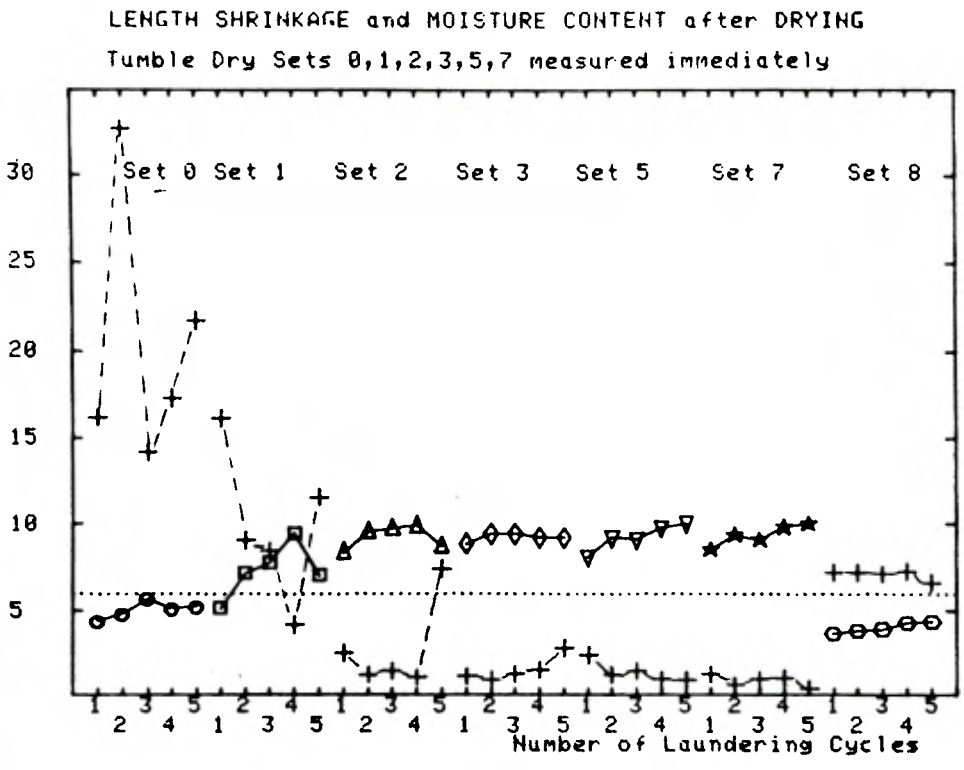

LENGTH SHRINKAGE and MOISTURE CONTENT after DRYING
Tumble Dry Sets 0,1,2,3,5,7 measured immediately
Set 0 Set 1 Set 2 Set 3 Set 5 Set 7 Set 8
30
25
20
15
10
5
Number of Laundering Cycles

FIG.5

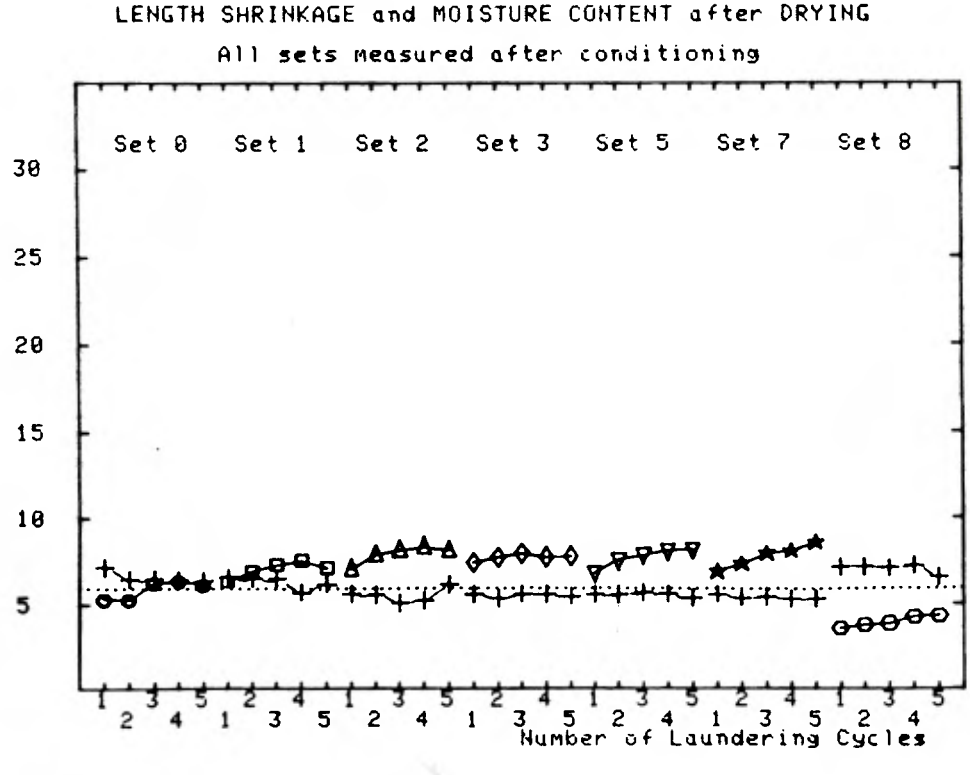

LENGTH SHRINKAGE and MOISTURE CONTENT after DRYING
All sets measured after conditioning
Set 0 Set 1 Set 2 Set 3 Set 5 Set 7 Set 8
30
25
20
15
10
5
Number of Laundering Cycles

FIG.6

FIG.7

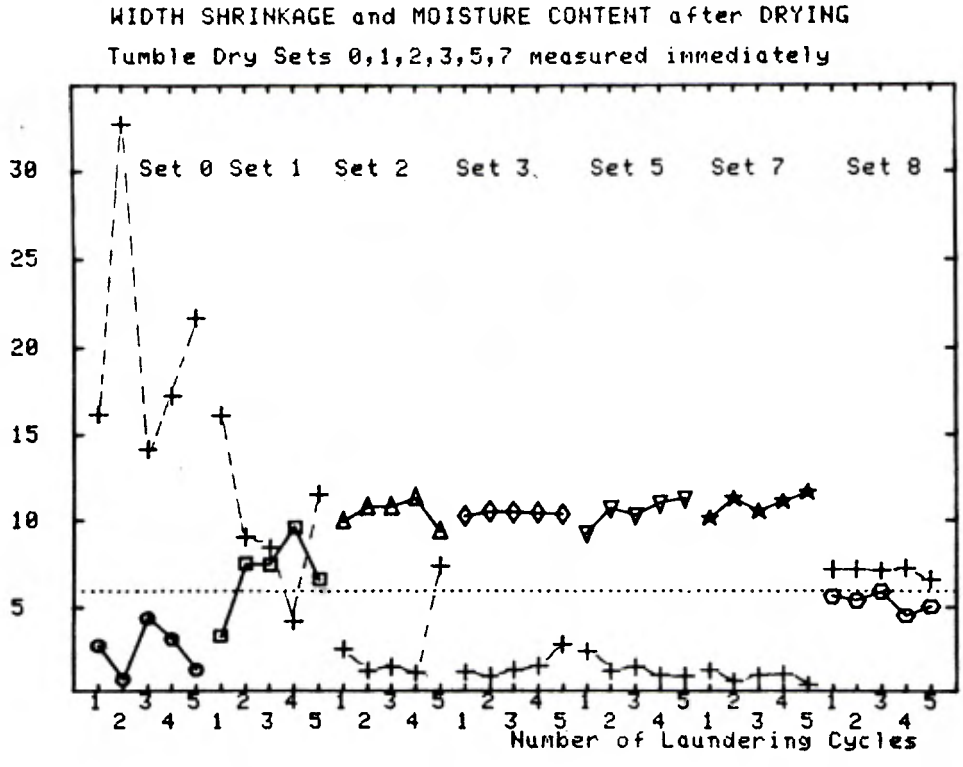

WIDTH SHRINKAGE and MOISTURE CONTENT after DRYING
Tumble Dry Sets 0,1,2,3,5,7 measured immediately
Set 0 Set 1 Set 2 Set 3 Set 5 Set 7 Set 8
30
25
20
15
10
5
1 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5
Number of Laundering Cycles

FIG.8

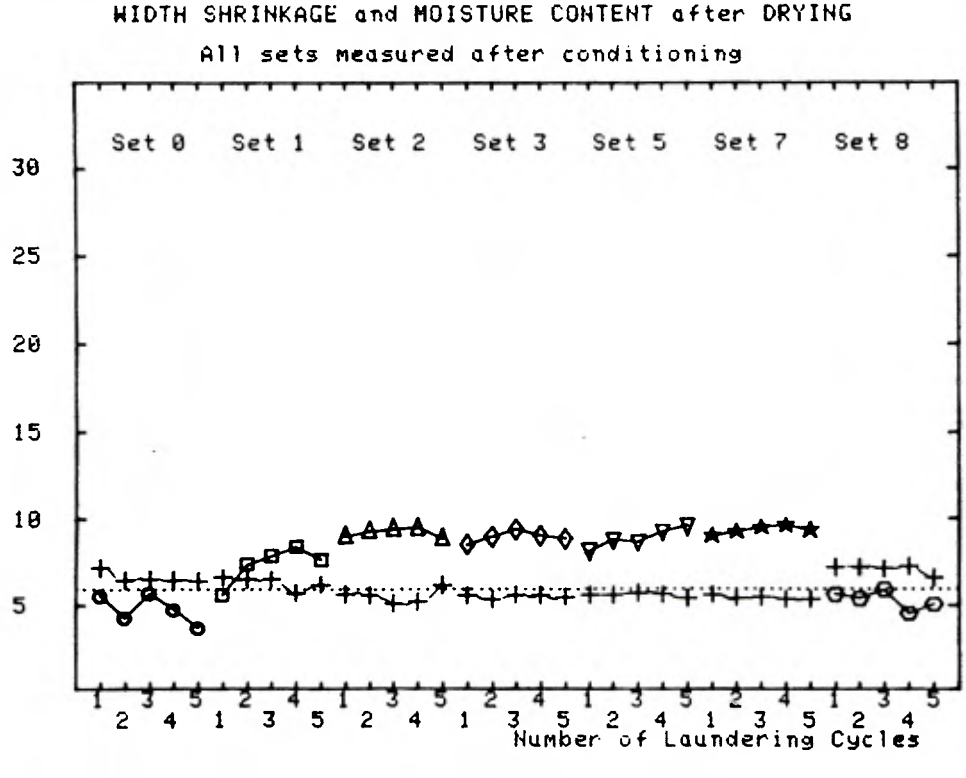

WIDTH SHRINKAGE and MOISTURE CONTENT after DRYING
All sets measured after conditioning
Set 0 Set 1 Set 2 Set 3 Set 5 Set 7 Set 8
30
25
20
15
10
5
1 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5
Number of Laundering Cycles

FIG.9

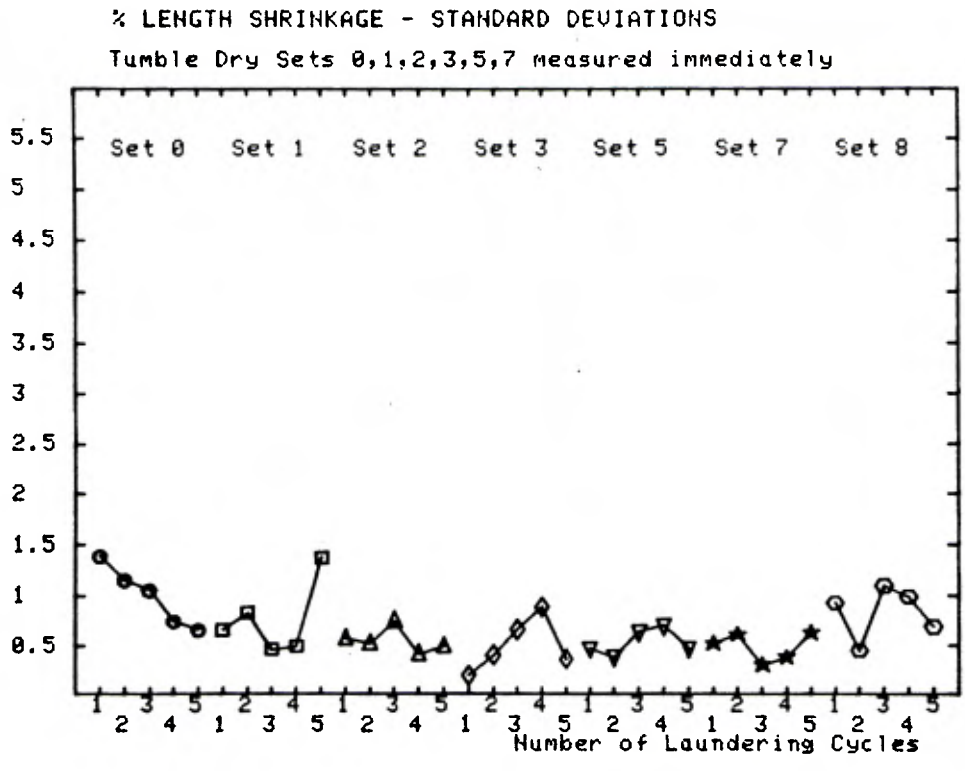
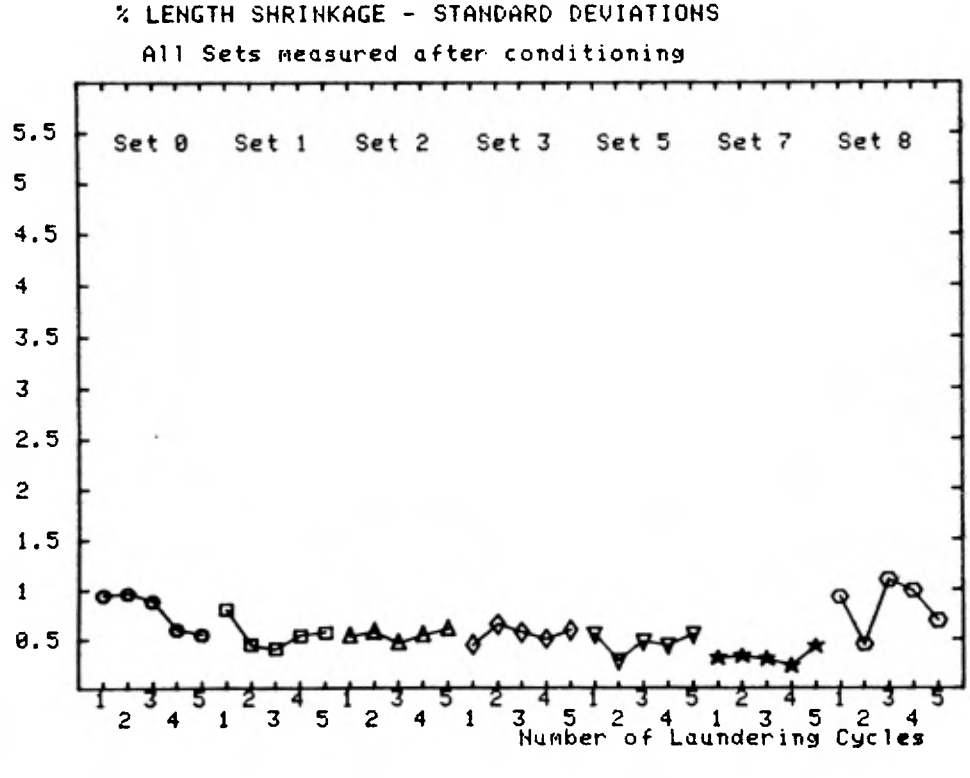

% LENGTH SHRINKAGE - STANDARD DEVIATIONS
Tumble Dry Sets 0,1,2,3,5,7 measured immediately
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
Number of Laundering Cycles

FIG.10


% LENGTH SHRINKAGE - STANDARD DEVIATIONS
All Sets measured after conditioning
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
Number of Laundering Cycles

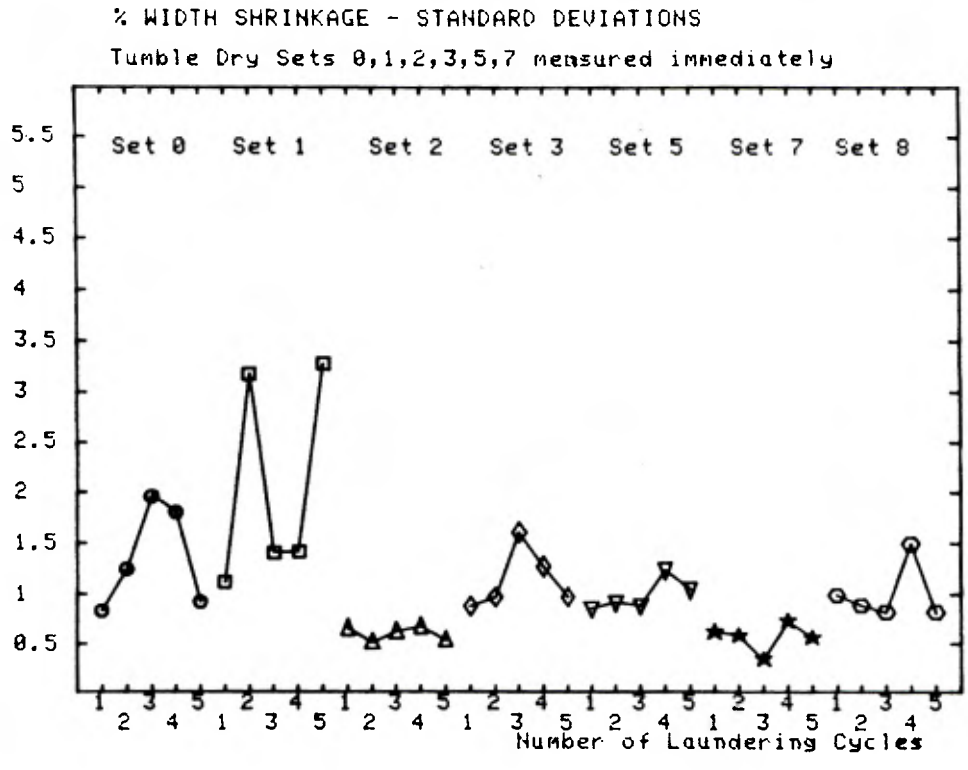

% WIDTH SHRINKAGE - STANDARD DEVIATIONS
Tumble Dry Sets 0,1,2,3,5,7 measured immediately
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
1 2 3 4 5
Number of Laundering Cycles

FIG.11

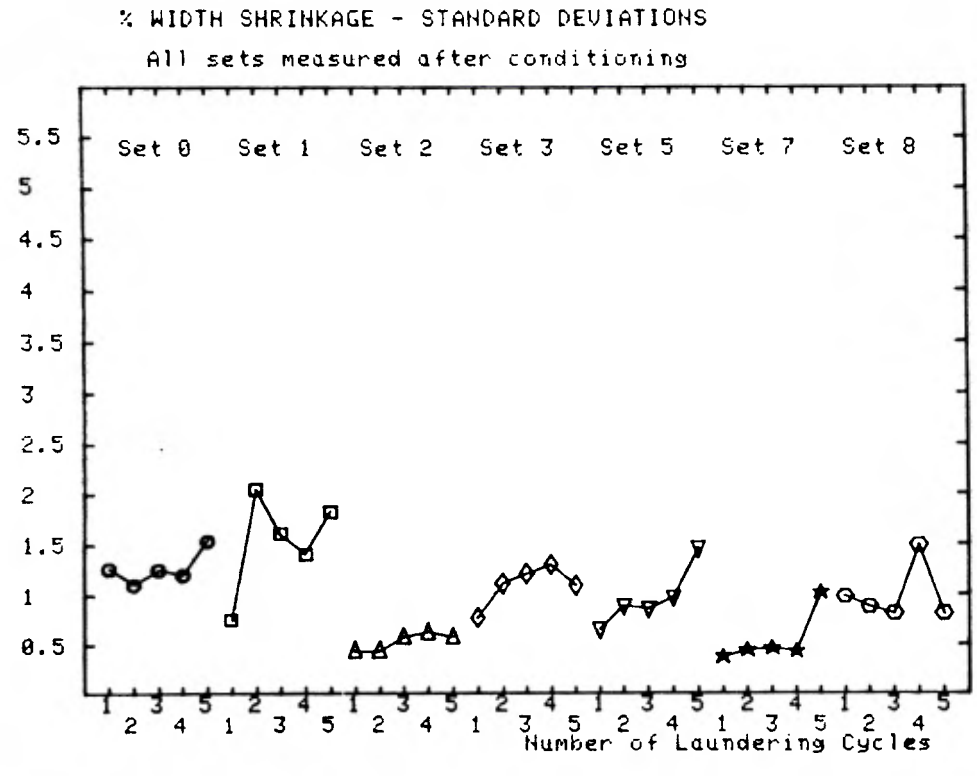

% WIDTH SHRINKAGE - STANDARD DEVIATIONS
All sets measured after conditioning
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
1 2 3 4 5
Number of Laundering Cycles

FIG.12

FIG.13

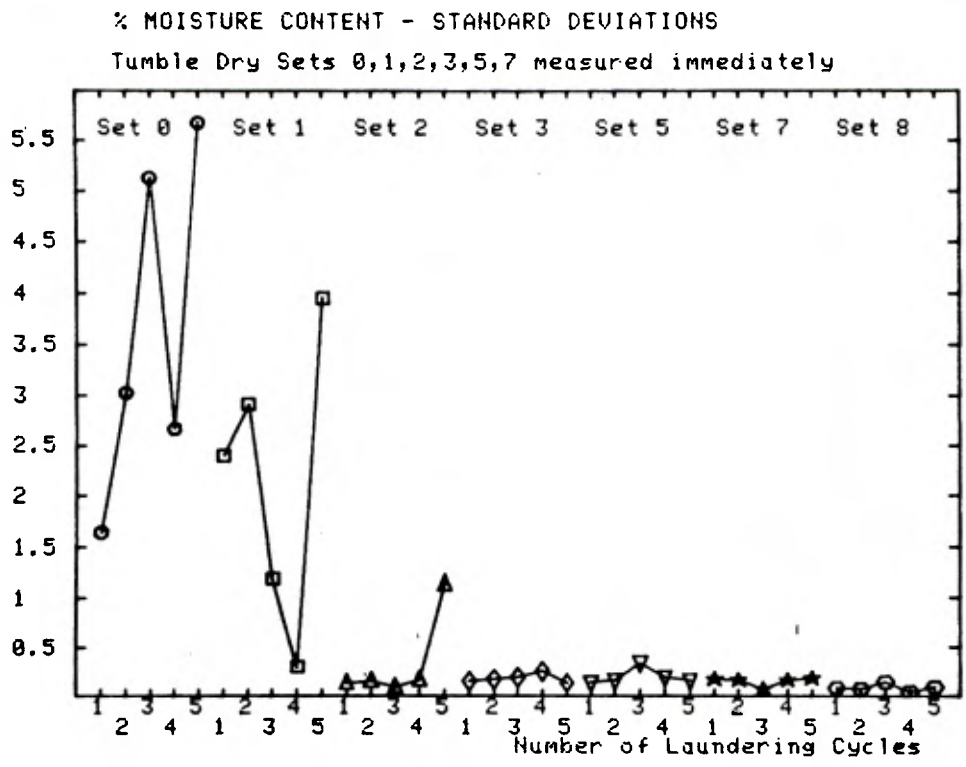
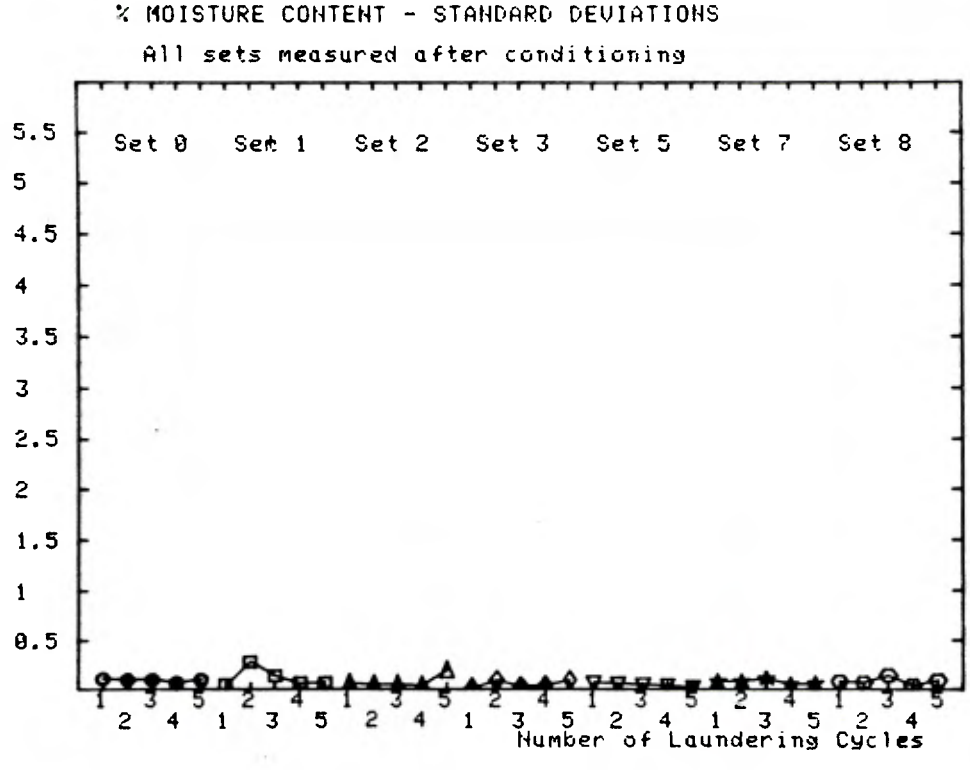

% MOISTURE CONTENT - STANDARD DEVIATIONS
Tumble Dry Sets 0,1,2,3,5,7 measured immediately
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
1 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4
Number of Laundering Cycles

FIG.14


% MOISTURE CONTENT - STANDARD DEVIATIONS
All sets measured after conditioning
Set 0
Set 1
Set 2
Set 3
Set 5
Set 7
Set 8
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
1 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4 1 3 5 2 4
Number of Laundering Cycles

SHRINKAGE IN TUMBLE DRYING

SET 0 : 30mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	2.3	2.7	2.8	1.3	5.4	5.2	5.1	4.4	4.2	2
B	3.7	2.1	4.8	0.6	5.4	1.2	4.9	3.5	5.7	0.2
C	4.9	1.9	5.5	-1.4	7.3	4.9	5.5	0	5.1	0.9
D	5.2	3.1	5.3	1.4	5.9	6.5	4	3.5	5.9	0.9
E	5.8	4	5.6	1.7	4.4	4.2	6	4.3	5.2	2.5

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	4.3800	1.3918	31.78
2. WASH	WS%	5	2.7600	0.8414	30.49
3. 1st	LS%	5	4.8000	1.1597	24.16
4. RINSE	WS%	5	0.7200	1.2518	173.86
5. 2nd	LS%	5	5.6800	1.0569	18.61
6. RINSE	WS%	5	4.4000	1.9736	44.85
7. 3rd	LS%	5	5.1000	0.7450	14.61
8. RINSE	WS%	5	3.1400	1.8064	57.53
9. 4th	LS%	5	5.2200	0.6611	12.66
10. RINSE	WS%	5	1.3000	0.9301	71.54

SHRINKAGE IN TUMBLE DRYING

SET 0 : 30mins HOT Tumble + 10mins COOL Down

SHRINKAGE MEASURED AFTER CONDITIONING

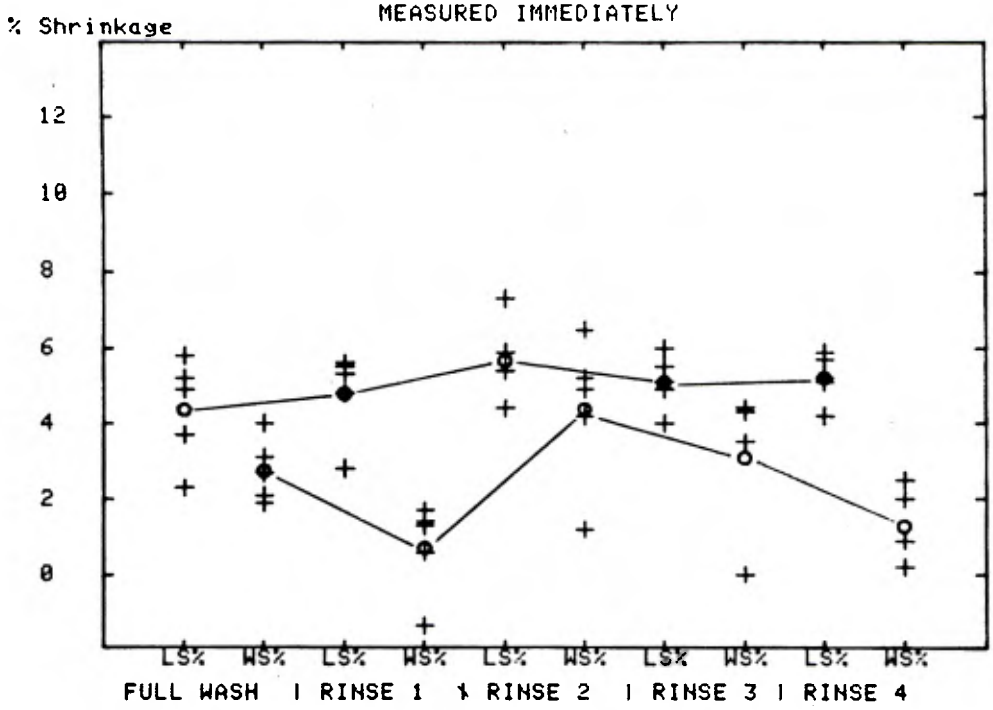
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	4	5	5.5	3.6	5.8	6.1	5.8	4.8	6.4	2.5
B	5.1	5.2	4.4	4	5.6	4.3	6.4	4.6	5.2	3.1
C	6.3	4	4.3	3	7.8	4.9	6.4	2.9	6.5	2.2
D	6.2	6.5	5.8	5.4	5.9	7.6	6.1	5.7	6.3	5.8
E	5.1	7.2	6.6	5.5	6.3	5.8	7.4	6	6.5	4.8

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	5.3400	0.9450	17.70
2. WASH	WS%	5	5.5800	1.2696	22.75
3. 1st	LS%	5	5.3200	0.9731	18.29
4. RINSE	WS%	5	4.3000	1.1091	25.79
5. 2nd	LS%	5	6.2800	0.8871	14.13
6. RINSE	WS%	5	5.7400	1.2621	21.99
7. 3rd	LS%	5	6.4200	0.6017	9.37
8. RINSE	WS%	5	4.8000	1.2145	25.30
9. 4th	LS%	5	6.1800	0.5541	8.97
10. RINSE	WS%	5	3.6800	1.5547	42.25

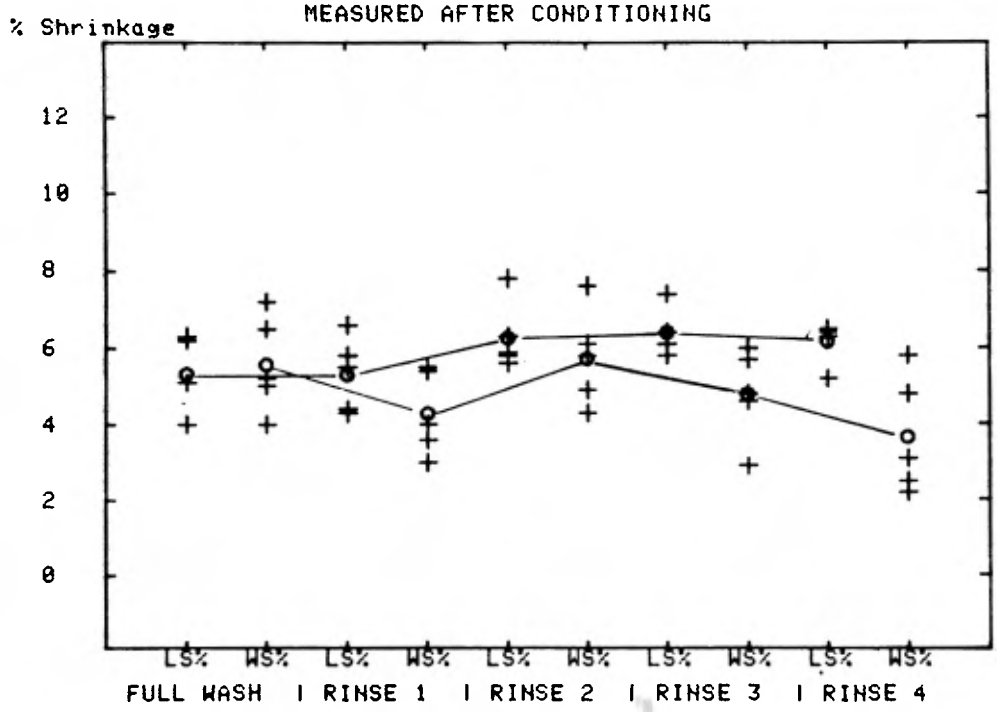
SHRINKAGE IN TUMBLE DRYING : SET 0 : ALL CYCLES

MEASURED IMMEDIATELY



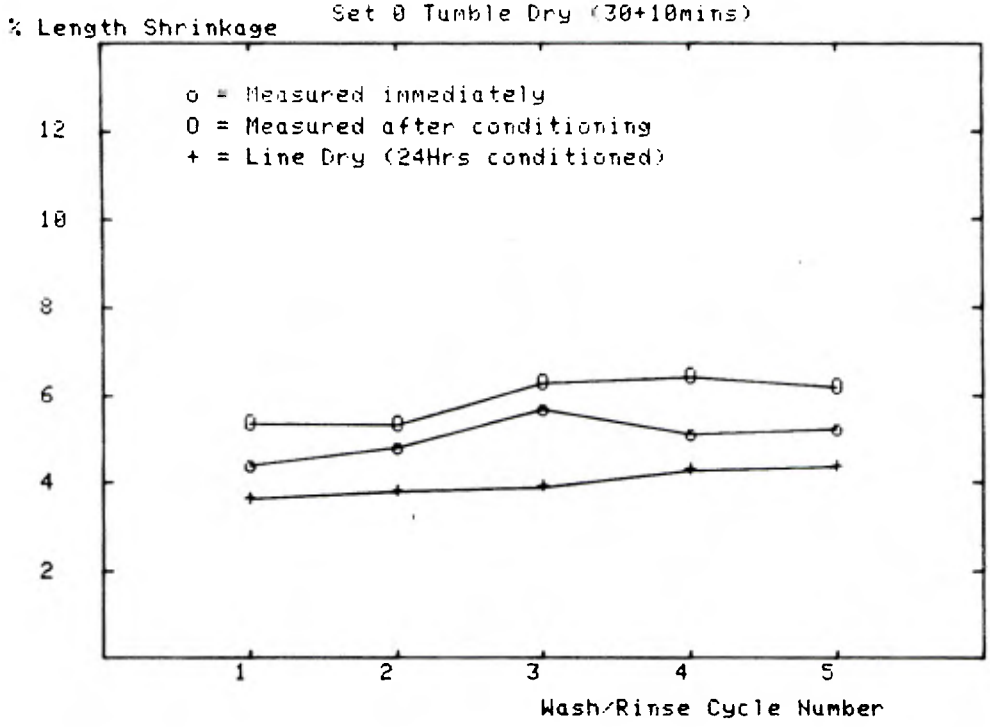
SHRINKAGE IN TUMBLE DRYING : SET 0 : ALL CYCLES

MEASURED AFTER CONDITIONING



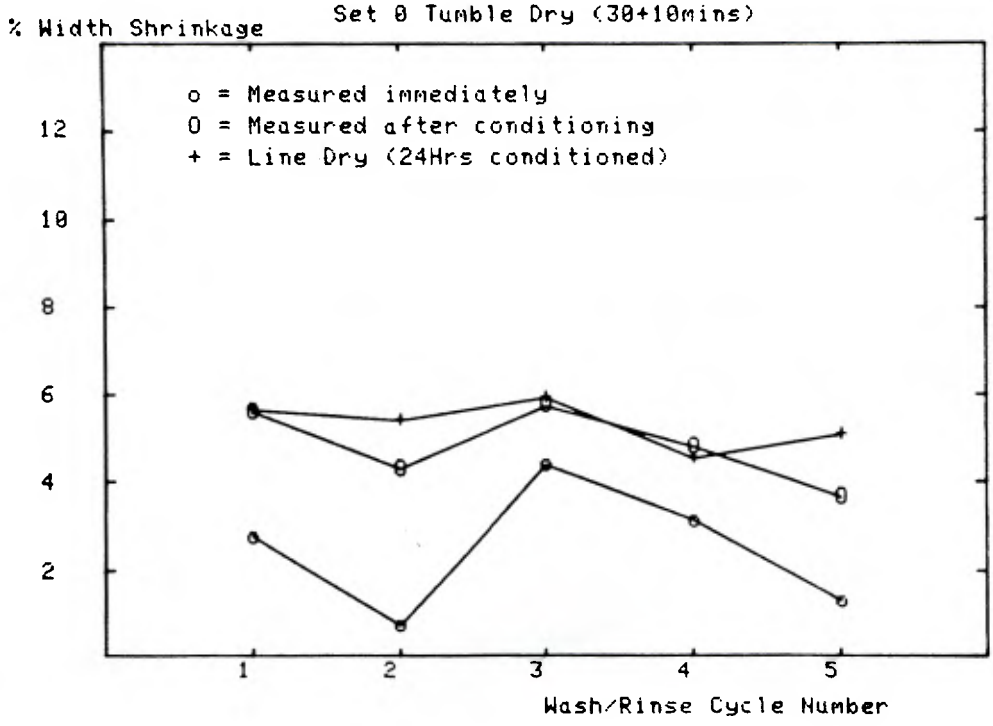
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 0 Tumble Dry (30+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 0 Tumble Dry (30+10mins)



SHRINKAGE IN TUMBLE DRYING

SET 0 : 30mins HOT Tumble + 10mins COOL Down

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	57.3	55.85	54.59	58.57	54.26
Orig Cond	60.92	59.38	58.04	62.27	57.69
1W+T Wet	104.86	103.31	98.21	107.34	96.88
1W+T Dry	68.11	67.71	63.05	70.55	65.39
1W+T Cond	61.8	60.14	58.73	63.19	58.51
2W+T Wet	120.55	117.97	106.79	124.55	110.51
2W+T Dry	84.22	85.88	86.22	84.45	76.84
2W+T Cond	61.34	59.71	58.3	62.62	58.09
3W+T Wet	99.95	97.56	84.97	103.4	95.71
3W+T Dry	64.63	69.52	59.44	66.71	67.29
3W+T Cond	61.37	59.79	58.33	62.71	58.13
4W+T Wet	103.14	96.46	97.39	105.44	98.4
4W+T Dry	68.45	65.48	66.11	74.8	64.67
4W+T Cond	61.31	59.73	58.32	62.67	58.09
5W+T Wet	104.38	101.56	98.09	110.7	103.59
5W+T Dry	68.68	79.11	65.17	78.46	68.84
5W+T Cond	61.3	59.68	58.28	62.59	58.08

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	56.1162	1.8285	3.24
2.Orig Cond	5	59.6600	1.9354	3.24
3.1W+T Wet	5	102.1200	4.4418	4.35
4.1W+T Dry	5	66.9620	2.8516	4.26
5.1W+T Cond	5	60.4740	2.0091	3.32
6.2W+T Wet	5	116.0740	7.2908	6.28
7.2W+T Dry	5	83.5220	3.8353	4.59
8.2W+T Cond	5	60.0120	1.9546	3.26
9.3W+T Wet	5	96.3180	6.9648	7.23
10.3W+T Dry	5	65.5180	3.8180	5.83
11.3W+T Cond	5	60.0660	1.9704	3.28
12.4W+T Wet	5	100.1660	3.9121	3.91
13.4W+T Dry	5	67.9020	4.1051	6.05
14.4W+T Cond	5	60.0240	1.9612	3.27
15.5W+T Wet	5	103.6640	4.6238	4.46
16.5W+T Dry	5	72.0520	6.3231	8.78
17.5W+T Cond	5	59.9860	1.9458	3.24

SHRINKAGE IN TUMBLE DRYING

SET 0 : 30mins HOT Tumble + 10mins COOL Down

% MOISTURE CONTENT

Sample Reference	A	B	C	D	E
Oven Dry	0	0	0	0	0
Orig Cond	5.94	5.94	5.94	5.94	5.94
1W+T Wet	45.35	45.94	44.41	45.43	43.99
1W+T Dry	15.87	17.51	13.41	16.98	17.02
1W+T Cond	7.28	7.13	7.05	7.31	7.26
2W+T Wet	52.47	52.66	48.88	52.97	50.9
2W+T Dry	31.96	34.96	36.68	38.64	29.38
2W+T Cond	6.58	6.46	6.36	6.47	6.59
3W+T Wet	42.67	42.75	35.75	43.35	43.3
3W+T Dry	11.34	19.66	8.16	12.2	19.36
3W+T Cond	6.63	6.59	6.41	6.6	6.65
4W+T Wet	44.44	42.1	43.94	44.45	44.85
4W+T Dry	16.29	14.7	17.42	21.7	16.89
4W+T Cond	6.54	6.49	6.39	6.54	6.59
5W+T Wet	45.1	45.01	44.34	47.09	47.62
5W+T Dry	16.57	29.4	16.23	25.35	21.17
5W+T Cond	6.52	6.41	6.33	6.42	6.57

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	45.0254	0.7992	1.77
4.1W+T Dry	5	16.1581	1.6474	10.20
5.1W+T Cond	5	7.2042	0.1126	1.56
6.2W+T Wet	5	51.5743	1.7064	3.31
7.2W+T Dry	5	32.7269	3.0317	9.26
8.2W+T Cond	5	6.4914	0.0961	1.48
9.3W+T Wet	5	41.5661	3.2657	7.86
10.3W+T Dry	5	14.1427	5.1265	36.25
11.3W+T Cond	5	6.5749	0.0970	1.48
12.4W+T Wet	5	43.9581	1.0890	2.48
13.4W+T Dry	5	17.2400	2.6719	15.50
14.4W+T Cond	5	6.5098	0.0744	1.14
15.5W+T Wet	5	45.8321	1.4316	3.12
16.5W+T Dry	5	21.7442	5.6812	26.13
17.5W+T Cond	5	6.4511	0.0967	1.50

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	5	3.1	6.6	9.2	7.8	8.9	9.6	10.6	8.4	9.1
B	4.7	3.4	6.7	9.8	7	8.4	8.9	10.9	7.4	9
C	4.8	2.2	8.6	8.9	8.2	6.2	9.5	10.3	8.2	7.5
D	6.3	5.1	6.8	2	7.9	5.7	10.2	7.5	6.1	1.1
E	4.9	2.6	7.2	7.7	8	6.3	9.2	8.9	5.2	6.5

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	5.1400	0.6580	12.80
2. WASH	WS%	5	3.2800	1.1167	34.05
3. 1st	LS%	5	7.1800	0.8258	11.50
4. RINSE	WS%	5	7.5200	3.1792	42.28
5. 2nd	LS%	5	7.7800	0.4604	5.92
6. RINSE	WS%	5	7.5000	1.4089	18.79
7. 3rd	LS%	5	9.4800	0.4868	5.14
8. RINSE	WS%	5	9.6400	1.4206	14.74
9. 4th	LS%	5	7.0600	1.3777	19.51
10. RINSE	WS%	5	6.6400	3.2815	49.42

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED AFTER CONDITIONING

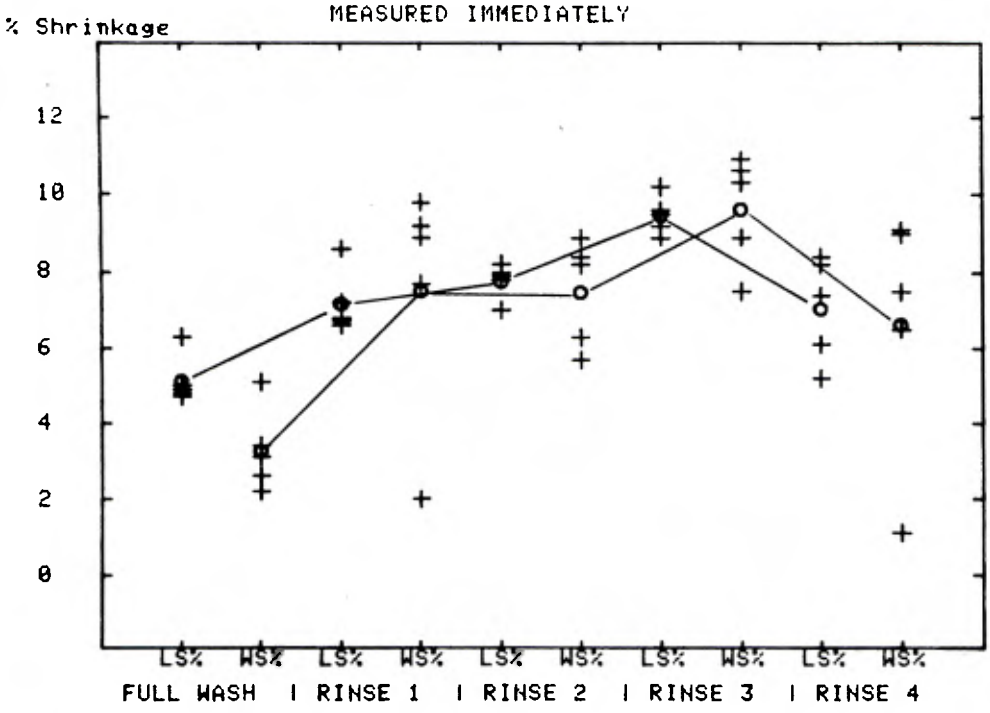
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	5.9	6.5	8.3	8.9	8.9	9.3	7.4	9.5	8	9.
B	5.7	6.3	6.8	9.1	7	9.8	7.2	9.5	6.7	8
C	6.8	4.6	7.4	8.1	7.5	8	7.7	9.2	7.5	8.3
D	7.6	5.4	7.7	4	7.9	5.7	8.5	6.3	6.9	4.
E	5.9	5.5	7	7.1	7.4	6.6	7.2	7.6	6.7	7.2

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	6.3800	0.8044	12.61
2. WASH	WS%	5	5.6600	0.7635	13.49
3. 1st	LS%	5	6.9600	0.4393	6.31
4. RINSE	WS%	5	7.4200	2.0608	27.77
5. 2nd	LS%	5	7.3400	0.4037	5.50
6. RINSE	WS%	5	7.8600	1.6208	20.57
7. 3rd	LS%	5	7.6000	0.5431	7.15
8. RINSE	WS%	5	8.4200	1.4237	16.91
9. 4th	LS%	5	7.1600	0.5727	8.00
10. RINSE	WS%	5	7.6800	1.8404	23.96

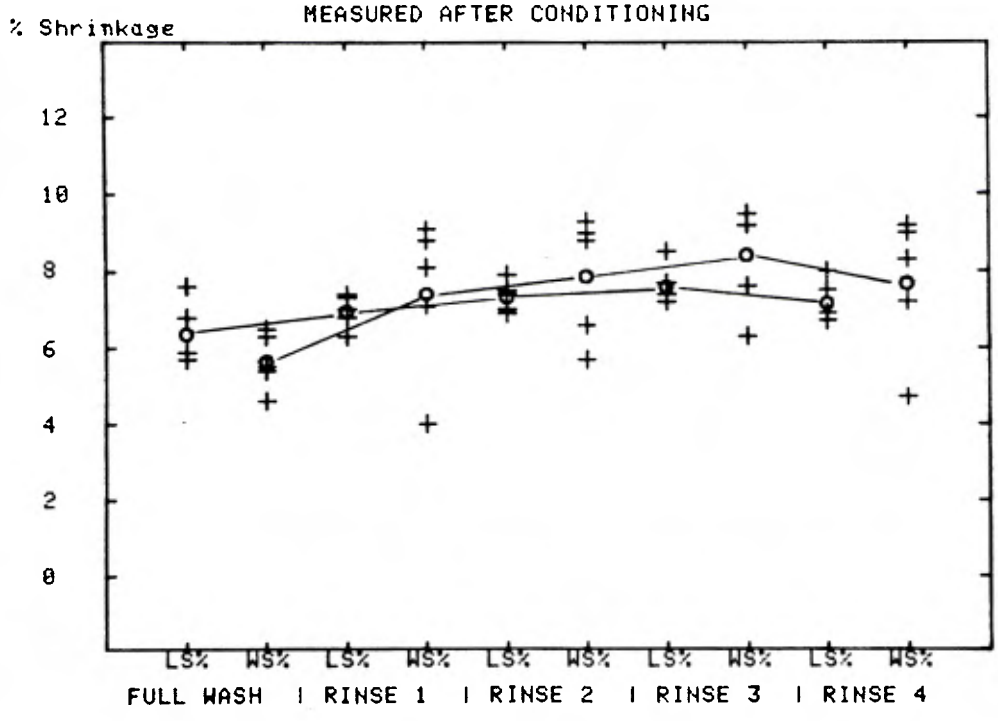
SHRINKAGE IN TUMBLE DRYING : SET 1 : ALL CYCLES

MEASURED IMMEDIATELY



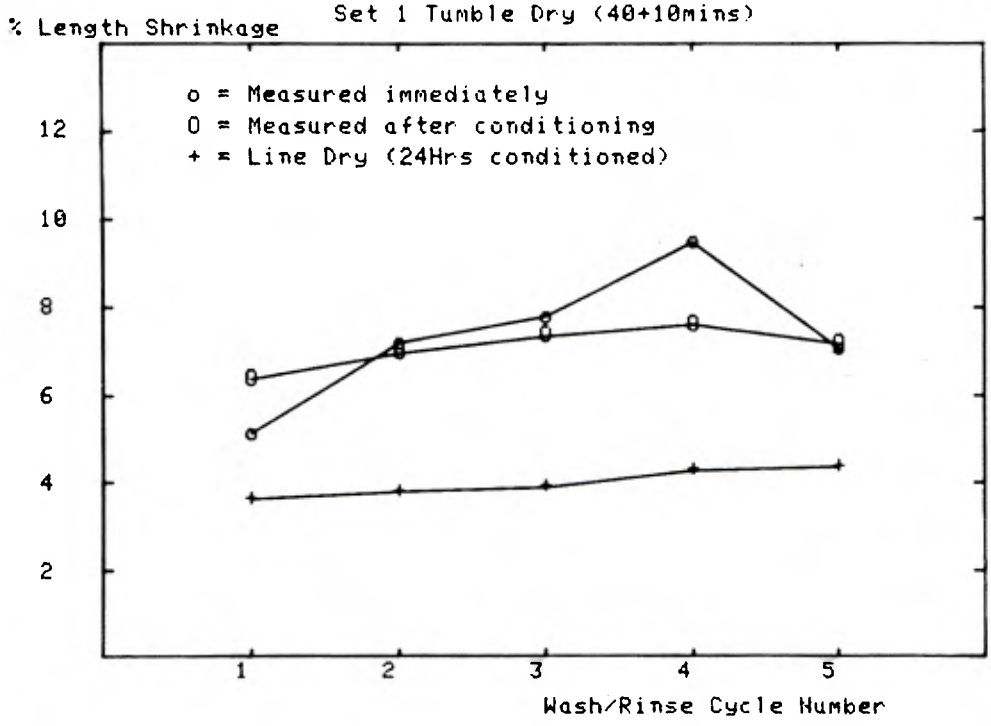
SHRINKAGE IN TUMBLE DRYING : SET 1 : ALL CYCLES

MEASURED AFTER CONDITIONING



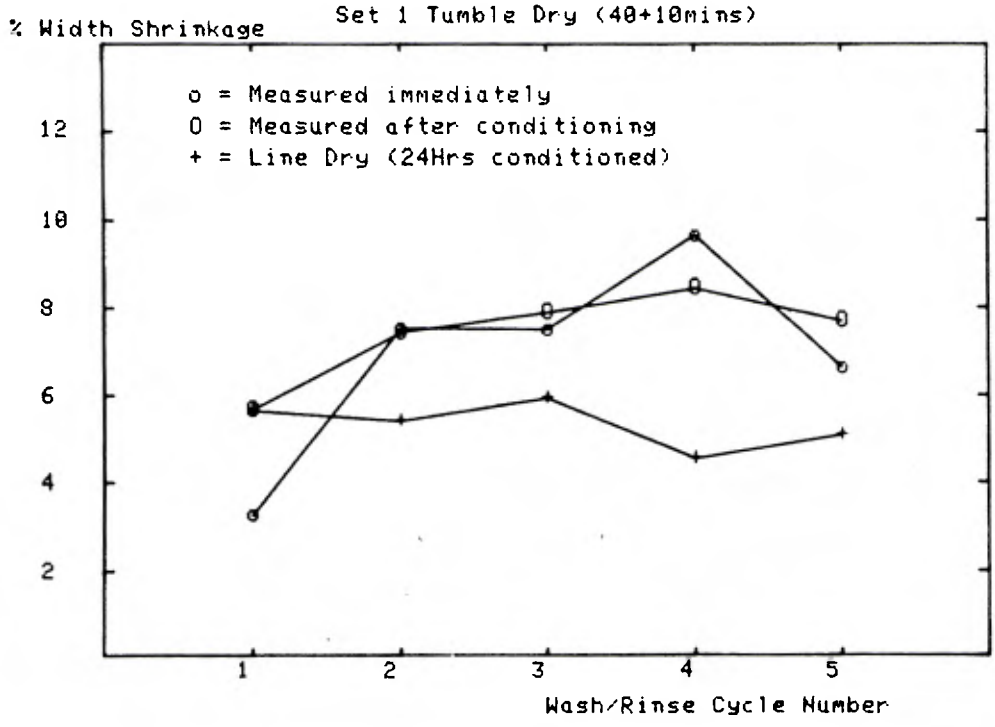
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 1 Tumble Dry (40+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 1 Tumble Dry (40+10mins)



SHRINKAGE IN TUMBLE DRYING

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

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	54.99	54.87	58.74	55.31	58.07
Orig Cond	58.46	58.33	62.45	58.8	61.74
1W+T Wet	110.06	100.13	116.49	105.44	107.23
1W+T Dry	65.8	65.69	72.44	63.04	69.56
1W+T Cond	58.95	58.78	62.89	59.26	62.21
2W+T Wet	101.14	93.93	102.66	99.69	96.25
2W+T Dry	58.74	60.2	63.53	64.29	63.58
2W+T Cond	58.53	58.81	62.84	59.3	62.23
3W+T Wet	94.25	91.82	99	94.64	97.34
3W+T Dry	59.79	60.53	64.19	61.25	62.23
3W+T Cond	58.83	58.74	62.88	59.27	61.98
4W+T Wet	93.14	97.72	105.67	95.58	101
4W+T Dry	57.5	57.19	61.13	57.97	60.45
4W+T Cond	58.37	58.2	62.29	58.73	61.57
5W+T Wet	99.81	105.83	110.14	113.8	113.8
5W+T Dry	59.83	60.47	65.61	67.62	65.72
5W+T Cond	58.65	58.47	62.62	59.06	61.92

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	56.3946	1.8588	3.30
2.Orig Cond	5	59.9560	1.9762	3.30
3.1W+T Wet	5	107.8700	6.0275	5.59
4.1W+T Dry	5	67.3060	3.6918	5.49
5.1W+T Cond	5	60.4180	1.9686	3.26
6.2W+T Wet	5	98.7340	3.5835	3.63
7.2W+T Dry	5	62.8680	2.4457	3.94
8.2W+T Cond	5	60.3420	2.0323	3.37
9.3W+T Wet	5	95.4100	2.8036	2.94
10.3W+T Dry	5	61.5980	1.7065	2.77
11.3W+T Cond	5	60.3400	1.9446	3.22
12.4W+T Wet	5	98.6220	4.8849	4.95
13.4W+T Dry	5	58.8480	1.8104	3.08
14.4W+T Cond	5	59.8320	1.9415	3.24
15.5W+T Wet	5	108.6760	5.9447	5.47
16.5W+T Dry	5	63.8500	3.4782	5.45
17.5W+T Cond	5	60.1440	1.9681	3.27

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	5.94	5.94	5.94	5.94	5.94
1W+T Wet	50.04	45.21	49.57	47.55	45.84
1W+T Dry	16.43	16.48	18.91	12.27	16.51
1W+T Cond	6.72	6.66	6.6	6.67	6.65
2W+T Wet	45.63	41.59	42.78	44.52	39.66
2W+T Dry	6.39	8.86	7.54	13.97	8.66
2W+T Cond	6.05	6.71	6.52	6.73	6.68
3W+T Wet	41.66	40.25	40.67	41.56	40.34
3W+T Dry	8.03	9.36	8.49	9.7	6.68
3W+T Cond	6.53	6.6	6.58	6.69	6.3
4W+T Wet	40.96	43.85	44.41	42.14	42.5
4W+T Dry	4.37	4.07	3.91	4.59	3.93
4W+T Cond	5.79	5.73	5.7	5.83	5.68
5W+T Wet	44.91	48.16	46.67	51.4	48.97
5W+T Dry	8.09	9.27	10.47	18.21	11.64
5W+T Cond	6.24	6.17	6.2	6.35	6.21

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	47.6417	2.1598	4.53
4.1W+T Dry	5	16.1207	2.3992	14.88
5.1W+T Cond	5	6.6602	0.0443	0.67
6.2W+T Wet	5	42.8377	2.3596	5.51
7.2W+T Dry	5	9.0847	2.9058	31.99
8.2W+T Cond	5	6.5395	0.2842	4.35
9.3W+T Wet	5	40.8944	0.6716	1.64
10.3W+T Dry	5	8.4527	1.1938	14.12
11.3W+T Cond	5	6.5403	0.1432	2.19
12.4W+T Wet	5	42.7732	1.3795	3.23
13.4W+T Dry	5	4.1739	0.2976	7.13
14.4W+T Cond	5	5.7463	0.0631	1.10
15.5W+T Wet	5	48.0203	2.4422	5.09
16.5W+T Dry	5	11.5356	3.9579	34.31
17.5W+T Cond	5	6.2346	0.0728	1.17

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	7.5	10.8	9.1	11.2	8.9	10.8	9.6	11.6	8.1	9.2
B	8.4	10	9	10.9	9.4	11.1	9.6	11.7	8.8	9.1
C	8.7	9	9.6	10.2	10.3	10	9.6	10.4	8.4	9.2
D	9	9.8	10.3	10.3	10.7	10.4	10.5	10.8	9.4	9
E	8.2	10.2	9.7	11.3	9.3	11.6	10.1	12	8.8	10.3

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	8.3600	0.5683	6.80
2. WASH	WS%	5	9.9600	0.6542	6.57
3. 1st	LS%	5	9.5400	0.5225	5.48
4. RINSE	WS%	5	10.7800	0.5070	4.70
5. 2nd	LS%	5	9.7200	0.7497	7.71
6. RINSE	WS%	5	10.7800	0.6181	5.73
7. 3rd	LS%	5	9.8800	0.4087	4.14
8. RINSE	WS%	5	11.3000	0.6708	5.94
9. 4th	LS%	5	8.7000	0.4899	5.63
10. RINSE	WS%	5	9.3600	0.5320	5.68

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED AFTER CONDITIONING

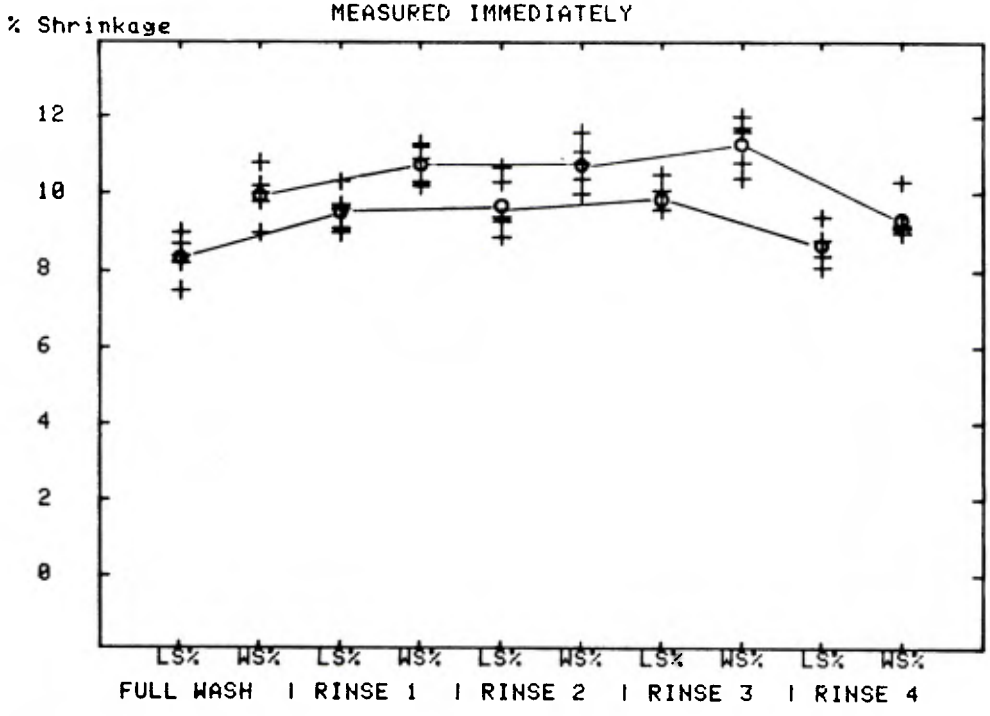
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	6.9	9.6	7.4	9.8	7.7	9.5	8	9.2	7.9	9.4
B	6.7	9	7.8	9.6	8.1	9.6	8.1	10.1	7.8	9
C	6.8	8.9	7.7	8.9	8.3	8.9	8.1	9	8.4	8.3
D	8	8.4	8.9	8.8	8.9	8.9	9.3	9	9.1	8.7
E	7.2	9.2	7.8	9.5	7.9	10.3	8.3	10.3	7.6	9.5

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	7.1200	0.5263	7.39
2. WASH	WS%	5	9.0200	0.4382	4.86
3. 1st	LS%	5	7.9200	0.5718	7.22
4. RINSE	WS%	5	9.3200	0.4438	4.76
5. 2nd	LS%	5	8.1800	0.4604	5.63
6. RINSE	WS%	5	9.4400	0.5814	6.16
7. 3rd	LS%	5	8.3600	0.5367	6.42
8. RINSE	WS%	5	9.5200	0.6301	6.62
9. 4th	LS%	5	8.1600	0.6025	7.38
10. RINSE	WS%	5	8.9000	0.5788	6.50

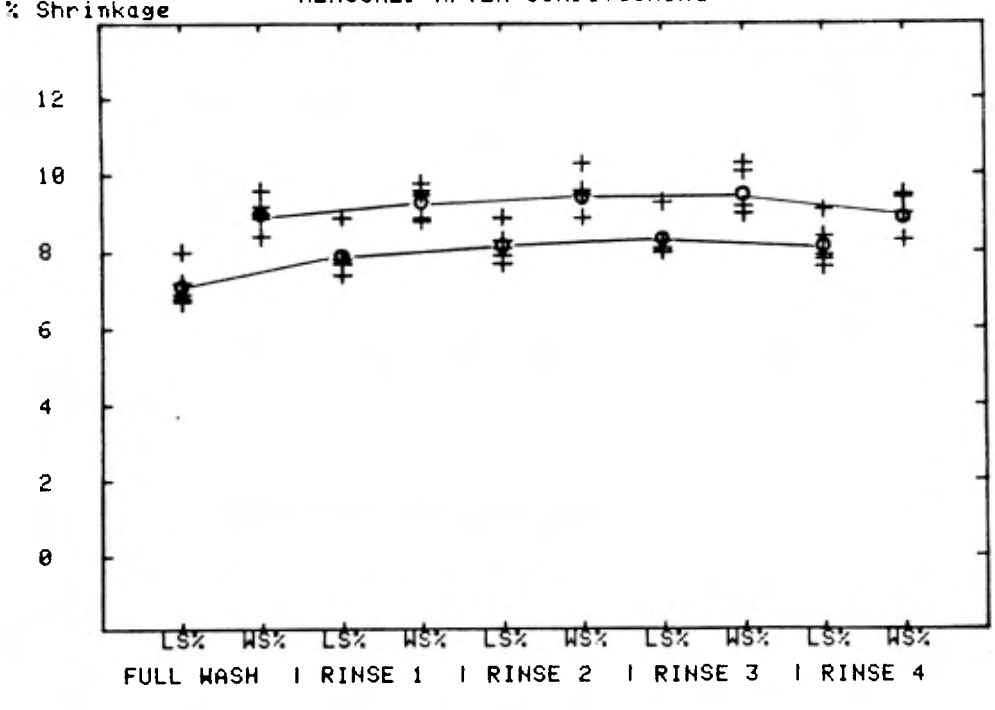
SHRINKAGE IN TUMBLE DRYING : SET 2 : ALL CYCLES

MEASURED IMMEDIATELY



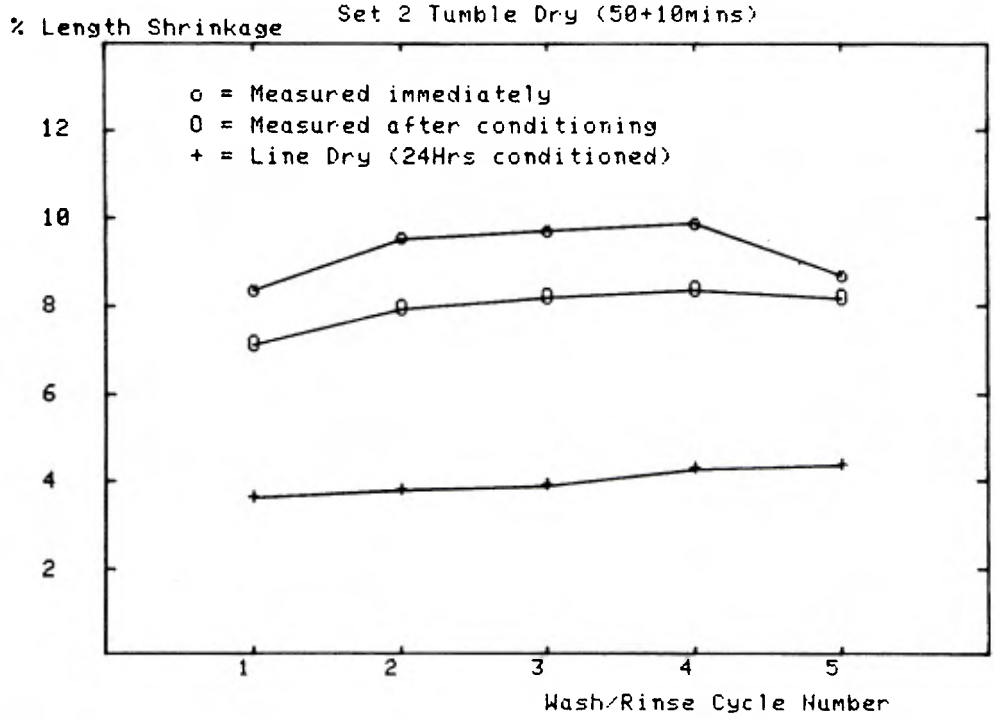
SHRINKAGE IN TUMBLE DRYING : SET 2 : ALL CYCLES

MEASURED AFTER CONDITIONING



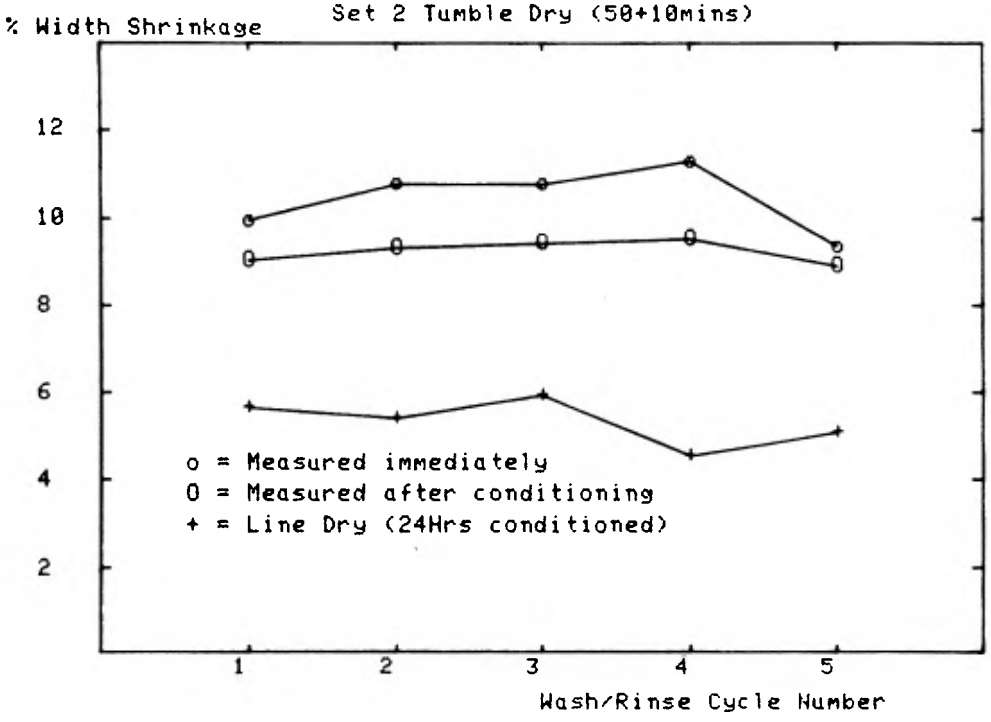
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 2 Tumble Dry (50+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 2 Tumble Dry (50+10mins)



SHRINKAGE IN TUMBLE DRYING

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

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	56	52.7	55.4	53.74	54.18
Orig Cond	59.54	56.03	58.9	57.13	57.6
1W+T Wet	105.13	95.2	101.79	101.42	102.3
1W+T Dry	57.36	54.02	56.74	55.15	55.66
1W+T Cond	59.31	55.85	58.75	56.93	57.47
2W+T Wet	89.43	90.18	91.77	88.05	94.53
2W+T Dry	56.83	53.26	56.09	54.35	54.82
2W+T Cond	59.36	55.8	58.7	56.9	57.37
3W+T Wet	98.62	88.11	94.31	87.34	88.69
3W+T Dry	56.84	53.4	56.23	54.55	54.91
3W+T Cond	59.07	55.51	58.42	56.67	57.1
4W+T Wet	95.63	91.78	94.75	93.3	93.96
4W+T Dry	56.63	53.24	56.07	54.34	54.6
4W+T Cond	59.26	55.76	58.65	56.91	57.36
5W+T Wet	115.77	106.34	102.35	107.75	104.17
5W+T Dry	61.35	56.29	60.06	58.43	57.65
5W+T Cond	59.8	56.08	59.15	57.34	57.61

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	54.4043	1.3178	2.42
2.Orig Cond	5	57.8400	1.4010	2.42
3.1W+T Wet	5	101.1680	3.6416	3.60
4.1W+T Dry	5	55.7860	1.3159	2.36
5.1W+T Cond	5	57.6620	1.3925	2.41
6.2W+T Wet	5	90.7920	2.4838	2.74
7.2W+T Dry	5	55.0700	1.4138	2.57
8.2W+T Cond	5	57.6260	1.4219	2.47
9.3W+T Wet	5	91.4140	4.8797	5.34
10.3W+T Dry	5	55.1860	1.3690	2.48
11.3W+T Cond	5	57.3540	1.4154	2.47
12.4W+T Wet	5	93.8840	1.4639	1.56
13.4W+T Dry	5	54.9760	1.3686	2.49
14.4W+T Cond	5	57.5880	1.3943	2.42
15.5W+T Wet	5	107.2760	5.1759	4.82
16.5W+T Dry	5	58.7560	1.9900	3.39
17.5W+T Cond	5	57.9960	1.4863	2.56

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	5.94	5.94	5.94	5.94	5.94
1W+T Wet	46.73	44.64	45.57	47.02	47.04
1W+T Dry	2.37	2.44	2.36	2.56	2.66
1W+T Cond	5.58	5.64	5.7	5.61	5.73
2W+T Wet	37.38	41.56	39.63	38.97	42.69
2W+T Dry	1.45	1.05	1.23	1.13	1.17
2W+T Cond	5.65	5.55	5.62	5.56	5.56
3W+T Wet	43.21	40.19	41.26	38.47	38.91
3W+T Dry	1.47	1.31	1.47	1.49	1.33
3W+T Cond	5.19	5.06	5.17	5.18	5.12
4W+T Wet	41.44	42.58	41.53	42.4	42.34
4W+T Dry	1.11	1.01	1.19	1.11	0.77
4W+T Cond	5.5	5.48	5.54	5.58	5.55
5W+T Wet	51.63	50.44	45.87	50.13	47.99
5W+T Dry	8.72	6.37	7.76	8.03	6.02
5W+T Cond	6.35	6.02	6.34	6.28	5.96

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

*** RDW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	46.1997	1.0577	2.29
4.1W+T Dry	5	2.4779	0.1315	5.31
5.1W+T Cond	5	5.6497	0.0629	1.11
6.2W+T Wet	5	40.0448	2.1043	5.25
7.2W+T Dry	5	1.2059	0.1537	12.75
8.2W+T Cond	5	5.5899	0.0451	0.81
9.3W+T Wet	5	40.4085	1.9113	4.73
10.3W+T Dry	5	1.4153	0.0880	6.22
11.3W+T Cond	5	5.1421	0.0544	1.06
12.4W+T Wet	5	42.0576	0.5325	1.27
13.4W+T Dry	5	1.0385	0.1624	15.63
14.4W+T Cond	5	5.5284	0.0379	0.69
15.5W+T Wet	5	49.2110	2.2820	4.64
16.5W+T Dry	5	7.3801	1.1409	15.46
17.5W+T Cond	5	6.1902	0.1859	3.00

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	8.6	11.1	9.9	11.3	9.2	12.2	9.2	11.9	9.3	11.2
B	8.9	11.1	9.5	11.5	9.6	12.2	9.9	11.7	9.1	11.3
C	8.7	10.3	8.9	10.7	8.4	8.8	8.2	10.1	8.7	10.7
D	8.9	9.7	9.6	9.9	10.2	9.8	10.3	9.4	9.5	9.2
E	9.1	9.1	9.1	9.2	9.6	9.4	8.5	9.2	9.6	9.4

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	8.8400	0.1949	2.21
2. WASH	WS%	5	10.2600	0.8764	8.54
3. 1st	LS%	5	9.4000	0.4000	4.26
4. RINSE	WS%	5	10.5200	0.9654	9.18
5. 2nd	LS%	5	9.4000	0.6633	7.06
6. RINSE	WS%	5	10.4800	1.6100	15.36
7. 3rd	LS%	5	9.2200	0.8927	9.68
8. RINSE	WS%	5	10.4600	1.2700	12.14
9. 4th	LS%	5	9.2400	0.3578	3.87
10. RINSE	WS%	5	10.3800	0.9680	9.33

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED AFTER CONDITIONING

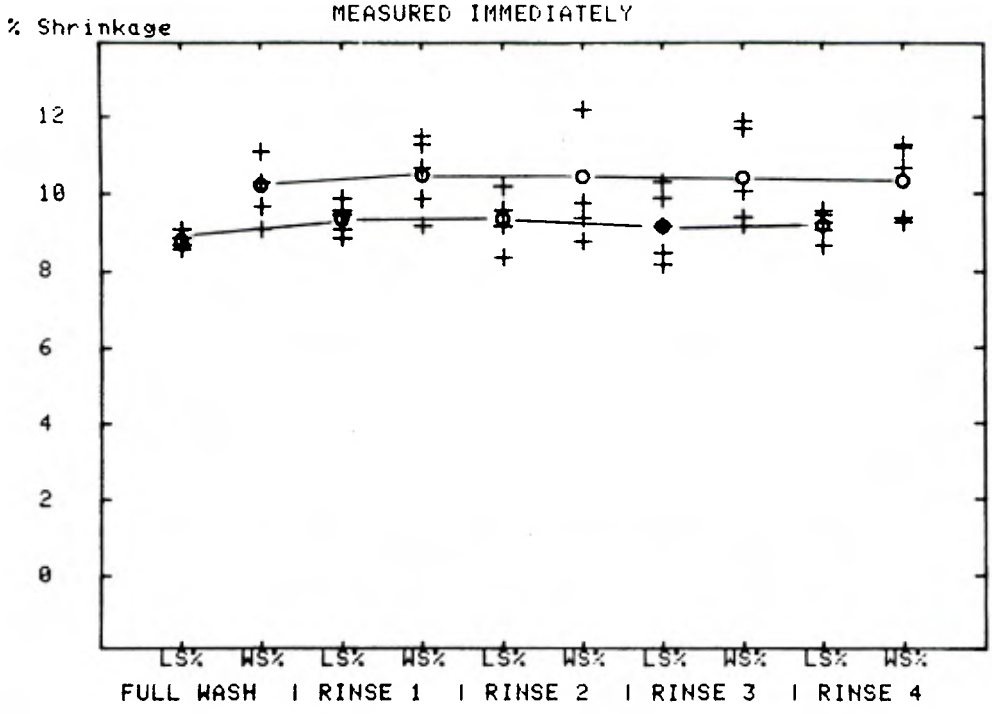
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	8.1	8.4	8.5	10.2	8.2	10.8	8	10.7	7.7	10.1
B	7.4	9.8	7.9	10	7.8	10.6	8	10	8	9.7
C	6.9	8.6	6.7	8.7	7.1	8.7	6.9	9	6.9	9
D	7.3	8.2	7.8	8.5	8.4	8.8	8.1	8	8.2	8
E	7.6	7.7	7.9	7.5	8.9	8.1	7.9	7.6	8.4	7.9

*** COLUMN STATISTICS ***

		N	Mean	SD	CV%
1. FULL	LS%	5	7.4600	0.4393	5.89
2. WASH	WS%	5	8.5400	0.7797	9.13
3. 1st	LS%	5	7.7600	0.6542	8.43
4. RINSE	WS%	5	8.9800	1.1212	12.49
5. 2nd	LS%	5	8.0000	0.5701	7.13
6. RINSE	WS%	5	9.4000	1.2186	12.96
7. 3rd	LS%	5	7.7800	0.4970	6.39
8. RINSE	WS%	5	9.0600	1.3069	14.42
9. 4th	LS%	5	7.8400	0.5857	7.47
10. RINSE	WS%	5	8.8600	1.1014	12.43

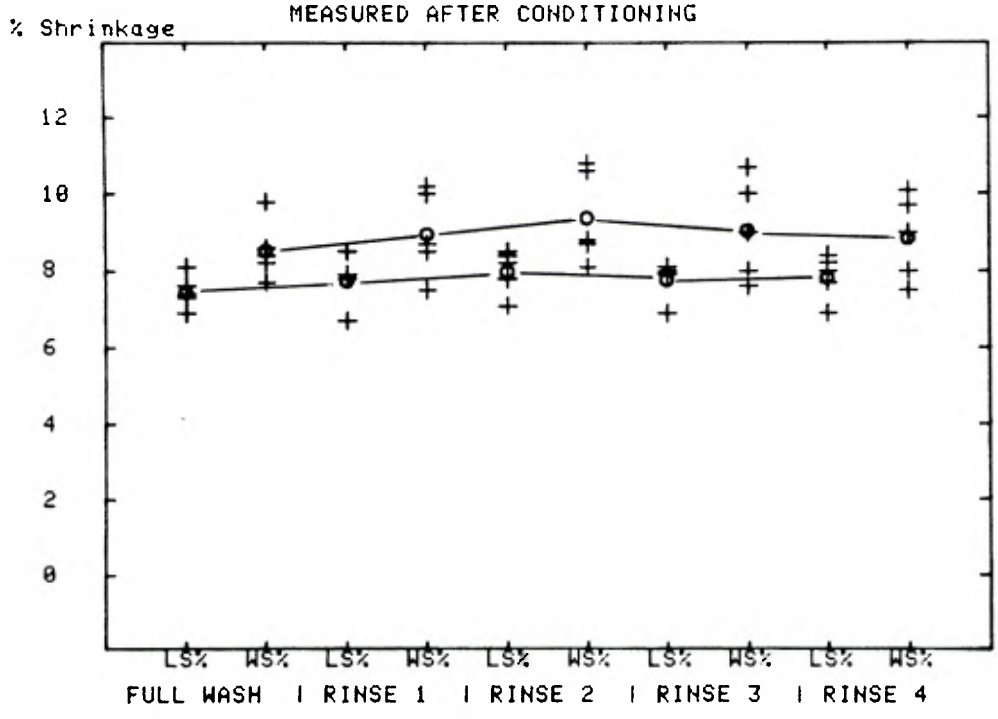
SHRINKAGE IN TUMBLE DRYING : SET 3 : ALL CYCLES

MEASURED IMMEDIATELY



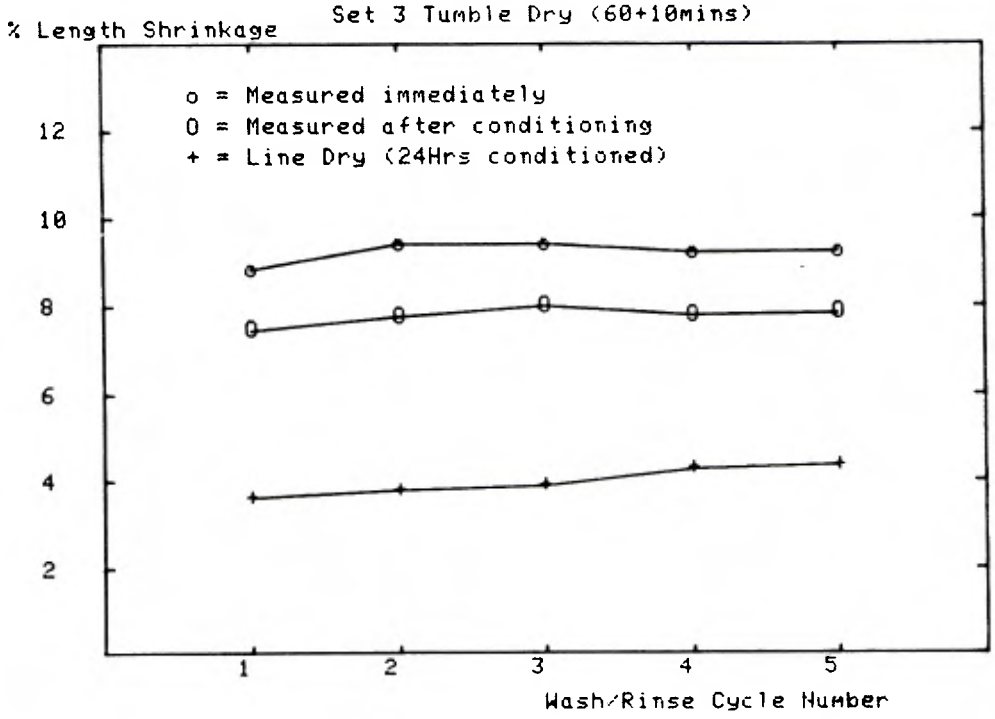
SHRINKAGE IN TUMBLE DRYING : SET 3 : ALL CYCLES

MEASURED AFTER CONDITIONING



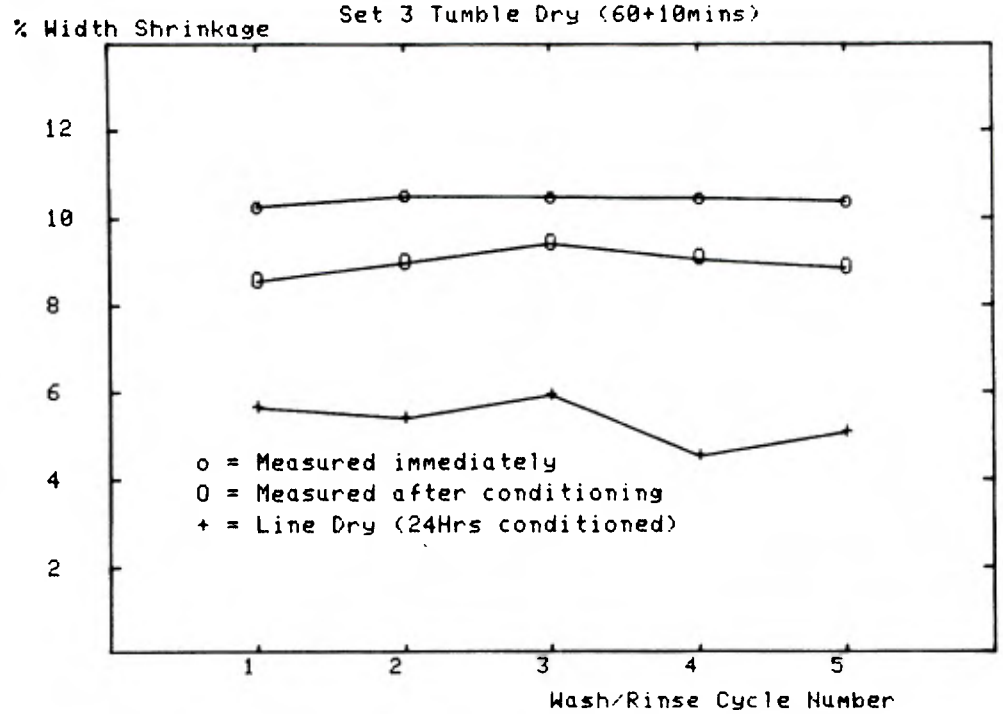
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 3 Tumble Dry (60+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 3 Tumble Dry (60+10mins)



SHRINKAGE IN TUMBLE DRYING

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

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	52.84	55.05	63.13	55.02	58.19
Orig Cond	56.18	58.53	67.12	58.49	61.86
1W+T Wet	105.34	104.89	124.59	102.96	119.57
1W+T Dry	53.36	55.67	63.72	55.7	58.93
1W+T Cond	55.99	58.32	66.9	58.28	61.65
2W+T Wet	94.18	99.06	109.16	94.39	102.55
2W+T Dry	53.21	55.68	63.72	55.52	58.63
2W+T Cond	55.86	58.24	66.72	58.15	61.4
3W+T Wet	93.78	85.22	105.14	87.12	101.08
3W+T Dry	53.46	55.68	63.86	55.9	58.92
3W+T Cond	55.99	58.33	66.93	58.3	61.63
4W+T Wet	93.94	86.05	109.3	95.02	94.64
4W+T Dry	53.45	56.06	64.16	55.79	59.09
4W+T Cond	55.94	58.35	66.89	58.28	61.64
5W+T Wet	85.26	94.91	108.42	90.5	92.87
5W+T Dry	54.31	56.66	65.01	56.65	59.73
5W+T Cond	55.88	58.27	66.92	58.23	61.53

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	56.8461	3.9972	7.03
2.Orig Cond	5	60.4360	4.2496	7.03
3.1W+T Wet	5	111.4700	9.8873	8.87
4.1W+T Dry	5	57.4760	4.0143	6.98
5.1W+T Cond	5	60.2200	4.2407	7.04
6.2W+T Wet	5	99.8680	6.2560	6.26
7.2W+T Dry	5	57.3520	4.0464	7.06
8.2W+T Cond	5	60.0740	4.2057	7.00
9.3W+T Wet	5	94.4680	8.6256	9.13
10.3W+T Dry	5	57.5640	4.0199	6.98
11.3W+T Cond	5	60.2360	4.2474	7.05
12.4W+T Wet	5	95.7900	8.4072	8.78
13.4W+T Dry	5	57.7100	4.1250	7.15
14.4W+T Cond	5	60.2200	4.2451	7.05
15.5W+T Wet	5	94.3920	8.6300	9.14
16.5W+T Dry	5	58.4720	4.1308	7.06
17.5W+T Cond	5	60.1660	4.2775	7.11

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	5.94	5.94	5.94	5.94	5.94
1W+T Wet	49.84	47.51	49.33	46.57	51.34
1W+T Dry	0.97	1.11	0.92	1.23	1.26
1W+T Cond	5.62	5.6	5.63	5.6	5.62
2W+T Wet	43.89	44.42	42.16	41.71	43.26
2W+T Dry	0.69	1.13	0.92	0.91	0.76
2W+T Cond	5.4	5.47	5.38	5.39	5.24
3W+T Wet	43.65	35.4	39.95	36.85	42.44
3W+T Dry	1.15	1.13	1.14	1.58	1.25
3W+T Cond	5.62	5.62	5.67	5.63	5.59
4W+T Wet	43.75	36.02	42.24	42.1	38.52
4W+T Dry	1.14	1.8	1.6	1.39	1.53
4W+T Cond	5.54	5.65	5.62	5.6	5.6
5W+T Wet	38.02	41.99	41.77	39.21	37.35
5W+T Dry	2.7	2.84	2.89	2.88	2.59
5W+T Cond	5.44	5.52	5.66	5.52	5.44

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	48.9160	1.8954	3.87
4.1W+T Dry	5	1.0980	0.1520	13.84
5.1W+T Cond	5	5.6147	0.0131	0.23
6.2W+T Wet	5	43.0913	1.1402	2.65
7.2W+T Dry	5	0.8806	0.1686	19.15
8.2W+T Cond	5	5.3748	0.0863	1.60
9.3W+T Wet	5	39.6582	3.5279	8.90
10.3W+T Dry	5	1.2493	0.1919	15.36
11.3W+T Cond	5	5.6267	0.0305	0.54
12.4W+T Wet	5	40.5257	3.1667	7.81
13.4W+T Dry	5	1.4901	0.2466	16.55
14.4W+T Cond	5	5.6016	0.0412	0.74
15.5W+T Wet	5	39.6684	2.1293	5.37
16.5W+T Dry	5	2.7790	0.1318	4.74
17.5W+T Cond	5	5.5140	0.0915	1.66

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	8.2	9	9.5	9.9	9.3	9.3	10	9.8	10.7	10.4
B	7.7	8.5	9.3	9.6	10.1	9.5	10.8	9.7	10.3	10
C	8.4	8.8	8.9	11.2	8.5	10.5	9.7	11.3	9.6	11.6
D	7.6	9.5	8.8	11.5	8.6	11	9.5	12.5	9.6	12.5
E	8.7	10.7	9.7	11.5	9.1	11.3	8.9	11.8	10	11.9

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	8.1200	0.4658	5.74
2.	WASH	WS%	5	9.3000	0.8631	9.28
3.	1st	LS%	5	9.2400	0.3847	4.16
4.	RINSE	WS%	5	10.7400	0.9182	8.55
5.	2nd	LS%	5	9.1200	0.6419	7.04
6.	RINSE	WS%	5	10.3200	0.8899	8.62
7.	3rd	LS%	5	9.7800	0.6979	7.14
8.	RINSE	WS%	5	11.0200	1.2357	11.21
9.	4th	LS%	5	10.0400	0.4722	4.70
10.	RINSE	WS%	5	11.2800	1.0474	9.29

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED AFTER CONDITIONING

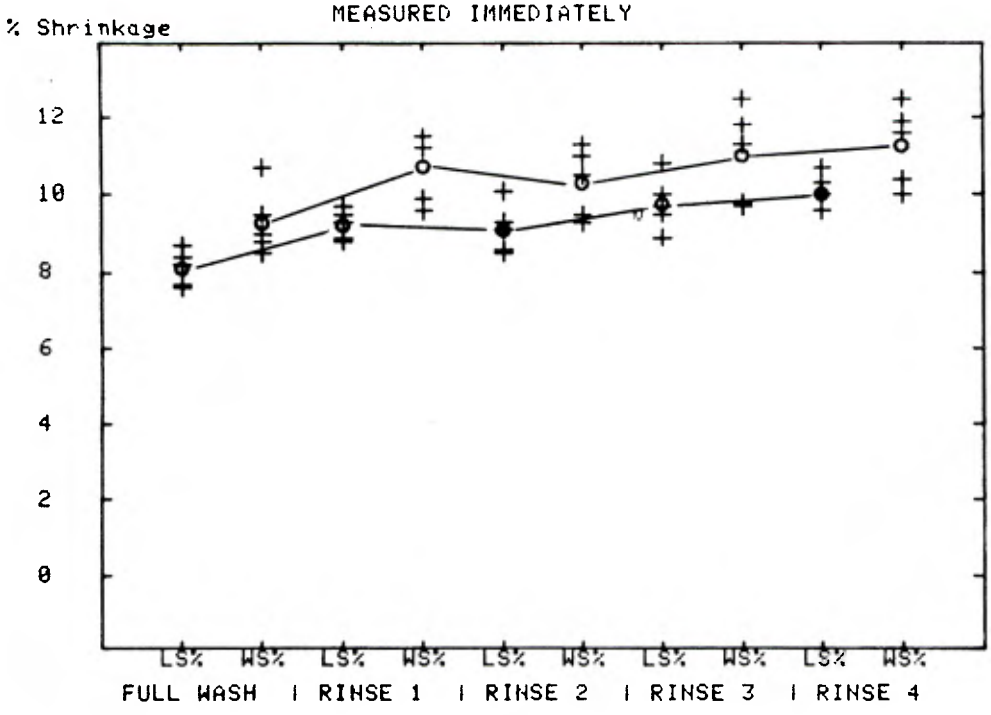
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	7.6	7.9	7.6	7.8	8.3	7.7	8	8.2	8.4	8.2
B	6.8	7.4	8.1	8	8.4	7.9	8.9	8.5	9	8
C	6.7	8	7.5	9.1	7.5	9.2	7.9	9.3	8	11.1
D	6.1	8.6	7.4	9.8	7.3	9.7	7.8	10.3	7.5	10
E	7.1	9.1	7.5	9.5	8	9.1	8.2	10.3	8.3	10.9

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	6.8600	0.5505	8.02
2.	WASH	WS%	5	8.2000	0.6595	8.04
3.	1st	LS%	5	7.6200	0.2775	3.64
4.	RINSE	WS%	5	8.8400	0.8761	10.14
5.	2nd	LS%	5	7.9000	0.4848	6.14
6.	RINSE	WS%	5	8.7200	0.8729	10.01
7.	3rd	LS%	5	8.1600	0.4393	5.38
8.	RINSE	WS%	5	9.3200	0.9808	10.52
9.	4th	LS%	5	8.2400	0.5505	6.68
10.	RINSE	WS%	5	9.6400	1.4673	15.22

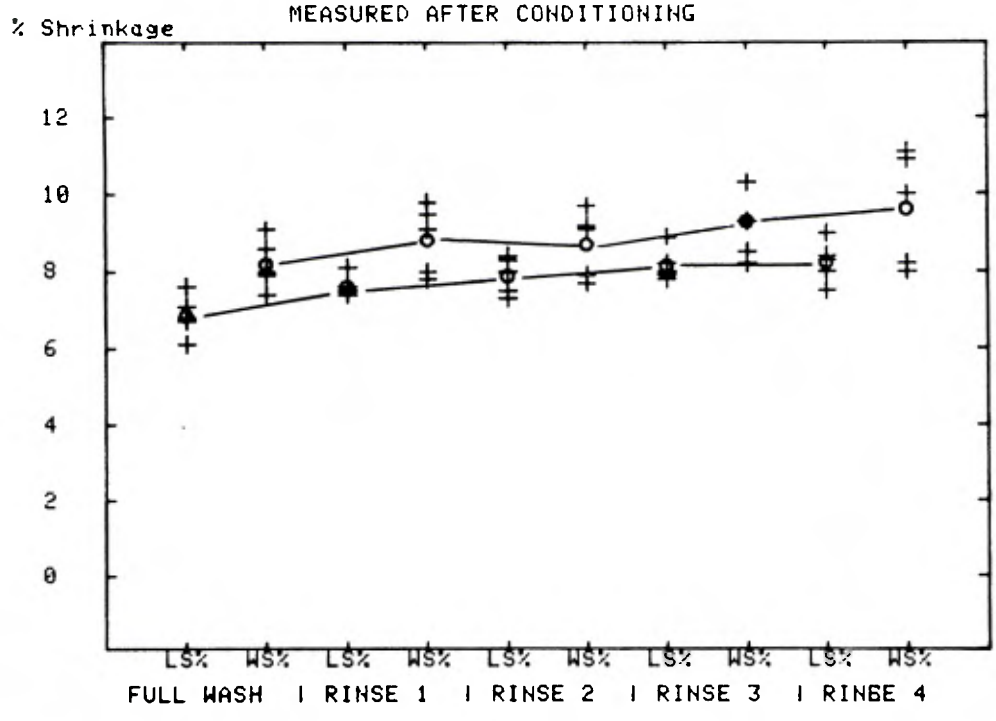
SHRINKAGE IN TUMBLE DRYING : SET 5 : ALL CYCLES

MEASURED IMMEDIATELY



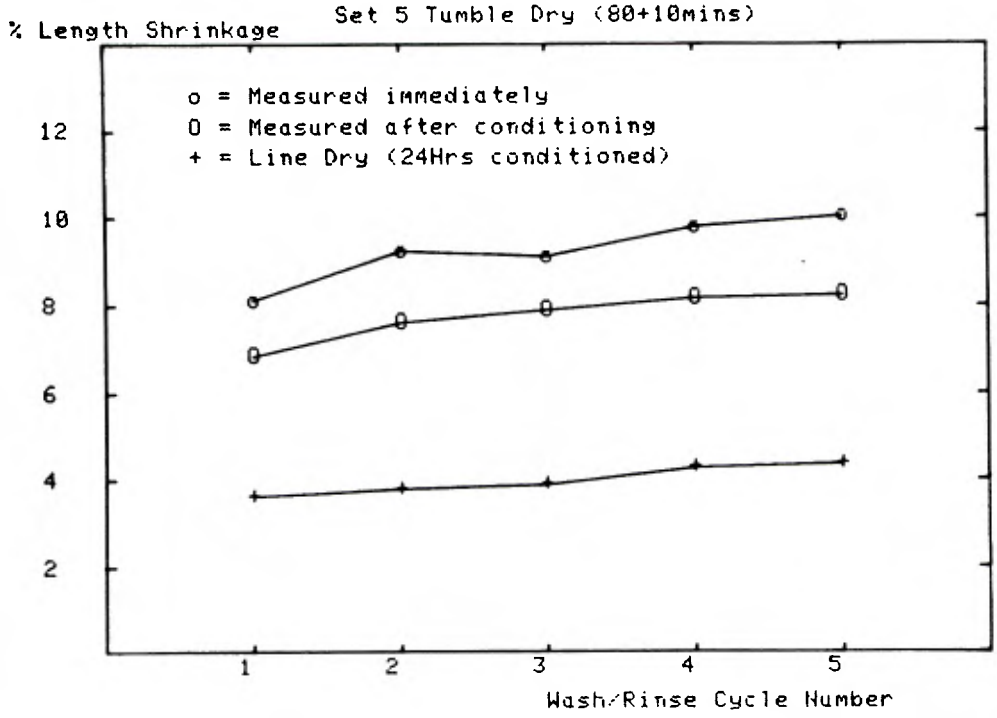
SHRINKAGE IN TUMBLE DRYING : SET 5 : ALL CYCLES

MEASURED AFTER CONDITIONING



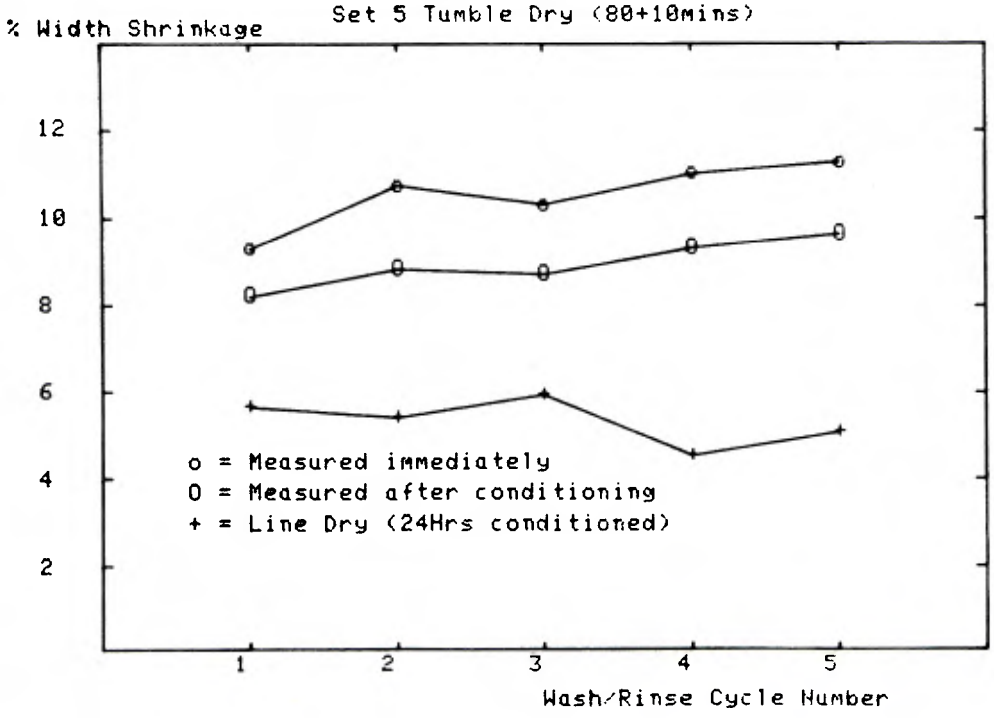
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 5 Tumble Dry (80+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 5 Tumble Dry (80+10mins)



SHRINKAGE IN TUMBLE DRYING

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

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	57.21	54.23	53.4	56.57	51.63
Orig Cond	60.82	57.66	56.77	60.14	54.89
1W+T Wet	102.84	96.18	90.55	101.13	92.23
1W+T Dry	58.65	55.43	54.77	57.9	52.89
1W+T Cond	60.57	57.42	56.58	59.93	54.76
2W+T Wet	93.5	87.84	84.13	93.35	94.92
2W+T Dry	57.96	54.85	53.93	57.36	52.19
2W+T Cond	60.68	57.44	56.57	59.92	54.69
3W+T Wet	100.46	91.21	90.66	106.85	86.01
3W+T Dry	58.05	54.88	54.24	57.68	52.18
3W+T Cond	60.67	57.48	56.65	59.99	54.79
4W+T Wet	95.72	97.5	92.06	87.16	78.64
4W+T Dry	57.78	54.59	53.85	57.12	52.23
4W+T Cond	60.6	57.45	56.62	59.95	54.72
5W+T Wet	90.39	89.76	83.55	98.98	94.68
5W+T Dry	57.6	54.76	53.8	57.18	52.09
5W+T Cond	60.52	57.36	56.45	59.83	54.6

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	54.6075	2.2952	4.20
2.Orig Cond	5	58.0560	2.4401	4.20
3.1W+T Wet	5	96.5860	5.3697	5.56
4.1W+T Dry	5	55.9280	2.3514	4.20
5.1W+T Cond	5	57.8520	2.4016	4.15
6.2W+T Wet	5	90.7480	4.5827	5.05
7.2W+T Dry	5	55.2580	2.4011	4.35
8.2W+T Cond	5	57.8600	2.4538	4.24
9.3W+T Wet	5	95.0380	8.4298	8.87
10.3W+T Dry	5	55.4060	2.4599	4.44
11.3W+T Cond	5	57.9160	2.4213	4.18
12.4W+T Wet	5	90.2160	7.5844	8.41
13.4W+T Dry	5	55.1140	2.3088	4.19
14.4W+T Cond	5	57.8680	2.4208	4.18
15.5W+T Wet	5	91.4720	5.7776	6.32
16.5W+T Dry	5	55.0860	2.3152	4.20
17.5W+T Cond	5	57.7520	2.4374	4.22

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	5.94	5.94	5.94	5.94	5.94
1W+T Wet	44.37	43.61	41.03	44.06	44.02
1W+T Dry	2.46	2.16	2.51	2.3	2.38
1W+T Cond	5.55	5.55	5.62	5.61	5.72
2W+T Wet	38.82	38.26	36.53	39.4	45.61
2W+T Dry	1.3	1.12	0.99	1.38	1.07
2W+T Cond	5.72	5.58	5.61	5.59	5.6
3W+T Wet	43.05	40.54	41.1	47.06	39.97
3W+T Dry	1.45	1.18	1.55	1.93	1.05
3W+T Cond	5.71	5.65	5.74	5.7	5.77
4W+T Wet	40.23	44.37	42	35.1	34.35
4W+T Dry	0.99	0.65	0.84	0.97	1.15
4W+T Cond	5.6	5.6	5.69	5.64	5.65
5W+T Wet	36.71	39.58	36.09	42.85	45.47
5W+T Dry	0.68	0.96	0.75	1.07	0.88
5W+T Cond	5.47	5.45	5.41	5.45	5.44

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	43.4196	1.3634	3.14
4.1W+T Dry	5	2.3611	0.1385	5.87
5.1W+T Cond	5	5.6100	0.0689	1.23
6.2W+T Wet	5	39.7224	3.4605	8.71
7.2W+T Dry	5	1.1724	0.1631	13.91
8.2W+T Cond	5	5.6202	0.0583	1.04
9.3W+T Wet	5	42.3451	2.8794	6.80
10.3W+T Dry	5	1.4326	0.3426	23.91
11.3W+T Cond	5	5.7134	0.0461	0.81
12.4W+T Wet	5	39.2104	4.3599	11.12
13.4W+T Dry	5	0.9195	0.1866	20.29
14.4W+T Cond	5	5.6350	0.0393	0.70
15.5W+T Wet	5	40.1392	4.0073	9.98
16.5W+T Dry	5	0.8686	0.1572	18.10
17.5W+T Cond	5	5.4443	0.0244	0.45

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED IMMEDIATELY

Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	9	10.4	10.1	11.7	9.3	10.4	10.4	11.4	10.9	11.8
B	9.1	9.4	9.7	11.5	9.3	10.8	9.9	11.4	10.1	12.1
C	8.4	10.9	8.9	11.8	8.6	11	9.6	11.8	9.7	12
D	8.2	10.4	9.5	10.8	9.2	10.3	9.8	11.1	10.2	11.6
E	7.9	9.6	8.6	10.5	9	10.2	9.4	9.9	9.2	10.7

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	8.5200	0.5167	6.06
2.	WASH	WS%	5	10.1400	0.6229	6.14
3.	1st	LS%	5	9.3600	0.6066	6.48
4.	RINSE	WS%	5	11.2600	0.5771	5.12
5.	2nd	LS%	5	9.0800	0.2950	3.25
6.	RINSE	WS%	5	10.5400	0.3435	3.26
7.	3rd	LS%	5	9.8200	0.3768	3.84
8.	RINSE	WS%	5	11.1200	0.7259	6.53
9.	4th	LS%	5	10.0200	0.6301	6.29
10.	RINSE	WS%	5	11.6400	0.5595	4.81

SHRINKAGE IN TUMBLE DRYING

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

SHRINKAGE MEASURED AFTER CONDITIONING

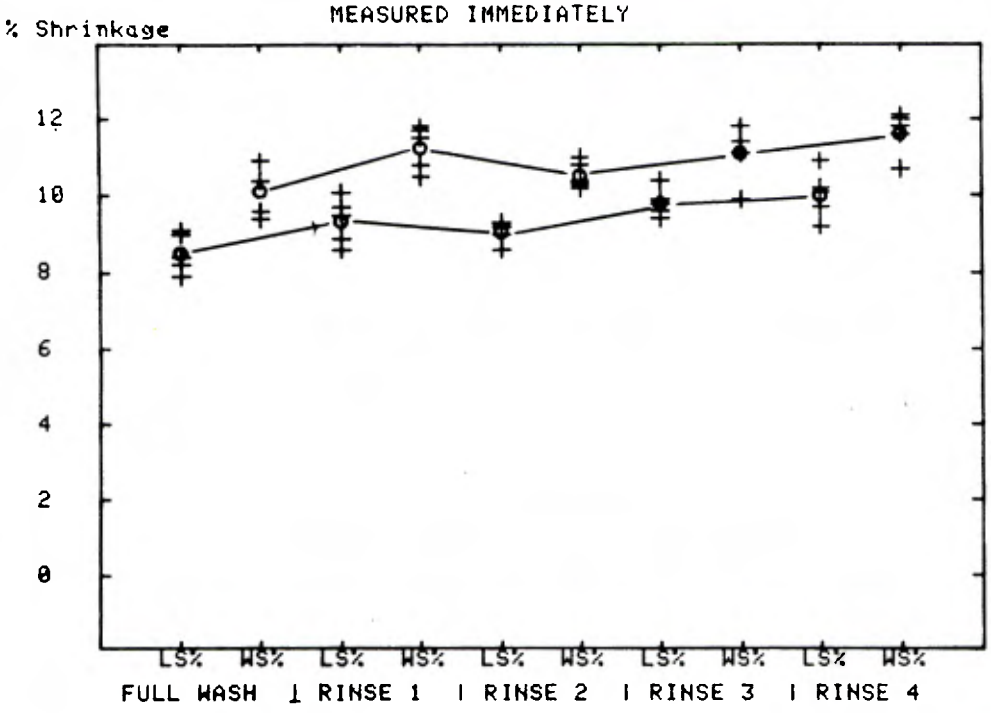
Sample Reference	FULL WASH LS%	FULL WASH WS%	1st RINSE LS%	1st RINSE WS%	2nd RINSE LS%	2nd RINSE WS%	3rd RINSE LS%	3rd RINSE WS%	4th RINSE LS%	4th RINSE WS%
A	7.2	9.1	7.2	9.2	8.4	9.8	8.2	9.9	8.8	9.
B	7.3	9.2	7.9	9.4	8.2	9.8	8.3	9.9	8.8	9
C	6.9	9.4	7.3	10	8	10	7.8	10.1	9	10.7
D	6.9	9.2	7.1	9.1	7.9	9.2	8.4	9.5	8.7	9.8
E	6.5	8.4	7.6	8.8	7.6	8.9	8.1	9	7.9	8.8

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	6.9600	0.3130	4.50
2.	WASH	WS%	5	9.0600	0.3847	4.25
3.	1st	LS%	5	7.4200	0.3271	4.41
4.	RINSE	WS%	5	9.3000	0.4472	4.81
5.	2nd	LS%	5	8.0200	0.3033	3.78
6.	RINSE	WS%	5	9.5400	0.4669	4.89
7.	3rd	LS%	5	8.1600	0.2302	2.82
8.	RINSE	WS%	5	9.6800	0.4382	4.53
9.	4th	LS%	5	8.6400	0.4278	4.95
10.	RINSE	WS%	5	9.4000	1.0320	10.98

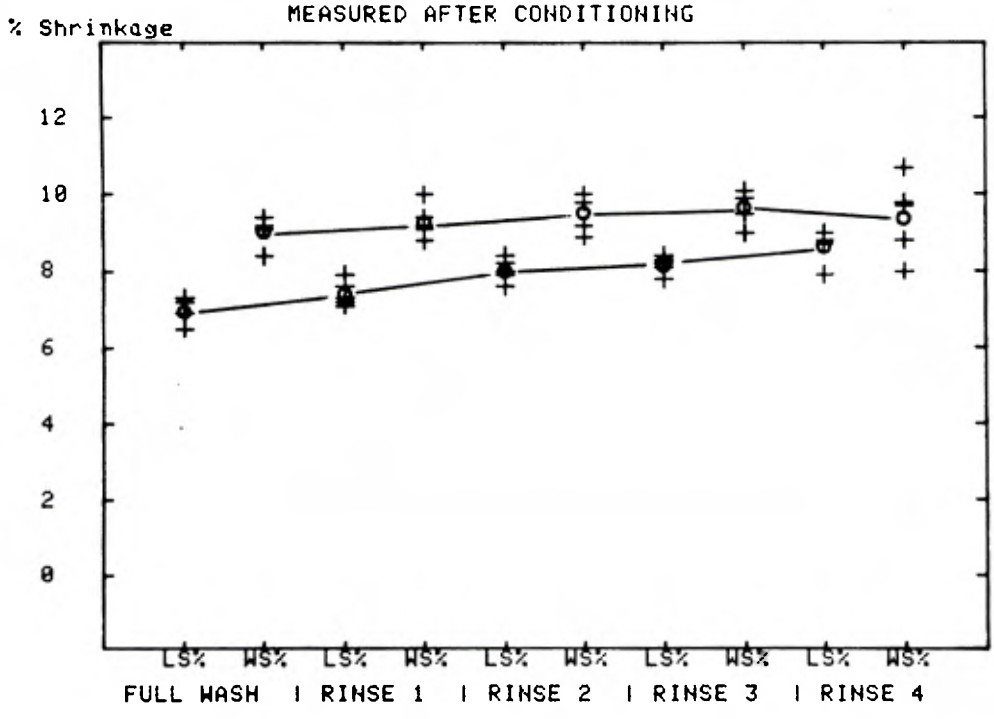
SHRINKAGE IN TUMBLE DRYING : SET 7 : ALL CYCLES

MEASURED IMMEDIATELY



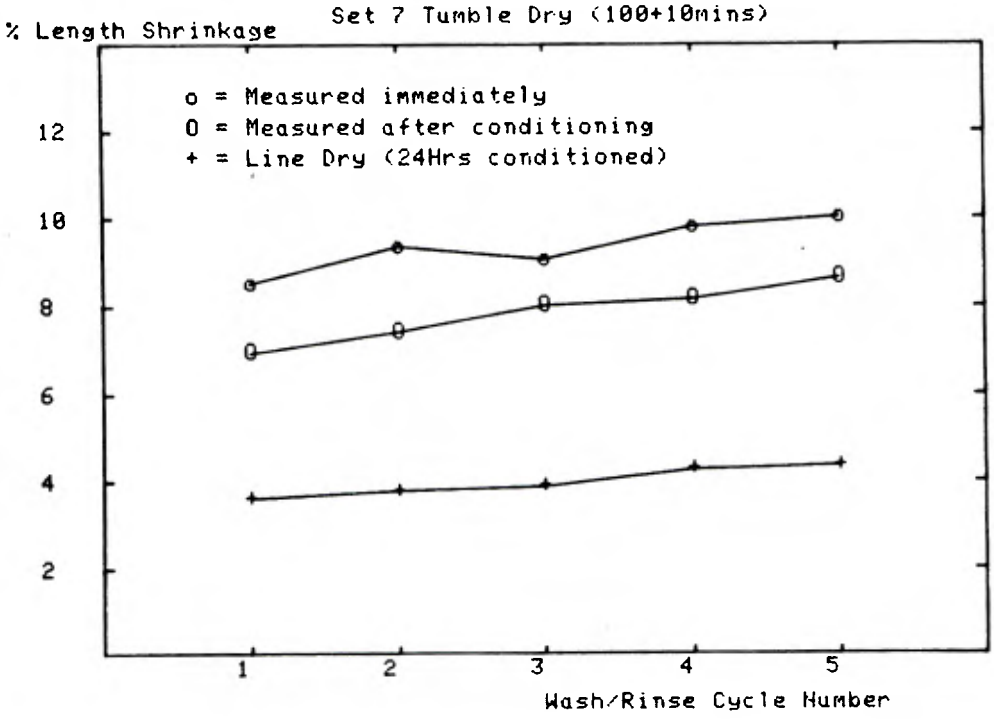
SHRINKAGE IN TUMBLE DRYING : SET 7 : ALL CYCLES

MEASURED AFTER CONDITIONING



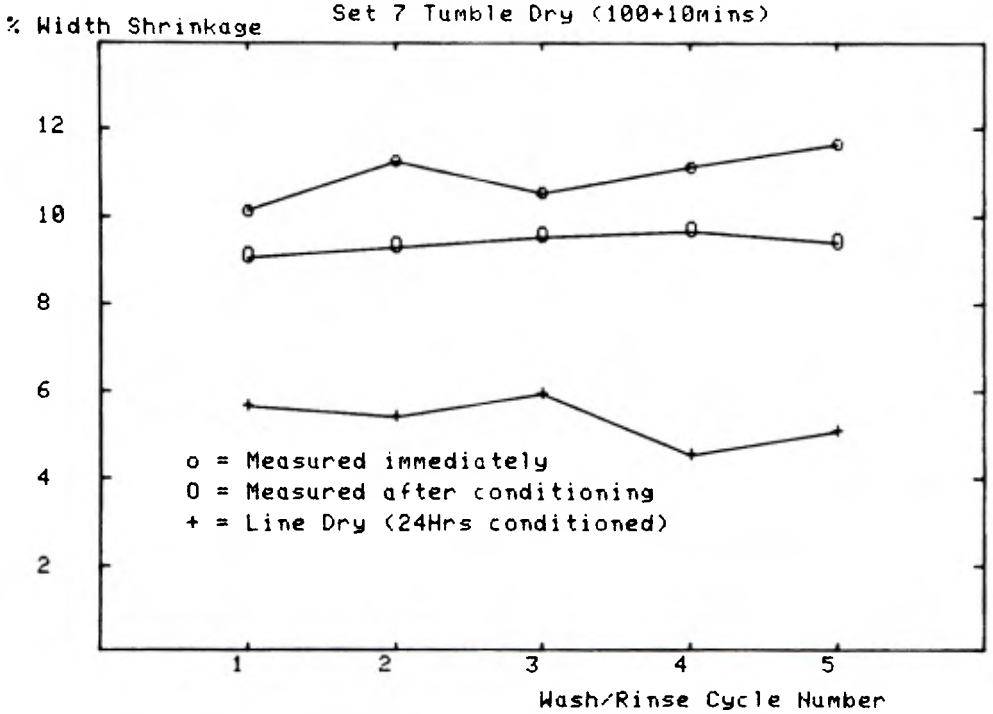
SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 7 Tumble Dry (100+10mins)



SHRINKAGE IN TUMBLE DRYING : 28G SINGLE JERSEY DYED ONLY

Set 7 Tumble Dry (100+10mins)



SHRINKAGE IN TUMBLE DRYING

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

SAMPLE WEIGHTS g

Sample Reference	A	B	C	D	E
Oven Dry	53.19	53.72	59.28	53.74	56.39
Orig Cond	56.55	57.11	63.02	57.13	59.95
1W+T Wet	97.37	94.84	105.19	95.23	101.27
1W+T Dry	53.84	54.32	60.04	54.3	57.23
1W+T Cond	56.42	56.91	62.84	56.87	59.77
2W+T Wet	86.92	86.26	100.1	90.3	94.74
2W+T Dry	53.64	53.96	59.54	54.02	56.69
2W+T Cond	56.34	56.77	62.69	56.82	59.61
3W+T Wet	84.94	86.37	101.35	86.9	91.56
3W+T Dry	53.74	54.2	59.8	54.19	56.94
3W+T Cond	56.36	56.77	62.71	56.8	59.71
4W+T Wet	95.07	91.79	104.6	90.02	100.14
4W+T Dry	53.83	54.32	59.74	54.22	56.95
4W+T Cond	56.25	56.74	62.6	56.77	59.55
5W+T Wet	84.12	84.23	105.09	83.81	96.88
5W+T Dry	53.4	54.02	59.32	53.93	56.62
5W+T Cond	56.18	56.71	62.66	56.76	59.62

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	CVI
1.Oven Dry	5	55.2621	2.5685	4.65
2.Orig Cond	5	58.7520	2.7307	4.65
3.1W+T Wet	5	98.7800	4.3989	4.45
4.1W+T Dry	5	55.9460	2.6551	4.75
5.1W+T Cond	5	58.5620	2.7359	4.67
6.2W+T Wet	5	93.2640	8.9495	9.60
7.2W+T Dry	5	55.5700	2.5365	4.56
8.2W+T Cond	5	58.4460	2.7044	4.63
9.3W+T Wet	5	90.2240	6.6969	7.42
10.3W+T Dry	5	55.7740	2.5832	4.63
11.3W+T Cond	5	58.4700	2.7224	4.66
12.4W+T Wet	5	96.3240	6.0192	6.25
13.4W+T Dry	5	55.8120	2.5206	4.52
14.4W+T Cond	5	58.3820	2.6924	4.61
15.5W+T Wet	5	90.8260	9.7187	10.70
16.5W+T Dry	5	55.4580	2.4952	4.50
17.5W+T Cond	5	58.3860	2.7436	4.70

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	5.94	5.94	5.94	5.94	5.94
1W+T Wet	45.37	43.36	43.65	43.57	44.32
1W+T Dry	1.21	1.11	1.27	1.04	1.47
1W+T Cond	5.72	5.61	5.67	5.51	5.66
2W+T Wet	38.8	37.73	45.17	40.49	40.48
2W+T Dry	0.84	0.45	0.44	0.52	0.53
2W+T Cond	5.59	5.38	5.44	5.43	5.4
3W+T Wet	37.38	37.81	41.51	38.16	38.41
3W+T Dry	1.02	0.89	0.88	0.84	0.97
3W+T Cond	5.62	5.38	5.48	5.39	5.56
4W+T Wet	44.05	41.48	43.33	40.31	43.69
4W+T Dry	1.19	1.11	0.78	0.89	0.99
4W+T Cond	5.44	5.33	5.31	5.34	5.31
5W+T Wet	36.77	36.23	43.59	35.88	41.8
5W+T Dry	0.39	0.56	0.07	0.36	0.41
5W+T Cond	5.32	5.28	5.4	5.33	5.42

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+T Wet	5	44.0540	0.8196	1.86
4.1W+T Dry	5	1.2186	0.1663	13.65
5.1W+T Cond	5	5.6340	0.0803	1.43
6.2W+T Wet	5	40.5334	2.8428	7.01
7.2W+T Dry	5	0.5569	0.1620	29.09
8.2W+T Cond	5	5.4483	0.0829	1.52
9.3W+T Wet	5	38.6545	1.6448	4.26
10.3W+T Dry	5	0.9183	0.0749	8.15
11.3W+T Cond	5	5.4860	0.1062	1.94
12.4W+T Wet	5	42.5709	1.6081	3.78
13.4W+T Dry	5	0.9897	0.1648	16.65
14.4W+T Cond	5	5.3451	0.0541	1.01
15.5W+T Wet	5	38.8531	3.5781	9.21
16.5W+T Dry	5	0.3582	0.1771	49.43
17.5W+T Cond	5	5.3486	0.0593	1.11

SHRINKAGE IN TUMBLE DRYING

SET 8 : Line Dried

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

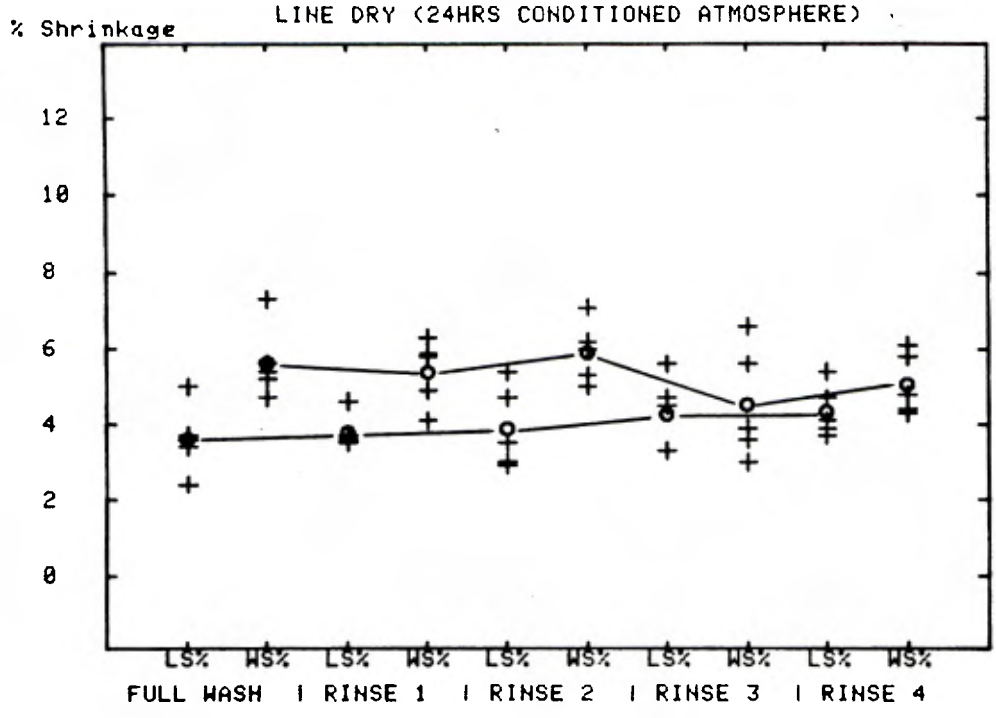
Sample Reference	FULL WASH		1st RINSE		2nd RINSE		3rd RINSE		4th RINSE	
	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%	LS%	WS%
A	3.6	5.6	3.5	6.3	3	6.2	3.3	6.6	3.7	5.8
B	2.4	5.4	3.7	4.9	2.9	5.3	3.3	3.6	4.1	4.4
C	3.7	5.2	3.6	4.1	3.5	5	4.5	3	3.9	4.8
D	3.4	7.3	3.6	5.9	4.7	7.1	4.7	5.6	4.7	6.1
E	5	4.7	4.6	5.8	5.4	6	5.6	3.9	5.4	4.3

*** COLUMN STATISTICS ***

			N	Mean	SD	CV%
1.	FULL	LS%	5	3.6200	0.9284	25.65
2.	WASH	WS%	5	5.6400	0.9864	17.49
3.	1st	LS%	5	3.8000	0.4528	11.91
4.	RINSE	WS%	5	5.4000	0.8886	16.46
5.	2nd	LS%	5	3.9000	1.1023	28.26
6.	RINSE	WS%	5	5.9200	0.8228	13.90
7.	3rd	LS%	5	4.2800	0.9859	23.04
8.	RINSE	WS%	5	4.5400	1.5027	33.10
9.	4th	LS%	5	4.3600	0.6914	15.86
10.	RINSE	WS%	5	5.0800	0.8228	16.20

SHRINKAGE IN TUMBLE DRYING : SET 8 : ALL CYCLES

LINE DRY (24HRS CONDITIONED ATMOSPHERE)



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	56.77	54.3	55.03	57.21	53.18
Orig Cond	60.35	57.73	58.51	60.82	56.54
1W+L Wet	101.69	97.48	98.24	102.44	94.84
1W+L Dry	61.17	58.57	59.23	61.66	57.35
2W+L Wet	91.1	90.06	96.07	99.14	90.08
2W+L Dry	61.15	58.55	59.26	61.62	57.37
3W+L Wet	100.15	98.8	98.92	102.84	97.38
3W+L Dry	61.15	58.54	59.27	61.44	57.3
4W+L Wet	101.1	98.05	89.71	91.99	94.01
4W+L Dry	61.21	58.58	59.33	61.65	57.37
5W+L Wet	105.58	96.74	102.01	91.97	93.62
5W+L Dry	60.77	58.17	58.91	61.2	57.04

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	55.2979	1.6838	3.05
2.Orig Cond	5	58.7900	1.7902	3.05
3.1W+L Wet	5	98.9380	3.1323	3.17
4.1W+L Dry	5	59.5960	1.8006	3.02
5.2W+L Wet	5	93.2900	4.1074	4.40
6.2W+L Dry	5	59.5900	1.7800	2.99
7.3W+L Wet	5	99.6180	2.0512	2.06
8.3W+L Dry	5	59.5400	1.7530	2.94
9.4W+L Wet	5	94.9720	4.5971	4.84
10.4W+L Dry	5	59.6280	1.7942	3.01
11.5W+L Wet	5	97.9840	5.7155	5.83
12.5W+L Dry	5	59.2180	1.7517	2.96

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	5.94	5.94	5.94	5.94	5.94
1W+L Wet	44.18	44.3	43.98	44.16	43.93
1W+L Dry	7.2	7.29	7.08	7.22	7.27
2W+L Wet	37.69	39.71	42.71	42.3	40.96
2W+L Dry	7.17	7.26	7.13	7.16	7.3
3W+L Wet	43.32	45.04	44.36	44.37	45.39
3W+L Dry	7.17	7.24	7.15	6.89	7.19
4W+L Wet	43.85	44.62	38.65	37.81	43.43
4W+L Dry	7.26	7.3	7.24	7.21	7.3
5W+L Wet	46.23	43.87	46.05	37.8	43.19
5W+L Dry	6.59	6.65	6.58	6.52	6.76

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

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1.Oven Dry	5	0.0000	0.0000	0.00
2.Orig Cond	5	5.9400	0.0000	0.00
3.1W+L Wet	5	44.1067	0.1519	0.34
4.1W+L Dry	5	7.2126	0.0804	1.11
5.2W+L Wet	5	40.6735	2.0448	5.03
6.2W+L Dry	5	7.2041	0.0717	1.00
7.3W+L Wet	5	44.4968	0.7916	1.78
8.3W+L Dry	5	7.1270	0.1375	1.93
9.4W+L Wet	5	41.6732	3.1839	7.64
10.4W+L Dry	5	7.2627	0.0416	0.57
11.5W+L Wet	5	43.4292	3.4169	7.87
12.5W+L Dry	5	6.6218	0.0917	1.39