

GARMENT TRIALS

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INTRODUCTION

From extensive knitted fabric projects already carried out, we now know a great deal about the behaviour of a wide range of constructions and fabric types.

However we know little about the behaviour of garments and the level of variation in quality found in retail outlets.

Therefore to obtain more information in these areas, it was decided that a number of garment trials should be carried out using garments from various retail outlets who utilise both UK and overseas manufacturers. During the course of these trials a range of constructions and garment types will eventually be included. Marks and Spencer were selected for the first trial.

OBJECTIVES

The objectives of these trials will be to discover from major retail outlets the normal variation in "standard" garments made from "standard" fabric to standard sizes.

This will include:-

- a) The quality of garment make-up.
- b) The variation in sizing and the size influence on laundering.
- c) Shrinkage during laundering.
- d) The effect of different laundering methods.

GARMENT SELECTION

It was decided that all the garments should be of the same construction, colour and style and three sizes should be evaluated.

Thirty garments were purchased all of which were childrens, navy, 1x1 rib, short sleeved T-Shirts. The three sizes included ten of each age 3/4, 7/8 and age 11.

TESTING

Garments age 3/4 were numbered 1-10, age 7/8 nos 11-20 and age 11 nos 21-30. Five sets of six garments were selected which included 2 of each size.

- SET 1 - Retained for full tests.
- SET 2 - Washed at 60°C and tumble dried.
- SET 3 - Washed at 60°C and line dried.
- SET 4 - Washed at 60°C, tumble dried and pressed.
- SET 5 - Washed at 60°C, line dried and pressed.

(All pressing was carried out using a domestic hand steam iron)

SET 1 was tested under normal laboratory conditions for size, weight, courses and wales, stitch length, yarn count, spirality, SES, % ext, thickness and R.G.B.

SETS 2-5 were marked for measuring using cotton sewing thread. The actual positions of marking are shown in figure 1.

It can be seen from this diagram that a set of garment measurements were taken and also a set of measurements centred in the middle of the front and back of the garments, which would record the 'fabric' shrinkage.

When garment shrinkage is quoted it refers to measurements taken at points 1W-5W and 1L-5L (L indicates length, W indicates width) and when fabric shrinkage is quoted it refers to measurements taken at points 1FL-4FL and 1FW-4FW (F indicates fabric).

SETS 2-5 were measured for dimensional change and courses and wales, before laundering and remeasured after each laundering cycle for a total of 10 washes.

After all laundering cycles were completed three garments out of each set were tested for weight, courses and wales, stitch length, yarn count, spirality, SES, % ext, thickness and R.G.B.

RESULTS

Table 1 shows the results of the garments tested as new. Comparing the chest size as specified on the label with the actual chest measurements made on the garments, there would appear to be a relatively high level of variation.

Table 2 shows the actual chest size measured on the unlaundered garments and also the calculated chest sizes (calculated from chest size measured AW and width shrinkage). Table 2 also shows the reference fit of the laundered garments.

$$\text{(Ref fit = } \frac{\text{chest AW}}{\text{nominal size}} \text{)}$$

(For more information of Ref fit see Computer Predictions for Cotton Shrinkage - S. Allan Heap).

Table 3 compares the mean results with the average for each size. The stitch length, yarn count and weight were within commercial tolerances but there was some variation in the wales and courses. The small size garments had approximately 2 more courses/3 cm than the larger garments.

Out of the 30 garments, ten were made up slightly different from the remaining twenty, which could indicate a different supplier, but no differences in the test figures could verify this.

Table 4 shows the results of the garments tested after ten laundering cycles.

The effect of the type of laundering cycle and effect of size is shown in table 5. For this style of garment and construction size does not appear to influence the results and the laundering method only appears to have an effect on courses, wales and thickness. The tumble dried garments being thicker and having more courses and wales, than the line dried garments.

Tables 6-9 show the individual measurements of courses and wales for each laundering method with the statistics for each cycle. The results are summarised in tables 10 and 11 and the mean values plotted in figures 3 and 4.

It was noticed however that the line dried garments were more creased than the tumble dried and visually the dimensional change was very noticeable comparing line and tumble drying see figure 2.

SHRINKAGE

Tables 12-19 show the individual measurements of shrinkage from both fabric and garment for all laundering methods with the statistics for each cycle. The results are summarised in Tables 20-23 and the mean shrinkages plotted in figures 5-8.

From these tables it can be seen that there is continuous shrinkage up to ten washes but the progression is minimal between 5 and 10. Table 24 shows this direct comparison which could indicate 5 laundering cycles may adequately show the final dimensional change. Also from this table it can be seen that there is very little difference between 'fabric' and garment shrinkage.

Percentage shrinkage was calculated from the change in courses and wales after each laundering cycle. The calculated shrinkage was compared with fabric and garment shrinkage values, (See tables 25-26) and as the differences between them was small the mean shrinkage values were plotted on figures 9 and 10, and table 27 shows the difference between one and five laundering cycles for all laundering methods.

Overall the reliability and reproducibility of the laundering methods is very similar.

CONCLUSIONS

The garments as bought showed some small variation in making up and also some differences in the size specified on the label and the size measured. As it was not possible to get an overall assessment of the variability of correct sizing, in any subsequent trials it would be advisable to take chest measurements on all the garments.

However, on the evidence of this trial, as size appears to have little effect on the overall behaviour in laundering of the garment, it may be possible to reduce the number of garments involved in any future trials to one size only.

It was also thought that a visual record sheet would have been helpful in assessing the garment performance before and after laundering.

It has been shown from this trial therefore that the type of laundering method had a large effect on the garment shrinkage showing that overall tumble drying appears to shrink the garment approximately 3-6 percentage points more than line drying.

Pressing had the effect of reducing shrinkage after tumble drying in the length direction by approximately 1.5%. After line drying pressing reduced shrinkage in the width by approximately 2.5%.

In future garment trials the testing could possibly be reduced by stopping the laundering cycles after 5 and perhaps only to carry out one set of shrinkage measurements on either garment or 'fabric'.

STORE GARMENT TRIALS - J. MARKS & SPENCER
 GARMENTS TESTED AS RECEIVED

AS RECEIVED	SAMPLE NO.					
	9	10	19	20	29	30
SIZE CM.	55	55	65	65	74	74
AGE	3/4	3/4	7/8	7/8	11	11
CHEST CM.	54.4	54.2	67.8	63.6	74.2	71
WEIGHT G.S.M	181.7	189.7	173.7	173.2	177.1	178.2
COURSES/3 CM	50.9	52.7	49.4	47.9	49	47.3
WALES/3 CM	29.3	30.8	30.7	30.2	31.4	31.6
S.L. MM.	2.781	2.745	2.776	2.74	2.778	2.786
YARN TEX	19.9	19.7	19.2	20.3	19.6	19.8
SPIRALITY	1.4	-1.8	1	-0.6	-2.3	-0.2
S.E.S. G.	214.6	183.4	208.3	211.5	222.8	253.4
%EXT.	6.4	6.4	6.4	6.5	7.1	6.7
THICKNESS	911.6	915.4	920.1	793.9	888.6	833.3
RED	1.8	1.9	1.6	1.9	1.9	2
GREEN	2.2	2.2	1.9	2.2	2.3	2.2
BLUE	4.4	4.5	3.9	4.4	4.7	4.5

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1. CHEST CM.	6	64.2000	8.4333	13.14
2. WEIGHT G.S.M	6	178.9333	6.1275	3.42
3. COURSES/ 3 CM	6	49.5333	1.9927	4.02
4. WALES/ 3 CM	6	30.6667	0.8383	2.73
5. S.L. MM.	6	2.7677	0.0198	0.72
6. YARN TEX	6	19.7500	0.3619	1.83
7. SPIRALITY	6	-0.4167	1.4730	353.51
8. S.E.S. G.	6	215.6667	22.7534	10.55
9. %EXT.	6	6.5833	0.2787	4.23
10. THICKNESS	6	877.1000	51.8815	5.92
11. RED	6	1.8500	0.1378	7.45
12. GREEN	6	2.1667	0.1366	6.31
13. BLUE	6	4.4000	0.2683	6.10

TABLE 2

SIZE 55	SET 1		W+T	W+L	W+T+P	W+L+P	
	not laundered						
GARMENT NO.	9	10	5	7	1	3	
CHEST AW	-	-	50.6	54.2	52.8	56.0	
% WIDTH SHRINKAGE	-	-	9.7	4.9	7.0	0.8	
CHEST BW	54.4	54.2	56.0	57.0	56.8	56.5	$\bar{x} = 55.8$
REF FIT	-	-	0.92	0.99	0.96	1.02	(+1.5%)
SIZE 65							
GARMENT NO.	19	20	15	17	11	13	
CHEST AW	-	-	61.6	58.2	63.0	67.0	
% WIDTH SHRINKAGE	-	-	9.7	6.9	9.7	3.6	
CHEST BW	67.8	63.6	68.2	62.5	69.8	69.5	$\bar{x} = 66.9$
REF FIT	-	-	0.95	0.90	0.97	1.03	(+2.9%)
SIZE 74							
GARMENT NO.	29	30	21	23	25	27	
CHEST AW	-	-	68.8	72.2	71.0	70.8	
% WIDTH SHRINKAGE	-	-	8.5	3.4	7.3	2.7	
CHEST BW	74.2	71.0	75.2	74.7	76.6	72.8	$\bar{x} = 74.1$
REF FIT	-	-	0.93	0.98	0.96	0.96	(+0.14%)

$$\text{REF FIT} = \frac{\text{CHEST AW}}{\text{NOMINAL SIZE}}$$

% width shrinkage = Mean of fabric and garment

Chest BW on laundered garments was calculated from Chest AW and % width shrinkage.

GARMENTS TESTED AS RECEIVED

	All Garments	Size 3/4	Size 7/8	Size 11
	\bar{x}	\bar{x}	\bar{x}	\bar{x}
Weight	178.9	185.7	173.5	177.7
Courses/3 cm	49.5	51.8	48.7	48.2
Wales/3 cm	30.7	30.1	30.5	31.5
S.L. mm	2.768	2.763	2.758	2.782
Tex	19.8	19.8	19.8	19.7
Spirality	- 0.4	- 0.2	0.2	- 1.3
S.E.S.	215.7	199.0	209.9	238.1
% Ext	6.6	6.4	6.5	6.9
Thickness	877.1	913.4	857.0	861.0
Red	1.9	1.9	1.8	2.0
Green	2.2	2.2	2.1	2.3
Blue	4.4	4.5	4.2	4.6

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENTS TESTED AFTER WASHING TRIALS

SAMPLE NO.	5	15	21	7	17	23	1	11	25	3	13	27
	W+T	W+T	W+T	W+L	W+L	W+L	W+T+P	W+T+P	W+T+P	W+L+P	W+L+P	W+L+P
SIZE CM.	55	65	74	55	65	74	55	65	74	55	65	74
AGE	3/4*	7/8	11	3/4	7/8	11	3/4	7/8	11	3/4	7/8	11
CHEST CM.	58.6	61.6	68.8	54.2	58.2	72.2	52.8	63	71	56	67	70.8
WEIGHT G.S.M	211.2	213.5	210.1	208.2	203.6	199.8	208.8	207.3	207.5	195.5	189.9	194.5
COURSES/3CM.	55.6	54	54.6	53.5	51.3	52.8	56.5	54.3	53.7	53.5	54.8	53.2
WALES/3CM.	31.7	34.2	32.8	33.1	32.6	31.8	32.2	32.7	32.4	29.9	31.8	31.5
S.L. MM.	2.754	2.747	2.752	2.747	2.748	2.77	2.727	2.749	2.775	2.768	2.752	2.753
YARN TEX	19.5	18.5	19.8	19.3	20.8	19.6	19.7	19.4	19.6	19.8	19.5	19.7
SPIRALITY	0.03	-1.1	-0.3	-0.1	-1.7	-1.8	-0.1	0.4	0.2	2.4	-0.8	-3.2
S.E.S. G.	278.8	246.7	270.9	236.8	216.4	247	255.8	245.5	261.7	275.3	237.3	261
% EXT.	6	5.7	6.3	5.9	5.8	5.6	6.2	5.9	5.8	5.9	5.6	5.5
THICKNESS	996.5	1015.1	998.6	942.6	887.1	915.3	993.5	1012.6	993.7	916.4	903.8	897
RED	1.7	1.6	1.8	1.8	1.8	1.8	1.9	1.6	1.6	1.9	1.7	1.9
GREEN	2.1	1.9	2.1	2.1	2	2.1	2.3	1.9	2.2	2.3	2	2.3
BLUE	4.4	4	4.5	4.3	4.2	4.5	4.8	4	4.7	4.7	4.2	4.8

*** ROW STATISTICS ***

	N	Mean	SD	CV%
1. CHEST CM.	12	62.1933	7.7481	12.46
2. WEIGHT G.S.M	12	204.1667	7.5088	3.68
3. COURSES/3CM.	12	54.0000	1.3531	2.51
4. WALES/3CM.	12	32.2250	1.0428	3.24
5. S.L. MM.	12	2.7535	0.0127	0.46
6. YARN TEX	12	19.6000	0.5135	2.62
7. SPIRALITY	12	-0.5058	1.3889	274.58
8. S.E.S. G.	12	252.7667	18.1174	7.17
9. % EXT.	12	5.8333	0.2397	4.09
10. THICKNESS	12	956.0167	49.8508	5.21
11. RED	12	1.7933	0.1115	6.25
12. GREEN	12	2.1083	0.1443	6.85
13. BLUE	12	4.4250	0.2896	6.54

TABLE 5

GARMENTS TESTED AFTER WASHING TRIALS

	All Garments - All wash conditions		All sizes W+T	All sizes W+L	All sizes W+T+P	All sizes W+L+P
	\bar{x}	SD	\bar{x}	\bar{x}	\bar{x}	\bar{x}
Weight	204.2	7.51	211.6	203.9	207.9	193.3
Courses/3cm	54.0	1.35	54.8	52.5	54.8	53.8
Wales/3 cm	32.2	1.04	32.9	32.5	32.4	31.1
S.L.mm	2.754	0.01	2.751	2.755	2.750	2.758
Tex	19.6	0.51	19.3	19.9	19.6	19.7
Spirality	-0.51	1.39	-0.46	-1.2	0.17	-0.53
S.E.S.g	252.8	18.1	265.5	233.4	254.3	257.9
% Ext	5.8	0.24	6.0	5.8	5.9	5.7
Thickness	956.0	49.9	1003.4	915.0	999.9	905.7
R	1.8	0.1	1.7	1.8	1.8	1.8
G	2.1	0.1	2.0	2.1	2.1	2.2
B	4.4	0.3	4.3	4.5	4.5	4.6

	All wash conditions size 3/4	All wash conditions size 7/8	All wash conditions size 11
Weight	205.9	203.6	203.0
Courses/3cm	54.8	53.6	53.6
Wales/3cm	31.7	32.8	32.1
S.L.mm	2.749	2.749	2.763
Tex	19.6	19.6	19.7
Spirality	0.56	-0.8	-1.28
S.E.S.g	261.7	236.5	260.2
% Ext	6.0	5.7	5.8
Thickness	962.3	954.7	951.2
R	1.8	1.7	1.9
G	2.2	2.0	2.2
B	4.6	4.1	4.6

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 NO. OF COURSES/3cm

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE											
5	50.1	53.8	53.9	54.6	56.5	55.5	57.1	56.2	55.5	54.5	55.8
2	49.5	53.7	54.6	53.9	55.8	57.6	57.2	54.6	54.5	54.4	54.8
15	47.7	49.8	53	52.4	53.8	53.9	53	53.9	53.5	53.7	53.6
12	47.9	49.9	53.2	53.3	53.9	52.5	54.7	54.5	53.9	53.3	53.5
21	47.7	50.5	52.5	52.6	54.5	53.6	53.9	53.4	54.2	53.1	53.2
22	46.5	50.2	50.7	52.4	53.8	54.1	54.1	53.7	54.3	52.8	53.1

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	48.2333	1.3246	2.75
2.	2	6	51.3167	1.9818	3.78
3.	3	6	52.9833	1.3378	2.52
4.	4	6	53.2888	0.9855	1.78
5.	5	6	54.7167	1.1618	2.12
6.	6	6	54.5667	1.7668	3.24
7.	7	6	55.8888	1.7527	3.19
8.	8	6	54.3833	1.8828	1.84
9.	9	6	54.3167	0.6785	1.25
10.	10	6	53.6333	0.6976	1.38
11.	11	6	54.8333	1.8596	1.96

 STORE GARMENT TRIALS - 1 MARKS & SPENCER
 NO. OF COURSES/3cm

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS											
1	52.5	52.4	54.2	53.9	53.8	54.1	54.4	55.2	55.3	54.1	55.6
6	50.4	50.7	54.2	53.8	53.5	54.4	54.4	54.6	54.9	55.1	53.9
11	47	51	50.6	52.3	53.6	53.3	53.6	54.6	53.5	54.2	54.4
16	47.7	49.8	53	53.1	53.8	53.9	53	53.9	53.5	52.6	53.6
25	47.6	49.4	49.8	52.2	52.6	53.5	54.7	54.2	52.7	52.8	52.1
26	47.8	49.1	50.3	52	53.1	53.3	54.1	53.7	53.7	53	51.8

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	48.8333	2.1518	4.48
2.	2	6	50.4888	1.2247	2.43
3.	3	6	52.0167	2.0183	3.88
4.	4	6	52.8833	0.8377	1.58
5.	5	6	53.4888	0.4698	0.88
6.	6	6	53.7588	0.4558	0.85
7.	7	6	54.8333	0.6282	1.14
8.	8	6	54.3667	0.5465	1.01
9.	9	6	53.9333	0.9758	1.81
10.	10	6	53.6667	0.9459	1.76
11.	11	6	53.6888	1.4325	2.67

STORE GARMENT TRIALS - I MARKS & SPENCER
 NO. OF COURSES/3CM

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & LINE											
7	52.3	53.2	53.4	52.1	52.8	52.7	52.3	52.9	53.2	53.4	53.2
4	50.9	52.2	53.9	53.1	54.3	53.5	52.6	53.7	53.7	53.8	53.8
17	47.7	50.5	50.3	50.3	51.2	50.2	49.9	50.8	50.4	51.3	50
14	49.9	52	51.1	50.8	51.1	51.9	50	51.2	51.2	51.4	51.4
23	48.3	51.2	51.3	51.2	53	50.8	52.3	52	51.6	52.1	52.4
24	48.1	51.1	51.6	52.1	51.3	51.6	51.8	52	51.7	51.7	52.1

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	49.3667	1.8272	3.70
2.	2	6	51.7000	0.9633	1.86
3.	3	6	51.9333	1.4067	2.71
4.	4	6	51.6000	1.0237	1.98
5.	5	6	52.2833	1.2952	2.48
6.	6	6	51.7833	1.2898	2.33
7.	7	6	51.4833	1.2156	2.36
8.	8	6	52.1000	1.0696	2.05
9.	9	6	51.9667	1.2469	2.40
10.	10	6	52.2833	1.0647	2.04
11.	11	6	52.1500	1.3472	2.58

 STORE GARMENT TRIALS - I MARKS & SPENCER
 NO. OF COURSES/3CM

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS											
3	51.1	53.1	53	53.9	53.6	53.3	52.7	53.6	53.4	54.5	53.7
8	48.9	49.6	49.2	50.4	50.3	50.5	50	50.1	50.3	50.6	50.7
13	49.6	51.4	51.3	51.8	51.4	51.3	51.6	51.9	52.3	52.2	52.3
18	47.4	50.6	50.7	50.5	50.3	51.5	50.1	51	50.8	51.4	51.3
27	48.6	50.9	51.8	52.1	52.1	52.2	51.4	52.4	52.3	52.6	52.4
28	48.6	51.9	52.4	52.4	52.4	51.7	52.4	52.7	52.6	52.4	52.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	49.0333	1.2372	2.52
2.	2	6	51.2500	1.1946	2.33
3.	3	6	51.4000	1.3461	2.62
4.	4	6	51.8500	1.3035	2.51
5.	5	6	51.6833	1.2859	2.49
6.	6	6	51.7500	0.9418	1.82
7.	7	6	51.3667	1.1290	2.20
8.	8	6	51.9500	1.2502	2.41
9.	9	6	51.9500	1.1675	2.25
10.	10	6	52.2833	1.3152	2.52
11.	11	6	52.1167	1.0323	1.98

STORE GARMENT TRIALS - 1 MARKS & SPENCER
NO. OF WALES/3cm

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE											
5	28.9	31.6	32.6	32.4	31.6	31.8	32.3	32.2	31.7	31.4	32.2
2	29.8	31.7	32.1	32.4	32.3	31.9	32.7	32.1	32.2	33.5	32.7
15	32.1	35.1	34.9	35.3	35.2	34.8	34.8	34.3	33.8	34.4	34.5
12	31.1	34.8	34.7	34.5	34.7	33.6	34.6	34.4	33.8	33.5	33.5
21	30.2	33.5	33.6	33.2	33.5	33	33.2	32.7	32.4	32.6	33.1
22	31.4	32.9	33.9	32.7	33.5	33.4	32.8	32.8	33.3	32.9	33.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	30.5833	1.1686	3.82
2.	2	6	33.2667	1.4922	4.49
3.	3	6	33.6333	1.1165	3.32
4.	4	6	33.4167	1.2123	3.63
5.	5	6	33.4667	1.3692	4.09
6.	6	6	33.0833	1.1286	3.41
7.	7	6	33.4000	1.0488	3.14
8.	8	6	33.0833	1.0107	3.08
9.	9	6	32.8667	0.8892	2.71
10.	10	6	33.8500	1.0173	3.08
11.	11	6	33.2167	0.7800	2.35

STORE GARMENT TRIALS - 1 MARKS & SPENCER
NO. OF WALES/3cm

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS											
1	29.8	32.7	33.2	32.5	32.4	32.7	32.2	32.4	31.9	32.6	32.5
6	29.3	32.3	31.7	31.7	31.3	31.7	31.6	32.2	32.1	30.9	32.3
11	30.4	33.9	33.5	32.6	32.4	33.8	33.6	32.5	32.8	33.5	33.1
16	32.1	35.1	34.9	35.3	35.2	34.8	34.8	34.5	34	33.9	34.4
25	30.9	33.4	32.9	32.7	33.4	33.5	33.3	32.6	32.6	33.2	32.5
26	30.3	33.2	32.7	32.6	33.3	33.6	33.6	33.5	32.8	32.9	32.7

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	30.4667	0.9688	3.18
2.	2	6	33.4333	0.9873	2.95
3.	3	6	33.1500	1.0540	3.18
4.	4	6	32.9800	1.2313	3.74
5.	5	6	33.0000	1.3191	4.00
6.	6	6	33.3500	1.0521	3.15
7.	7	6	33.1833	1.1356	3.42
8.	8	6	32.9500	0.8826	2.68
9.	9	6	32.7800	0.7376	2.26
10.	10	6	32.8333	1.0581	3.20
11.	11	6	32.9167	0.7757	2.36

STORE GARMENT TRIALS - 1 MARKS & SPENCER
NO. OF MALES/3CM

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & LINE											
7	30.6	33.5	32.9	32.8	32.8	32.6	32.8	32.9	33	32.6	32.8
4	29.4	31	30.3	30.2	30.5	31.2	31.6	30.3	31.4	30.9	31
17	30	32.7	37.4	33.3	32.8	32.5	32.7	32.9	32.7	32.7	32.6
14	31.3	34	33.8	33.7	33.7	33.5	33.7	33.7	33.8	33.7	33.5
23	30.5	32	32.4	33.2	32.3	32.1	32	31.8	31.9	32.4	31.6
24	30.5	32.8	32.7	33.1	33.5	32.8	32.5	32.7	33.3	32.9	32.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CVZ	
1.	1	6	30.3033	0.6369	2.18
2.	2	6	32.6667	1.0690	3.27
3.	3	6	33.2500	2.3399	7.04
4.	4	6	32.7167	1.2671	3.87
5.	5	6	32.6000	1.1489	3.52
6..	6	6	32.4500	0.7662	2.36
7.	7	6	32.5500	0.7232	2.22
8.	8	6	32.3033	1.1873	3.67
9.	9	6	32.6833	0.8931	2.73
10.	10	6	32.5333	0.9180	2.82
11.	11	6	32.3000	0.8899	2.76

STORE GARMENT TRIALS - 1 MARKS & SPENCER
NO. OF MALES/3CM

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS											
3	29.8	30	29.2	29.7	30.1	30	30.1	29.7	30.6	30	29.8
8	31.1	33	32.8	32.2	32.3	32.3	32.9	32.5	32	32	31.9
13	30.8	32.3	31.7	31.1	31.6	32	32.9	31.4	31.8	31.8	31.5
18	30.7	33.3	33.4	32.2	32.7	32.6	33.5	32.5	32.6	33	32.7
27	28.9	32	31.6	31	31.4	31.5	31.9	31.8	32.1	32.5	31.7
28	31.1	32	31.2	31.3	31.7	31.6	31.5	32.1	31.7	31.7	32.2

*** COLUMN STATISTICS ***

	N	Mean	SD	CVZ	
1.	1	6	30.4000	0.8764	2.88
2.	2	6	32.1000	1.1593	3.61
3.	3	6	31.6500	1.4557	4.60
4.	4	6	31.2500	0.9268	2.97
5.	5	6	31.6333	0.8937	2.83
6..	6	6	31.6667	0.9158	2.89
7	7	6	32.1333	1.2356	3.85
8.	8	6	31.6667	1.0520	3.32
9.	9	6	31.8000	0.6663	2.18
10.	10	6	31.8333	1.0211	3.21
11.	11	6	31.6333	0.9913	3.13

STORE GARMENT TRIALS - I MARKS & SPENCER
 NO. OF COURSES/3 CM.

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE											
5	50.1	53.8	53.9	54.6	56.5	58.5	57.1	56.2	55.5	54.5	55.8
2	49.5	53.7	54.6	53.9	55.8	57.6	57.2	54.6	54.5	54.4	54.8
15	47.7	49.8	53	52.4	53.8	53.9	53	53.9	53.5	53.7	53.8
12	47.9	49.9	53.2	53.3	53.9	52.5	54.7	54.5	53.9	53.3	53.5
21	47.7	50.5	52.5	52.6	54.5	53.8	53.9	53.4	54.2	53.1	53.2
22	46.5	50.2	50.7	52.4	53.8	54.1	54.1	53.7	54.3	52.8	53.1
WASH & LINE											
7	52.3	53.2	53.4	52.1	52.8	52.7	52.3	52.9	53.2	53.4	53.2
4	50.9	52.2	53.9	53.1	54.3	53.5	52.6	53.7	53.7	53.8	53.8
17	47.7	50.5	50.3	50.3	51.2	50.2	49.9	50.8	50.4	51.3	50
14	48.9	52	51.1	50.8	51.1	51.9	50	51.2	51.2	51.4	51.4
23	48.3	51.2	51.3	51.2	53	50.8	52.3	52	51.6	52.1	52.4
24	48.1	51.1	51.6	52.1	51.3	51.6	51.8	52	51.7	51.7	52.1
WASH TUMBLE & PRESS											
1	52.5	52.4	54.2	53.9	53.8	54.1	54.4	55.2	55.3	54.1	55.6
6	50.4	50.7	54.2	53.8	53.5	54.4	54.4	54.6	54.9	55.1	53.9
11	47	51	50.6	52.3	53.6	53.3	53.6	54.6	53.5	54.2	54.4
16	47.7	49.8	53	53.1	53.8	53.9	53	53.9	53.5	52.8	53.6
25	47.5	49.4	49.8	52.2	52.6	53.5	54.7	54.2	52.7	52.8	52.1
26	47.8	49.1	50.3	52	53.1	53.3	54.1	53.7	53.7	53	51.8
WASH LINE & PRESS											
3	51.1	53.1	53	53.9	53.6	53.3	52.7	53.6	53.4	54.5	53.7
8	48.9	49.6	49.2	50.4	50.3	50.5	50	50.1	50.3	50.6	50.7
13	49.6	51.4	51.3	51.8	51.4	51.3	51.6	51.9	52.3	52.2	52.3
18	47.4	50.6	50.7	50.5	50.3	51.5	50.1	51	50.8	51.4	51.3
27	48.6	50.9	51.8	52.1	52.1	52.2	51.4	52.4	52.3	52.6	52.4
28	48.6	51.9	52.4	52.4	52.4	51.7	52.4	52.7	52.6	52.4	52.3

STORE GARMENT TRIALS - I MARKS & SPENCER
NO. OF WALES/3 CM.

GARMENT NO.	NO. OF WASHES										
	0	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE											
5	28.9	31.6	32.6	32.4	31.6	31.8	32.3	32.2	31.7	31.4	32.2
2	29.8	31.7	32.1	32.4	32.3	31.9	32.7	32.1	32.2	33.5	32.7
15	32.1	35.1	34.9	35.3	35.2	34.8	34.8	34.3	33.8	34.4	34.5
12	31.1	34.8	34.7	34.5	34.7	33.6	34.6	34.4	33.8	33.5	33.5
21	30.2	33.5	33.6	33.2	33.5	33	33.2	32.7	32.4	32.6	33.1
22	31.4	32.9	33.9	32.7	33.5	33.4	32.8	32.8	33.3	32.9	33.3
WASH & LINE											
7	30.6	33.5	32.9	32.8	32.8	32.6	32.8	32.9	33	32.6	32.8
4	29.4	31	30.3	30.2	30.5	31.2	31.6	30.3	31.4	30.9	31
17	30	32.7	37.4	33.3	32.8	32.5	32.7	32.9	32.7	32.7	32.6
14	31.3	34	33.8	33.7	33.7	33.5	33.7	33.7	33.8	33.7	33.5
23	30.5	32	32.4	33.2	32.3	32.1	32	31.8	31.9	32.4	31.6
24	30.5	32.8	32.7	33.1	33.5	32.8	32.5	32.7	33.3	32.9	32.3
WASH TUMBLE & PRESS											
1	29.8	32.7	33.2	32.5	32.4	32.7	32.2	32.4	31.9	32.6	32.5
6	29.3	32.3	31.7	31.7	31.3	31.7	31.6	32.2	32.1	30.9	32.3
11	30.4	33.9	33.5	32.6	32.4	33.8	33.6	32.5	32.8	33.5	33.1
16	32.1	35.1	34.9	35.3	35.2	34.8	34.8	34.5	34	33.9	34.4
25	30.9	33.4	32.9	32.7	33.4	33.5	33.3	32.6	32.6	33.2	32.5
26	30.3	33.2	32.7	32.6	33.3	33.6	33.6	33.5	32.5	32.9	32.7
WASH LINE & PRESS											
3	29.6	30	29.2	29.7	30.1	30	30.1	29.7	30.6	30	29.6
8	31.1	33	32.8	32.2	32.3	32.3	32.9	32.5	32	32	31.9
13	30.8	32.5	31.7	31.1	31.6	32	32.9	31.4	31.8	31.8	31.5
18	30.7	33.3	33.4	32.2	32.7	32.6	33.5	32.5	32.6	33	32.7
27	28.9	32	31.6	31	31.4	31.5	31.9	31.5	32.1	32.5	31.7
28	31.1	32	31.2	31.3	31.7	31.6	31.5	32.1	31.7	31.7	32.2

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT LENGTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	6.6	8	8.2	8.8	9.8	9.7	11.1	10.8	10	10.7
2	7.8	7.9	9	9.5	10.6	9.6	10.8	11.1	10.1	10.8
15	7	8.1	8.8	8.4	9.9	10.2	10.4	10.8	10.8	10.3
12	7.6	7.7	8.5	8.9	9.2	9	9.8	11	10.9	10.2
21	8.9	9.8	10.8	10.6	11.1	11.6	11.6	11.9	12	12.3
22	11.2	12.2	12.1	13.3	13.9	13.2	14.4	14.4	13.9	14.1

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%
1.	1	6	8.1833	1.6738
2.	2	6	8.9500	1.7649
3.	3	6	9.5667	1.5397
4.	4	6	9.9167	1.8258
5.	5	6	10.7500	1.6790
6.	6	6	10.5500	1.5668
7.	7	6	11.3500	1.6146
8.	8	6	11.6667	1.3995
9.	9	6	11.2833	1.4689
10.	10	6	11.4000	1.5232

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT LENGTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS										
1	3.5	6.2	5.9	5.9	6.1	6.5	6.6	6.8	6.4	6.9
6	5.5	6.7	7.1	7.8	7.8	9	9.1	9.1	8.7	8.8
11	7.2	8.5	8.1	9.3	8.9	10.9	10.4	10.4	9.7	10.8
16	8.9	10.8	10.3	10.3	11.6	11.9	12.1	12	11.8	12.2
25	7.6	9	9.5	10.2	10.7	10.1	11.2	11.2	11.6	11.3
26	8.9	10.3	11.1	10.3	11.6	12.7	12.5	12.7	12.1	12.5

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%
1.	1	6	6.9333	2.1021
2.	2	6	8.5833	1.8584
3.	3	6	8.6667	1.9856
4.	4	6	8.9667	1.7862
5.	5	6	9.4500	2.2385
6.	6	6	10.1833	2.2257
7.	7	6	10.3167	2.1922
8.	8	6	10.3667	2.1518
9.	9	6	10.0500	2.2332
10.	10	6	10.4167	2.1646

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT LENGTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & LINE DRY										
7	0.8	1.2	2.1	0.5	0.6	0.5	2	1.6	1.8	0.9
4	4.7	5.7	6.5	6.3	6.2	5.6	6.4	6.1	5.3	5.2
17	4.3	5.5	5.2	5.1	6.3	5.7	6.2	5.1	5.8	5.4
14	3	4.1	3.6	4	3.7	4	3.6	4.7	3.7	4.5
23	6.2	7.1	7.6	7.4	6.9	6.9	7.2	7.3	7.8	7.8
24	4.9	5.4	5.7	6.1	6	6.1	6.6	6.9	6.7	6.4

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	3.9833	1.8691	46.92
2.	2	6	4.8333	2.0196	41.78
3.	3	6	5.1167	1.9914	38.92
4.	4	6	4.9000	2.4438	49.87
5.	5	6	4.9500	2.3990	48.46
6.	6	6	4.8000	2.3100	48.12
7.	7	6	5.3333	2.0539	38.51
8.	8	6	5.2833	2.0634	39.06
9.	9	6	5.1833	2.1535	41.55
10.	10	6	5.0333	2.3261	46.21

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT LENGTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS										
3	5.1	5.4	5.3	4.7	5.4	5.3	5.2	5.4	6.2	5.6
8	0.5	0.9	1.6	2.4	2.2	2.2	2.1	2.3	2.1	2.3
13	4.4	4.9	5.5	5	4.5	5.2	5.5	5.9	5.5	6.1
18	5.1	5.4	5.4	5.9	5.5	6.3	5.5	5.9	6	6.2
27	5.4	6.3	7	7.3	6.9	6.5	6.6	7.7	8.1	7.1
28	4.8	5.4	6	6.4	6.2	6.6	6.6	6	6.9	6.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	4.1833	1.9323	46.19
2.	2	6	4.7167	1.9240	40.79
3.	3	6	5.1333	1.8414	35.87
4.	4	6	5.2833	1.6987	32.15
5.	5	6	5.1167	1.6412	32.08
6.	6	6	5.3500	1.6574	30.98
7.	7	6	5.2500	1.6550	31.52
8.	8	6	5.5333	1.7694	31.98
9.	9	6	5.8000	2.0239	34.89
10.	10	6	5.6000	1.6876	30.14

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT WIDTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	7.6	8.9	7.6	8.7	10.1	8.8	9.7	9.2	7.7	9.6
2	7.9	7.7	9.3	8.2	9.1	8.2	9.4	9.5	8.6	9.7
15	9.6	10.6	10.6	9.1	10.1	10.5	11.3	10.2	8.6	10.5
12	8	8.4	8.8	8.5	10.5	9	10	8.6	8.7	10.4
21	7.7	8.8	9.5	8.9	8.9	9.8	9.8	9.9	8.4	9.4
22	4.4	6.2	4.7	5.6	6	4.8	5.4	5.9	4.8	6.5

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	7.5333	1.7014	22.58
2.	2	6	8.4333	1.4542	17.24
3.	3	6	8.4167	2.0663	24.55
4.	4	6	8.1667	1.2956	15.86
5.	5	6	9.1167	1.6497	18.10
6..	6	6	8.5167	1.9904	23.37
7.	7	6	9.2667	2.0057	21.64
8.	8	6	8.8833	1.5639	17.60
9.	9	6	7.8000	1.5139	19.41
10.	10	6	9.3500	1.4653	15.67

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT WIDTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS										
1	7.7	8	8.3	8.1	7.4	7.1	8	6.9	6.8	7.3
6	7.4	8.3	7.6	7.6	8.2	7.8	7.4	6.4	6.4	7
11	9.6	11.5	9.6	11.1	9.5	10.8	8.7	10.9	8.9	10
16	9.8	11.3	9.1	11	10.9	11.9	11.4	10.1	9.8	11.2
25	8.3	10.2	9	10.1	9.7	10.8	8.8	10.1	10.1	8.1
26	8.4	8.8	7.8	7.8	9.4	9.7	8.5	9.3	9.9	9

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	8.5333	0.9791	11.47
2.	2	6	9.6833	1.5303	15.80
3.	3	6	8.5667	0.7916	9.24
4.	4	6	9.2833	1.6339	17.60
5.	5	6	9.1833	1.2254	13.34
6..	6	6	9.6833	1.8777	19.39
7.	7	6	8.8000	1.3755	15.63
8.	8	6	8.9500	1.8588	20.77
9.	9	6	8.6500	1.6453	19.02
10.	10	6	8.7667	1.6256	18.54

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT WIDTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & LINE DRY										
7	6.1	6.3	4.5	5.9	4.6	4	4.8	3.8	4.8	4.3
4	4.5	3.1	4.9	2.5	3	4	3.2	3	3.2	2.9
17	4.7	5.8	5.7	4.5	6.4	6.7	6.9	5.4	4.9	5.7
14	6.8	7.5	9.8	9.9	6.3	6.6	6.5	6.5	8.7	6.6
23	4	5.4	5.4	5.4	3.7	4.9	1.4	3.7	5.3	2.7
24	3.3	2	3.9	1.9	3.1	2.7	8.7	1.5	1.8	-0.1

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	4.9000	1.3130	26.80
2.	2	6	5.0167	2.0663	41.19
3.	3	6	5.7000	2.1081	36.98
4.	4	6	5.0167	2.8666	57.14
5.	5	6	4.5167	1.5303	33.88
6..	6	6	4.8167	1.5842	32.89
7.	7	6	3.9167	2.5903	66.14
8.	8	6	3.9833	1.7657	44.33
9.	9	6	4.7833	2.3250	48.61
10.	10	6	3.6833	2.4020	65.21

STORE GARMENT TRIALS - 1 MARKS & SPENCER
GARMENT WIDTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS										
3	0.8	1.4	3.1	1.4	0.4	1.1	2	0.3	1	-1
8	2.5	1.8	11	2.1	0.6	2.7	0.6	1.1	1	-0.6
13	3.9	3.9	3.8	4	3.9	5	5.3	2.7	4	3.4
18	4.8	4.3	4.9	4.7	4.4	6.7	3.7	7	5.4	4.4
27	2.5	1.2	0.9	1.4	0.4	1.9	1.4	0.7	1	0.4
28	1.5	1.4	1.4	0.8	1.7	1.5	2.3	2.3	-0.25	2.5

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	2.6667	1.4814	55.55
2.	2	6	2.3333	1.3880	59.49
3.	3	6	4.1833	3.6559	87.39
4.	4	6	2.4000	1.5811	65.88
5.	5	6	1.9000	1.8155	95.55
6..	6	6	3.1500	2.2233	70.58
7	7	6	2.5500	1.6956	66.49
8.	8	6	2.3500	2.4591	104.64
9.	9	6	2.0250	2.1734	107.33
10.	10	6	1.5167	2.2311	147.10

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC LENGTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	7.2	7.9	8.1	8.9	10.2	9.3	10.1	9.2	9.9	10.4
2	8.5	8.2	9.6	10.2	10.9	10.4	10.4	10.5	10.2	11
15	6.7	7.9	8.9	8.9	9.9	10	10	10.3	9.9	10.2
12	6.8	8	8.4	8.7	9.7	9.9	10	10.3	10.4	9.5
21	9.3	10.5	11.2	11.3	12.3	12.2	12.3	12.5	12.3	11.7
22	12.3	12	13.4	14	14.1	13.8	14.9	14.5	14.8	15.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	8.4667	2.1398	25.27
2.	2	6	9.0833	1.7475	19.24
3.	3	6	9.9333	2.0255	20.39
4.	4	6	10.3333	2.0578	19.91
5.	5	6	11.1833	1.7116	15.31
6.	6	6	10.9333	1.7154	15.69
7.	7	6	11.3667	1.9449	17.11
8.	8	6	11.2167	1.9333	17.24
9.	9	6	11.2500	1.9583	17.41
10.	10	6	11.3500	2.0734	18.27

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC LENGTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS										
1	3	5.2	4.8	4.5	5.1	5.6	5.2	6.1	5.3	5.4
6	6.6	7.5	8.4	8.2	8.7	8.9	9.8	9.4	9.5	9.4
11	6.8	8	9.1	9	9.3	9.6	9.3	10.4	9.4	9.8
16	9	10	10.4	10.4	11.6	11.9	12.3	11.7	10.9	12.3
25	7.8	7.2	10.7	10.6	10.9	10.7	11.1	10.6	10.7	11.8
26	9.7	10	10.7	11.8	12.5	14.1	12.7	12.6	12.2	12.9

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	7.1500	2.3662	33.09
2.	2	6	7.9833	1.8291	22.91
3.	3	6	9.0167	2.2693	25.17
4.	4	6	9.0833	2.5771	28.37
5.	5	6	9.6833	2.6536	27.40
6.	6	6	10.1333	2.8821	28.44
7.	7	6	9.9833	2.6423	26.47
8.	8	6	10.1333	2.2642	22.34
9.	9	6	9.6667	2.3737	24.56
10.	10	6	10.2667	2.7595	26.88

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC LENGTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & LINE DRY										
7	0.7	0.8	1.9	1.3	0.9	0.1	1.2	1.7	1.3	0.9
4	3.4	4.0	5.3	6.3	5.8	4.0	5.7	5.4	4.7	5.3
17	5.2	5.0	5.6	6.7	6.1	5.4	5.8	5.6	6.5	6.6
14	2.6	3.3	3.6	3.9	4.3	3.2	3.9	3.8	4	4.2
23	6.6	6.6	6.8	7	7	7.5	7.2	6.9	7.3	7.4
24	5.2	7.7	6.1	7.4	7.8	6.9	7.7	7.2	7.8	7.8

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	3.9500	2.1371	54.10
2.	2	6	4.8333	2.4857	51.43
3.	3	6	4.8833	1.8104	37.07
4.	4	6	5.4333	2.3712	43.64
5.	5	6	5.3167	2.4653	46.37
6.	6	6	4.6500	2.7046	58.16
7.	7	6	5.2500	2.3889	45.50
8.	8	6	5.1000	2.0611	40.41
9.	9	6	5.2667	2.4386	46.30
10.	10	6	5.3667	2.5649	47.79

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC LENGTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS										
3	4.2	4.5	5.1	5.1	5.6	4.6	4.7	5.3	5.3	5.5
8	0.8	1.7	2.2	1.8	2.7	2.9	2.9	3.2	3.5	3.1
13	4.4	4.3	5.1	5.7	4.9	5.5	5.5	5.1	5.2	6.1
18	4	5.3	5.7	4.8	5.3	5.2	5.5	6.4	6.1	5.4
27	4.2	5.1	6.1	7	6.4	6.4	6.4	6.9	6.3	6.6
28	4.9	5.7	5.9	6.1	5.7	7	6.4	7.3	7	6

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	3.7500	1.4775	39.40
2.	2	6	4.4333	1.4348	32.36
3.	3	6	5.0167	1.4400	28.70
4.	4	6	5.0833	1.7860	35.13
5.	5	6	5.1000	1.2759	25.02
6.	6	6	5.2667	1.4418	27.38
7.	7	6	5.2333	1.3110	25.05
8.	8	6	5.7000	1.5007	26.33
9.	9	6	5.5667	1.2127	21.79
10.	10	6	5.4500	1.2309	22.58

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC WIDTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	8.7	9.4	8.2	9	9.6	9.3	8.3	8.7	7.9	9.8
2	8.8	8.3	8.1	9.2	8.7	7.8	8.7	8.4	7.6	8.9
15	10	10.3	9.6	9.9	10.3	9.2	9.7	8.6	7.3	8.9
12	11	9.8	9.2	9.4	10.2	8.1	9.7	8.1	6.8	5.9
21	7	8.6	8.6	7.9	9.1	9	8.4	9.5	7.4	7.6
22	6.4	7.3	7.5	5.5	7	5.5	6.8	5.2	5.6	5.6

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	8.6500	1.7410	20.13
2.	2	6	8.9500	1.0968	12.25
3.	3	6	8.5333	0.7685	9.01
4.	4	6	8.4833	1.6043	18.91
5.	5	6	9.1500	1.2211	13.34
6.	6	6	8.1500	1.4349	17.61
7.	7	6	8.6000	1.0770	12.52
8.	8	6	8.0833	1.4878	18.41
9.	9	6	7.1000	0.8198	11.55
10.	10	6	7.7833	1.7268	22.19

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 FABRIC WIDTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH TUMBLE & PRESS										
1	7.7	8.6	7.1	6.7	6.7	6.4	5.9	6.5	6.4	6.8
6	8.7	8.9	7.5	8.4	8.5	8.3	6.4	8.1	6.4	8.8
11	10.6	10.2	8.5	10.7	9.9	10.7	7.2	8.3	8.6	9.3
16	11.3	11.6	10.2	10.9	12	12.1	12.1	10.9	10.4	10.8
25	8.2	8.4	6.7	7.3	8.5	7.5	5.9	6.7	5.9	6.5
26	8.2	10.1	7.6	8.9	9.1	7.7	6.2	6.2	7.9	8.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	9.1167	1.4716	16.14
2.	2	6	9.6333	1.2275	12.74
3.	3	6	7.9333	1.2628	15.92
4.	4	6	8.8167	1.7233	19.55
5.	5	6	9.1167	1.7623	19.33
6.	6	6	8.7833	2.1637	24.63
7.	7	6	7.2833	2.4078	33.06
8.	8	6	7.7833	1.7555	22.55
9.	9	6	7.6000	1.7146	22.56
10.	10	6	8.4167	1.6068	19.09

STORE GARMENT TRIALS - 1 MARKS & SPENCER
FABRIC WIDTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & LINE DRY										
7	8	6.7	5.3	6.6	7	6.7	6	5.7	6.1	5.5
4	6.5	4.8	6.5	4.2	5.5	6	3.8	4.4	3.8	4.5
17	10.1	8.3	9	9.1	7.9	9.4	9.7	8.6	7.9	8
14	6.2	7.6	8.4	7.1	6.7	6.9	3.9	7.5	7.3	4.6
23	4.6	6.3	5.9	5.6	6	3.5	4	4.8	4.4	4
24	5	3.7	5.7	6.6	6.5	7	6.7	5.4	5.5	2.7

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	6.7333	2.0412	30.32
2.	2	6	6.2333	1.7224	27.63
3.	3	6	6.8000	1.5336	22.55
4.	4	6	6.5333	1.6269	24.90
5.	5	6	6.6000	0.8295	12.57
6.	6	6	6.5833	1.9010	28.88
7.	7	6	5.6833	2.3164	40.76
8.	8	6	6.0667	1.6391	27.02
9.	9	6	5.8333	1.5996	27.42
10.	10	6	4.8833	1.7815	36.48

STORE GARMENT TRIALS - 1 MARKS & SPENCER
FABRIC WIDTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH LINE & PRESS										
3	1.1	0.6	1.4	3.5	1.3	3.6	2.4	1.2	1.5	2.6
8	5.2	3	-0.1	4	2.9	4.6	2.6	1.2	1.9	1.1
13	6.6	3.2	4.4	5	3.4	4.5	3.6	2.6	3.6	3.7
18	7.5	6.9	5.7	7.5	5.5	8	4.7	7.1	6.8	6.9
27	3.8	0.9	2.3	3.8	2.7	4.6	4.8	2.9	1.8	4.9
28	0.5	-0.1	-2.3	0.3	1.6	3.1	1	2.1	1.9	2.3

*** COLUMN STATISTICS ***

	N	Mean	SD	CV%	
1.	1	6	4.1167	2.8659	69.62
2.	2	6	2.4167	2.5686	106.29
3.	3	6	1.9000	2.9237	153.88
4.	4	6	4.0167	2.3336	58.10
5.	5	6	2.9000	1.5033	51.84
6.	6	6	4.7333	1.7154	36.24
7.	7	6	3.1833	1.4783	46.19
8.	8	6	2.8500	2.1970	77.09
9.	9	6	2.9167	2.0430	70.04
10.	10	6	3.5833	2.0750	57.91

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 GARMENT LENGTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	6.6	8	8.2	8.6	9.8	9.7	11.1	10.8	10	10.7
2	7.8	7.9	9	9.5	10.6	9.6	10.8	11.1	10.1	10.8
15	7	8.1	8.8	8.4	9.9	10.2	10.4	10.8	10.8	10.3
12	7.6	7.7	8.5	8.9	9.2	9	9.8	11	10.9	10.2
21	8.9	9.8	10.8	10.6	11.1	11.6	11.6	11.9	12	12.3
22	11.2	12.2	12.1	13.3	13.9	13.2	14.4	14.4	13.9	14.1
WASH & LINE DRY										
7	0.8	1.2	2.1	0.5	0.6	0.5	2	1.6	1.8	0.9
4	4.7	5.7	6.5	6.3	6.2	5.6	6.4	6.1	5.3	5.2
17	4.3	5.5	5.2	5.1	6.3	5.7	6.2	5.1	5.8	5.4
14	3	4.1	3.6	4	3.7	4	3.6	4.7	3.7	4.5
23	6.2	7.1	7.6	7.4	6.9	6.9	7.2	7.3	7.8	7.8
24	4.9	5.4	5.7	6.1	6	6.1	6.6	6.9	6.7	6.4
WASH TUMBLE & PRESS										
1	3.5	6.2	5.9	5.9	6.1	6.5	6.6	6.8	6.4	6.9
6	5.5	6.7	7.1	7.8	7.8	9	9.1	9.1	8.7	9.8
11	7.2	8.5	8.1	9.3	8.9	10.9	10.4	10.4	9.7	10.8
16	8.9	10.8	10.3	10.3	11.6	11.9	12.1	12	11.8	12.2
25	7.6	9	9.5	10.2	10.7	10.1	11.2	11.2	11.6	11.3
26	8.9	10.3	11.1	10.3	11.6	12.7	12.5	12.7	12.1	12.5
WASH LINE & PRESS										
3	5.1	5.4	5.3	4.7	5.4	5.3	5.2	5.4	6.2	5.6
8	0.3	0.9	1.6	2.4	2.2	2.2	2.1	2.3	2.1	2.3
13	4.4	4.9	5.5	5	4.5	5.2	5.5	5.9	5.5	6.1
18	5.1	5.4	5.4	5.9	5.5	6.3	5.5	5.9	6	6.2
27	5.4	6.3	7	7.3	6.9	6.5	6.6	7.7	8.1	7.1
28	4.8	5.4	6	6.4	6.2	6.6	6.6	6	6.9	6.3

STORE GARMENT TRIALS - 1 MARKS & SPENCER
 GARMENT WIDTH SHRINKAGE - ALL MEASUREMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	7.6	8.9	7.6	6.7	10.1	8.8	9.7	9.2	7.7	9.6
2	7.9	7.7	9.3	8.2	9.1	8.2	9.4	9.5	8.6	9.7
15	9.6	10.6	10.6	9.1	10.1	10.5	11.3	10.2	8.6	10.5
12	8	8.4	8.8	8.5	10.5	9	10	8.6	8.7	10.4
21	7.7	8.8	9.5	8.9	8.9	9.8	9.8	9.9	8.4	9.4
22	4.4	6.2	4.7	5.6	6	4.8	5.4	5.9	4.8	6.5
WASH & LINE DRY										
7	6.1	6.3	4.5	5.9	4.6	4	4.8	3.8	4.8	4.3
4	4.5	3.1	4.9	2.5	3	4	3.2	3	3.2	2.9
17	4.7	5.8	5.7	4.5	6.4	6.7	6.9	5.4	4.9	5.7
14	6.8	7.5	9.8	9.9	6.3	6.6	6.5	6.5	8.7	6.6
23	4	5.4	5.4	5.4	3.7	4.9	1.4	3.7	5.3	2.7
24	3.3	2	3.9	1.9	3.1	2.7	0.7	1.5	1.8	-0.1
WASH TUMBLE & PRESS										
1	7.7	8	8.3	8.1	7.4	7.1	8	6.9	6.8	7.3
6	7.4	8.3	7.6	7.6	8.2	7.8	7.4	6.4	6.4	7
11	9.6	11.5	9.6	11.1	9.5	10.8	8.7	10.9	8.9	10
16	9.8	11.3	9.1	11	10.9	11.9	11.4	10.1	9.8	11.2
25	8.3	10.2	9	10.1	9.7	10.8	8.8	10.1	10.1	8.1
26	8.4	8.8	7.8	7.8	9.4	9.7	8.5	9.3	9.3	9
WASH LINE & PRESS										
3	0.8	1.4	3.1	1.4	0.4	1.1	2	0.3	1	-1
8	2.5	1.8	11	2.1	0.6	2.7	0.6	1.1	1	-0.6
13	3.9	3.9	3.8	4	3.9	5	5.3	2.7	4	3.4
18	4.8	4.3	4.9	4.7	4.4	6.7	3.7	7	5.4	4.4
27	2.5	1.2	0.9	1.4	0.4	1.9	1.4	0.7	1	0.4
28	1.5	1.4	1.4	0.8	1.7	1.5	2.3	2.3	-0.25	2.5

STORE GARMENT TRIALS - I MARKS & SPENCER
 FABRIC LENGTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	7.2	7.9	8.1	8.9	10.2	9.3	10.1	9.2	9.9	10.4
2	8.5	8.2	9.6	10.2	10.9	10.4	10.9	10.5	10.2	11
15	6.7	7.9	8.9	8.9	9.9	10	10	10.3	9.9	10.2
12	6.8	8	8.4	8.7	9.7	9.9	10	10.3	10.4	9.5
21	9.3	10.5	11.2	11.3	12.3	12.2	12.3	12.5	12.3	11.7
22	12.3	12	13.4	14	14.1	13.8	14.9	14.5	14.8	15.3
WASH & LINE DRY										
7	0.7	0.8	1.9	1.3	0.9	0.1	1.2	1.7	1.3	0.9
4	3.4	4.6	5.3	6.3	5.8	4.8	5.7	5.4	4.7	5.3
17	5.2	5.6	5.6	6.7	6.1	5.4	5.8	5.6	6.5	6.6
14	2.6	3.5	3.6	3.9	4.3	3.2	3.9	3.8	4	4.2
23	6.6	6.6	6.8	7	7	7.5	7.2	6.9	7.3	7.4
24	5.2	7.7	6.1	7.4	7.6	6.9	7.7	7.2	7.8	7.6
WASH TUMBLE & PRESS										
1	3	5.2	4.8	4.5	5.1	5.6	5.2	6.1	5.3	5.4
6	6.6	7.5	8.4	8.2	8.7	8.9	9.6	9.4	9.5	9.4
11	6.8	6	9.1	9	9.3	9.6	9.3	10.4	9.4	9.8
16	9	10	10.4	10.4	11.6	11.9	12.3	11.7	10.9	12.3
25	7.6	7.2	10.7	10.6	10.9	10.7	11.1	10.6	10.7	11.6
26	7.7	10	10.7	11.8	12.5	14.7	12.2	12.6	12.2	12.9
WASH LINE & PRESS										
3	4.2	4.5	5.1	5.1	5.6	4.6	4.7	5.3	5.3	5.5
5	0.6	1.1	2.2	1.6	2.7	2.9	2.9	3.2	3.5	3.1
13	4.4	4.3	5.1	5.7	4.9	5.5	5.5	5.1	5.2	6.1
16	4	5.3	5.3	4.8	5.3	5.2	5.5	6.4	6.1	5.4
27	4.2	5.1	6.1	7	6.4	6.4	6.4	6.9	6.3	6.6
28	4.9	5.7	5.9	6.1	5.7	7	6.4	7.3	7	6

STORE GARMENT TRIALS - I MARKS & SPENCER
 FABRIC WIDTH SHRINKAGE - MEASURED ON THE GARMENTS

GARMENT NO.	NO. OF WASHES									
	1	2	3	4	5	6	7	8	9	10
WASH & TUMBLE										
5	8.7	9.4	8.2	9	9.6	9.3	8.3	8.7	7.9	9.8
2	8.8	8.3	8.1	9.2	8.7	7.6	8.7	8.4	7.6	8.9
15	10	10.3	9.6	9.9	10.3	9.2	9.7	8.6	7.3	8.9
12	11	9.8	9.2	9.4	10.2	8.1	9.7	8.1	6.8	5.9
21	7	8.6	8.6	7.9	9.1	9	8.4	9.5	7.4	7.6
22	8.4	7.3	7.5	5.5	7	5.5	6.8	5.2	5.6	5.6
WASH & LINE DRY										
7	8	6.7	5.3	6.6	7	6.7	6	5.7	6.1	5.5
4	6.5	4.8	6.5	4.2	5.5	6	3.8	4.4	3.8	4.5
17	10.1	9.3	9	9.1	7.9	9.4	9.7	8.6	7.9	8
14	6.2	7.6	8.4	7.1	6.7	6.9	3.9	7.5	7.3	4.6
23	4.6	6.3	5.9	5.6	6	3.5	4	4.8	4.4	4
24	5	3.7	5.7	5.6	6.5	7	6.7	5.4	5.5	2.7
WASH TUMBLE & PRESS										
1	7.7	8.6	7.1	6.7	6.7	6.4	5.9	6.5	6.4	6.8
6	8.7	8.9	7.5	8.4	8.5	8.3	6.4	8.1	6.4	8.8
11	10.6	10.2	6.5	10.7	9.9	10.7	7.2	8.3	8.6	9.3
16	11.3	11.6	10.2	10.9	12	12.1	12.1	10.9	10.4	10.8
25	8.2	8.4	6.7	7.3	8.5	7.5	5.9	6.7	5.9	6.5
26	8.2	10.1	7.6	8.9	9.1	7.7	6.2	6.2	7.9	8.3
WASH LINE & PRESS										
3	1.1	0.6	1.4	3.5	1.3	3.6	2.4	1.2	1.5	2.6
8	5.2	3	-0.1	4	2.9	4.6	2.6	1.2	1.9	1.1
13	6.6	3.2	4.4	5	3.4	4.5	3.6	2.6	3.6	3.7
18	7.5	6.9	5.7	7.5	5.5	8	4.7	7.1	6.6	6.9
27	3.8	0.9	2.3	3.8	2.7	4.6	4.8	2.9	1.6	4.9
28	0.5	-0.1	-2.3	0.3	1.6	3.1	1	2.1	1.9	2.3

% SHRINKAGE

	LENGTH								WIDTH							
	FABRIC				GARMENT				FABRIC				GARMENT			
	5W		10W		5W		10W		5W		10W		5W		10W	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
W + T	11.18	1.71	11.35	2.02	10.75	1.68	11.4	1.52	9.15	1.22	7.78	1.73	9.12	1.65	9.35	1.46
W + T + P	9.68	2.65	10.27	2.76	9.45	2.24	10.42	2.16	9.12	1.76	8.42	1.61	9.18	1.22	8.77	1.63
W + L	5.32	2.46	5.37	2.56	4.95	2.40	5.03	2.33	6.60	0.83	4.88	1.78	4.52	1.53	3.68	2.40
W + L + P	5.10	1.28	5.45	1.23	5.12	1.64	5.60	1.69	2.90	1.50	3.58	2.07	1.90	1.82	1.52	2.23

SD = STANDARD DEVIATION

5W, 10W = 5 WASH CYCLES, 10 WASH CYCLES

W + T = WASH + TUMBLE

W + T + P = WASH + TUMBLE + PRESS

W + L = WASH + LINE

W + L + P = WASH + LINE + PRESS

% SHRINKAGE CALCULATED FROM COURSES AND WALES

<u>W + T</u>	NO. OF WASHES	<u>LENGTH</u>				<u>WIDTH</u>			
		Calc	Fabric	Garment	\bar{x}	Calc	Fabric	Garment	\bar{x}
	1	6.02	8.47	8.18	7.56	8.09	8.65	7.53	8.09
	2	8.97	9.08	8.95	9.0	9.07	8.95	8.43	8.82
	3	9.34	9.93	9.57	9.61	8.50	8.53	8.42	8.48
	4	11.86	10.33	9.92	10.70	8.64	8.48	8.17	8.43
	5	11.62	11.18	10.75	11.18	7.56	9.15	9.12	8.61
	6	12.31	10.93	10.55	11.26	8.44	8.15	8.52	8.37
	7	11.31	11.37	11.35	11.34	7.56	8.60	9.27	8.48
	8	11.21	11.22	11.67	11.37	6.97	8.08	8.88	7.98
	9	10.07	11.25	11.28	10.87	7.47	7.10	7.80	7.46
	10	<u>10.74</u>	<u>11.35</u>	<u>11.40</u>	11.16	<u>7.95</u>	<u>7.78</u>	<u>9.35</u>	8.36
	\bar{x}	10.35	10.51	10.36		\bar{x} 8.03	8.35	8.55	

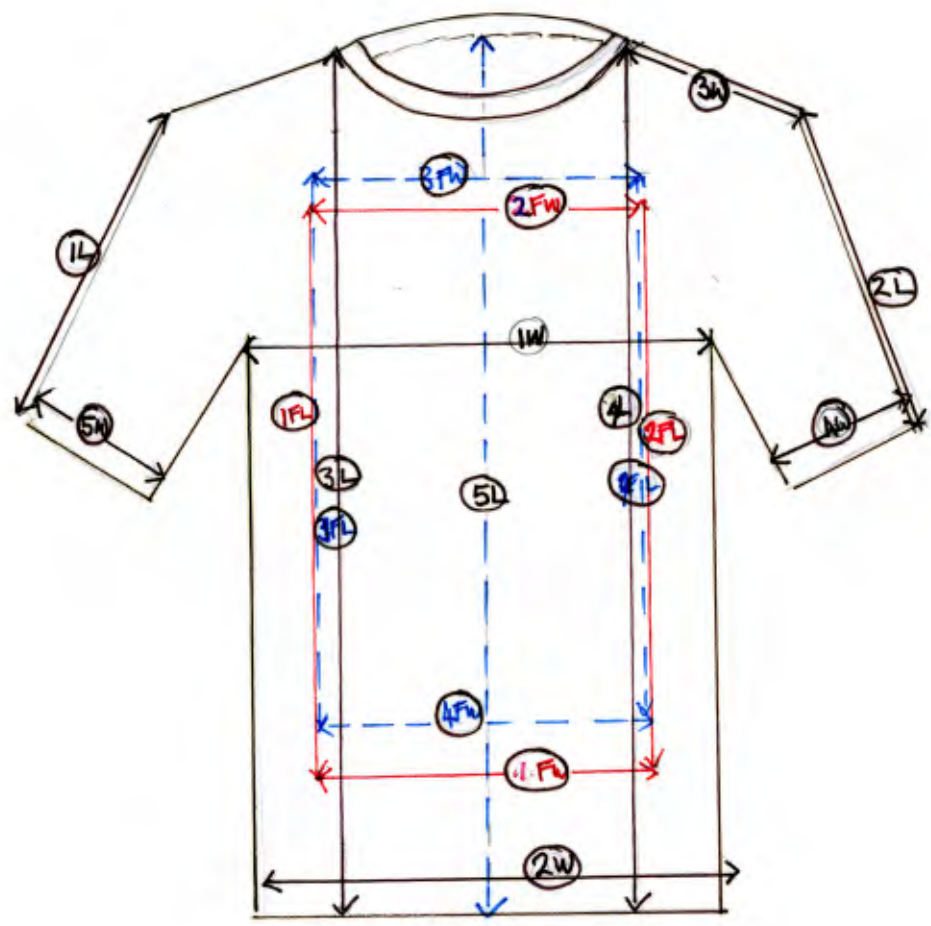
<u>W + L</u>	Calc	Fabric	Garment	\bar{x}	Calc	Fabric	Garment	\bar{x}
1	4.51	3.95	3.98	4.15	7.01	6.73	4.90	6.21
2	4.93	4.83	4.83	4.86	8.63	6.23	5.02	6.63
3	4.32	4.88	5.12	4.77	7.15	6.80	5.70	6.55
4	5.57	5.43	4.90	5.30	6.81	6.53	5.02	6.12
5	4.65	5.32	4.95	4.97	6.38	6.60	4.52	5.83
6	4.10	4.65	4.80	4.52	6.67	6.58	4.82	6.02
7	5.24	5.25	5.33	5.27	6.18	5.68	3.92	5.26
8	5.00	5.10	5.28	5.13	7.04	6.07	3.98	5.70
9	5.57	5.27	5.18	5.34	6.61	5.83	4.78	5.74
10	<u>5.33</u>	<u>5.37</u>	<u>5.03</u>	5.24	<u>5.94</u>	<u>4.88</u>	<u>3.68</u>	4.83
	\bar{x} 4.92	5.01	4.94		\bar{x} 6.84	6.19	4.63	

% SHRINKAGE CALCULATED FROM COURSES AND WALES

<u>W+T+P</u>	NO. OF WASHES	<u>LENGTH</u>				<u>WIDTH</u>			
		Calc	Fabric	Garment	\bar{x}	Calc	Fabric	Garment	\bar{x}
	1	3.12	7.15	6.93	5.73	8.85	9.12	8.53	8.83
	2	6.13	7.98	8.58	7.56	8.08	9.63	9.68	9.13
	3	7.66	9.02	8.67	8.45	7.39	7.93	8.57	7.96
	4	8.56	9.08	8.97	8.87	7.67	8.82	9.28	8.59
	5	9.15	9.68	9.45	9.43	8.64	9.12	9.18	8.98
	6	9.62	10.13	10.18	9.98	8.17	8.78	9.68	8.88
	7	10.19	9.98	10.32	10.16	7.53	7.28	8.80	7.87
	8	9.46	10.13	10.37	9.99	6.82	7.78	8.95	7.85
	9	9.02	9.67	10.05	9.58	7.19	7.60	8.65	7.81
	10	8.90	10.27	10.42	9.86	7.44	8.42	8.77	8.21
	\bar{x}	8.18	9.31	9.39		\bar{x} 8.70	7.67	9.01	

<u>W+L+P</u>	Calc	Fabric	Garment	\bar{x}	Calc	Fabric	Garment	\bar{x}
1	4.33	3.75	4.18	4.09	5.30	4.12	2.67	4.03
2	4.61	4.43	4.72	4.59	3.95	2.42	2.33	2.90
3	5.44	5.02	5.13	5.20	2.72	1.90	4.18	2.93
4	5.13	5.08	5.28	5.16	3.89	4.02	2.40	3.44
5	5.26	5.10	5.12	5.16	4.01	2.90	1.90	2.94
6	4.56	5.27	5.35	5.06	5.38	4.73	3.15	4.42
7	5.62	5.23	5.25	5.37	4.01	3.18	2.55	3.25
8	5.62	5.70	5.53	5.62	4.40	2.85	2.35	3.20
9	6.22	5.57	5.80	5.86	4.49	2.92	2.03	3.15
10	5.91	5.45	5.60	5.65	3.89	3.58	1.52	3.00
	\bar{x}	5.27	5.06	5.20	\bar{x}	4.20	3.26	2.51

FIGURE 1



--- back measurement

WASH + TUMBLE

5

12

22



WASH + TUMBLE + PRESS

1

16

26



WASH + LINE + PRESS

3

18

28



WASH + LINE

7

14

24



STORE GARMENT TRIALS - MEAN COURSES/3CM

COURSES/3CM.

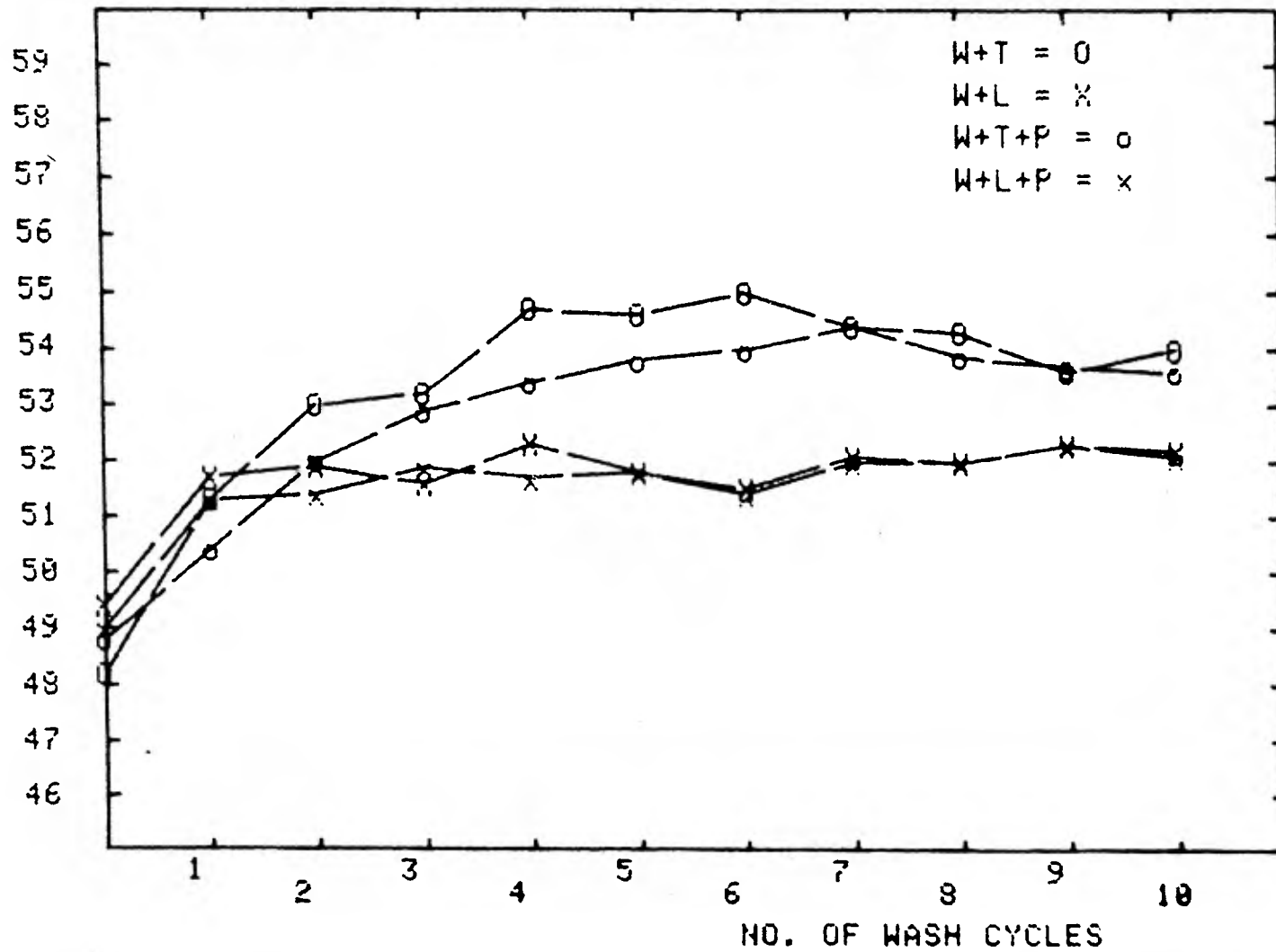


FIGURE 3

STORE GARMENT TRIALS - MEAN WALES/3CM.

WALES/3CM.

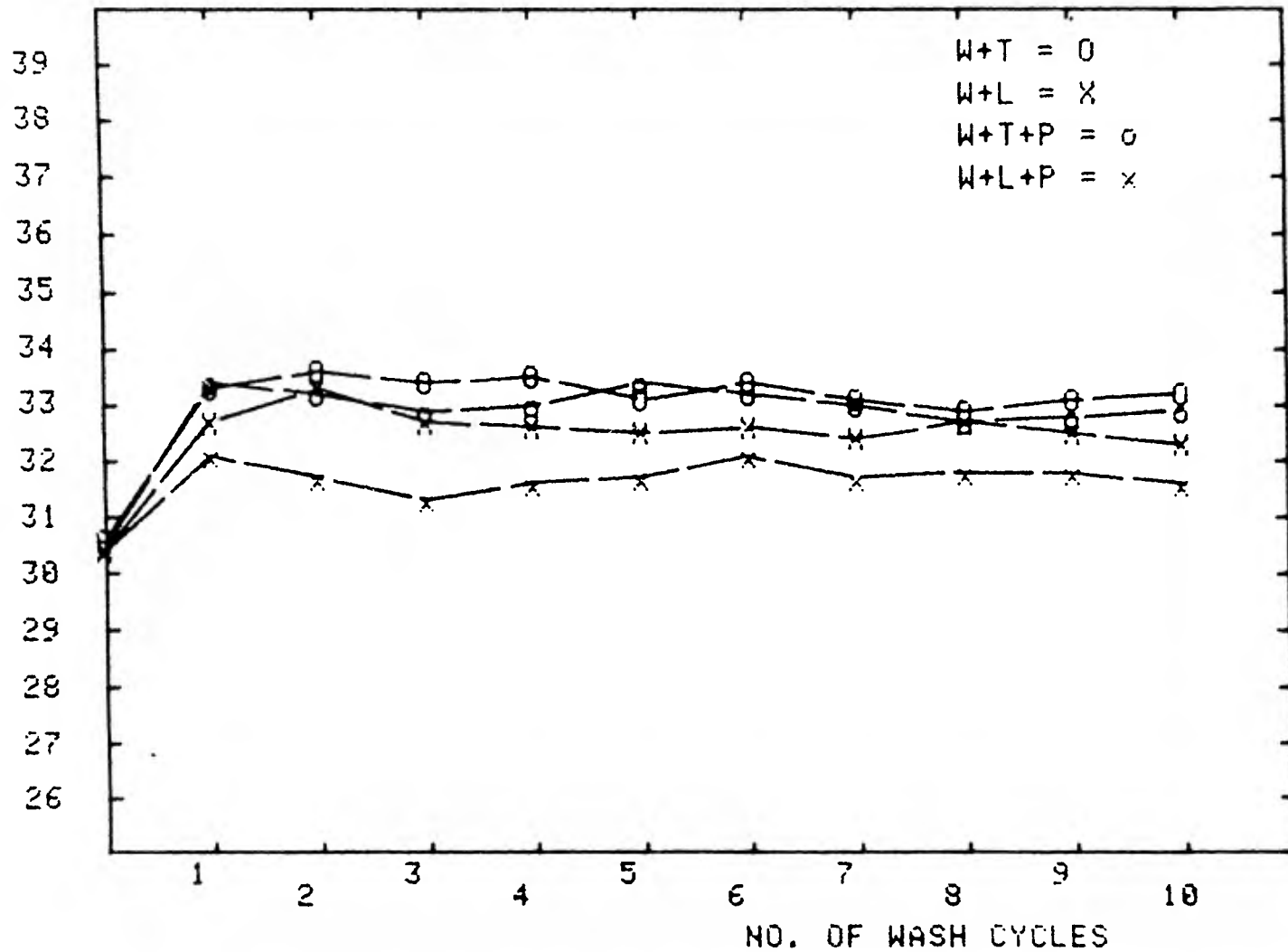


FIGURE 4

STORE GARMENT TRIALS - MEAN LENGTH SHRINKAGE - FABRIC

LENGTH SHRINKAGE

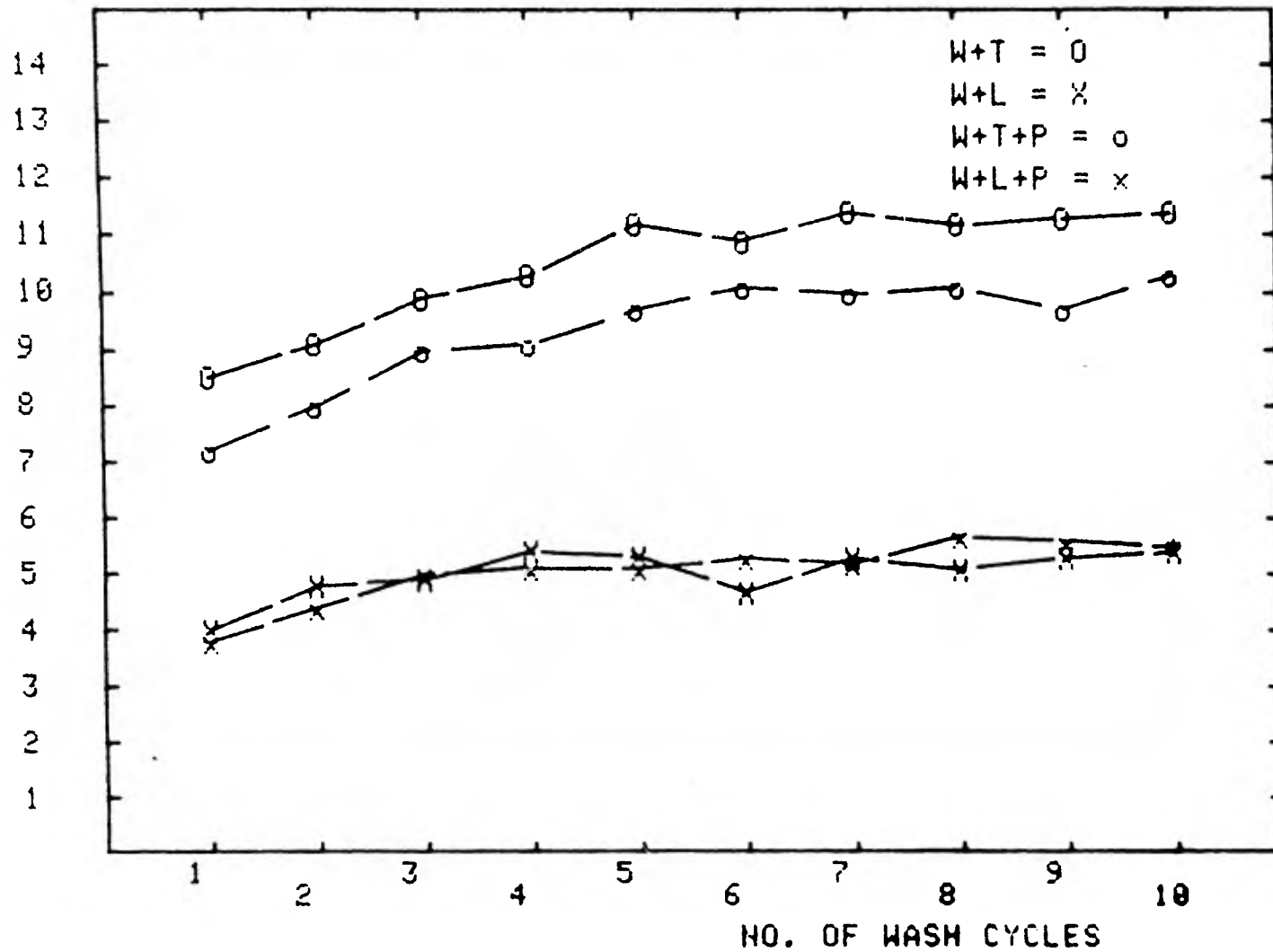


FIGURE 5

STORE GARMENT TRIALS - MEAN WIDTH SHRINKAGE - FABRIC

WIDTH SHRINKAGE

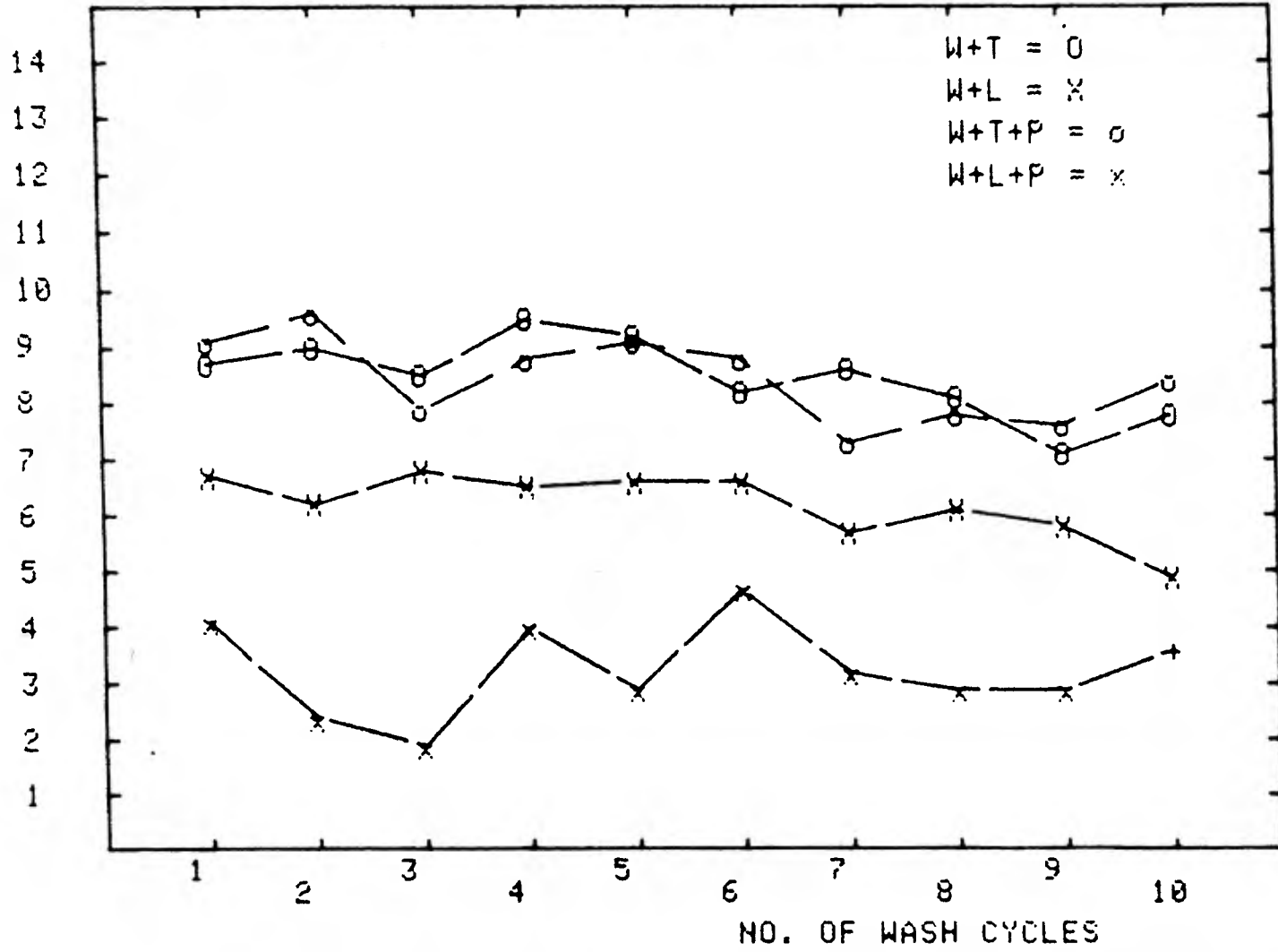


FIGURE 6

STORE GARMENT TRIALS - MEAN GARMENT SHRINKAGE

LENGTH SHRINKAGE

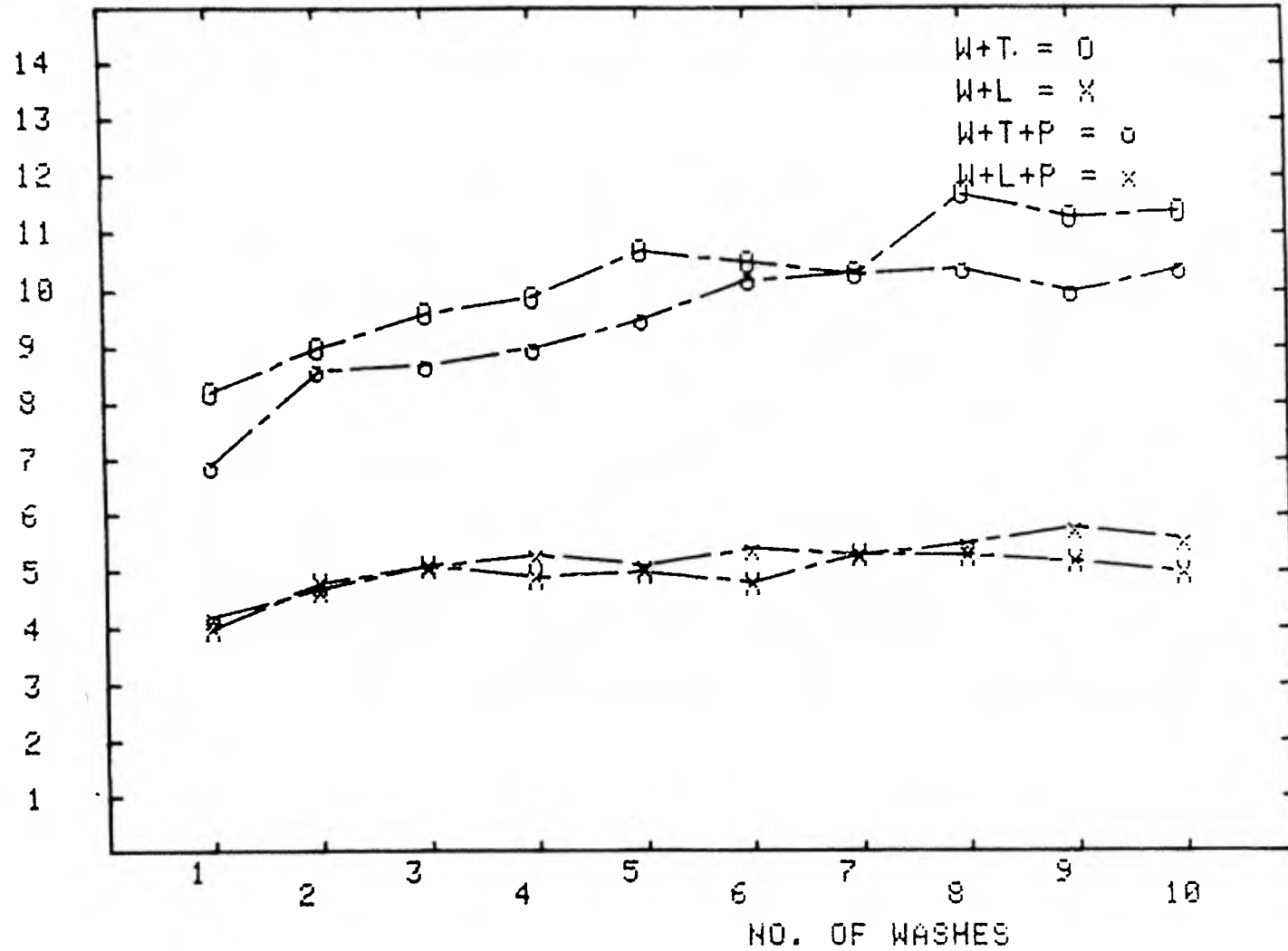


FIGURE 7

STORE GARMENT TRIALS - MEAN GARMENT SHRINKAGE

WIDTH SHRINKAGE

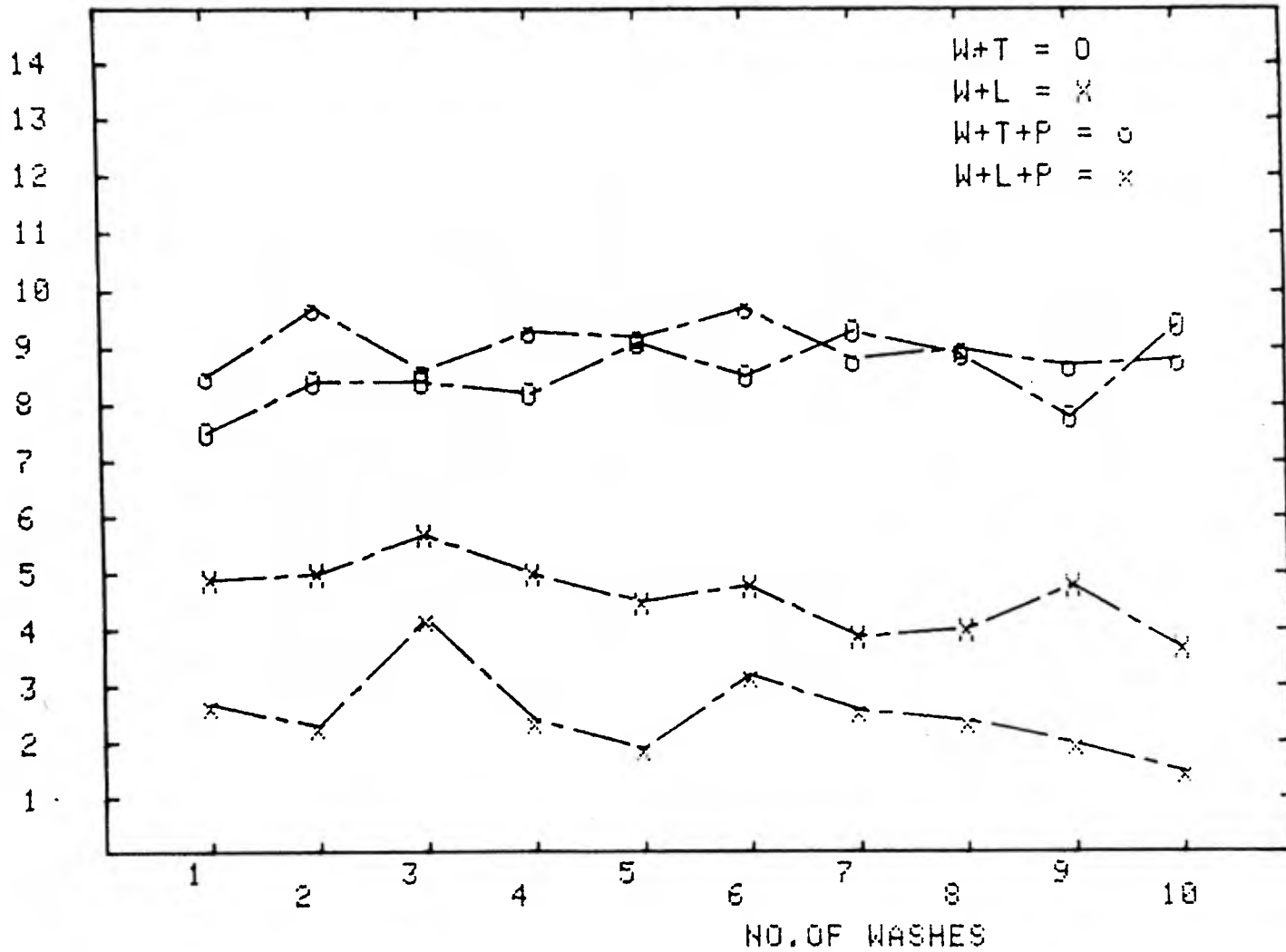


FIGURE 8

AVERAGE LENGTH SHRINKAGE

% SHRINKAGE

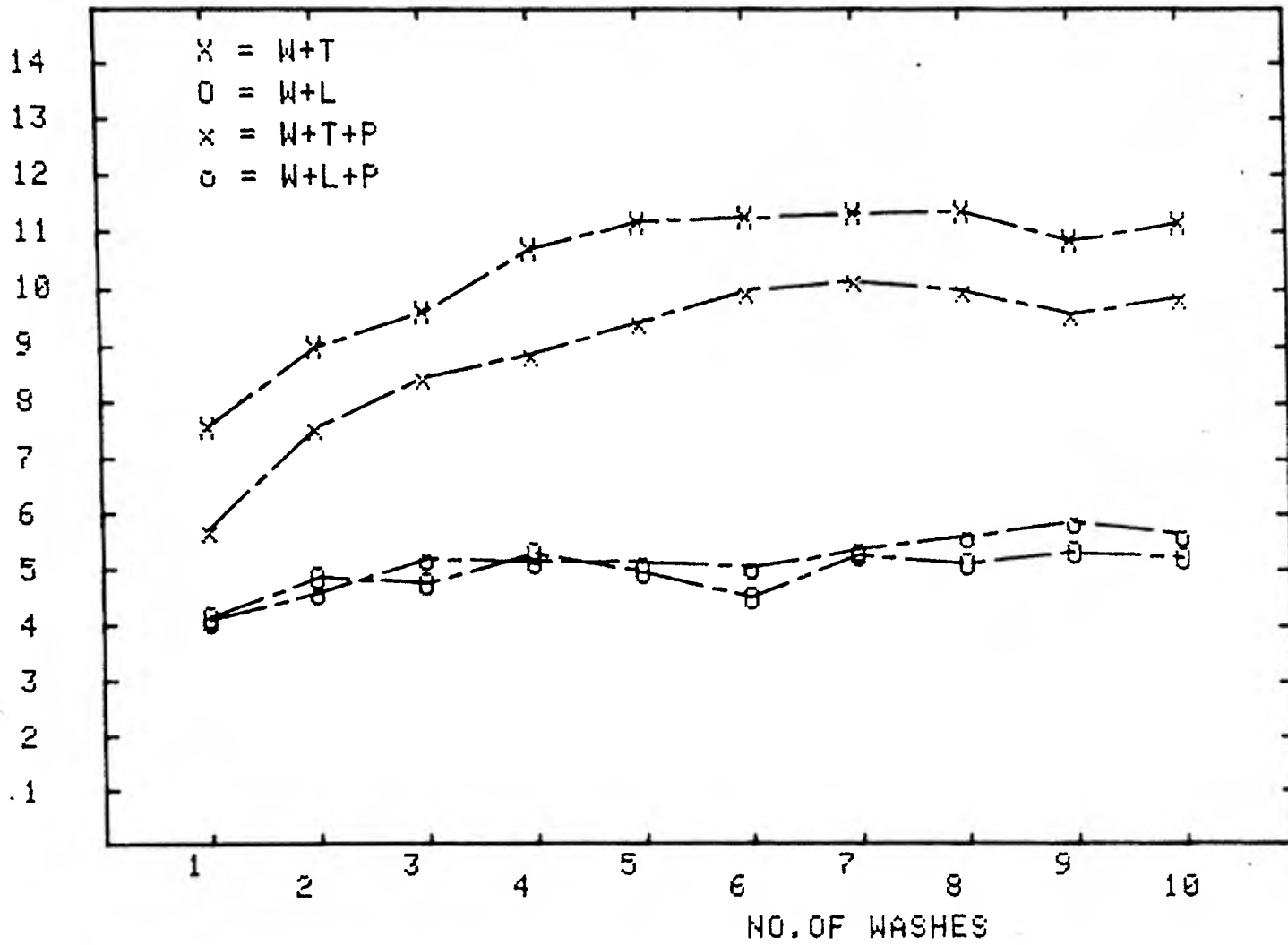


FIGURE 9

AVERAGE WIDTH SHRINKAGE

% SHRINKAGE

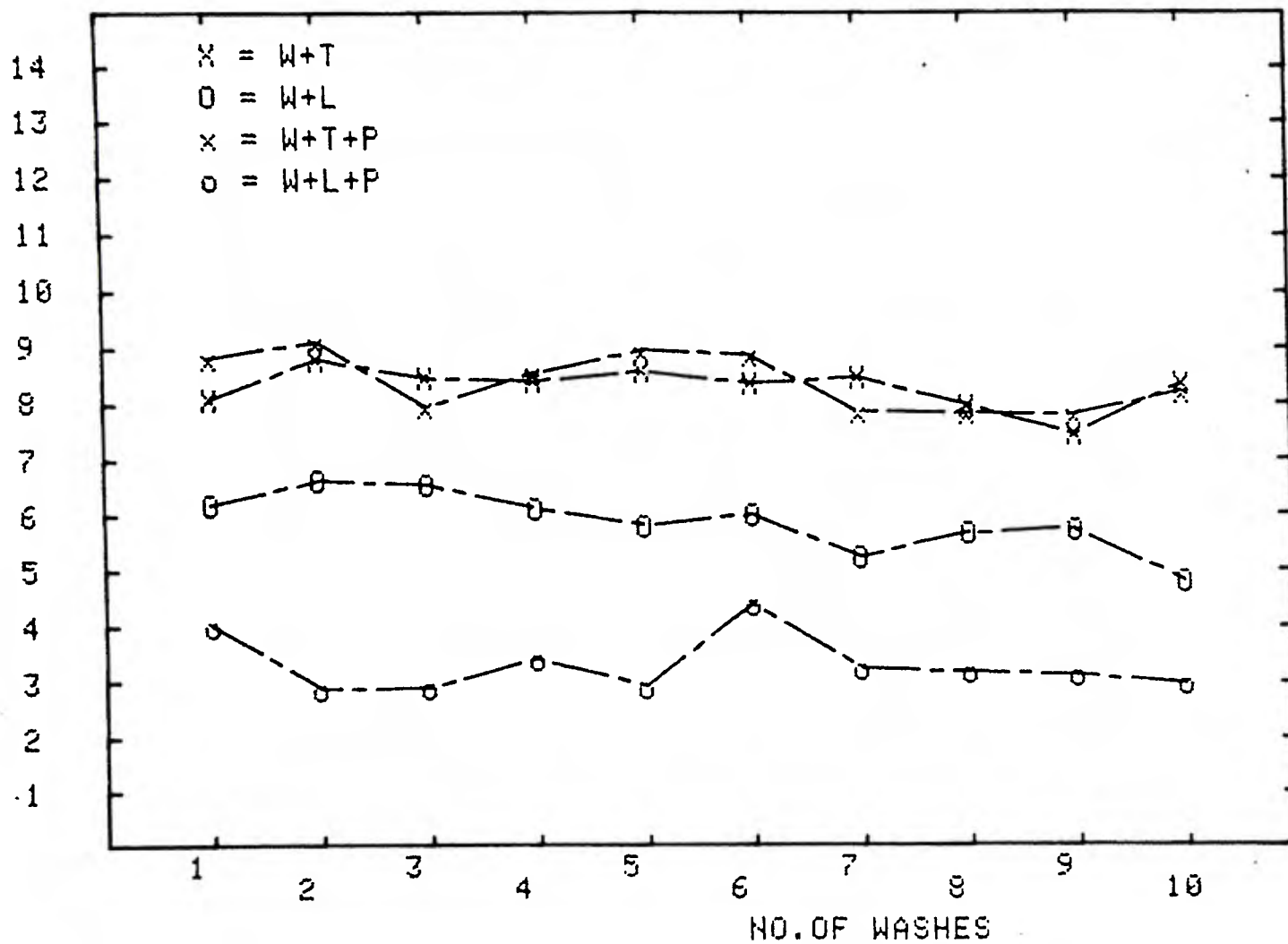


FIGURE 10