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Variability in a Resin Finished Plain Single Jersey Fabric

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Contents

1. Introduction

The IIC STARFISH computer model for predicting the dimensions of finished knitted cotton fabrics contains no equations at present which are suitable for resin finished single jersey fabrics. Since such finishing processes are becoming more popular it is probably desirable to collect the experimental data from which the appropriate equations can be developed.

However, it is not a simple matter to collect the right data for resin finished single jersey for at least two reasons.

a) The level of resin finishing (amount of fixed resin) is known to affect the outcome quite markedly in the case of 1 x 1 rib and interlock so it is assumed that the same will be true for plain single jersey. This means that trials have to be run at several different known levels of resin add-on under very well controlled conditions in order to establish the effect of resin content reliably: i.e. a large number of trials are required (at least 250 pieces of fabric).

b) Plain single jersey cannot be reliably processed on the small scale (10-30 metre lengths) because of handling problems which are caused by varying levels of spirality when the necessary fabric quality changes are made.

Because of these two difficulties it was feared that large scale trials would be prohibitively expensive whereas smaller scale operations would be insufficiently reliable.

In addition, it was feared that the sensitivity of resin finishing to processing conditions (wet pick-up, fabric pH, fabric weight, fabric colour, stenter efficiency, time and temperature of drying/curing) could mean that even a relatively experienced and competent finisher might be unavoidably introducing so much extra variation into the product as to make STARFISH type predictions of limited value.

Therefore it was decided to attempt to determine the amount of product variability which is actually being experienced by a competent manufacturer before deciding whether to embark on a full scale exercise to develop STARFISH equations for resin finished plain single jersey.

The fabric chosen for investigation was a Marks and Spencer quality currently made from 1/30 Ne combed cotton, with a nominal stitch length of 2.72 mm. It is supposed to be finished with about 35-40 g/l of resin and to be delivered with 58 courses by 42 wales per cm at a weight of 140 gsm and shrinkages not exceeding about 5% in both length and width.

2. Summary of Results

1. The greige fabrics sampled in this study were apparently produced to relatively high standards of quality control. The basic variability in yarn count was about 1.6% CV and that in stitch length was 0.9% CV.

2. Most of the variation in stitch length was due to differences between individual knitting machines.

3. The resin finishing process did introduce some extra variation but the finisher has been remarkably successful in containing this additional variation to a very low level.

4. Considering the good levels of quality control which have apparently been achieved in both knitting and finishing, the variation which was found in these samples must represent levels which are practically almost unavoidable (i.e. due to normal random fluctuations in materials, processing and testing) and therefore should present a good guide to the tolerances which can reasonably be imposed by a customer.

5. The actual levels at which tolerances should be set depends upon the evaluation methods used. In the case where only a single sample is monitored, then the test values can not be expected to agree with the specification by closer than plus or minus about two standard deviations. When the production is assessed on the basis of the average of multiple (at least 5) samples taken at random over a period of time, then agreement to within one standard deviation may be expected.

The results of this study allow the following approximate allowances to be deduced, expressed as percentage deviation from specification.

	Courses	Wales	Weight
Single Sample	4.0	2.6	6.6
Multiple Samples	2.0	1.3	3.3

6. The specification which has been laid down for this resin finished quality has been shown to be a fairly reasonable one. However, the customer will have to exercise some latitude in width shrinkage, which is mathematically certain to be somewhat greater than the specified 5% if the fabric is to be delivered at the specified width.

7. Resin finishing significantly changes the average dimensions of the fabric in the relaxed reference state whether compared to the dyed fabric or to the greige. Thus a knowledge of the dyed or the greige reference states will be of little assistance in arriving at finishing targets or product specifications for resin finished goods. As a rough guide, finishing factors have been calculated from the results of this study and were found to be as follows, compared to the greige reference state.

	Courses	Wales	Weight
F =	0.934	0.959	0.889

   In general the effect of resin finishing was to make the relaxed fabric slightly longer and somewhat wider. This change in the reference state is responsible for improved shrinkage performance at a given fabric weight as compared to the un-resinated material.

8. Yarn strength losses caused by the resin finishing averaged about 30% based on the dyed-only material.

9. For these fabrics, the single-cycle tumble drying test for shrinkage does not seriously underestimate the final shrinkage after multiple cycles. The discrepancy is only of the order of one percentage point.

   A single-cycle line drying test underestimates final shrinkage by up to 4 percentage points.

10. Spirality is markedly reduced as a result of the finishing process so that final twisting in the garment is estimated to be only of the order of six degrees. However the bulk of this improvement is brought about by the dyeing process with the resination contributing relatively little.

11. Resin treatment alters the shade of the fabrics in a more or less predictable way, but the extent of the change is small.

12. Free formaldehyde levels were found to average around 450 ppm (Shirley test) but the variation was rather high.

13. With the possible exception of spirality, no differences were found in the performance of the two different resin systems. Based only on the testing done in this study, the two systems seem to be interchangeable.

14. The average bursting strength of the resinated material was about 435 KN/sq.m compared to about 560 in the dyed-only fabric. This represents a strength loss of about 22% but a part of this loss is accounted for by a change in weight per unit area of about 6%. Thus the loss in strength per unit weight was only about 18% (12% after relaxation).

3. Sampling & Testing

All the samples for this study were obtained from Meridian Dyers and Finishers of Nottingham.

Greige fabric	24 samples of greige fabric knitted on 24" and 26" diameter machines to a nominal stitch length of 2.72 mm with 1/30 Ne combed cotton yarns (*Table 1*).

Dyed-only fabric	46 samples of dyed only fabrics in a range of colours (reactive, direct and optical white). All dyed on Thies Softstream (*Table 2*).
Resinated fabric	43 samples of fabrics treated with either Fixapret CPU or Permafresh ULF (*Table 3*) (For resin recipes see *Table 4*).
	40 of these fabric samples had been taken from pieces which had already been sampled in the dyed-only state.

All of the above fabrics were submitted for testing and a complete set of test data is included (*Tables 5 - 22*).

By using the following two equations it is possible to calculate the weight and shrinkage of a fabric and compare the result with that measured in the laboratory. This enables a quick check for "rogue" test data to be made and allows an overall evaluation of the self-consistency of the test data.

Weight Calculation

$$Weight = Courses/cm \cdot Wales/cm \cdot Tex.x\ Stitch\ Length \cdot 0.1$$

Shrinkage Calculation

$$Length\ Shrinkage = [Courses(AW) - Courses(BW)] / Courses(AW)$$

$$Width\ Shrinkage = [Wales(AW) - Wales(BW)] / Wales(AW)$$

The raw data obtained from the above 3 equations can be seen in *Tables 23 - 25* and are summarised below where BW indicates the as-received (before wash) state and AW indicates the relaxed reference state (after 5 cycles including tumble drying).

		Measured Ave.	**Calculated Ave.**	**Difference %**
Greige (24 samples)				
Weight (gsm)	BW	131.3 ± 4.3	126.1 ± 4.5	3.9
	AW	173.4 ± 2.3	169.3 ± 6.5	2.3
Dyed only (46 samples)				
Weight (gsm)	BW	143.6 ± 1 5.5	147.0 ± 4.9	-2.4
	AW	164.1 ± 3.7	167.6± 3.3	-2.1
Shrinkage (%)	Length	4.9 ± 1.5	4.1 ± 1.8	0.8
	Width	8.4 ± 2.8	8.8 ± 2.8	0.4
Resinated (43 samples)				
Weight (gsm)	BW	135.0 ± 4.4	135.6 ± 5.2	-0.5
	AW	154.1 ± 5.0	155.5 ± 6.0	-0.9
Shrinkage (%)	Length	5.3 ± 1.2	5.1 ± 1.4	0.2
	Width	7.6 ± 1.1	8.0 ± 1.2	0.4

On the whole, agreement between measured and calculated values is acceptable, indicating that the testing procedures are under reasonably good control. The largest discrepancies appear in the greige fabric and the smallest in the resinated ones.

4. Variation Within Processing Groups

The means, standard deviations and variation coefficients for all tests averaged over all samples are given in *Tables 26* (greige), *27* (dyed only) and *28* (dyed and finished). In addition, the finished samples are divided into those which were finished with Fixapret CPU (*Table 29*) and those which were finished with Permafresh ULF (*Table 30*).

The average yarn count in the greige fabric was found to be 19.25 tex with a standard deviation of 0.31 and a coefficient of variation of 1.62%. This compares reasonably well with the nominal count of 19.7 tex (30 Ne). The reason for the relatively low variation coefficient is that only a single yarn supplier has been used. These data are shown graphically in *Figure 1*.

The average stitch length found in the greige fabric was 2.70 mm with a standard deviation of 0.024 and a variation coefficient of 0.9%. Most of the variation was caused by differences between machines and especially by variation in machine No. 10 which appears to have been set up slightly long at the beginning of the trial (2.73 mm) and reset somewhat short towards the end (2.66 mm). The other three machines did not vary by more than about 0.02 mm throughout the trial. In spite of the extra variation introduced by machine No. 10, the overall level of variation in stitch length is low indicating careful control over the production.

The summary statistics for the most important dimensional properties in the relaxed reference state have been extracted from *Tables 26 to 30* and are given below.

	Mean	**s.d.**	**CV%**
Greige (AW) - 24 samples			
Courses	64.7	1.20	1.9
Wales	46.8	1.40	3.0
Weight	173.4	2.3	1.3
Tex	18.9	0.36	1.9
Stitch length	2.66	0.032	1.2
Yarn strength	235.5	14.4	6.1
Dyed only (AW) - 46 samples			
Courses	61.6	0.7	1.1
Wales	48.4	0.58	1.2
Weight	164.0	3.70	2.3
Tex	19.0	0.36	1.9
Stitch length	2.66	0.013	0.5
Yarn strength	292.3	30.9	10.6

Resinated (AW) - 43 samples

Courses	60.4	0.87	1.4
Wales	44.9	0.57	1.3
Weight	154.1	5.0	3.2
Tex	19.3	0.53	2.8
Stitch length	2.67	0.02	0.9
Yarn strength	200.1	13.7	6.8
Nitrogen (fixed)	0.31	0.12	38.3

Resin 1 (Fixapret CPU) 18 samples

Courses	60.3	0.85	1.4
Wales	44.7	0.46	1.2
Weight	151.5	3.6	2.4
Tex	19.2	0.38	2.0
Stitch length	2.66	0.017	0.62
Yarn strength	191.3	10.1	5.3
Nitrogen (fixed)	0.30	0.07	23.1

Resin 2 (Permafresh ULF) 25 samples

Courses	60.5	0.90	1.5
Wales	45.1	0.55	1.2
Weight	155.9	5.0	3.2
Tex	19.4	0.61	3.1
Stitch length	2.68	0.03	0.9
Yarn strength	206.4	12.5	6.0
Nitrogen (fixed)	0.32	0.15	46.0

The levels of variation found in the reference state give an indication of:-

a) The amount of variations in measured weight and shrinkage to be expected between different pieces of fabric all finished to the same width and courses.

b) The accuracy with which tests on an individual sample or group of samples can be predicted by the STARFISH model. An individual sample may return test values anywhere within 2 standard deviations of the predicted values (which are predictions of the mean). The average of tests on 5 or more different pieces will lie anywhere within ±1 standard deviation.

Looking at the variation coefficients for these relaxed dimensions we may conclude as follows.

1. Although the variation in relaxed courses, wales and weight is greater for the resinated samples than for the dyed-only ones, the differences are quite small so that the resination process itself is not introducing much additional variation. There is nothing to choose in this respect between the two different resin systems.

2. The average levels of relaxed courses, wales and weight are significantly different as a result of resin finishing.

   Courses change from 61.6 to 60.4 per 3cm. Wales change from 48.4 to 44.9 per 3cm. Weight changes from 164 to 154 gsm

3. These changes in relaxed dimensions mean that, if resinated and unresinated samples were to be finished to the same width and courses then, on the average, length shrinkage would be slightly less and width shrinkage would be markedly less in the resin finished goods.

   For example the average courses and wales in the resinated fabrics as delivered were 57.3 and 41.3 per 3cm respectively, from which the average shrinkages (5WTD) can be calculated as 5.1% in length and 8.0% in width. Actual measured values were 5.3% and 7.6% (*Table 28*). If unresinated fabric were to be finished to the same courses and wales (i.e. roughly the same weight per unit area) then the calculated average shrinkages would be 7% in length and 14.7% in width.

4. The customer specification laid down for this resinated fabric is 58 courses by 42 wales with a weight of 140 gsm, and shrinkages of about 5% by 5%. The validity of this specification can be checked by starting from the relaxed reference dimensions and scaling up according to a) the required courses and wales, or b) according to the required weight and width, or c) according to the required shrinkages. Thus for example, using method a)

Ref. Courses /3cm =	60.4
Spec. Courses /3cm =	58
Therefore, length shrinkage =	3.9%
Ref. Wales /3cm =	44.9
Spec. Wales /3cm =	42
Therefore width shrinkage =	6.5%
Ref. Weight, gsm =	154
Shrinkage =	3.9 x 6.5
Therefore finished weight =	138.4 gsm

   Thus the specification is not absolutely correct but is certainly very close, maybe as close as is practicable.

5. Since the knitting production has been shown to be under good control (as judged by the variation in yarn count and stitch length), the variations in the finished relaxed reference dimensions can be used to arrive at reasonable tolerances for the customer's specification. The coefficients of variation for the courses, wales and weight in the relaxed, resinated fabrics were found to be 1.4%, 1.3%, and 3.2% respectively.

   Therefore without any allowance whatsoever for variations in the as-delivered courses and wales (an impossible situation in practice) both manufacturer and customer must accept that measurements from any one individual piece may lie anywhere within ± 2 times the CV; i.e. ± 2.8% for courses, ± 2.6% for wales, and ± 6.4% for weight.

When some allowance is made for inevitable variations in finishing these tolerances will naturally need to be set higher.

6. In fact the finisher appears to have done a remarkably good job in containing these extra variations since the variation coefficients for courses, wales and weight in the as delivered state are only 2.0%, 1.3%, and 3.3% respectively. The actual measured values of courses, wales and weight are charted in *Figures 3, 4, and 5* compared to the specific targets and typical tolerances.

   It should perhaps be noted that larger variations (especially in the weight) would almost certainly have been found if this manufacturer had been receiving yarn from more than one spinner or if samples of the same nominal quality had been taken from more than one manufacturer.

5. Yarn Strength

The average loss in strength caused by the resin finish was about 30% based on the dyed-only fabrics, or 15% based on the greige, and this is analysed further in the table below.

	Dyed only	**Resin 1**	**Difference**	**Resin 2**	**Difference**
	g	**g**	**%**	**g**	**%**
Reactive					
BW	261.6	193.7	26	200.9	23
AW	268.6	193.0	28	206.5	23
Direct					
BW	308.3	192.2	38	198.8	35
AW	308.1	193.1	37	208.0	32
Optical White					
BW	294.6	184.8	37	190.1	35
AW	310.6	188.6	39	199.7	36

There are no significant differences between the two different resin systems but there was a significant difference in strength loss between fabrics dyed with reactive dyes and fabrics that were either optical white or direct dyed. However, this difference is only due to the fact that fabrics which were reactive dyed were actually weaker before resin finishing - the final strength is about the same for all classes after resination.

6. Finishing Factors

	Average Relaxed Reference Dimensions		
	Courses /3cm	**Wales /3cm**	**Weight gsm**
Greige	64.72	46.83	173.4
Dyed Only	61.56	48.39	164.0
Resin Treated	60.42	44.92	154.1
Fixapret CPU	60.3	44.7	151.5
Permafresh ULF	60.5	45.1	155.9

These data confirm that measurements made on relaxed greige fabrics are in themselves of little value in predicting the final finished dimensions. However, it has been proposed that in the absence of more comprehensive data, if a new single jersey fabric is to be made (i.e. with a different yarn count and stitch length) for resin finishing with a similar finishing recipe, then the so-called finishing factors (F factors) may be helpful and there is a limited amount of experimental evidence to support this proposition.

The F factors are arrived at by calculating the ratios of finished relaxed courses, wales and weight to those of the grey relaxed fabrics. Thus for the present study the F factors are as follows:

	Dyed	**Resinated**
courses	0.951	0.934
wales	1.033	0.959
weight	0.946	0.889

Thus, when a new quality is produced it is only necessary to carry out the reference relaxation procedure upon (several samples of) the greige fabric and to multiply the average measured courses, wales and weight by the appropriate finishing factors in order to arrive at a rough prediction for the average dyed and/or resin finished reference state. Once the finished reference state is known, then a preliminary specification and finishing targets can easily be deduced by scaling up to the as-delivered dimensions.

7. Shrinkages

Comparisons were made of the shrinkage values which were returned after 1 wash and line drying, or 1 wash and tumble drying, or the standard reference relaxation procedure (5 cycles with tumble drying). Plots of all the data are given for the resin finished samples in *Figures 6, 7 and 8*. In *Figures 9 and 10* the results of the single-cycle tests are compared to those after 5 cycles with tumble drying. The table below summarises the averages from the different test methods.

	1WLD (a)		**1WTD (b)**		**5CTD (c)**		**Difference**	
	mean	**s.d.**	**mean**	**s.d.**	**mean**	**s.d.**	**(b-a)**	**(c-b)**
Length								
Dyed	0.8	1.6	3.8	1.5	4.9	2.8	3.0	1.1
Resin 1	2.5	1.4	4.7	1.3	5.2	1.0	2.2	0.5
Resin 2	2.4	1.0	4.9	1.1	5.4	1.4	2.5	0.5
All resin	2.5	1.2	4.8	1.2	5.3	1.1	2.3	0.5
Width								
Dyed	6.6	2.7	7.9	2.7	8.4	2.8	1.3	0.5
Resin 1	5.7	1.2	6.8	1.1	7.3	1.1	1.1	0.5
Resin 2	6.3	0.9	7.4	1.0	7.9	1.1	1.1	0.5
All resin	6.1	1.1	7.2	1.2	7.6	1.1	1.1	0.4

From these data we can deduce that, for the fabrics on average, the single-cycle line dry test may be underestimating final shrinkage at the consumer level by 3 to 4 percentage points in the length and 1.5 to 2 points in the width. The single cycle tumble dry test underestimates by only 0.5 to 1 percentage point in both length and width.

The shrinkages specified by the customer (5 x 5 after one tumble dry cycle) have been met with reasonable consistency in the length (the most important direction) but have been generally overshot in the width

(which is presumably less critical). In any case, reference back to the discussion of the specification in *Section 4.4.* will show that, if the finisher provides the specified width, then the specified width shrinkage is bound to be exceeded.

Here again, there was no significant difference in the performance of the two different resin systems.

8. Effect of Processing on Spirality

Spirality is defined as the angle, in degrees, between the wales and a line drawn perpendicular to the courses. It is always present in plain jersey fabrics made from singles yarns and although the fabric may be temporarily straightened by the finisher, the garment will always tend to return to the relaxed, spiralled state after laundering. Thus the spirality before washing (BW) is a measure of the success of the finisher in presenting a straight fabric to the maker up, but the increase in spiral angle in the reference state (AW) is an indication of how much the garment will twist in use.

A twisting effect of about 5 degrees has been said to be acceptable and it has been claimed that resin finishing will reduced the spiral angle in the relaxed state.

The table below summarises the measurements which have been made on these fabrics, and the individual results are charted in *Figure 11*.

Spiral Angle (degrees)

	As Received		**Relaxed**		**Twisting**
	Mean (a)	**s.d.**	**Mean (b)**	**s.d.**	**(b-a)**
Greige	10.2	3.4	15.3	4.8	5.1
Dyed	3.3	2.4	8.8	1.7	5.9
Resinated	2.5	1.3	8.4	1.7	5.9
Fixapret	2.0	0.9	7.2	1.1	5.2
Permafresh	2.9	1.4	9.3	1.5	6.4

From these results it appears that the finisher has been rather successful in presenting a straight fabric since the spiral angle in the finished fabrics averages only 2.5 degrees with a standard deviation of only 1.3. Relaxation causes the spiral angle to increase to an average of 8.4 degrees i.e. there is a twisting effect of about 6 degrees. Processing has had a clear influence upon spirality since the value in the greige was over 15 degrees. However, most of this improvement was already apparent after dyeing with only an insignificant further reduction as a result of the resin treatment. There is an indication that the Permafresh resin system was slightly less effective than the Fixapret but the difference is very small and might not be borne out by closer investigation.

The pattern of results in the greige fabrics is rather interesting since it implies that there are at least two and maybe three populations of samples, one with an average spiral angle of about 19 degrees, one at about 14 degrees, and one at about 6 degrees! It is interesting to speculate on the sources of these differences in the greige, and whether they are responsible for any of the variations found within dyed and within resinated samples. A further trial with a different design would be necessary to discover the source of these differences and to see whether any practical use could be made of them. Inspection of *Tables 5 to 7* shows that differences can not be attributed to differences in yarn twist levels.

9. Change in Shade

From the red, green and blue measurements made in the laboratory the standard parameters L, A, B, C, X, Y, and Z have been calculated and are listed in *Tables 31 and 32* for reference purposes only, since no analysis has been attempted for this report.

In addition, however the colour difference, δE, between corresponding dyed and resinated pieces has been calculated and these values are given in the last data column of *Table 32*. For those colours where more than one sample was available, the δE values have been grouped according to colour and averaged.

The individual values are charted in *Figures 12 and 13* and are summarised below.

		δE	
	N	**Mean**	**s.d.**
Yellow (y)	12	0.9408	0.6271
Navy (n)	11	0.8927	0.3053
White (w)	9	1.0044	0.4299
Grey (g)	2	0.6	-
Pink (p)	2	0.685	-

It can be seen from the above table that the changes in shade are relatively small and they seem to be randomly scattered over the different colours and dyestuff classes.

10. Free Formaldehyde Content

The Permafresh ULF resin is supposed to be a low formaldehyde product so it was considered useful to compare the two resin systems from this point of view. Free formaldehyde was measured by the Shirley Institute method using aqueous extraction.

In addition, the nitrogen content was measured as received and after washing since obviously the amount of free formaldehyde will be related to the total amount of resin and to the efficiency of fixation. Total and fixed nitrogen contents were measured by the Kjeldahl method.

Individual results are charted in *Figures 14, 15, and 16*. Averaging these data over resin systems yields the following table.

	Fixapret CPU		**Permafresh ULF**	
	Mean	**s.d.**	**Mean**	**s.d.**
Formaldehyde, ppm	409.4	131.8	471.4	189.9
Total N, %	0.36	0.10	0.35	0.16
Fixed N, %	0.30	0.08	0.32	0.15

There is no significant difference between the free formaldehyde contents for the two resin systems and certainly no indication that the Permafresh type is superior.

However, the nitrogen contents can not be taken at face value since inspection of *Table 33* will show that some of the measured total nitrogen contents are more than double the amount to be expected from a 35 g/l bath of Fixapret CPU or a 40 g/1 bath of Permafresh ULF.

Obviously, the dyestuff is contributing to the nitrogen content and this effect is illustrated in *Figures 17 and 18*. Obviously the higher nitrogen contents are associated with the deeper shades and the reactive dyes.

Some supplementary measurements on a few of the dyed-only samples yielded nitrogen contents of from 0.04% for whites up to 0.6% for a navy.

Because of the confounding effect of the dyestuff - and presumably also of other impregnation bath components - it is not possible to deduce the reproducibility of the resin application and fixation from nitrogen contents without a much more comprehensive testing regime.

11. Bursting Strength

Bursting strength was measured on the Heals model 111 tester with a diaphragm of 3 cm diameter. The units of measurement are KN/sq.m. The individual data are charted in *Figure 19* and are summarised in *Table 34*.

As in the case of the yarn strength (*Section 5*), we see that reactive-dyed materials tend to be slightly weaker in the dyed-only state but slightly stronger after resin finishing. Although these differences are not statistically significant, they are consistent and they result in a lower calculated % strength loss for the reactive dyed fabrics.

Strength loss as a result of resin finishing (compared to the dyed-only fabrics) averages about 22% in the as-delivered state and 18% after the reference relaxation procedure. This is lower than the 30% loss found in the yarns. Moreover, a significant portion of this loss in burst strength is due to the change in weight per unit area (averaging about 6%) caused by the resin finish. *Figure 20* shows a plot of burst strength against weight where the trend of increased strength for increased weight can be seen. Thus, to isolate the influence of the resin finish we can calculate the strength/weight ratio. Averaged over all colours this ratio works out at 3.9 for the dyed-only fabrics and 3.2 for the resin finished ones respectively in the as-received state. After relaxation the corresponding figures are 3.4 and 3.0.

The loss in strength/weight ratio as a result of resin finishing is thus only about 18% as received or 12% after relaxation.

If the original fabric were to be reconstructed so that the weight per unit area after resin finishing was similar to that of the present fabric without resin, then the strength of the new resin finished material could be expected to be somewhat higher. For example, considering the reference state data, if the reference weight after resin finishing were to be 165 gsm instead of 154, then the bursting strength would be about 165 x 3.0 = 495 KN/sq.m. (instead of 458).

Since, in general, the resin finished fabrics have been delivered at weights slightly below the specified 140 gsm, there may be some scope for improving the burst strength by increasing the reference weight.

The table also records the coefficients of variation in strength and in weight for the three dyestuff classes. Note that resin finishing results in a pronounced increase in the variation of strength but little or no change in the variation of weight. *Figures 21, 22, and 23* show that this extra variability is not due to the different dyestuff classes nor to the different colours or depths of shade. It must presumably therefore be attributed to variability in the resin finish itself either as variations in resin add-on or in the degree of cure (time, temperature, pick-up, catalyst, stenter efficiency). However, even with this extra variation, the variation coefficients are not excessively high for resin finished materials.

In general, the fabrics which were finished with the Permafresh resin system show slightly higher bursting strengths and slightly heavier weights than the Fixapret series.

Although these differences are not statistically significant they are consistent over all colour classes both as-received and relaxed. Most, but not quite all, of the difference in strength is accounted for by the difference in weight which suggests that the Fixapret system is slightly more efficient in curing the applied resin.

Table 1

Meridian 28 gauge Single Jersey (ESBI H1034)

Greige - Caleb Wright (1/30's Combed Cotton L.W.)

No.	Piece No.	Machine No.	Knitting Date	M/c Dia.
1	DE3034/5	10	08/02/84	26"
2	DE3034/2	10	08/02/84	26"
3	DE5006/4	118	09/01/84	24"
4	DE5006/6	118	10/01/84	24"
5	DE5005/10	117	10/01/84	24"
6	DE5005/8	117	10/01/84	24"
7	DE5011/2	118	24/01/84	24"
8	DE5011/3	118	24/01/84	24"
9	DE5022/1	82	24/02/84	26"
10	DE5022/2	82	24/02/84	26"
11	DE5034/6	82	29/02/84	26"
12	DE5034/2	82	01/03/84	26"
13	DE5009/1	118	18/01/84	24"
14	DE5009/2	118	17/01/84	24"
15	DE5027	82	28/02/84	26"
16	DE5027/2	82	28/02/84	26"
17	DE3019/2	10	24/01/84	26"
18	DE3019/1	10	25/01/84	26"
19	DE3027/10	10	02/02/84	26"
20	DE5018/2	82	21/02/84	26"
21	DE3017/3	10	24/01/84	26"
22	DE3020	10	25/01/84	26"
23	DE5010	117	17/01/84	24"
24	DE5037	10	13/02/84	26"

Table 2

Meridian 28 gauge Single Jersey (ESBI H1034)

Dyed - Thies Softstream(Jet)

No.	Pc. No.	Fabric Type	Colour	Dye Type
1	3006	Coronation Street	Navy 10242	Reactive Dye
2	3008	Coronation Street	Yellow	Direct Dye
3	3010	Coronation Street	White	Optical White(OBA)
4	3011	Coronation Street	White	Optical White(OBA)
5	3014	Coronation Street	Yellow	Direct Dye
6	3025	Coronation Street	Blue	Reactive Dye
7	3030	Coronation Street	Yellow	Direct Dye
8	5005	Coronation Street	White	Optical White(OBA)
9	5006	Coronation Street	Blue	Reactive Dye
10	5036	Worksop	Pink 10823	Reactive Dye
11	5038	Worksop	Pink	Reactive Dye
12	5076	Worksop	Black 8507	Reactive Dye
13	5110	Worksop	White	Optical White(OBA)
14	5112	Worksop	White	Optical White(OBA)
15	5114	Worksop	White	Optical White(OBA)
16	5293	Heanor	Red 4293A	Reactive Dye
17	5300	Heanor	White	Optical White(OBA)
18	5306	Heanor	Yellow	Direct Dye
19	5316	Heanor	Yellow H1034	Direct Dye
20	5330	Heanor	Grey	Direct Dye
21	5332	Heanor	Yellow	Direct Dye
22	5336	Heanor	Navy 40046	Indosol Direct
23	5340	Heanor	White	Optical White(OBA)
24	5343	Heanor	Grey	Direct Dye
25	5344	Heanor	White	Optical White(OBA)
26	5349	Heanor	Navy H1034	Reactive Dye
27	5358	Heanor	Navy H1034	Reactive Dye
28	5360	Heanor	Navy 40046	Reactive Dye
29	5362	Heanor	Yellow H1034	Direct Dye
30	5367	Heanor	Yellow	Direct Dye
31	5381	Heanor	Navy	Reactive Dye
32	5385	Heanor	Yellow	Direct Dye
33	5416	Heanor	Yellow	Direct Dye
34	5418	Heanor	Navy	Reactive Dye
35	5420	Heanor	Navy	Reactive Dye
36	5426	Heanor	Navy	Reactive Dye
37	5428	Heanor	Navy	Reactive Dye
38	5430	Heanor	Yellow	Direct Dye
39	5432	Heanor	Yellow	Direct Dye
40	5441	Heanor	Navy	Reactive Dye
41	5074	Worksop	Black 8507	Reactive Dye
42	5118	Worksop	White	Optical White(OBA)
43	5102	Heanor	Navy 40046A	Indosol Direct
44	5315	Heanor	Navy	Indosol Direct (spec)
45	5370	Heanor	Navy 40046	Reactive Dye
46	5375	Heanor	Navy 40046	Reactive Dye

Table 3

Meridian 28 gauge Single Jersey (ESBI H1034)

Resinated

No.	Pc.No.	Fabric Type	Colour	Dye Type	Resin Type
1	3006	Coronation Street	Navy 10242	Reactive Dye	Fixapret CPU
2	3008	Coronation Street	Yellow	Direct Dye	Fixapret CPU
3	3010	Coronation Street	White	Optical White(OBA)	Fixapret CPU
4	3011	Coronation Street	White	Optical White(OBA)	Fixapret CPU
5	3014	Coronation Street	Yellow	Direct Dye	Fixapret CPU
6	3025	Coronation Street	Blue	Reactive Dye	Fixapret CPU
7	3030	Coronation Street	Yellow	Direct Dye	Fixapret CPU
8	5005	Coronation Street	White	Optical White(OBA)	Fixapret CPU
9	5006	Coronation Street	Blue	Reactive Dye	Fixapret CPU
10	5036	Worksop	Pink 10823	Reactive Dye	Fixapret CPU
11	5038	Worksop	Pink	Reactive Dye	Fixapret CPU
12	5076	Worksop	Black 8507	Reactive Dye	Fixapret CPU
13	5110	Worksop	White	Optical White(OBA)	Fixapret CPU
14	5112	Worksop	White	Optical White(OBA)	Fixapret CPU
15	5114	Worksop	White	Optical White(OBA)	Fixapret CPU
16	5293	Heanor	Red 4293A	Reactive Dye	Permafresh ULF
17	5300	Heanor	White	Optical White(OBA)	Permafresh ULF
18	5306	Heanor	Yellow	Direct Dye	Permafresh ULF
19	5316	Heanor	Yellow H1034	Direct Dye	Permafresh ULF
20	5330	Heanor	Grey	Direct Dye	Permafresh ULF
21	5332	Heanor	Yellow	Direct Dye	Permafresh ULF
22	5336	Heanor	Navy 40046	Indosol Direct	Permafresh ULF
23	5340	Heanor	White	Optical White(OBA)	Permafresh ULF
24	5343	Heanor	Grey	Direct Dye	Permafresh ULF
25	5344	Heanor	White	Optical White(OBA)	Permafresh ULF
26	5349	Heanor	Navy H1034	Reactive Dye	Permafresh ULF
27	5358	Heanor	Navy H1034	Reactive Dye	Permafresh ULF
28	5360	Heanor	Navy 40046	Reactive Dye	Permafresh ULF
29	5362	Heanor	Yellow H1034	Direct Dye	Permafresh ULF
30	5367	Heanor	Yellow	Direct Dye	Permafresh ULF
31	5381	Heanor	Navy	Reactive Dye	Permafresh ULF
32	5385	Heanor	Yellow	Direct Dye	Permafresh ULF
33	5416	Heanor	Yellow	Direct Dye	Permafresh ULF
34	5418	Heanor	Navy	Reactive Dye	Permafresh ULF
35	5420	Heanor	Navy	Reactive Dye	Permafresh ULF
36	5426	Heanor	Navy	Reactive Dye	Permafresh ULF
37	5428	Heanor	Navy	Reactive Dye	Permafresh ULF
38	5430	Heanor	Yellow	Direct Dye	Permafresh ULF
39	5432	Heanor	Yellow	Direct Dye	Permafresh ULF
40	5441	Heanor	Navy	Reactive Dye	Permafresh ULF
41	3009	Coronation Street	Yellow	Direct Dye	Fixapret Cpu
42	3031	Coronation Street	Yellow	Direct Dye	Fixapret Cpu
43	5108	Worksop	White	Optical White(OBA)	Fixapret CPU

Table 4

MERIDIAN SINGLE JERSEY PROJECT

Finishing Recipes

Recipe 1 - Samples collected up to but excluding 26 April 1984

35g/l	Fixapret CPU (BASF)
20g/l	Perapret PE40 (BASF)
8g/l	Perapret SF (BASF)
25g/l	Dicrylan WK (Ciba-Geigy)
1.8g/l	Catalyst AP (Ciba-Geigy)
0.8g/l	Acetic acid
9g/l	Phobotone WS (Ciba-Geigy)
1g/l	Tinovetin JU (Ciba-Geigy)

plus either

3.5g/l	magnesium chloride hexahydrate
0.4g/l	ammonium chloride

or

10g/l	Catalyst HOE 3282 (Hoechst)

Fabric from Meridian's Worksop and Coronation Street factories will probably continue to be treated with this recipe.

Recipe 2 - Most samples collected on and after 26 April 1984

40g/l	Permafresh ULF (Warwick)
10g/l	Catalyst HOE 3282 (Hoechst)
7.5g/l	Dicrylan WK (Ciba-Geigy)
3g/l	Phobotone WS (Ciba-Geigy)
1.5g/l	Catalyst AP (Ciba-Geigy)
7.5g/l	Perapret PE40 (BASF)
30g/l	Sandolube NV (Sandoz)

Table 5

MERIDIAN SINGLE JERSEY CASE STUDY

GREIGE FABRICS ESBI-H1034

		Sample Identification						
	Test Method	1	2	3	4	5	6	7
1	Length shrinkage, LD							
2	Width shrinkage, LD							
3	Length shrinkage, TD							
4	Width shrinkage, TD							
5	Length shrinkage, 5x							
6	Width shrinkage, 5x							
7	Weight (gsm)BW	121.86	122.07	129.51	128.55	132.01	130.83	134.11
8	Weight (gsm)AW	169.00	169.38	173.24	175.53	175.94	173.68	174.12
9	Courses per 3cm BW	58.30	56.20	59.40	59.10	60.90	57.80	63.10
10	Courses per 3cm LD							
11	Courses per 3cm TD							
12	Courses per 3cm AW	65.10	64.80	66.10	66.10	65.70	64.60	65.80
13	Wales per 3cm BW	36.30	37.10	37.50	37.50	37.10	38.80	37.10
14	Wales per 3cm LD							
15	Wales per 3cm TD							
16	Wales per 3cm AW	47.50	47.50	47.90	48.10	47.80	48.00	48.10
17	Stitch length (mm) BW	2.73	2.74	2.70	2.69	2.70	2.72	2.70
18	Stitch length (mm) AW	2.70	2.72	2.66	2.65	2.67	2.68	2.67
19	Burst strength, BW	615.60	586.40	611.10	611.30	609.50	592.50	607.30
20	Burst strength, AW	591.70	594.90	603.20	586.20	593.90	597.00	614.90
21	Distension at burst, BW	17.07	16.21	17.92	17.74	17.93	17.08	18.11
22	Distension at burst, AW	20.08	20.54	20.93	20.46	20.73	20.30	20.78
23	Angle of spirality, BW	11.23	11.34	11.09	10.10	11.45	10.96	11.32
24	Angle of spirality, AW	20.31	20.98	17.25	16.84	17.49	18.93	18.32
25	Width, BW							
26	Yarn strength, BW	255.95	254.61	261.97	258.27	265.31	255.57	256.43
27	Yarn strength, AW	244.93	240.85	243.01	246.44	250.56	258.16	239.87
28	Yarn extension at break, BW	6.93	6.56	7.00	6.92	7.01	6.85	6.84
29	Yarn extension at break, AW	7.40	7.07	7.19	7.17	7.61	8.25	7.37
30	Yarn count (tex), BW	19.18	19.17	19.30	19.43	18.95	18.90	19.01
31	Yarn count (tex), AW	18.97	18.61	18.83	18.82	18.79	19.08	18.97
32	Thickness, BW	592.90	592.80	601.60	596.90	606.30	591.00	628.90
33	Thickness, AW	772.70	777.20	767.50	767.80	752.90	777.60	781.80
34	Turns per metre	149.60	151.30	155.70	148.60	154.20	159.30	159.90

Table 6

MERIDIAN SINGLE JERSEY CASE STUDY

GREIGE FABRICS ESBI-H1034

		Sample Identification						
	Test Method	8	9	10	11	12	13	14
1	Length shrinkage, LD							
2	Width shrinkage, LD							
3	Length shrinkage, TD							
4	Width shrinkage, TD							
5	Length shrinkage, 5x							
6	Width shrinkage, 5x							
7	Weight (gsm)BW	135.50	134.24	135.48	133.93	131.93	135.77	132.82
8	Weight (gsm)AW	174.40	173.71	172.71	170.53	172.06	172.24	173.31
9	Courses per 3cm BW	60.70	61.40	61.00	61.10	61.30	58.30	54.71
10	Courses per 3cm LD							
11	Courses per 3cm TD							
12	Courses per 3cm AW	65.50	65.90	64.70	64.80	65.50	63.40	63.70
13	Wales per 3cm BW	37.80	37.00	37.40	36.60	36.80	37.10	36.40
14	Wales per 3cm LD							
15	Wales per 3cm TD							
16	Wales per 3cm AW	48.30	48.10	48.10	47.90	47.70	44.00	44.80
17	Stitch length (mm) BW	2.70	2.71	2.70	2.71	2.71	2.69	2.68
18	Stitch length (mm) AW	2.66	2.68	2.67	2.67	2.67	2.65	2.65
19	Burst strength, BW	609.70	632.20	618.80	619.80	616.60	538.20	544.60
20	Burst strength, AW	610.30	618.40	580.70	584.50	591.70	504.60	506.50
21	Distension at burst, BW	18.84	17.03	19.02	18.06	19.42	17.81	16.44
22	Distension at burst, AW	20.55	20.89	20.64	20.18	20.77	21.56	21.28
23	Angle of spirality, BW	10.73	14.20	15.64	16.30	15.43	5.71	2.89
24	Angle of spirality, AW	18.40	18.96	21.26	19.85	21.68	4.64	5.41
25	Width, BW							
26	Yarn strength, BW	257.96	262.67	259.44	260.11	240.99	212.53	210.15
27	Yarn strength, AW	234.07	256.05	247.87	233.80	245.16	198.85	207.45
28	Yarn extension at break, BW	6.98	6.96	6.82	6.80	6.26	6.30	6.58
29	Yarn extension at break, AW	7.20	7.60	7.32	6.92	7.19	6.55	6.67
30	Yarn count (tex), BW	18.95	19.02	19.10	19.04	18.92	19.79	19.69
31	Yarn count (tex), AW	18.80	18.94	18.44	18.52	18.24	19.98	19.45
32	Thickness, BW	622.20	620.30	609.00	633.80	627.60	645.80	604.10
33	Thickness, AW	781.80	778.50	766.90	775.50	761.00	752.10	752.20
34	Turns per metre	154.30	152.20	155.30	154.60	154.20	159.30	157.20

Table 7

MERIDIAN SINGLE JERSEY CASE STUDY

GREIGE FABRICS ESBI-H1034

		Sample Identification						
	Test Method	15	16	17	18	19	20	21
1	Length shrinkage, LD							
2	Width shrinkage, LD							
3	Length shrinkage, TD							
4	Width shrinkage, TD							
5	Length shrinkage, 5x							
6	Width shrinkage, 5x							
7	Weight (gsm)BW	135.80	137.09	128.66	127.86	125.35	128.97	131.08
8	Weight (gsm)AW	171.84	173.75	175.68	176.77	171.83	173.51	177.87
9	Courses per 3cm BW	59.10	58.10	58.90	57.80	55.80	57.40	58.00
10	Courses per 3cm LD							
11	Courses per 3cm TD							
12	Courses per 3cm AW	63.30	63.70	63.90	66.80	61.90	64.80	64.80
13	Wales per 3cm BW	36.50	37.40	36.30	37.00	38.30	38.30	36.80
14	Wales per 3cm LD							
15	Wales per 3cm TD							
16	Wales per 3cm AW	45.10	47.90	45.90	44.10	45.90	46.70	46.40
17	Stitch length (mm) BW	2.71	2.73	2.65	2.67	2.74	2.70	2.66
18	Stitch length (mm) AW	2.67	2.67	2.59	2.58	2.67	2.65	2.59
19	Burst strength, BW	612.80	596.60	598.70	617.50	582.80	591.90	623.50
20	Burst strength, AW	577.00	580.10	584.10	599.10	585.80	613.60	629.30
21	Distension at burst, BW	17.79	18.94	17.39	17.74	17.51	17.24	17.91
22	Distension at burst, AW	21.44	21.93	20.80	21.23	21.32	21.43	21.20
23	Angle of spirality, BW	11.12	11.81	8.73	8.22	7.00	12.14	6.75
24	Angle of spirality, AW	14.39	12.82	11.76	13.81	14.73	14.09	12.46
25	Width, BW							
26	Yarn strength, BW	240.44	255.77	252.63	239.60	250.55	252.64	244.35
27	Yarn strength, AW	229.45	227.03	232.97	242.64	227.09	243.27	233.52
28	Yarn extension at break, BW	6.60	6.79	6.54	6.41	6.56	7.29	6.60
29	Yarn extension at break, AW	7.41	7.16	7.15	7.16	7.45	7.86	7.05
30	Yarn count (tex), BW	19.14	19.38	18.88	18.99	19.24	19.28	19.16
31	Yarn count (tex), AW	18.61	18.95	19.28	19.04	19.16	18.98	18.80
32	Thickness, BW	626.30	627.00	592.40	622.40	569.30	594.30	585.30
33	Thickness, AW	748.60	770.50	781.50	783.70	785.20	752.30	770.40
34	Turns per metre	159.40	154.10	159.00	165.70	168.60	170.90	175.40

Table 8

MERIDIAN SINGLE JERSEY CASE STUDY

GREIGE FABRICS ESBI-H1034

		Sample Identification		
	Test Method	22	23	24
1	Length shrinkage, LD			
2	Width shrinkage, LD			
3	Length shrinkage, TD			
4	Width shrinkage, TD			
5	Length shrinkage, 5x			
6	Width shrinkage, 5x			
7	Weight (gsm)BW	130.45	137.07	129.66
8	Weight (gsm)AW	176.24	173.02	170.64
9	Courses per 3cm BW	59.00	59.80	52.90
10	Courses per 3cm LD			
11	Courses per 3cm TD			
12	Courses per 3cm AW	62.40	64.90	65.20
13	Wales per 3cm BW	37.50	36.70	37.40
14	Wales per 3cm LD			
15	Wales per 3cm TD			
16	Wales per 3cm AW	46.70	44.70	46.70
17	Stitch length (mm) BW	2.67	2.70	2.72
18	Stitch length (mm) AW	2.61	2.65	2.69
19	Burst strength, BW	625.40	554.30	593.20
20	Burst strength, AW	604.10	567.50	591.00
21	Distension at burst, BW	16.85	17.21	16.71
22	Distension at burst, AW	20.79	21.20	21.14
23	Angle of spirality, BW	6.13	6.54	7.48
24	Angle of spirality, AW	12.91	6.89	13.91
25	Width, BW			
26	Yarn strength, BW	248.17	216.99	241.91
27	Yarn strength, AW	232.33	212.35	225.28
28	Yarn extension at break, BW	6.92	6.57	6.65
29	Yarn extension at break, AW	7.01	7.82	7.30
30	Yarn count (tex), BW	19.65	19.82	19.87
31	Yarn count (tex), AW	18.87	19.32	18.82
32	Thickness, BW	574.40	638.50	571.50
33	Thickness, AW	753.70	747.50	769.20
34	Turns per metre	162.70	158.50	157.70

Table 9

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	1	2	3	4	5	6	7
1	Length shrinkage, LD	-0.77	1.36	0.66	1.21	2.51	1.30	1.76
2	Width shrinkage, LD	9.88	4.21	4.71	7.38	5.49	5.78	4.58
3	Length shrinkage, TD	2.09	4.21	3.79	4.18	5.22	4.25	5.04
4	Width shrinkage, TD	10.51	5.42	5.85	9.23	7.18	7.33	5.87
5	Length shrinkage, 5x	3.49	5.55	5.40	4.82	6.47	5.29	6.05
6	Width shrinkage, 5x	11.32	5.96	6.12	10.04	7.58	8.04	6.31
7	Weight (gsm)BW	141.12	143.42	145.47	136.50	139.19	141.83	140.99
8	Weight (gsm)AW	166.03	162.48	159.35	160.65	159.86	160.86	163.07
9	Courses per 3cm BW	59.20	58.30	57.60	59.30	57.70	57.80	57.50
10	Courses per 3cm LD	58.70	58.70	58.50	60.30	59.50	59.10	58.80
11	Courses per 3cm TD	59.80	60.50	59.70	61.90	60.90	60.00	60.30
12	Courses per 3cm AW	60.70	61.10	60.20	61.80	61.80	60.70	60.70
13	Wales per 3cm BW	42.80	45.40	44.70	43.40	44.60	44.80	45.20
14	Wales per 3cm LD	47.50	47.70	47.50	46.90	47.00	47.40	48.10
15	Wales per 3cm TD	48.00	48.30	48.40	48.10	47.90	48.10	48.60
16	Wales per 3cm AW	49.10	48.70	48.90	48.30	48.00	49.10	49.00
17	Stitch length (mm) BW	2.69	2.67	2.68	2.67	2.66	2.67	2.67
18	Stitch length (mm) AW	2.67	2.67	2.66	2.67	2.64	2.66	2.66
19	Burst strength, BW	509.20	572.60	597.40	557.40	566.70	560.20	569.40
20	Burst strength, AW	513.80	594.70	565.40	573.20	573.30	565.40	569.30
21	Distension at burst, BW	17.56	17.41	17.13	16.61	17.88	17.22	16.75
22	Distension at burst, AW	18.66	18.70	18.48	18.79	18.48	18.45	18.41
23	Angle of spirality, BW	2.70	5.66	4.23	4.81	2.73	2.79	4.23
24	Angle of spirality, AW	8.27	10.74	11.11	10.95	7.09	8.05	10.31
25	Width, BW	161.77	154.37	153.90	161.63	155.57	154.73	153.47
26	Yarn strength, BW	248.21	320.49	296.77	320.08	330.28	319.04	319.32
27	Yarn strength, AW	251.75	326.13	322.89	307.01	309.88	312.04	324.00
28	Yarn extension at break, BW	7.02	7.71	7.54	8.61	6.60	7.47	8.00
29	Yarn extension at break, AW	7.65	7.63	7.53	7.95	6.86	7.18	7.39
30	Yarn count (tex), BW	19.11	19.06	18.49	18.82	18.75	18.56	19.02
31	Yarn count (tex), AW	19.27	18.97	18.74	18.66	19.04	18.74	18.76
32	Thickness, BW	691.40	664.50	682.90	638.10	625.30	629.40	667.90
33	Thickness, AW	793.30	786.70	791.90	775.90	795.10	799.00	783.90
34	Turns per metre							
35	Colour (Red)	1.83	81.22	87.83	86.70	85.26	44.05	79.85
36	(Green)	1.92	67.23	88.80	87.49	80.06	51.03	65.93
37	(Blue)	3.52	26.05	101.36	98.73	48.29	67.27	25.87

Table 10

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

	Test Method	Sample Identification 8	9	10	11	12	13	14
1	Length shrinkage, LD	1.36	-0.01	1.83	0.73	-0.08	2.78	0.23
2	Width shrinkage, LD	5.75	6.11	8.57	7.89	10.24	7.00	7.63
3	Length shrinkage, TD	4.71	2.47	3.81	3.18	2.99	5.30	3.44
4	Width shrinkage, TD	7.67	6.99	9.38	8.39	11.07	8.90	9.05
5	Length shrinkage, 5x	5.68	4.00	5.28	5.06	4.52	5.70	3.75
6	Width shrinkage, 5x	8.08	8.23	9.58	9.64	11.27	8.97	9.08
7	Weight (gsm)BW	139.88	148.27	140.81	127.62	146.15	141.67	141.54
8	Weight (gsm)AW	161.80	166.78	164.53	162.31	171.25	160.26	159.50
9	Courses per 3cm BW	59.90	60.90	59.70	58.50	58.60	59.20	60.20
10	Courses per 3cm LD	60.20	61.10	60.10	59.00	58.10	61.00	60.00
11	Courses per 3cm TD	62.30	62.70	62.20	61.40	60.30	62.00	61.70
12	Courses per 3cm AW	63.30	63.10	62.60	61.70	60.60	62.60	61.90
13	Wales per 3cm BW	43.70	44.80	43.20	43.90	44.10	43.10	42.90
14	Wales per 3cm LD	47.10	47.20	48.10	47.50	49.30	46.60	47.20
15	Wales per 3cm TD	47.90	47.80	48.40	48.20	49.40	48.00	48.00
16	Wales per 3cm AW	48.00	48.30	48.60	48.70	49.80	48.50	48.30
17	Stitch length (mm) BW	2.66	2.66	2.63	2.66	2.67	2.65	2.66
18	Stitch length (mm) AW	2.64	2.64	2.63	2.64	2.64	2.66	2.68
19	Burst strength, BW	561.60	550.20	577.50	564.70	548.10	534.70	570.80
20	Burst strength, AW	561.30	555.20	582.20	585.40	537.60	565.00	568.20
21	Distension at burst, BW	17.23	18.31	16.38	17.60	17.18	18.85	19.72
22	Distension at burst, AW	18.23	19.80	20.11	18.79	18.64	18.72	18.65
23	Angle of spirality, BW	1.36	4.23	0.60	0.03	2.32	1.85	0.96
24	Angle of spirality, AW	9.50	6.66	10.39	7.08	6.41	9.62	9.50
25	Width, BW	146.77	146.10	147.37	150.87	145.13	156.67	157.17
26	Yarn strength, BW	304.03	275.13	312.89	309.51	239.96	300.20	300.83
27	Yarn strength, AW	314.29	304.48	324.23	313.48	253.69	299.29	317.67
28	Yarn extension at break, BW	8.34	7.78	8.03	8.10	8.17	7.63	8.02
29	Yarn extension at break, AW	6.99	7.18	8.44	7.59	7.34	6.79	6.37
30	Yarn count (tex), BW	18.75	18.97	19.26	18.86	19.64	19.25	18.54
31	Yarn count (tex), AW	18.58	19.10	18.96	18.99	19.71	18.59	18.41
32	Thickness, BW	629.70	649.90	629.50	635.10	659.80	641.70	637.70
33	Thickness, AW	808.80	775.80	748.30	749.80	795.90	790.80	778.70
34	Turns per metre							
35	Colour (Red)	86.16	3.86	33.50	31.77	1.65	85.73	86.91
36	(Green)	87.32	6.36	17.44	15.99	1.73	87.42	88.45
37	(Blue)	98.26	22.87	22.71	20.53	2.04	97.72	101.72

Table 11

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

	Test Method	Sample Identification 15	16	17	18	19	20	21
1	Length shrinkage, LD	2.78	-1.48	-4.71	2.27	1.16	-3.62	0.56
2	Width shrinkage, LD	6.06	10.46	12.46	5.22	6.81	16.82	7.51
3	Length shrinkage, TD	5.58	1.63	-1.39	5.62	4.55	0.19	3.65
4	Width shrinkage, TD	7.68	11.50	13.72	6.50	8.62	18.37	8.79
5	Length shrinkage, 5x	6.35	3.14	-0.58	6.12	5.75	0.56	4.45
6	Width shrinkage, 5x	8.23	12.72	14.53	6.67	9.47	18.64	9.16
7	Weight (gsm)BW	136.04	137.35	139.77	144.43	138.56	133.86	143.38
8	Weight (gsm)AW	157.45	164.18	161.76	163.91	160.89	157.05	162.57
9	Courses per 3cm BW	57.70	59.60	62.10	58.90	58.10	61.10	59.70
10	Courses per 3cm LD	59.50	59.40	61.10	59.60	59.10	58.60	60.50
11	Courses per 3cm TD	60.80	61.50	63.00	61.30	60.60	61.40	61.60
12	Courses per 3cm AW	61.40	62.00	63.00	62.00	61.50	61.40	61.60
13	Wales per 3cm BW	44.00	42.50	40.40	44.40	44.30	38.90	43.90
14	Wales per 3cm LD	47.50	47.20	45.90	47.40	47.30	47.20	46.70
15	Wales per 3cm TD	48.50	48.00	46.80	48.30	48.00	47.80	47.90
16	Wales per 3cm AW	48.80	48.40	46.80	48.20	48.00	47.80	47.90
17	Stitch length (mm) BW	2.66	2.68	2.69	2.67	2.67	2.68	2.70
18	Stitch length (mm) AW	2.66	2.67	2.67	2.67	2.66	2.68	2.68
19	Burst strength, BW	573.60	525.40	536.80	586.80	586.60	564.30	565.50
20	Burst strength, AW	615.40	540.90	540.00	578.80	574.80	552.10	552.60
21	Distension at burst, BW	17.78	18.54	18.65	16.97	17.31	16.38	18.18
22	Distension at burst, AW	18.34	19.80	20.57	18.11	18.90	19.48	19.74
23	Angle of spirality, BW	9.58	-0.02	0.89	1.33	2.63	0.05	2.64
24	Angle of spirality, AW	10.78	8.17	9.75	9.63	8.68	8.92	8.82
25	Width, BW	157.77	162.03	171.40	153.37	151.27	166.03	156.50
26	Yarn strength, BW	287.95	241.92	250.07	305.48	330.55	317.27	335.21
27	Yarn strength, AW	328.72	251.16	270.25	334.00	320.31	301.27	308.57
28	Yarn extension at break, BW	7.43	7.54	8.30	8.04	7.80	7.18	6.64
29	Yarn extension at break, AW	6.73	7.57	7.98	7.10	4.82	6.63	6.69
30	Yarn count (tex), BW	18.82	18.98	19.01	18.90	18.71	18.90	18.68
31	Yarn count (tex), AW	18.29	19.17	18.63	18.87	18.80	18.76	18.84
32	Thickness, BW	622.60	646.50	638.70	649.00	614.70	611.50	633.60
33	Thickness, AW	791.40	780.80	804.80	816.60	805.00	800.00	802.80
34	Turns per metre							
35	Colour (Red)	84.99	30.84	85.00	84.55	83.41	36.66	84.45
36	(Green)	86.28	12.65	85.39	78.24	76.73	37.73	77.41
37	(Blue)	98.25	4.69	95.22	52.22	49.89	43.17	50.81

Table 12

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

	Test Method	Sample Identification 22	23	24	25	26	27	28
1	Length shrinkage, LD	2.13	1.03	1.50	-1.88	1.50	1.61	-0.48
2	Width shrinkage, LD	6.82	5.31	3.46	9.87	4.59	4.96	6.76
3	Length shrinkage, TD	4.01	4.46	5.12	1.35	4.40	4.29	2.35
4	Width shrinkage, TD	7.46	7.05	4.40	10.85	5.63	5.94	8.36
5	Length shrinkage, 5x	6.08	5.09	6.12	2.99	5.31	5.24	3.18
6	Width shrinkage, 5x	8.46	7.46	4.80	11.53	5.90	6.31	9.20
7	Weight (gsm)BW	145.12	141.54	145.58	137.38	153.41	146.20	149.13
8	Weight (gsm)AW	165.16	160.47	162.36	160.23	168.07	164.15	167.31
9	Courses per 3cm BW	58.00	58.00	58.20	59.30	59.40	58.80	61.30
10	Courses per 3cm LD	60.10	59.00	58.50	59.20	60.00	59.70	60.90
11	Courses per 3cm TD	61.10	60.80	61.10	60.40	61.70	61.40	62.50
12	Courses per 3cm AW	62.10	61.90	61.50	61.40	62.20	61.80	61.50
13	Wales per 3cm BW	43.70	44.70	46.30	42.90	44.60	44.50	43.40
14	Wales per 3cm LD	46.80	47.10	48.00	47.30	47.40	46.90	46.00
15	Wales per 3cm TD	47.90	47.90	48.10	48.00	48.40	48.10	47.30
16	Wales per 3cm AW	48.20	48.00	48.50	48.20	48.50	47.80	47.30
17	Stitch length (mm) BW	2.67	2.69	2.67	2.69	2.68	2.69	2.69
18	Stitch length (mm) AW	2.66	2.68	2.68	2.66	2.67	2.68	2.66
19	Burst strength, BW	526.60	585.70	586.60	569.30	528.60	556.50	538.50
20	Burst strength, AW	519.50	574.30	570.20	562.40	562.70	560.60	545.00
21	Distension at burst, BW	18.82	17.68	17.17	18.47	20.07	19.47	19.75
22	Distension at burst, AW	18.88	18.30	18.48	18.76	19.91	19.60	19.78
23	Angle of spirality, BW	2.88	3.57	2.48	-0.87	7.94	5.97	2.31
24	Angle of spirality, AW	7.12	10.08	10.50	8.74	9.29	8.87	7.55
25	Width, BW	155.43	150.83	147.97	157.67	149.67	152.57	157.53
26	Yarn strength, BW	265.19	294.88	302.28	296.13	239.55	258.55	243.85
27	Yarn strength, AW	281.51	328.21	323.40	299.32	265.57	268.19	216.59
28	Yarn extension at break, BW	7.50	8.50	7.65	7.71	7.64	7.65	7.71
29	Yarn extension at break, AW	7.77	7.23	6.34	7.04	7.75	7.30	5.64
30	Yarn count (tex), BW	19.29	18.69	19.09	18.74	19.48	19.28	19.26
31	Yarn count (tex), AW	19.52	18.68	18.69	18.81	19.27	19.29	19.30
32	Thickness, BW	659.20	646.90	660.80	622.20	675.20	661.30	644.40
33	Thickness, AW	780.80	799.70	817.70	795.30	826.00	801.60	839.60
34	Turns per metre							
35	Colour (Red)	2.23	87.35	39.19	86.21	2.44	2.30	2.39
36	(Green)	2.57	88.64	41.29	87.42	2.92	2.76	2.79
37	(Blue)	5.58	100.41	46.71	99.00	6.26	6.07	6.22

Table 13

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

	Test Method	Sample Identification 29	30	31	32	33	34	35
1	Length shrinkage, LD	4.09	0.23	-0.07	2.62	2.23	0.32	0.66
2	Width shrinkage, LD	3.69	5.16	5.33	3.06	7.71	4.90	3.18
3	Length shrinkage, TD	6.66	3.58	2.99	5.85	4.68	3.49	2.75
4	Width shrinkage, TD	5.09	6.61	6.91	4.62	9.26	6.94	5.23
5	Length shrinkage, 5x	7.78	5.49	3.79	6.46	5.92	4.32	3.59
6	Width shrinkage, 5x	5.18	7.35	7.68	4.62	9.76	7.20	5.93
7	Weight (gsm)BW	144.60	144.71	151.42	146.73	141.86	150.44	155.58
8	Weight (gsm)AW	163.31	165.76	170.27	160.85	163.30	168.42	169.40
9	Courses per 3cm BW	56.60	59.30	59.90	56.90	58.50	59.60	60.00
10	Courses per 3cm LD	59.10	58.80	60.30	59.00	60.00	60.10	60.70
11	Courses per 3cm TD	60.40	60.90	61.70	60.10	61.20	61.60	61.60
12	Courses per 3cm AW	61.60	61.50	60.90	61.10	61.50	61.40	62.60
13	Wales per 3cm BW	45.50	45.50	44.50	46.00	43.90	44.10	45.30
14	Wales per 3cm LD	48.20	47.60	46.70	47.60	47.30	46.40	46.60
15	Wales per 3cm TD	48.40	48.70	48.10	48.50	48.30	47.90	47.60
16	Wales per 3cm AW	49.20	48.70	47.90	48.60	48.40	47.50	48.00
17	Stitch length (mm) BW	2.68	2.68	2.67	2.68	2.66	2.66	2.66
18	Stitch length (mm) AW	2.67	2.65	2.65	2.66	2.66	2.66	2.66
19	Burst strength, BW	567.40	541.70	532.70	573.70	559.80	555.20	545.10
20	Burst strength, AW	579.10	574.70	529.10	606.30	595.10	539.90	529.80
21	Distension at burst, BW	18.51	19.42	18.63	18.26	17.55	19.14	18.37
22	Distension at burst, AW	18.96	19.80	19.32	19.01	18.94	19.33	19.16
23	Angle of spirality, BW	6.86	4.53	1.85	6.85	2.28	2.26	5.46
24	Angle of spirality, AW	9.85	9.94	7.43	9.54	8.91	6.83	7.46
25	Width, BW	147.77	147.93	149.57	148.27	154.17	152.10	149.90
26	Yarn strength, BW	324.35	256.11	272.67	298.63	324.15	272.48	247.01
27	Yarn strength, AW	311.85	269.61	263.19	294.73	338.28	290.75	252.07
28	Yarn extension at break, BW	7.31	5.98	5.58	7.82	7.14	8.22	7.38
29	Yarn extension at break, AW	6.62	5.66	5.22	7.68	7.44	5.32	7.32
30	Yarn count (tex), BW	18.91	18.84	19.31	18.65	18.92	19.27	19.51
31	Yarn count (tex), AW	18.62	18.94	19.68	18.89	19.11	19.57	19.64
32	Thickness, BW	634.00	661.70	662.00	638.10	619.40	655.40	659.60
33	Thickness, AW	799.00	834.10	834.70	777.50	799.70	818.60	809.40
34	Turns per metre							
35	Colour (Red)	83.83	83.17	2.32	82.46	82.78	2.32	2.31
36	(Green)	77.11	77.25	2.70	75.87	75.35	2.77	2.72
37	(Blue)	50.77	52.22	5.98	49.85	49.84	6.10	6.06

Table 14

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	36	37	38	39	40	41	42
1	Length shrinkage, LD	1.02	0.75	1.97	3.20	1.76	0.26	1.24
2	Width shrinkage, LD	2.71	5.30	5.60	4.83	6.47	7.86	6.41
3	Length shrinkage, TD	3.89	3.46	4.95	5.79	4.39	3.19	4.30
4	Width shrinkage, TD	3.92	6.75	6.98	6.12	7.95	9.17	7.76
5	Length shrinkage, 5x	4.92	4.65	6.12	7.33	5.59	4.77	4.94
6	Width shrinkage, 5x	4.53	7.49	7.39	6.29	8.26	9.23	7.77
7	Weight (gsm)BW	153.93	148.86	140.14	141.19	147.58	145.15	142.92
8	Weight (gsm)AW	166.66	167.45	162.52	161.75	167.54	170.17	161.21
9	Courses per 3cm BW	59.60	59.50	58.20	56.80	57.60	59.60	59.80
10	Courses per 3cm LD	60.40	59.10	59.40	58.30	59.00	60.10	59.60
11	Courses per 3cm TD	61.60	60.10	60.60	60.10	60.40	61.50	60.80
12	Courses per 3cm AW	61.40	60.20	61.30	60.70	61.20	62.30	61.50
13	Wales per 3cm BW	46.20	44.30	44.60	45.80	44.70	43.20	44.60
14	Wales per 3cm LD	46.90	47.40	47.30	48.10	47.70	47.30	47.40
15	Wales per 3cm TD	47.80	47.80	48.10	48.90	48.40	48.20	48.60
16	Wales per 3cm AW	47.60	48.50	48.40	49.30	49.00	48.70	48.60
17	Stitch length (mm) BW	2.69	2.68	2.67	2.68	2.67	2.65	2.66
18	Stitch length (mm) AW	2.68	2.67	2.67	2.65	2.66	2.64	2.64
19	Burst strength, BW	547.90	547.80	559.50	572.50	540.00	541.40	585.60
20	Burst strength, AW	530.70	537.70	583.10	579.80	535.00	523.10	579.40
21	Distension at burst, BW	19.31	18.38	17.95	17.42	18.37	17.81	18.85
22	Distension at burst, AW	18.88	18.99	18.38	18.83	19.57	18.72	18.83
23	Angle of spirality, BW	4.69	5.26	-0.95	3.94	2.65	2.85	3.30
24	Angle of spirality, AW	8.20	8.48	8.35	8.54	7.46	7.05	9.46
25	Width, BW	148.17	151.90	152.47	149.17	152.47	147.50	153.70
26	Yarn strength, BW	266.48	267.76	317.55	292.13	245.97	222.71	295.07
27	Yarn strength, AW	277.95	259.04	314.21	308.93	261.24	257.26	318.32
28	Yarn extension at break, BW	6.16	7.35	7.85	6.69	7.08	7.14	7.80
29	Yarn extension at break, AW	5.36	6.99	6.93	7.30	7.23	7.41	7.47
30	Yarn count (tex), BW	19.24	19.39	18.84	18.76	19.28	19.31	18.65
31	Yarn count (tex), AW	19.25	19.34	18.81	19.22	19.38	19.48	18.57
32	Thickness, BW	665.60	635.30	635.40	621.30	636.30	645.80	640.40
33	Thickness, AW	817.70	813.10	803.40	784.30	804.90	794.90	789.70
34	Turns per metre							
35	Colour (Red)	2.22	2.36	83.31	81.84	2.42	1.72	85.78
36	(Green)	2.58	2.81	77.87	75.04	2.85	1.82	87.05
37	(Blue)	5.70	6.19	51.92	48.23	6.25	2.15	99.53

Table 15

MERIDIAN SINGLE JERSEY CASE STUDY

DYED FABRICS ESBI-H1034

	Test Method	Sample Identification 43	44	45	46
1	Length shrinkage, LD	-0.34	0.49	0.66	-0.14
2	Width shrinkage, LD	11.60	7.51	2.80	5.82
3	Length shrinkage, TD	3.31	3.65	3.59	2.85
4	Width shrinkage, TD	13.06	8.80	4.14	7.29
5	Length shrinkage, 5x	4.62	4.75	5.05	3.69
6	Width shrinkage, 5x	13.63	9.27	4.55	7.80
7	Weight (gsm)BW	138.15	146.12	148.59	149.86
8	Weight (gsm)AW	170.30	166.03	168.65	169.23
9	Courses per 3cm BW	59.60	59.40	59.30	60.30
10	Courses per 3cm LD	59.10	59.30	59.40	60.10
11	Courses per 3cm TD	60.80	61.30	61.10	62.30
12	Courses per 3cm AW	61.10	61.30	61.00	61.30
13	Wales per 3cm BW	42.20	45.00	46.00	44.10
14	Wales per 3cm LD	47.90	47.80	47.20	46.70
15	Wales per 3cm TD	48.40	48.70	48.20	47.80
16	Wales per 3cm AW	49.50	48.70	48.00	47.70
17	Stitch length (mm) BW	2.67	2.67	2.68	2.68
18	Stitch length (mm) AW	2.64	2.64	2.66	2.67
19	Burst strength, BW	611.70	607.20	562.10	531.00
20	Burst strength, AW	607.70	581.80	518.50	533.60
21	Distension at burst, BW	17.26	18.09	18.09	19.80
22	Distension at burst, AW	18.70	19.93	18.85	20.22
23	Angle of spirality, BW	2.03	4.73	8.35	3.51
24	Angle of spirality, AW	8.86	7.52	8.59	7.73
25	Width, BW	162.20	153.43	156.67	154.33
26	Yarn strength, BW	302.84	299.29	266.21	221.76
27	Yarn strength, AW	271.75	298.37	261.16	218.85
28	Yarn extension at break, BW	8.52	7.84	5.69	5.65
29	Yarn extension at break, AW	7.65	7.65	5.47	5.56
30	Yarn count (tex), BW	19.42	19.29	19.19	19.06
31	Yarn count (tex), AW	19.44	19.35	19.21	19.54
32	Thickness, BW	646.10	657.50	670.00	659.50
33	Thickness, AW	793.40	817.70	840.20	843.10
34	Turns per metre				
35	Colour (Red)	2.30	2.33	2.29	2.18
36	(Green)	2.85	2.89	2.68	2.56
37	(Blue)	6.43	6.47	5.91	5.70

Table 16

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	1	2	3	4	5	6	7
1	Length shrinkage, LD	0.06	1.34	3.47	2.24	3.00	1.98	1.00
2	Width shrinkage, LD	7.75	4.82	3.77	5.12	5.29	5.58	6.30
3	Length shrinkage, TD	3.26	3.77	6.27	5.17	4.42	3.34	4.17
4	Width shrinkage, TD	8.86	6.04	5.51	6.43	5.82	6.33	7.45
5	Length shrinkage, 5x	4.20	4.54	6.17	6.01	5.03	4.21	4.78
6	Width shrinkage, 5x	9.40	6.34	5.57	6.84	6.29	6.66	8.02
7	Weight (gsm)BW	138.28	135.04	136.31	132.21	131.62	132.06	132.79
8	Weight (gsm)AW	160.03	149.31	152.91	147.30	148.32	148.66	151.00
9	Courses per 3cm BW	58.50	57.80	56.40	57.50	55.70	56.00	57.80
10	Courses per 3cm LD	58.80	59.70	58.60	59.10	57.80	57.00	59.40
11	Courses per 3cm TD	60.10	61.10	60.45	60.70	59.20	59.27	59.70
12	Courses per 3cm AW	59.20	60.90	60.20	60.40	59.80	59.10	60.70
13	Wales per 3cm BW	41.70	41.10	42.00	41.30	40.90	40.50	41.10
14	Wales per 3cm LD	44.00	41.90	43.70	43.10	44.40	43.90	43.90
15	Wales per 3cm TD	45.40	44.40	45.20	45.00	44.60	44.50	46.00
16	Wales per 3cm AW	45.30	44.10	45.30	44.60	44.70	44.40	45.00
17	Stitch length (mm) BW	2.70	2.65	2.67	2.67	2.67	2.64	2.68
18	Stitch length (mm) AW	2.68	2.66	2.65	2.65	2.65	2.65	2.65
19	Burst strength, BW	447.50	408.40	460.50	398.10	416.90	413.10	436.00
20	Burst strength, AW	467.40	424.10	464.90	387.20	463.90	433.70	414.60
21	Distension at burst, BW	16.84	16.57	19.09	17.42	16.01	14.94	16.86
22	Distension at burst, AW	19.72	19.88	18.59	19.04	18.36	18.23	18.95
23	Angle of spirality, BW	2.00	0.60	1.52	2.46	2.50	3.34	2.06
24	Angle of spirality, AW	8.82	6.12	7.58	8.10	6.44	7.58	8.50
25	Width, BW	160.50	160.73	156.40	160.37	160.33	161.67	160.23
26	Yarn strength, BW	195.72	193.85	187.44	182.38	199.29	189.80	193.44
27	Yarn strength, AW	193.09	190.11	210.39	179.59	191.71	188.69	197.28
28	Yarn extension at break, BW	6.89	6.72	6.75	6.05	6.55	6.35	6.64
29	Yarn extension at break, AW	6.55	6.58	6.87	6.15	6.65	7.01	6.51
30	Yarn count (tex), BW	19.95	19.32	19.21	18.93	18.86	19.68	19.26
31	Yarn count (tex), AW	19.92	19.16	18.84	19.13	18.74	19.06	18.94
32	Thickness, BW	580.00	542.00	549.60	531.90	519.70	536.80	545.18
33	Thickness, AW	707.40	659.60	669.30	647.20	599.60	609.00	650.60
34	Turns per metre							
35	Colour (Red)	1.87	79.66	86.63	86.77	84.64	45.19	79.49
36	(Green)	1.96	65.83	88.08	88.00	80.13	51.95	65.67
37	(Blue)	3.51	25.16	99.43	99.20	48.74	67.98	25.61
38	Formaldehyde(ppm)	753.13	383.67	409.54	276.69	393.38	404.85	450.30
39	% Nitrogen (Total)	0.54	0.36	0.19	0.32	0.34	0.37	0.33
40	% Nitrogen (Fixed)	0.41	0.30	0.18	0.21	0.30	0.33	0.26

Table 17

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	8	9	10	11	12	13	14
1	Length shrinkage, LD	3.81	2.16	3.96	2.20	5.72	3.87	2.33
2	Width shrinkage, LD	6.65	4.96	4.72	6.48	8.31	4.11	5.10
3	Length shrinkage, TD	6.26	4.21	6.56	4.28	7.87	5.36	3.69
4	Width shrinkage, TD	7.76	5.71	7.18	7.30	9.51	5.07	5.99
5	Length shrinkage, 5x	6.56	5.29	6.22	5.06	7.37	5.59	3.85
6	Width shrinkage, 5x	8.26	6.73	6.78	7.99	9.31	5.96	6.52
7	Weight (gsm)BW	132.27	136.67	132.62	132.75	131.99	129.73	132.31
8	Weight (gsm)AW	151.30	155.62	151.04	151.07	160.00	148.31	151.10
9	Courses per 3cm BW	56.80	59.00	57.50	57.60	56.50	56.50	58.30
10	Courses per 3cm LD	58.70	60.00	59.50	59.10	57.70	58.40	59.30
11	Courses per 3cm TD	59.70	60.00	60.70	59.10	59.70	60.50	60.90
12	Courses per 3cm AW	60.10	62.10	60.40	61.40	58.80	59.70	60.80
13	Wales per 3cm BW	41.40	41.80	41.70	41.30	41.30	41.00	40.60
14	Wales per 3cm LD	45.10	44.20	44.50	44.73	44.90	43.30	42.82
15	Wales per 3cm TD	45.20	44.80	44.80	44.90	45.10	44.00	43.00
16	Wales per 3cm AW	45.80	44.50	44.70	44.73	45.00	44.10	43.40
17	Stitch length (mm) BW	2.67	2.65	2.59	2.66	2.66	2.65	2.63
18	Stitch length (mm) AW	2.67	2.67	2.65	2.67	2.66	2.68	2.62
19	Burst strength, BW	374.00	441.20	483.17	454.50	462.50	383.40	392.50
20	Burst strength, AW	449.20	447.60	421.80	413.80	475.60	408.40	448.40
21	Distension at burst, BW	17.23	19.26	16.85	17.40	17.24	15.20	16.34
22	Distension at burst, AW	18.31	18.01	16.91	19.27	19.41	17.36	18.05
23	Angle of spirality, BW	2.04	0.10	0.70	1.84	1.84	3.28	2.32
24	Angle of spirality, AW	7.68	5.32	5.38	6.22	5.50	8.20	7.13
25	Width, BW	147.83	146.93	147.27	147.67	147.00	157.67	160.33
26	Yarn strength, BW	193.15	198.36	199.91	185.24	193.19	168.51	181.29
27	Yarn strength, AW	210.15	201.65	193.85	186.68	193.72	171.48	185.99
28	Yarn extension at break, BW	8.46	6.20	6.61	5.94	6.42	6.51	6.28
29	Yarn extension at break, AW	6.40	6.90	7.07	6.18	6.72	5.80	6.75
30	Yarn count (tex), BW	18.74	19.19	19.36	19.49	20.36	18.92	18.74
31	Yarn count (tex), AW	18.57	19.32	19.63	19.30	19.65	18.71	19.37
32	Thickness, BW	506.90	530.40	533.80	517.80	544.20	532.90	551.00
33	Thickness, AW	663.20	651.80	635.00	629.00	681.40	610.50	612.90
34	Turns per metre							
35	Colour (Red)	86.06	4.00	33.62	32.54	1.67	85.88	86.84
36	(Green)	87.38	6.55	17.57	16.53	1.77	87.55	88.48
37	(Blue)	97.57	22.71	22.64	21.07	2.05	97.18	100.98
38	Formaldehyde(ppm)	291.24	269.03	452.27	323.70	619.49	277.07	420.23
39	% Nitrogen (Total)	0.20	0.39	0.42	0.37	0.55	0.33	0.31
40	% Nitrogen (Fixed)	0.18	0.36	0.35	0.32	0.45	0.28	0.27

Table 18

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

	Test Method	Sample Identification 15	16	17	18	19	20	21
1	Length shrinkage, LD	3.42	2.38	2.83	2.70	1.47	4.18	2.77
2	Width shrinkage, LD	6.16	6.39	7.80	5.75	6.33	8.08	7.46
3	Length shrinkage, TD	4.90	4.66	5.05	5.38	4.87	6.99	5.23
4	Width shrinkage, TD	7.12	7.61	9.00	6.72	7.75	9.48	8.86
5	Length shrinkage, 5x	5.40	5.44	5.33	7.55	4.71	6.82	5.58
6	Width shrinkage, 5x	7.51	8.15	9.56	7.17	8.36	9.60	8.94
7	Weight (gsm)BW	130.56	135.50	131.38	137.41	131.84	125.85	128.02
8	Weight (gsm)AW	149.79	158.22	152.03	154.40	149.68	150.47	148.11
9	Courses per 3cm BW	56.20	57.30	58.40	57.50	57.20	56.90	57.50
10	Courses per 3cm LD	58.60	58.60	59.70	59.20	57.80	58.90	59.20
11	Courses per 3cm TD	59.10	58.60	60.90	60.50	60.20	61.30	60.50
12	Courses per 3cm AW	60.20	60.50	61.00	60.60	59.70	62.10	61.10
13	Wales per 3cm BW	40.50	42.10	40.60	41.90	41.20	40.40	40.40
14	Wales per 3cm LD	43.60	45.40	43.20	45.10	43.60	42.90	43.30
15	Wales per 3cm TD	43.80	45.90	44.20	44.90	44.60	45.10	44.00
16	Wales per 3cm AW	45.10	45.90	44.60	45.40	44.60	45.00	44.10
17	Stitch length (mm) BW	2.64	2.67	2.70	2.66	2.70	2.69	2.64
18	Stitch length (mm) AW	2.66	2.70	2.70	2.62	2.66	2.69	2.62
19	Burst strength, BW	410.70	480.60	448.40	474.70	438.90	426.70	406.80
20	Burst strength, AW	452.10	508.20	451.40	492.40	488.50	458.00	434.70
21	Distension at burst, BW	18.01	17.58	18.29	16.44	16.84	16.69	17.39
22	Distension at burst, AW	17.83	18.42	20.63	19.03	19.05	21.08	18.26
23	Angle of spirality, BW	2.74	2.40	3.12	1.54	3.28	2.90	2.32
24	Angle of spirality, AW	7.78	9.90	9.72	8.80	8.52	7.98	7.42
25	Width, BW	159.33	155.17	162.87	154.83	156.63	161.97	162.30
26	Yarn strength, BW	193.81	187.57	190.17	204.67	203.60	208.89	191.00
27	Yarn strength, AW	184.11	204.95	186.08	236.72	205.95	192.61	194.12
28	Yarn extension at break, BW	6.47	6.26	7.19	7.98	4.56	7.16	6.48
29	Yarn extension at break, AW	7.10	6.97	6.42	6.89	4.63	6.35	6.09
30	Yarn count (tex), BW	19.33	19.30	19.27	19.50	18.49	19.04	19.52
31	Yarn count (tex), AW	18.84	19.01	18.77	18.92	19.29	18.75	19.17
32	Thickness, BW	525.30	527.60	523.80	528.70	525.00	504.00	514.40
33	Thickness, AW	616.80	664.80	624.40	696.10	623.60	616.10	612.60
34	Turns per metre							
35	Colour (Red)	85.43	31.82	85.50	83.79	83.43	36.31	84.20
36	(Green)	87.10	13.23	86.46	77.08	76.70	37.48	77.32
37	(Blue)	97.68	5.03	96.08	50.24	49.68	42.78	50.24
38	Formaldehyde(ppm)	416.40	278.80	387.10	375.49	358.63	333.31	179.44
39	% Nitrogen (Total)	0.41	0.32	0.18	0.21	0.23	0.21	0.22
40	% Nitrogen (Fixed)	0.33	0.29	0.16	0.21	0.20	0.13	0.21

Table 19

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	22	23	24	25	26	27	28
1	Length shrinkage, LD	1.76	1.66	2.24	3.38	2.77	1.13	3.33
2	Width shrinkage, LD	6.70	6.17	6.59	5.52	7.64	5.66	7.30
3	Length shrinkage, TD	4.09	4.78	4.87	6.24	5.61	3.38	6.15
4	Width shrinkage, TD	6.92	6.97	6.49	7.34	8.94	7.08	8.65
5	Length shrinkage, 5x	6.59	4.97	5.80	6.75	5.91	3.88	6.33
6	Width shrinkage, 5x	7.80	7.31	7.32	7.87	9.57	7.39	9.50
7	Weight (gsm)BW	139.90	133.39	134.21	132.13	140.66	142.37	137.92
8	Weight (gsm)AW	160.14	151.31	153.07	151.79	162.63	159.81	160.52
9	Courses per 3cm BW	58.20	57.60	57.90	54.70	57.60	58.80	58.10
10	Courses per 3cm LD	59.90	58.80	59.60	56.90	58.40	59.30	59.80
11	Courses per 3cm TD	61.20	60.20	60.60	58.70	60.50	60.80	61.10
12	Courses per 3cm AW	61.00	59.60	61.00	59.20	60.80	60.70	61.50
13	Wales per 3cm BW	42.00	42.00	41.73	41.60	41.70	41.40	41.70
14	Wales per 3cm LD	44.70	44.70	45.30	44.20	44.00	43.70	44.40
15	Wales per 3cm TD	45.30	45.40	45.40	45.20	44.90	44.70	44.80
16	Wales per 3cm AW	45.30	44.80	46.18	45.40	45.60	44.60	45.30
17	Stitch length (mm) BW	2.67	2.65	2.66	2.72	2.71	2.69	2.73
18	Stitch length (mm) AW	2.68	2.70	2.66	2.70	2.70	2.69	2.66
19	Burst strength, BW	407.60	428.20	410.40	464.00	486.40	462.10	468.70
20	Burst strength, AW	473.40	450.40	517.00	464.30	507.70	488.40	482.50
21	Distension at burst, BW	17.56	16.75	17.02	15.99	17.34	18.19	18.27
22	Distension at burst, AW	18.88	18.21	19.00	18.43	20.44	19.75	20.55
23	Angle of spirality, BW	0.36	2.48	2.04	0.32	5.36	3.65	5.30
24	Angle of spirality, AW	9.50	9.82	8.52	10.23	11.89	9.55	10.90
25	Width, BW	155.57	154.07	155.57	156.10	153.70	155.33	156.60
26	Yarn strength, BW	193.76	187.15	204.95	193.11	211.12	200.90	204.42
27	Yarn strength, AW	208.56	201.48	226.92	211.71	221.81	199.52	220.81
28	Yarn extension at break, BW	7.55	8.39	7.27	4.23	4.13	4.40	4.68
29	Yarn extension at break, AW	7.10	6.51	7.16	4.85	5.24	4.64	5.33
30	Yarn count (tex), BW	20.01	18.83	19.16	18.79	19.10	18.98	19.34
31	Yarn count (tex), AW	19.80	18.77	18.63	18.61	19.99	19.81	19.67
32	Thickness, BW	563.00	526.10	525.50	527.60	550.00	565.10	553.30
33	Thickness, AW	706.40	670.20	695.80	671.60	692.30	688.10	691.80
34	Turns per metre							
35	Colour (Red)	2.38	85.43	40.13	86.60	2.46	2.49	2.47
36	(Green)	2.80	86.76	42.07	88.00	2.95	2.98	2.90
37	(Blue)	6.09	96.57	47.08	98.88	6.58	6.59	6.52
38	Formaldehyde(ppm)	459.47	272.37	383.85	467.35	903.69	493.93	985.40
39	% Nitrogen (Total)	0.73	0.16	0.21	0.21	0.45	0.47	0.49
40	% Nitrogen (Fixed)	0.64	0.18	0.19	0.17	0.42	0.40	0.45

Table 20

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	29	30	31	32	33	34	35
1	Length shrinkage, LD	3.10	3.12	2.25	5.42	1.98	1.47	1.35
2	Width shrinkage, LD	5.70	7.06	6.72	6.41	5.20	6.04	4.69
3	Length shrinkage, TD	5.70	5.86	4.87	7.64	3.73	4.46	4.33
4	Width shrinkage, TD	7.13	8.15	7.86	7.53	5.92	7.37	6.44
5	Length shrinkage, 5x	5.47	6.92	5.11	8.82	3.57	4.10	3.63
6	Width shrinkage, 5x	7.58	8.19	8.96	8.20	6.13	7.85	6.70
7	Weight (gsm)BW	133.37	133.27	142.77	131.31	135.54	141.65	145.31
8	Weight (gsm)AW	148.82	153.65	163.55	152.73	153.67	160.00	162.44
9	Courses per 3cm BW	56.40	56.00	58.70	54.30	56.30	58.50	60.20
10	Courses per 3cm LD	58.00	57.00	59.40	56.70	57.70	59.00	60.70
11	Courses per 3cm TD	60.30	59.00	60.90	58.50	59.20	60.70	61.80
12	Courses per 3cm AW	59.50	58.80	61.60	59.40	59.90	60.80	61.80
13	Wales per 3cm BW	41.20	42.00	41.50	41.90	41.00	41.50	41.80
14	Wales per 3cm LD	43.40	44.60	44.50	44.70	44.40	44.20	43.50
15	Wales per 3cm TD	44.10	45.30	45.40	45.20	44.70	44.30	44.40
16	Wales per 3cm AW	44.20	45.50	45.40	45.80	44.30	44.70	44.60
17	Stitch length (mm) BW	2.69	2.78	2.71	2.70	2.65	2.69	2.70
18	Stitch length (mm) AW	2.65	2.71	2.70	2.71	2.67	2.68	2.69
19	Burst strength, BW	434.90	435.50	469.10	471.60	451.60	441.30	454.70
20	Burst strength, AW	449.90	497.80	499.70	489.70	430.10	467.20	490.90
21	Distension at burst, BW	16.49	16.59	18.24	16.24	15.52	18.16	17.18
22	Distension at burst, AW	18.95	19.52	19.93	19.06	17.52	19.34	19.93
23	Angle of spirality, BW	4.45	0.54	2.98	3.52	4.00	4.62	3.87
24	Angle of spirality, AW	9.77	6.91	9.67	12.06	8.24	9.92	8.68
25	Width, BW	157.03	154.17	153.40	154.37	154.67	154.47	155.57
26	Yarn strength, BW	203.75	192.77	207.38	202.40	199.07	197.17	211.89
27	Yarn strength, AW	200.71	203.80	218.95	217.68	210.57	199.33	197.53
28	Yarn extension at break, BW	4.29	4.57	4.33	4.39	6.31	4.17	4.63
29	Yarn extension at break, AW	4.56	4.13	5.13	5.09	6.96	4.53	4.26
30	Yarn count (tex), BW	18.59	18.85	19.11	18.94	19.44	19.45	19.61
31	Yarn count (tex), AW	19.43	18.99	19.66	19.22	19.59	21.13	19.94
32	Thickness, BW	528.50	523.50	564.60	519.50	559.70	561.80	580.20
33	Thickness, AW	625.40	654.70	683.00	666.80	609.60	662.90	668.40
34	Turns per metre							
35	Colour (Red)	82.99	84.20	2.44	82.85	84.20	2.52	2.41
36	(Green)	76.02	78.11	2.86	76.16	78.11	2.99	2.84
37	(Blue)	49.35	52.44	6.35	49.49	52.44	6.60	6.32
38	Formaldehyde(ppm)	297.35	453.35	560.13	459.04	540.47	409.94	556.57
39	% Nitrogen (Total)	0.22	0.21	0.45	0.23	0.38	0.45	0.52
40	% Nitrogen (Fixed)	0.18	0.19	0.42	0.19	0.34	0.43	0.48

Table 21

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS ESBI-H1034

		Sample Identification						
	Test Method	36	37	38	39	40	41	42
1	Length shrinkage, LD	1.35	1.62	1.92	3.02	1.87	1.20	1.10
2	Width shrinkage, LD	6.62	6.70	4.80	5.41	5.57	5.58	5.71
3	Length shrinkage, TD	3.54	4.14	3.22	5.53	3.22	3.61	3.75
4	Width shrinkage, TD	7.33	7.38	5.64	6.23	5.88	6.86	7.23
5	Length shrinkage, 5x	4.29	4.18	3.64	6.24	3.82	4.10	4.62
6	Width shrinkage, 5x	8.07	7.66	5.80	6.84	6.56	7.43	7.73
7	Weight (gsm)BW	139.97	143.69	135.38	132.81	140.75	134.45	135.71
8	Weight (gsm)AW	162.56	161.55	153.00	153.04	161.38	150.15	151.72
9	Courses per 3cm BW	57.10	58.00	57.30	56.10	57.10	57.90	57.80
10	Courses per 3cm LD	57.20	57.30	58.60	57.70	58.00	60.20	59.10
11	Courses per 3cm TD	59.40	59.20	60.00	58.70	58.90	60.60	60.70
12	Courses per 3cm AW	61.60	60.70	59.80	59.50	59.90	61.00	61.30
13	Wales per 3cm BW	41.70	41.60	41.00	42.00	40.30	41.40	41.50
14	Wales per 3cm LD	43.90	43.90	43.80	43.50	44.70	42.70	42.40
15	Wales per 3cm TD	44.70	44.70	44.60	44.10	44.60	44.70	45.00
16	Wales per 3cm AW	45.50	45.30	44.70	44.70	45.00	44.40	44.80
17	Stitch length (mm) BW	2.71	2.72	2.64	2.77	2.66	2.70	2.70
18	Stitch length (mm) AW	2.71	2.67	2.65	2.69	2.66	2.68	2.65
19	Burst strength, BW	465.30	434.50	405.64	423.20	401.30	443.80	396.30
20	Burst strength, AW	497.10	465.10	408.40	467.90	460.00	416.40	436.30
21	Distension at burst, BW	17.54	17.96	16.49	16.38	16.10	16.53	18.36
22	Distension at burst, AW	19.08	18.75	18.13	19.58	18.40	19.51	19.05
23	Angle of spirality, BW	3.51	2.43	4.52	1.72	1.22	1.08	2.44
24	Angle of spirality, AW	11.06	10.00	7.88	9.76	5.74	7.48	8.00
25	Width, BW	156.50	155.43	155.30	156.53	155.00	161.33	160.70
26	Yarn strength, BW	197.03	199.69	184.92	195.36	191.32	195.93	178.32
27	Yarn strength, AW	210.96	199.72	188.85	209.05	191.28	196.77	189.76
28	Yarn extension at break, BW	4.37	4.38	6.17	5.62	6.77	6.81	6.66
29	Yarn extension at break, AW	4.98	4.53	6.33	4.19	6.95	6.74	6.51
30	Yarn count (tex), BW	19.74	19.56	19.26	18.71	20.03	19.23	18.88
31	Yarn count (tex), AW	19.85	19.83	19.05	19.08	20.40	19.36	19.61
32	Thickness, BW	564.90	577.90	546.00	541.40	573.80	542.30	549.00
33	Thickness, AW	699.60	692.50	600.70	651.90	639.30	652.80	650.50
34	Turns per metre							
35	Colour (Red)	2.27	2.42	85.19	83.47	2.35	78.48	79.09
36	(Green)	2.64	2.88	78.82	76.63	2.72	65.51	65.85
37	(Blue)	5.90	6.44	52.35	49.66	6.00	25.21	25.69
38	Formaldehyde(ppm)	791.74	540.96	423.63	315.45	557.96	449.11	383.28
39	% Nitrogen (Total)	0.47	0.52	0.36	0.20	0.63	0.32	0.36
40	% Nitrogen (Fixed)	0.44	0.48	0.33	0.22	0.57	0.32	0.29

Table 22

MERIDIAN SINGLE JERSEY CASE STUDY

RESINATED FABRICS — ESBI-H1034

		Sample Identification
	Test Method	43
1	Length shrinkage, LD	2.44
2	Width shrinkage, LD	6.94
3	Length shrinkage, TD	3.81
4	Width shrinkage, TD	7.04
5	Length shrinkage, 5x	4.18
6	Width shrinkage, 5x	8.04
7	Weight (gsm)BW	130.25
8	Weight (gsm)AW	149.24
9	Courses per 3cm BW	57.30
10	Courses per 3cm LD	58.20
11	Courses per 3cm TD	59.70
12	Courses per 3cm AW	60.10
13	Wales per 3cm BW	40.50
14	Wales per 3cm LD	43.60
15	Wales per 3cm TD	44.90
16	Wales per 3cm AW	45.10
17	Stitch length (mm) BW	2.66
18	Stitch length (mm) AW	2.64
19	Burst strength, BW	401.70
20	Burst strength, AW	417.70
21	Distension at burst, BW	16.77
22	Distension at burst, AW	18.60
23	Angle of spirality, BW	3.28
24	Angle of spirality, AW	7.98
25	Width, BW	158.67
26	Yarn strength, BW	187.04
27	Yarn strength, AW	178.20
28	Yarn extension at break, BW	6.98
29	Yarn extension at break, AW	6.51
30	Yarn count (tex), BW	18.70
31	Yarn count (tex), AW	18.90
32	Thickness, BW	534.20
33	Thickness, AW	613.40
34	Turns per metre	
35	Colour (Red)	85.97
36	(Green)	87.34
37	(Blue)	99.26
38	Formaldehyde(ppm)	462.49
39	% Nitrogen (Total)	0.32
40	% Nitrogen (Fixed)	0.31

Table 23

Meridian 28g Single Jersey (Greige Fabrics)
Comparison of Measured and Calculated Weight

Item No.	Mea.Wt (BW)	Cal.Wt (BW)	Mea.Wt (AW)	Cal.Wt (AW)
1	121.86	123.19	169.00	175.88
2	122.07	121.48	169.38	172.84
3	129.50	128.77	173.24	176.18
4	128.55	128.68	175.53	176.45
5	132.01	128.65	175.94	175.02
6	130.82	128.05	173.67	175.91
7	134.11	133.56	174.12	177.76
8	135.49	130.19	174.40	175.47
9	134.24	129.94	173.71	178.81
10	135.47	130.57	172.71	170.06
11	133.93	128.13	170.53	170.53
12	131.93	128.70	172.06	168.99
13	135.77	127.70	172.24	163.84
14	132.82	116.68	173.31	163.58
15	135.79	124.37	171.84	157.46
16	137.09	127.67	173.75	171.64
17	128.66	118.92	175.68	162.97
18	127.85	120.28	176.77	161.07
19	125.35	124.95	171.83	161.80
20	128.97	127.06	173.50	169.16
21	131.07	120.71	177.86	162.93
22	130.45	128.73	176.24	159.52
23	137.06	130.70	173.01	165.29
24	129.66	118.95	170.64	171.05

Table 24

Meridian 28g Single Jersey (Dyed Fabrics)
Comparison of Measured vs Calculated Weight and % Shrinkage

Item No.	Mea.Wt (BW)	Cal.Wt (BW)	Mea.Wt (AW)	Cal.Wt (AW)	Mea.Sh (Len)	Cal.Sh (Len)	Mea.Sh (Wid)	Cal.Sh (Wid)
1	141.11	144.48	166.03	170.21	3.492	2.4711	11.318	12.830
2	143.42	149.42	162.48	167.39	5.552	4.5826	5.964	6.7761
3	145.46	141.52	159.34	163.05	5.402	4.3189	6.118	8.5889
4	136.49	143.46	160.65	164.93	4.818	4.0453	10.036	10.144
5	139.19	142.42	159.86	165.95	6.47	6.6343	7.58	7.0833
6	141.82	142.79	160.86	165.01	5.288	4.7775	8.04	8.7576
7	140.99	146.58	163.07	165.13	6.046	5.2718	6.308	7.7551
8	139.88	144.92	161.79	165.75	5.684	5.3712	8.078	8.9583
9	148.27	152.75	166.78	170.74	4.004	3.4865	8.228	7.2463
10	140.80	144.94	164.52	168.58	5.278	4.6325	9.578	11.111
11	127.61	143.12	162.31	167.46	5.064	5.1863	9.636	9.8562
12	146.15	150.28	171.25	174.80	4.524	3.3003	11.27	11.445
13	141.67	144.64	160.26	167.08	5.7	5.4313	8.972	11.134
14	141.54	141.43	159.50	163.67	3.75	2.7463	9.078	11.180
15	136.04	141.15	157.45	161.79	6.348	6.0260	8.228	9.8360
16	137.34	143.11	164.17	170.34	3.136	3.8709	12.718	12.190
17	139.77	142.50	161.75	162.71	-0.582	1.4285	14.532	13.675
18	144.42	146.42	163.91	167.15	6.122	5	6.668	7.8838
19	138.55	142.84	160.88	163.76	5.748	5.5284	9.47	7.7083
20	133.85	133.99	157.04	163.76	0.558	0.4885	18.64	18.619
21	143.37	147.11	162.57	165.69	4.448	3.0844	9.164	8.3507
22	145.12	145.12	165.16	172.70	6.082	6.6022	8.464	9.3360
23	141.54	144.69	160.47	164.97	5.092	6.3004	7.458	6.875
24	145.57	152.39	162.35	166.00	6.122	5.3658	4.804	4.5360
25	137.37	142.71	160.22	164.74	2.986	3.4201	11.528	10.995
26	153.41	153.92	168.07	172.48	5.31	4.5016	5.902	8.0412
27	146.20	150.54	164.15	169.88	5.24	4.8543	6.308	6.9037
28	149.12	152.91	167.30	165.90	3.18	0.3252	9.2	8.2452
29	144.60	145.10	163.31	167.36	7.782	8.1168	5.184	7.5203
30	144.71	151.42	165.75	167.02	5.49	3.5772	7.352	6.5708
31	151.42	152.43	170.26	169.19	3.786	1.6420	7.676	7.0981
32	146.73	145.41	160.84	165.49	6.462	6.8739	4.618	5.3497
33	141.86	143.64	163.30	168.14	5.92	4.8780	9.762	9.2975
34	150.43	149.81	168.41	168.76	4.316	2.9315	7.204	7.1578
35	155.57	156.40	169.40	174.37	3.588	4.1533	5.934	5.625
36	153.93	158.32	166.65	167.43	4.918	2.9315	4.528	2.9411
37	148.86	152.32	167.44	167.46	4.646	1.1627	7.488	8.6597
38	140.14	144.95	162.52	165.65	6.12	5.0570	7.386	7.8512
39	141.18	145.13	161.75	169.51	7.328	6.4250	6.29	7.0993
40	147.57	147.13	167.54	171.59	5.594	5.8823	8.258	8.7755
41	145.15	146.64	170.16	173.61	4.768	4.3338	9.234	11.293
42	142.91	147.19	161.20	163.02	4.94	2.7642	7.766	8.2304
43	138.14	144.70	170.29	172.66	4.616	2.4549	13.63	14.747
44	146.12	152.65	166.03	169.70	4.752	3.0995	9.27	7.5975
45	148.58	155.81	168.64	166.21	5.052	2.7868	4.546	4.1666
46	149.85	150.63	169.22	169.56	3.686	1.6313	7.796	7.5471

Table 25

Meridian 28g Single Jersey (Resinated Fabrics)
Comparison of Measured vs Calculated (Weight and % Shrinkage)

Item No.	Mea.Wt (BW)	Cal.Wt (BW)	Mea.Wt (AW)	Cal.Wt (AW)	Mea.Sh (Len)	Cal.Sh (Len)	Mea.Sh (Wid)	Cal.Sh (Wid)
1	138.28	146.06	160.03	159.17	4.204	1.1824	9.398	7.9470
2	135.03	135.01	149.30	152.18	4.542	5.0903	6.344	6.8027
3	136.30	134.86	152.90	151.47	6.17	6.3122	5.572	7.2847
4	132.20	133.24	147.30	151.81	6.012	4.8013	6.838	7.3991
5	131.61	127.39	148.32	147.25	5.034	6.8561	6.29	8.5011
6	132.05	130.98	148.66	147.32	4.214	5.2453	6.66	8.7837
7	132.79	136.46	150.99	152.06	4.782	4.7775	8.02	8.6666
8	132.27	130.50	151.30	151.51	6.564	5.4908	8.26	9.6069
9	136.67	139.31	155.61	158.13	5.288	4.9919	6.732	6.0674
10	132.61	133.79	151.03	155.84	6.22	4.8013	6.784	6.7114
11	132.75	136.99	151.07	157.23	5.062	6.1889	7.994	7.6626
12	131.98	140.42	160.00	153.58	7.368	3.9115	9.312	8.2222
13	129.72	129.15	148.30	146.49	5.594	5.3601	5.962	7.0294
14	132.30	129.41	151.1	148.50	3.854	4.1118	6.516	6.4516
15	130.56	129.08	149.79	150.92	5.404	6.6445	7.51	10.199
16	135.50	137.98	158.21	158.25	5.442	5.2892	8.15	8.2788
17	131.38	136.96	152.03	153.04	5.326	4.2622	9.556	8.9686
18	137.41	138.87	154.40	151.78	7.546	5.1155	7.168	7.7092
19	131.84	130.62	149.67	151.60	4.708	4.1876	8.356	7.6233
20	125.85	130.69	150.47	156.64	6.818	8.3735	9.602	10.222
21	128.01	132.82	148.11	150.14	5.584	5.8919	8.944	8.3900
22	139.9	145.00	160.14	162.90	6.588	4.5901	7.802	7.2847
23	133.39	134.32	151.30	150.14	4.972	3.3557	7.31	6.25
24	134.20	136.96	153.06	155.21	5.796	5.0819	7.322	9.6456
25	132.13	129.02	151.78	149.79	6.748	7.6013	7.868	8.3700
26	140.66	137.95	162.63	166.07	5.91	5.2631	9.574	8.5526
27	142.37	138.24	159.80	160.38	3.884	3.1301	7.388	7.1748
28	137.92	142.05	160.51	161.95	6.328	5.5284	9.502	7.9470
29	133.37	128.99	148.82	150.54	5.466	5.2100	7.578	6.7873
30	133.27	136.91	153.65	152.95	6.922	4.7619	8.19	7.6923
31	142.77	140.20	163.54	165.00	5.108	4.7077	8.956	8.5903
32	131.31	129.39	152.72	157.15	8.816	8.5858	8.196	8.5152
33	135.54	131.95	153.67	154.32	3.572	6.0100	6.128	7.4492
34	141.65	140.89	159.99	171.29	4.104	3.7828	7.852	7.1588
35	145.31	148.32	162.44	164.02	3.626	2.5889	6.696	6.2780
36	139.97	141.56	162.55	167.24	4.288	7.3051	8.074	8.3516
37	143.69	142.46	161.55	162.05	4.178	4.4481	7.66	8.1677
38	135.38	132.84	153.00	149.95	3.642	4.1806	5.796	8.2774
39	132.81	135.53	153.03	151.43	6.236	5.7142	6.836	6.0402
40	140.75	136.45	161.37	162.41	3.822	4.6744	6.562	10.444
41	134.45	138.33	150.14	156.30	4.096	5.0819	7.43	6.7567
42	135.70	135.84	151.72	158.61	4.622	5.7096	7.734	7.3660
43	130.25	128.02	149.24	150.16	4.176	4.6589	8.044	10.199

Table 26

GREIGE (ALL SAMPLES)

*** COLUMN STATISTICS ***

TEST	N	Mean	SD	CV%
1	0	0.0000	0.0000	0.00
2	0	0.0000	0.0000	0.00
3	0	0.0000	0.0000	0.00
4	0	0.0000	0.0000	0.00
5	0	0.0000	0.0000	0.00
6	0	0.0000	0.0000	0.00
7	24	131.2753	4.2585	3.24
8	24	173.3762	2.2590	1.30
9	24	58.7548	2.3223	3.95
10	0	0.0000	0.0000	0.00
11	0	0.0000	0.0000	0.00
12	24	64.7250	1.2008	1.86
13	24	37.1958	0.6437	1.73
14	0	0.0000	0.0000	0.00
15	0	0.0000	0.0000	0.00
16	24	46.8292	1.4001	2.99
17	24	2.6999	0.0239	0.89
18	24	2.6569	0.0323	1.22
19	24	600.4292	24.7526	4.12
20	24	587.9208	29.1991	4.97
21	24	17.6659	0.8149	4.61
22	24	20.9236	0.4607	2.20
23	24	10.1794	3.3836	33.24
24	24	15.3371	4.8091	31.36
25	0	0.0000	0.0000	0.00
26	24	248.1244	15.3462	6.18
27	24	235.5422	14.4576	6.14
28	24	6.7384	0.2488	3.69
29	24	7.2863	0.3692	5.07
30	24	19.2453	0.3110	1.62
31	24	18.9288	0.3574	1.89
32	24	607.2750	21.7953	3.59
33	24	767.8375	12.3574	1.61
34	24	158.2375	6.5669	4.15

Table 27

DYED ONLY (ALL SAMPLES)

*** COLUMN STATISTICS ***

TEST	N	Mean	SD	CV%
1	46	0.8307	1.6068	193.43
2	46	6.5713	2.7376	41.66
3	46	3.7797	1.4774	39.09
4	46	7.9201	2.6932	34.00
5	46	4.8832	1.5028	30.77
6	46	8.4176	2.7555	32.74
7	46	143.5656	5.4873	3.82
8	46	164.0674	3.6968	2.25
9	46	59.0239	1.1960	2.03
10	46	59.5674	0.7772	1.30
11	46	61.1522	0.7918	1.29
12	46	61.5652	0.7028	1.14
13	46	44.1435	1.3937	3.16
14	46	47.3022	0.5965	1.26
15	46	48.1413	0.4166	0.87
16	46	48.3913	0.5846	1.21
17	46	2.6710	0.0139	0.52
18	46	2.6603	0.0126	0.47
19	46	559.8609	22.2086	3.97
20	46	561.3848	25.0579	4.46
21	46	18.0928	0.9452	5.22
22	46	19.0424	0.5992	3.15
23	46	3.2681	2.3614	72.26
24	46	8.7561	1.2613	14.40
25	46	153.6355	5.4734	3.56
26	46	286.0603	31.6795	11.07
27	46	292.2930	30.9122	10.58
28	46	7.4671	0.7504	10.05
29	46	6.9509	0.8454	12.16
30	46	19.0162	0.2878	1.51
31	46	19.0318	0.3632	1.91
32	46	645.9326	18.1788	2.81
33	46	800.2478	20.7224	2.59
34	0	0.0000	0.0000	0.00
35	46	46.0059	38.8107	84.36
36	46	43.5817	37.7125	86.53
37	46	40.5813	36.4204	89.75

Table 28

RESINATED (ALL SAMPLES)

*** COLUMN STATISTICS ***

TEST	N	Mean	SD	CV%
1	43	2.4733	1.1527	46.61
2	43	6.0847	1.0656	17.51
3	43	4.8430	1.1968	24.71
4	43	7.1598	1.1007	15.37
5	43	5.3171	1.2189	22.92
6	43	7.6387	1.0969	14.36
7	43	134.9776	4.4029	3.26
8	43	154.0793	4.9789	3.23
9	43	57.3209	1.1252	1.96
10	43	58.6651	0.9773	1.67
11	43	60.0681	0.8496	1.41
12	43	60.4256	0.8729	1.44
13	43	41.3448	0.5252	1.27
14	43	43.9615	0.7877	1.79
15	43	44.7860	0.5617	1.25
16	43	44.9188	0.5671	1.26
17	43	2.6784	0.0355	1.33
18	43	2.6690	0.0242	0.91
19	43	435.2652	29.4275	6.76
20	43	457.7628	31.8055	6.95
21	43	17.0718	0.9496	5.56
22	43	18.9533	0.8943	4.72
23	43	2.5255	1.3187	52.21
24	43	8.4241	1.6768	19.90
25	43	156.2349	4.2254	2.70
26	43	194.9006	8.9686	4.60
27	43	200.0673	13.6558	6.83
28	43	6.0367	1.2276	20.34
29	43	6.0187	0.9801	16.28
30	43	19.2275	0.4174	2.17
31	43	19.3119	0.5321	2.76
32	43	540.6717	19.6972	3.64
33	43	652.7581	32.0766	4.91
34	0	0.0000	0.0000	0.00
35	43	52.7477	37.2369	70.59
36	43	49.5526	36.2313	73.12
37	43	43.8923	35.3307	80.49
38	43	447.0067	165.3923	37.00
39	43	0.3526	0.1336	37.88
40	43	0.3109	0.1190	38.28

Table 29

FIXAPRET (18 SAMPLES)

*** COLUMN STATISTICS ***

TEST	N	Mean	SD	CV%
1	18	2.5150	1.3699	54.47
2	18	5.7420	1.1902	20.73
3	18	4.7064	1.2968	27.55
4	18	6.8451	1.1394	16.64
5	18	5.1781	0.9831	18.98
6	18	7.3000	1.0768	14.75
7	18	133.2001	2.3653	1.78
8	18	151.4926	3.6429	2.40
9	18	57.2833	0.9205	1.61
10	18	58.8444	0.8262	1.40
11	18	60.0682	0.6590	1.10
12	18	60.3444	0.8508	1.41
13	18	41.2000	0.4653	1.13
14	18	43.7081	0.8829	2.02
15	18	44.7389	0.6608	1.48
16	18	44.7237	0.5461	1.22
17	18	2.6599	0.0270	1.02
18	18	2.6565	0.0166	0.62
19	18	423.5704	30.9570	7.31
20	18	435.7278	24.3139	5.58
21	18	17.0491	1.1419	6.70
22	18	18.6158	0.8143	4.37
23	18	2.0078	0.9321	46.42
24	18	7.2115	1.1045	15.32
25	18	156.3870	5.9107	3.78
26	18	189.8150	8.2366	4.34
27	18	191.2900	10.0644	5.26
28	18	6.6270	0.5346	8.07
29	18	6.6114	0.3381	5.11
30	18	19.2314	0.4420	2.30
31	18	19.1697	0.3769	1.97
32	18	537.3879	15.9637	2.97
33	18	642.2222	28.8157	4.49
34	0	0.0000	0.0000	0.00
35	18	62.4350	32.8774	52.66
36	18	58.5139	33.6429	57.50
37	18	54.5372	38.9677	71.45
38	18	413.1039	120.7497	29.23
39	18	0.3572	0.0906	25.36
40	18	0.3028	0.0699	23.10

Table 30

PERMAFRESH (25 SAMPLES)

*** COLUMN STATISTICS ***

TEST	N	Mean	SD	CV%
1	25	2.4433	0.9969	40.80
2	25	6.3314	0.9123	14.41
3	25	4.9413	1.1364	23.00
4	25	7.3863	1.0359	14.02
5	25	5.4172	1.3749	25.38
6	25	7.8826	1.0660	13.52
7	25	136.2574	5.0878	3.73
8	25	155.9418	5.0348	3.23
9	25	57.3480	1.2702	2.21
10	25	58.5360	1.0708	1.83
11	25	60.0680	0.9775	1.63
12	25	60.4840	0.9012	1.49
13	25	41.4491	0.5499	1.33
14	25	44.1440	0.6715	1.52
15	25	44.8200	0.4899	1.09
16	25	45.0593	0.5500	1.22
17	25	2.6918	0.0354	1.31
18	25	2.6780	0.0250	0.93
19	25	443.6855	25.6946	5.79
20	25	473.6280	26.9294	5.69
21	25	17.0881	0.8086	4.73
22	25	19.1963	0.8848	4.61
23	25	2.8983	1.4429	49.78
24	25	9.2972	1.4695	15.81
25	25	156.1253	2.5433	1.63
26	25	198.5621	7.7037	3.88
27	25	206.3870	12.4584	6.04
28	25	5.6116	1.4091	25.11
29	25	5.5919	1.0710	19.15
30	25	19.2247	0.4081	2.12
31	25	19.4142	0.6074	3.13
32	25	543.0360	22.0123	4.05
33	25	660.3440	32.6991	4.95
34	0	0.0000	0.0000	0.00
35	25	45.7728	39.2405	85.73
36	25	43.1004	37.3084	86.56
37	25	36.2280	31.0272	85.64
38	25	471.4168	189.8947	40.28
39	25	0.3492	0.1593	45.62
40	25	0.3168	0.1457	46.00

Table 31

MERIDIAN 286 SINGLE JERSEY CASE STUDY

- DYED FABRICS COLOUR MEASUREMENT

No.	G	R	B	L	A	B	C	X	Y	Z	FINISH
1	1.92	1.83	3.52	15.06	7.01	-13.81	15.48	2.13	1.92	4.16	Rea/
2	67.23	81.22	26.05	85.62	11.02	43.93	45.29	68.81	67.23	30.77	Dir/
3	88.80	87.83	101.36	95.50	8.22	-14.24	16.44	88.76	88.80	119.71	Opt/
4	87.49	86.70	98.73	94.95	8.01	-13.38	15.60	87.36	87.49	116.60	Opt/
5	80.06	85.26	48.29	91.71	0.57	24.45	24.46	76.34	80.06	57.03	Dir/
6	51.03	44.05	67.27	76.70	-2.04	-20.28	20.38	47.74	51.03	79.45	Rea/
7	65.93	79.85	25.87	84.96	11.43	43.10	44.59	67.70	65.93	30.55	Dir/
8	87.32	86.16	98.26	94.87	7.36	-13.18	15.10	86.84	87.32	116.05	Opt/
9	6.36	3.86	22.87	30.30	15.03	-45.86	48.26	7.51	6.36	27.01	Rea/
10	17.44	33.50	22.71	48.81	63.87	-13.66	65.31	30.73	17.44	26.82	Rea/
11	15.99	31.77	20.53	46.96	65.06	-12.70	66.29	28.94	15.99	24.25	Rea/
12	1.73	1.65	2.04	14.00	1.31	-4.44	4.63	1.69	1.73	2.41	Rea/
13	87.42	85.73	97.72	94.92	6.35	-12.73	14.23	86.40	87.42	115.41	Opt/
14	88.45	86.91	101.72	95.35	7.65	-14.73	16.60	88.11	88.45	120.13	Opt/
15	86.28	84.99	98.25	94.43	7.54	-13.94	15.85	85.92	86.28	116.03	Opt/
16	12.65	30.84	4.69	42.23	69.87	26.27	74.65	25.11	12.65	5.54	Rea/
17	85.39	85.00	95.22	94.05	8.08	-12.47	14.86	85.34	85.39	112.45	Opt/
18	78.24	84.55	52.22	90.89	4.55	18.77	19.32	76.55	78.24	61.67	Dir/
19	76.73	83.41	49.89	90.20	4.78	20.08	20.64	75.20	76.73	58.92	Dir/
20	37.73	36.66	43.17	67.82	4.56	-10.83	11.75	37.22	37.73	50.98	Dir/
21	77.41	84.45	50.81	90.51	5.47	19.62	20.37	76.20	77.41	60.01	Dir/
22	2.57	2.23	5.58	18.23	7.69	-19.52	20.98	2.84	2.57	6.59	Ind/
23	88.64	87.35	100.41	95.43	7.47	-13.70	15.61	88.20	88.64	118.58	Opt/
24	41.29	39.19	46.71	70.38	2.11	-10.55	10.76	39.90	41.29	55.16	Dir/
25	87.42	86.21	99.00	94.92	7.52	-13.62	15.56	87.03	87.42	116.92	Opt/
26	2.92	2.44	6.26	19.72	6.52	-20.03	21.06	3.14	2.92	7.39	Rea/
27	2.76	2.30	6.07	19.06	6.84	-20.34	21.46	2.99	2.76	7.17	Rea/
28	2.79	2.39	6.22	19.18	8.03	-20.78	22.28	3.09	2.79	7.35	Rea/
29	77.11	83.83	50.77	90.37	5.05	19.43	20.07	75.70	77.11	59.96	Dir/
30	77.25	83.17	52.22	90.44	4.30	17.99	18.50	75.47	77.25	61.67	Dir/
31	2.70	2.32	5.98	18.80	7.90	-20.38	21.86	2.99	2.70	7.06	Rea/
32	75.87	82.46	49.85	89.80	4.95	19.44	20.06	74.45	75.87	58.87	Dir/
33	75.35	82.78	49.84	89.56	6.51	19.03	20.11	74.70	75.35	58.86	Dir/
34	2.77	2.32	6.10	19.10	7.03	-20.40	21.58	3.02	2.77	7.20	Rea/
35	2.72	2.31	6.06	18.89	7.67	-20.59	21.97	3.00	2.72	7.16	Rea/
36	2.58	2.22	5.70	18.28	7.78	-20.01	21.47	2.86	2.58	6.73	Rea/
37	2.81	2.36	6.19	19.27	7.16	-20.50	21.72	3.06	2.81	7.31	Rea/
38	77.87	83.31	51.92	90.72	3.18	18.80	19.07	75.52	77.87	61.32	Dir/
39	75.04	81.84	48.23	89.41	4.95	20.55	21.14	73.65	75.04	56.96	Dir/
40	2.85	2.42	6.25	19.43	7.45	-20.48	21.79	3.12	2.85	7.38	Rea/
41	1.82	1.72	2.15	14.51	1.05	-4.55	4.67	1.77	1.82	2.54	Rea/
42	87.05	85.78	99.53	94.76	7.76	-14.26	16.23	86.80	87.05	117.54	Opt/
43	2.85	2.30	6.43	19.43	6.44	-21.25	22.21	3.06	2.85	7.59	Ind/
44	2.89	2.33	6.47	19.60	6.27	-21.14	22.05	3.10	2.89	7.64	Ind/
45	2.68	2.29	5.91	18.71	7.62	-20.21	21.60	2.95	2.68	6.98	Rea/
46	2.56	2.18	5.70	18.19	7.59	-20.16	21.54	2.83	2.56	6.73	Rea/

Table 32

MERIDIAN 28G SINGLE JERSEY CASE STUDY

RESINATED FABRICS COLOUR MEASUREMENT

No.	G	R	B	L	A	B	C	X	Y	Z	Δ E	FINISH
1	1.96	1.87	3.51	15.28	6.73	-13.37	14.97	2.15	1.96	4.15	0.56	Rea/Fix
2	65.83	79.66	25.16	84.91	11.02	44.22	45.57	67.41	65.83	29.71	0.77	Dir/Fix
3	88.08	86.63	99.43	95.19	7.09	-13.44	15.19	87.44	88.08	117.43	1.42	Opt/Fix
4	88.00	86.77	99.20	95.16	7.35	-13.34	15.23	87.51	88.00	117.16	0.69	Opt/Fix
5	80.13	84.64	48.74	91.74	-0.37	24.01	24.01	75.94	80.13	57.56	1.04	Dir/Fix
6	51.95	45.19	67.98	77.25	-1.58	-19.95	20.02	48.77	51.95	80.28	0.79	Rea/Fix
7	65.67	79.49	25.61	84.83	11.27	43.31	44.75	67.37	65.67	30.25	0.30	Dir/Fix
8	87.38	86.06	97.57	94.90	6.85	-12.66	14.39	86.63	87.38	115.23	0.73	Opt/Fix
9	6.55	4.00	22.71	30.76	13.80	-44.78	46.86	7.59	6.55	26.82	1.70	Rea/Fix
10	17.57	33.62	22.64	48.97	63.47	-13.26	64.84	30.81	17.57	26.74	0.59	Rea/Fix
11	16.53	32.54	21.07	47.66	64.76	-12.55	65.97	29.65	16.53	24.88	0.78	Rea/Fix
12	1.77	1.67	2.05	14.23	0.78	-4.13	4.20	1.71	1.77	2.42	0.66	Rea/Fix
13	87.55	85.88	97.18	94.97	6.13	-12.26	13.71	86.41	87.55	114.77	0.52	Opt/Fix
14	88.48	86.84	100.98	95.36	7.23	-14.21	15.94	87.91	88.48	119.26	0.67	Opt/Fix
15	87.10	85.43	97.68	94.78	6.48	-12.94	14.47	86.16	87.10	115.36	1.50	Opt/Fix
16	13.23	31.82	5.03	43.11	69.62	26.04	74.32	25.94	13.23	5.94	0.94	Rea/Per
17	86.46	85.50	96.08	94.51	7.16	-12.29	14.23	85.90	86.46	113.47	1.04	Opt/Per
18	77.08	83.79	50.24	90.36	4.84	19.98	20.55	75.57	77.08	59.33	1.35	Dir/Per
19	76.70	83.43	49.68	90.18	4.79	20.28	20.84	75.18	76.70	58.67	0.21	Dir/Per
20	37.48	36.31	42.78	67.64	4.21	-10.68	11.48	36.87	37.48	50.52	0.43	Dir/Per
21	77.32	84.20	50.24	90.47	5.02	20.17	20.78	75.89	77.32	59.33	0.71	Dir/Per
22	2.80	2.38	6.09	19.22	7.27	-20.14	21.41	3.06	2.80	7.19	1.24	Ind/Per
23	86.76	85.43	96.57	94.64	6.69	-12.41	14.10	85.94	86.76	114.05	1.70	Opt/Per
24	42.07	40.13	47.08	70.92	2.30	-10.04	10.30	40.71	42.07	55.60	0.77	Dir/Per
25	88.00	86.60	98.88	95.16	6.99	-13.12	14.86	87.31	88.00	116.78	0.77	Opt/Per
26	2.95	2.46	6.58	19.84	7.31	-21.18	22.41	3.22	2.95	7.77	1.41	Rea/Per
27	2.98	2.49	6.59	19.96	7.22	-21.02	22.22	3.25	2.98	7.78	1.20	Rea/Per
28	2.90	2.47	6.52	19.64	8.13	-21.28	22.78	3.22	2.90	7.70	0.69	Rea/Per
29	76.02	82.99	49.35	89.87	5.30	20.10	20.79	74.77	76.02	58.28	0.88	Dir/Per
30	78.11	84.20	52.44	90.83	4.34	18.44	18.94	76.32	78.11	61.93	0.60	Dir/Per
31	2.86	2.44	6.35	19.47	7.88	-20.84	22.28	3.16	2.86	7.50	0.82	Rea/Per
32	76.16	82.85	49.49	89.93	4.85	20.06	20.64	74.68	76.16	58.45	0.65	Dir/Per
33	78.11	84.20	52.44	90.83	4.34	18.44	18.94	76.32	78.11	61.93	2.58	Dir/Per
34	2.99	2.52	6.60	20.00	7.47	-20.99	22.28	3.27	2.99	7.79	1.17	Rea/Per
35	2.84	2.41	6.32	19.39	7.73	-20.85	22.24	3.13	2.84	7.46	0.57	Rea/Per
36	2.64	2.27	5.90	18.54	8.05	-20.47	21.99	2.94	2.64	6.97	0.60	Rea/Per
37	2.88	2.42	6.44	19.56	7.56	-21.08	22.40	3.16	2.88	7.61	0.76	Rea/Per
38	78.82	85.19	52.35	91.15	4.48	19.09	19.61	77.08	78.82	61.83	1.40	Dir/Per
39	76.63	83.47	49.66	90.15	4.98	20.25	20.85	75.20	76.63	58.65	0.80	Dir/Per
40	2.72	2.35	6.00	18.89	8.02	-20.32	21.84	3.02	2.72	7.09	0.80	Rea/Per

Table 33

MERIDIAN 286 SINGLE JERSEY

NITROGENS & FORMALDEHYDES

ID	TOTAL(N)	FIXED(N)	%CURED	FORMALDEHYDE	
1	0.54	0.41	75.93	753.13	
2	0.36	0.30	83.33	383.67	
3	0.19	0.18	94.74	409.54	
4	0.32	-0.21	65.63	276.69	FIXAPRET C.P.J
5	0.34	0.30	88.24	393.38	
6	0.37	0.33	89.19	404.85	
7	0.33	0.26	78.79	450.30	
8	0.20	0.18	90.00	291.24	
9	0.39	0.36	92.31	269.03	
10	0.42	0.35	83.33	452.27	
11	0.37	0.32	86.49	323.70	
12	0.55	0.45	81.82	619.49	
13	0.33	0.28	84.85	277.07	
14	0.31	0.27	87.10	420.23	
15	0.41	0.33	80.49	416.40	
16	0.32	0.29	90.63	278.80	
17	0.18	0.16	88.89	387.10	
18	0.21	0.21	100.00	375.49	
19	0.23	0.20	86.96	358.63	
20	0.21	0.13	61.90	333.31	
21	0.22	0.21	95.45	179.44	
22	0.73	0.64	87.67	459.47	
23	0.16	0.18	112.50	272.37	
24	0.21	0.19	90.48	383.85	
25	0.21	0.17	80.95	467.35	
26	0.45	0.42	93.33	903.69	
27	0.47	0.40	85.11	493.93	PERMAFRESH U.L.F
28	0.49	0.45	91.84	985.40	
29	0.22	0.18	81.82	297.35	
30	0.21	0.19	90.48	453.35	
31	0.45	0.42	93.33	560.13	
32	0.23	0.19	82.61	459.04	
33	0.38	0.34	89.47	540.47	
34	0.45	0.43	95.56	409.94	
35	0.52	0.48	92.31	556.57	
36	0.47	0.44	93.62	791.74	
37	0.52	0.48	92.31	540.96	
38	0.36	0.33	91.67	423.63	
39	0.20	0.22	110.00	315.45	
40	0.63	0.57	90.48	557.96	
41	0.32	0.32	100.00	449.11	
42	0.36	0.29	80.56	383.28	
43	0.32	0.31	96.88	462.49	FIXAPRET C.P.J.

Table 34

Burst Strength to Weight Comparisons

AS RECEIVED

	Strength kn/sqm		Weight g/sqm		Str/Wt ratio	Str loss	Str/Wt loss	Wt loss
	mean	%cv	mean	%cv	mean	%	%	%
Dyed Only								
White	567.0	3.6	140.0	2.1	4.1	-	-	-
Direct	572.0	3.6	142.0	2.5	4.0	-	-	-
Reactive	545.0	2.9	146.0	4.5	3.7	-	-	-
All Fabrics	560.0	4.0	144.0	3.8	3.9	-	-	-
Resin Finished								
White	416.0	7.8	132.0	1.4	3.2	26.7	22.2	5.7
Direct	429.0	5.3	133.0	2.5	3.2	25.0	19.9	6.3
Reactive	454.0	5.2	138.0	3.2	3.3	16.7	12.1	5.5
All Fabrics	435.0	6.8	135.0	3.3	3.2	22.4	17.9	6.2
Fixapret								
White	403.0	7.0	132.0	1.7	3.1	28.9	24.7	5.7
Direct	420.0	4.6	134.0	1.3	3.1	26.6	22.1	5.6
Reactive	450.0	5.2	134.0	2.0	3.4	17.4	9.9	8.2
All Fabrics	424.0	7.3	133.0	2.4	3.2	24.3	17.9	7.6
Permafresh								
White	447.0	4.5	132.0	0.8	3.4	21.2	16.3	5.7
Direct	433.0	5.5	133.0	2.9	3.3	24.3	18.9	5.3
Reactive	456.0	5.5	141.0	2.0	3.2	16.3	13.4	3.4
All Fabrics	444.0	5.8	136.0	3.7	3.3	20.8	15.4	5.6

REFERENCE STATE

	Strength kn/sqm		Weight g/sqm		Str/Wt ratio	Str loss	Str/Wt loss	Wt loss
	mean	%cv	mean	%cv	mean	%	%	%
Dyed Only								
White	570.0	3.3	160.0	0.8	3.6	-	-	-
Direct	576.0	3.7	163.0	1.8	3.5	-	-	-
Reactive	543.0	3.7	167.0	1.7	3.3	-	-	-
All Fabrics	561.0	4.5	164.0	2.3	3.4	-	-	-
Resin Finished								
White	439.0	5.9	150.0	1.2	2.9	23.0	17.7	6.3
Direct	457.0	7.3	152.0	2.0	3.0	20.7	15.0	6.8
Reactive	470.0	6.2	159.0	2.9	3.0	13.5	9.2	4.8
All Fabrics	458.0	7.0	154.0	3.2	3.0	18.4	11.8	6.1
Fixapret								
White	433.0	6.5	150.0	1.3	2.9	24.1	18.8	6.2
Direct	431.0	4.7	150.0	0.9	2.9	25.2	18.7	8.0
Reactive	443.0	5.6	154.0	3.2	2.9	18.4	11.7	7.8
All Fabrics	436.0	5.6	151.0	2.4	2.9	22.3	14.7	8.0
Permafresh								
White	455.0	1.7	152.0	0.3	3.0	20.2	16.0	5.0
Direct	467.0	6.9	153.0	2.1	3.1	19.0	13.6	6.1
Reactive	487.0	3.6	161.0	1.0	3.0	10.3	7.1	3.6
All Fabrics	474.0	5.7	156.0	3.2	3.0	15.5	11.8	4.9

Figure 1

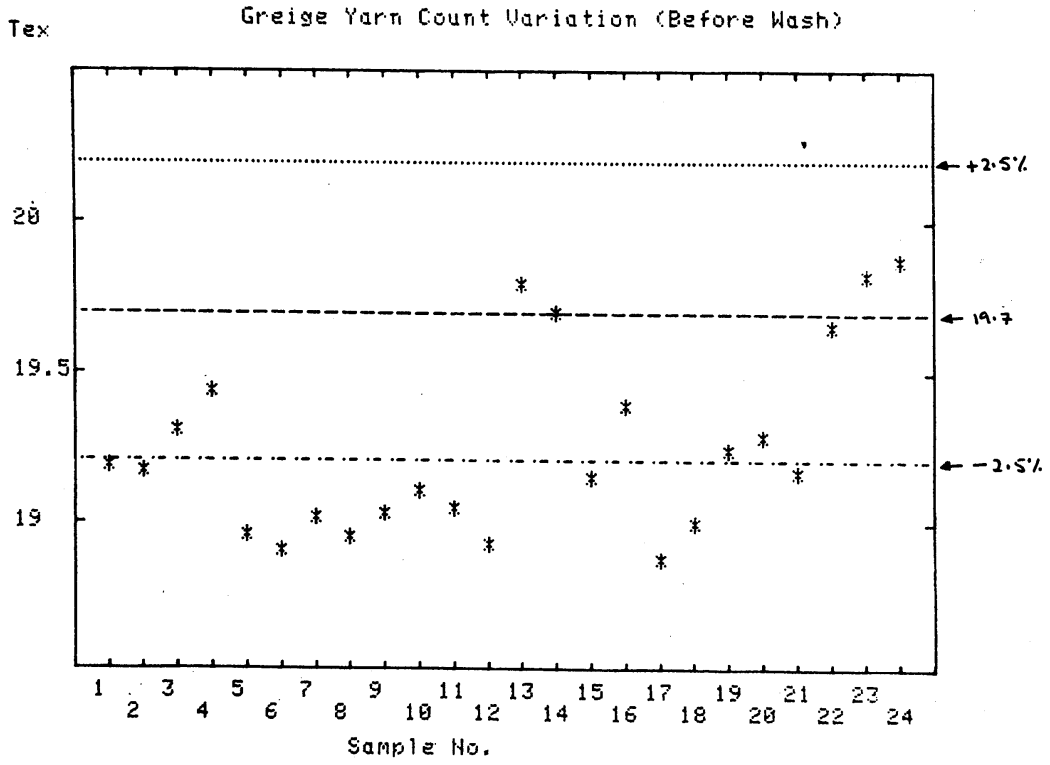


Figure 2

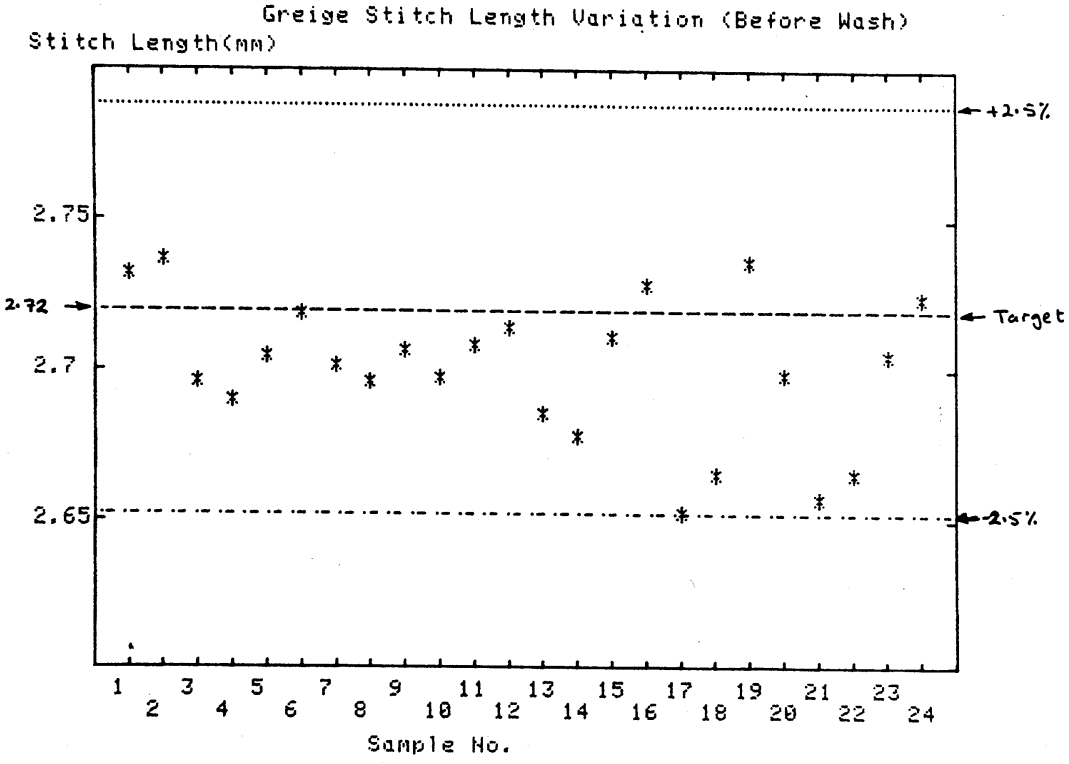


Figure 3

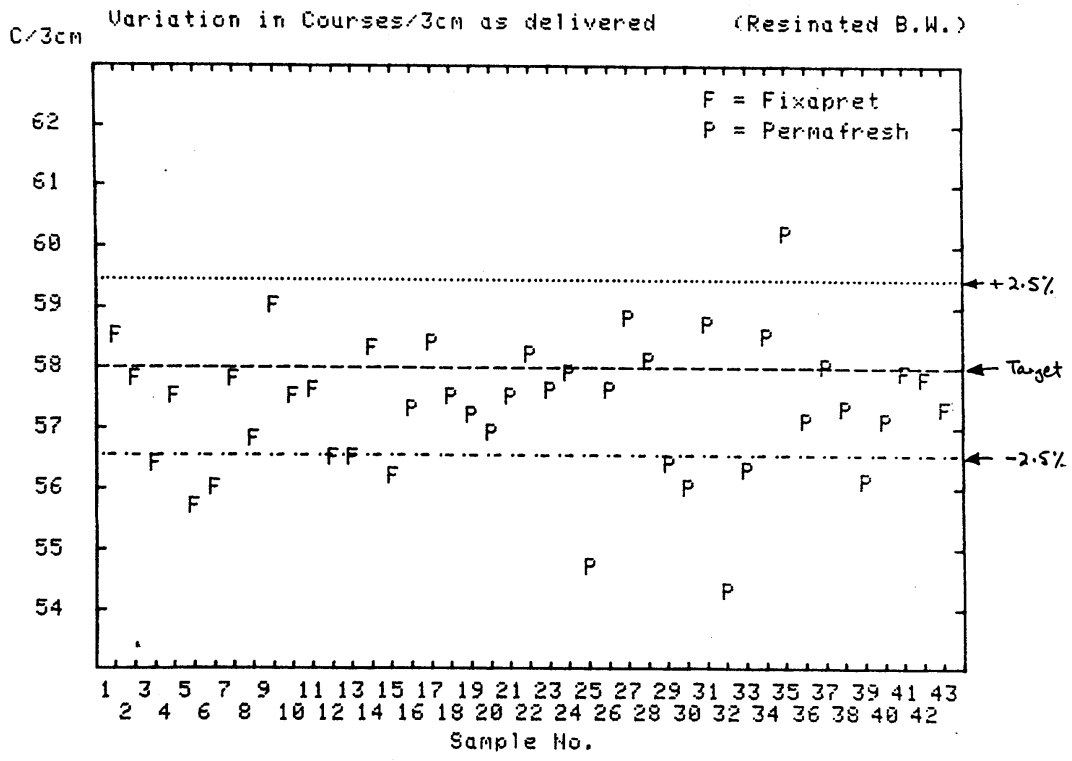


Figure 4

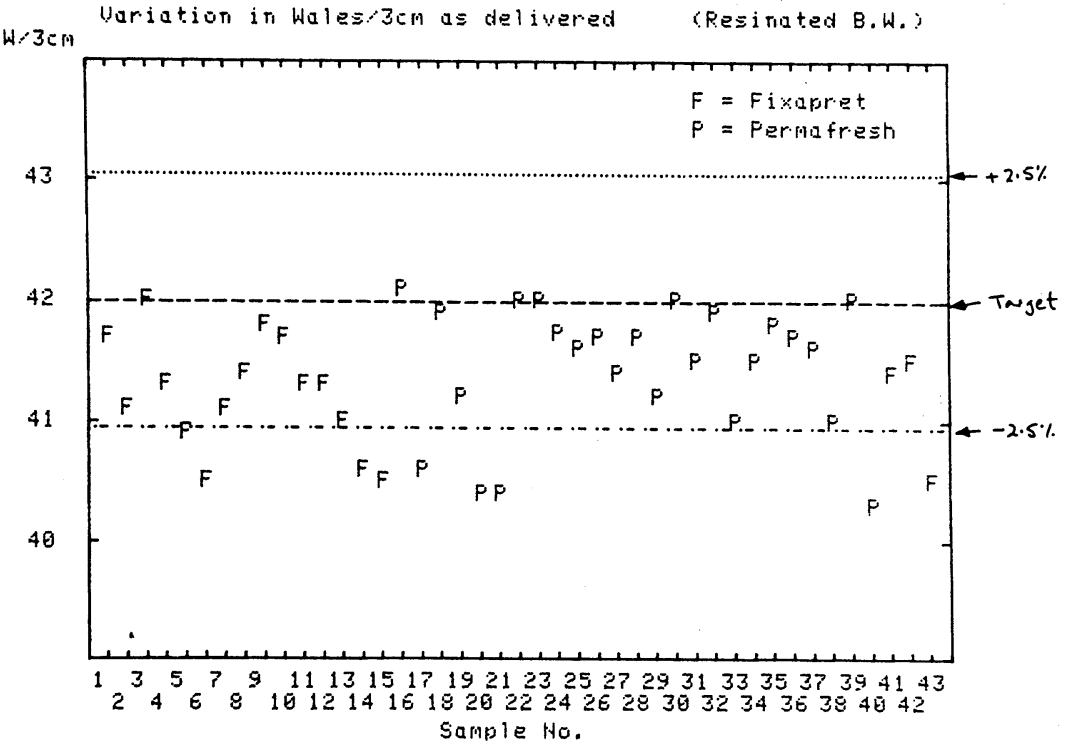


Figure 5

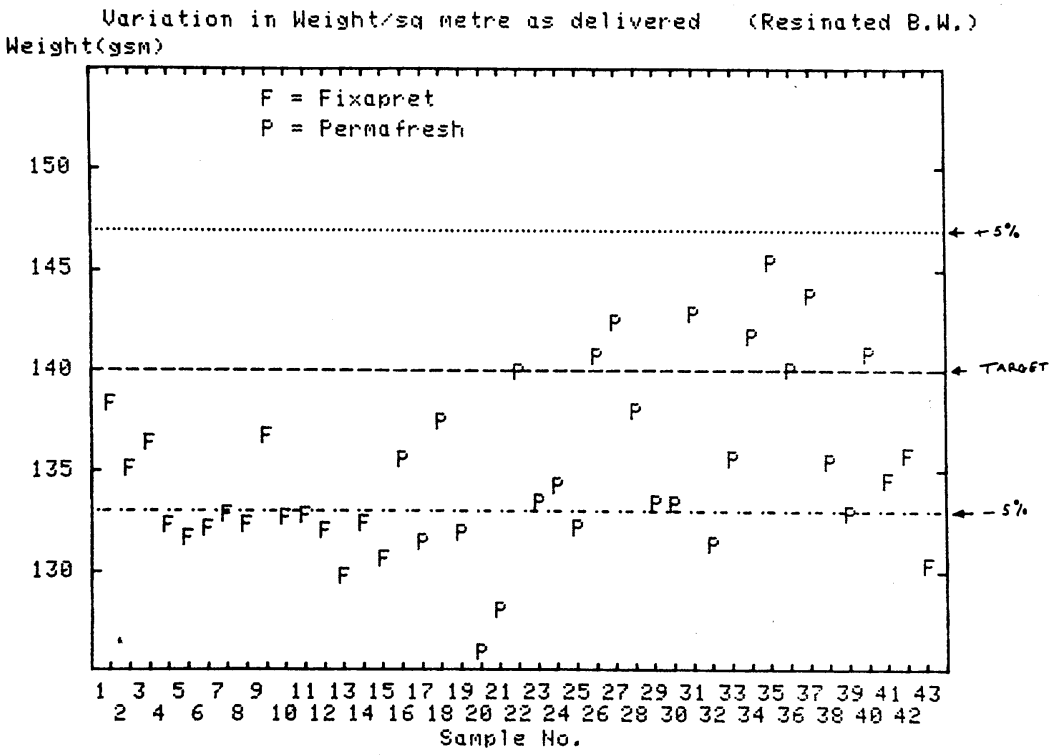


Figure 6

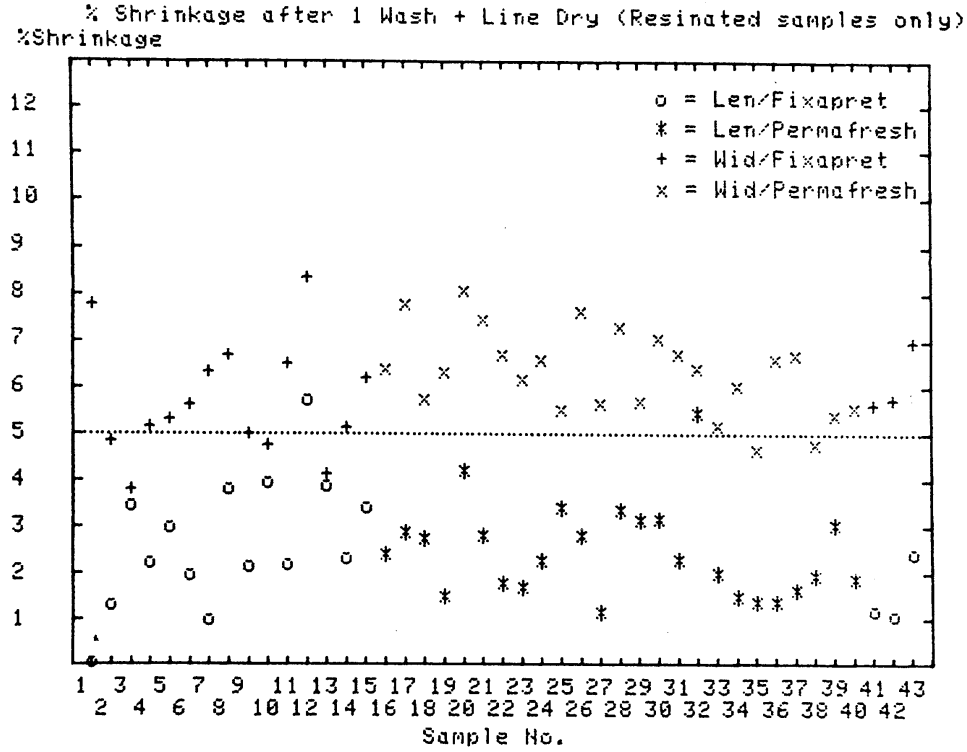


Figure 7

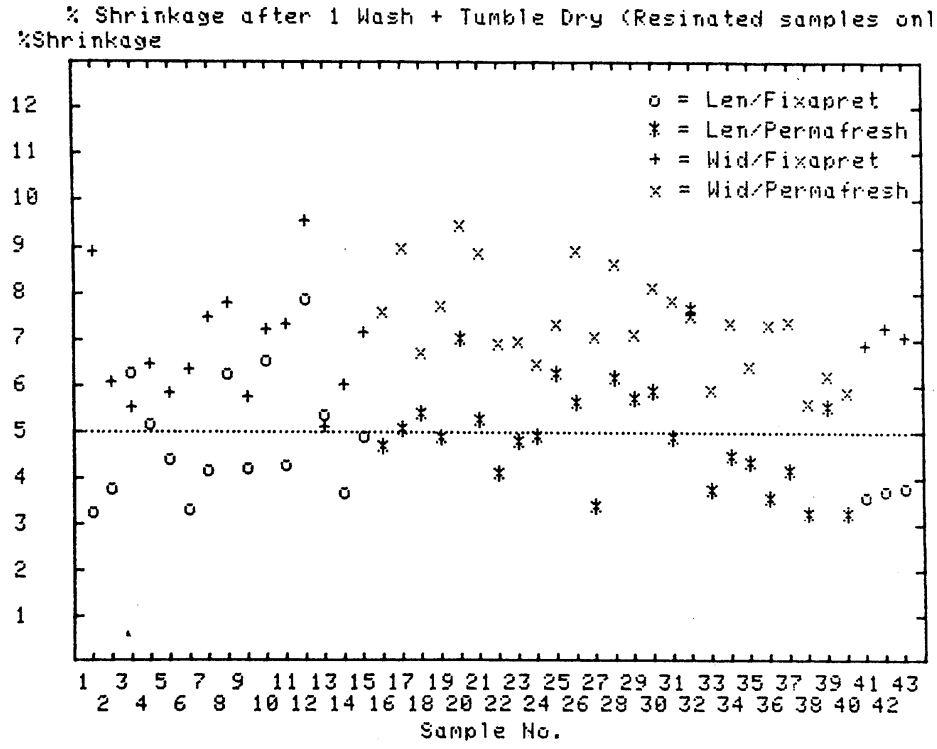


Figure 8

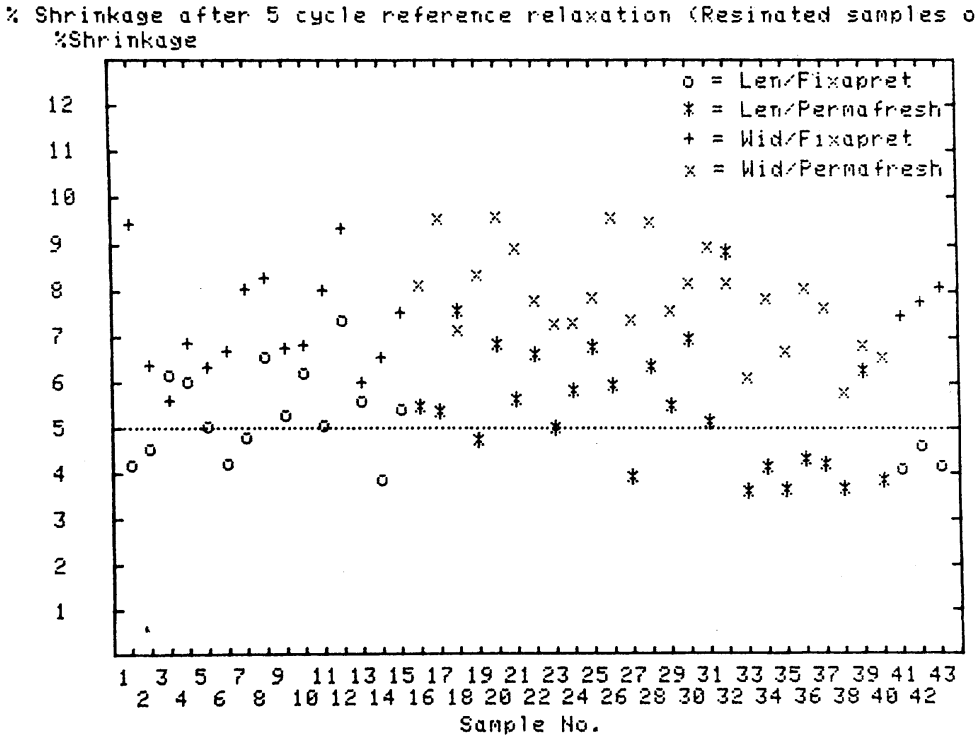


Figure 9

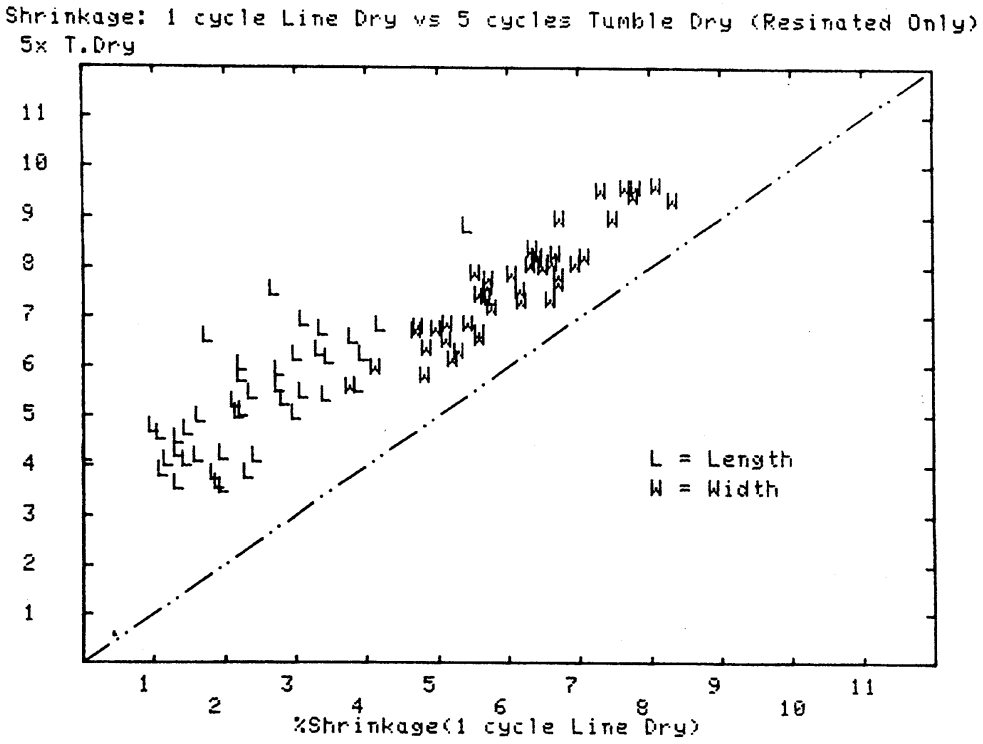


Figure 10

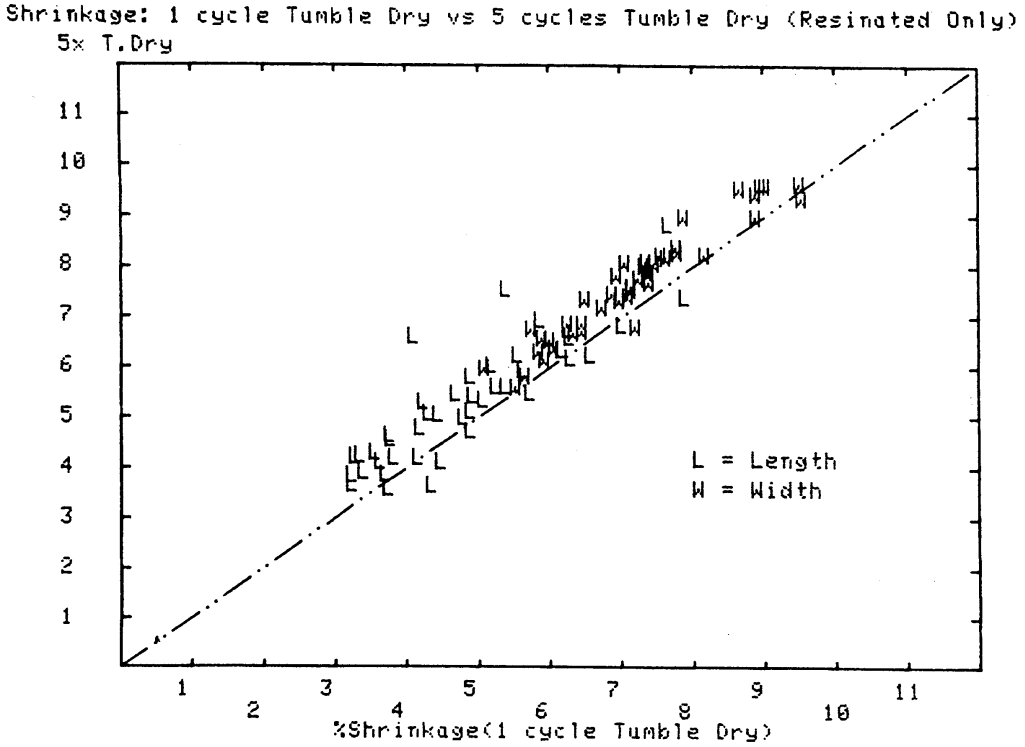


Figure 11

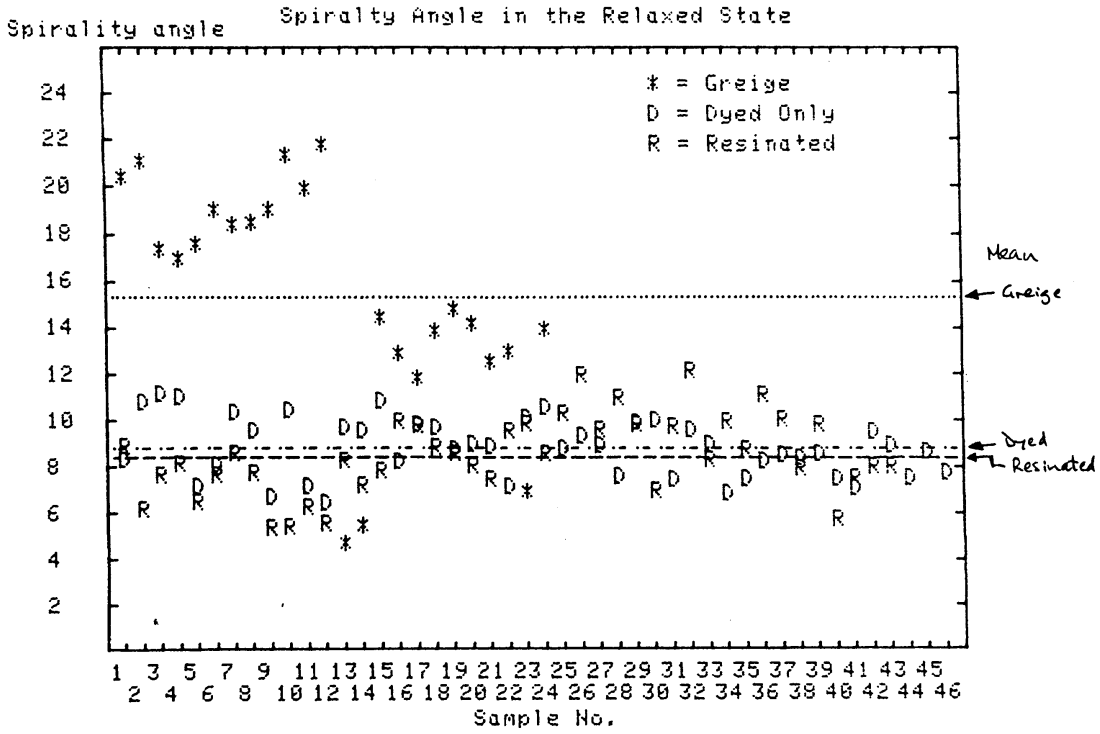


Figure 12

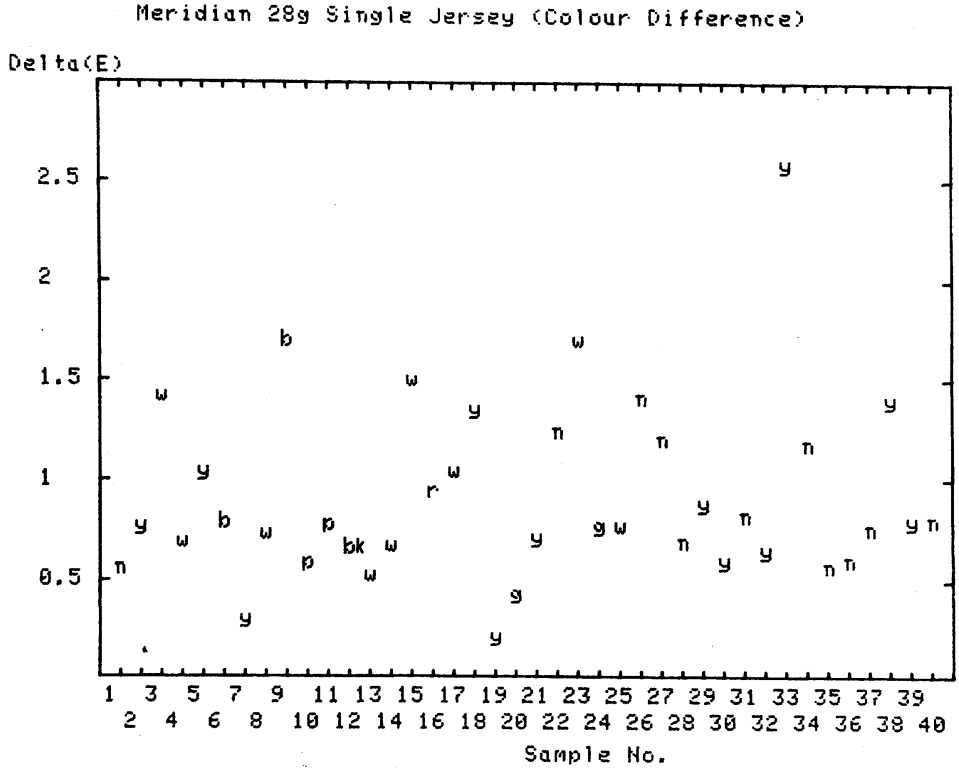


Figure 13

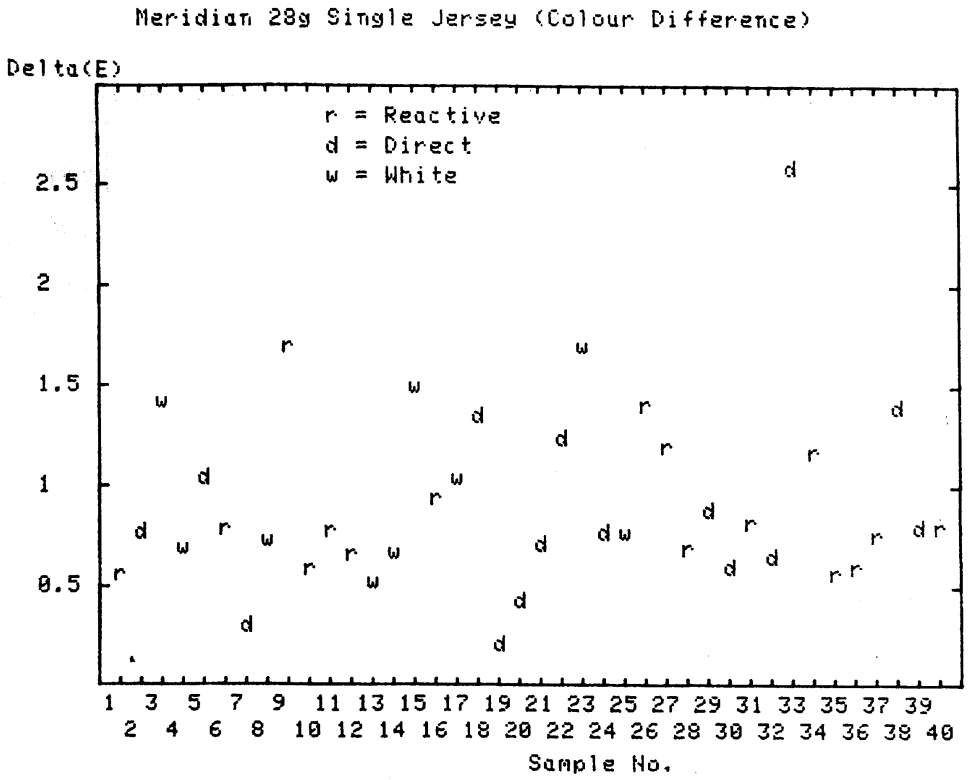


Figure 14

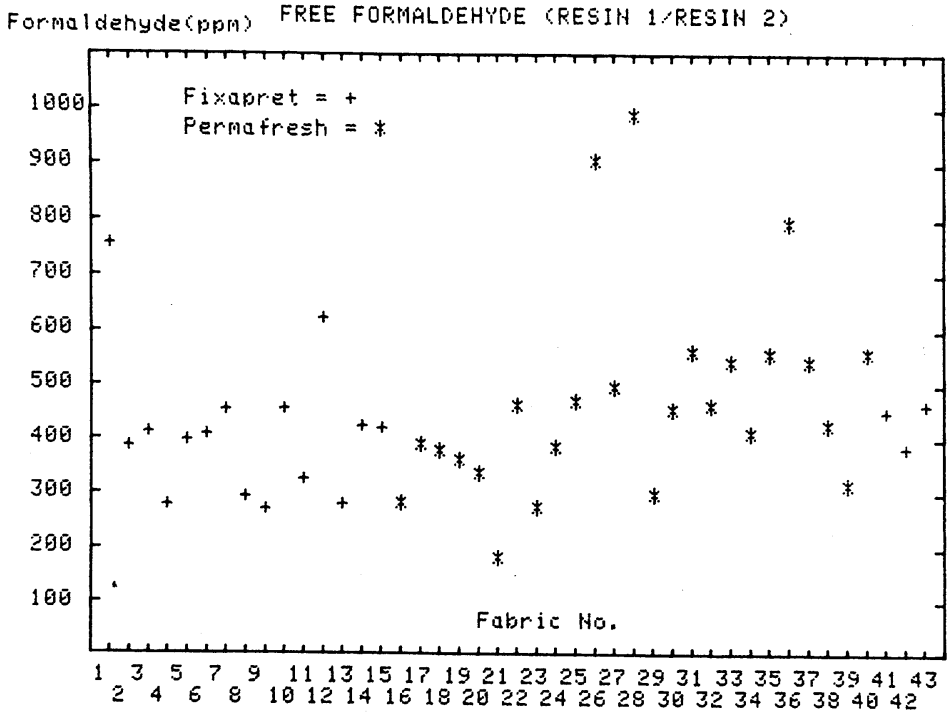


Figure 15

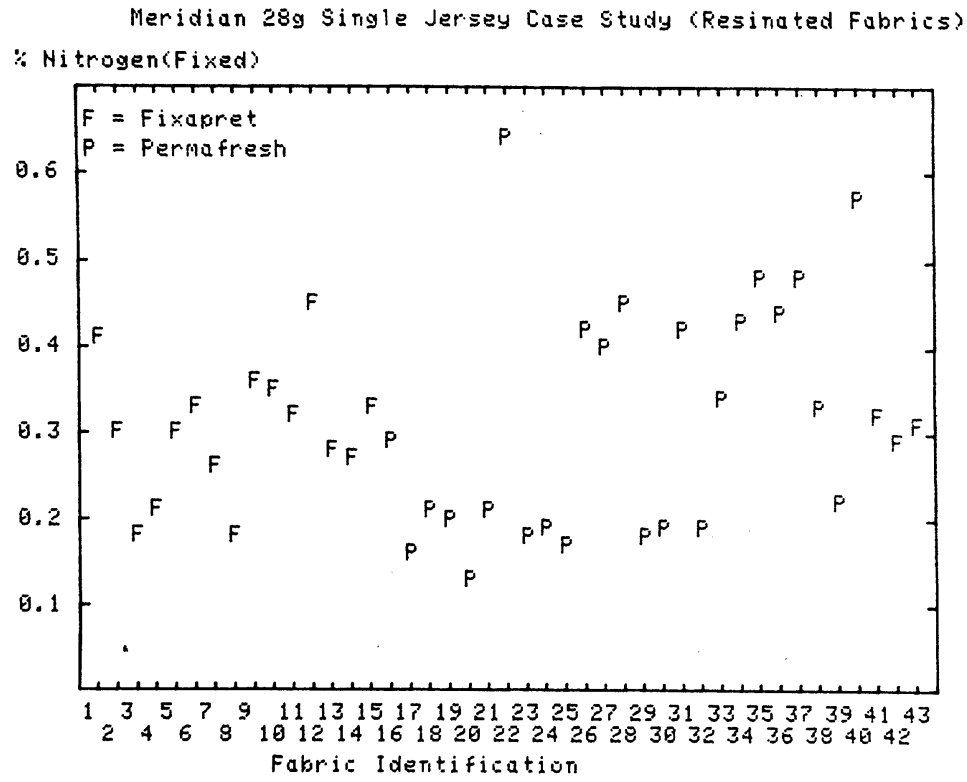


Figure 16

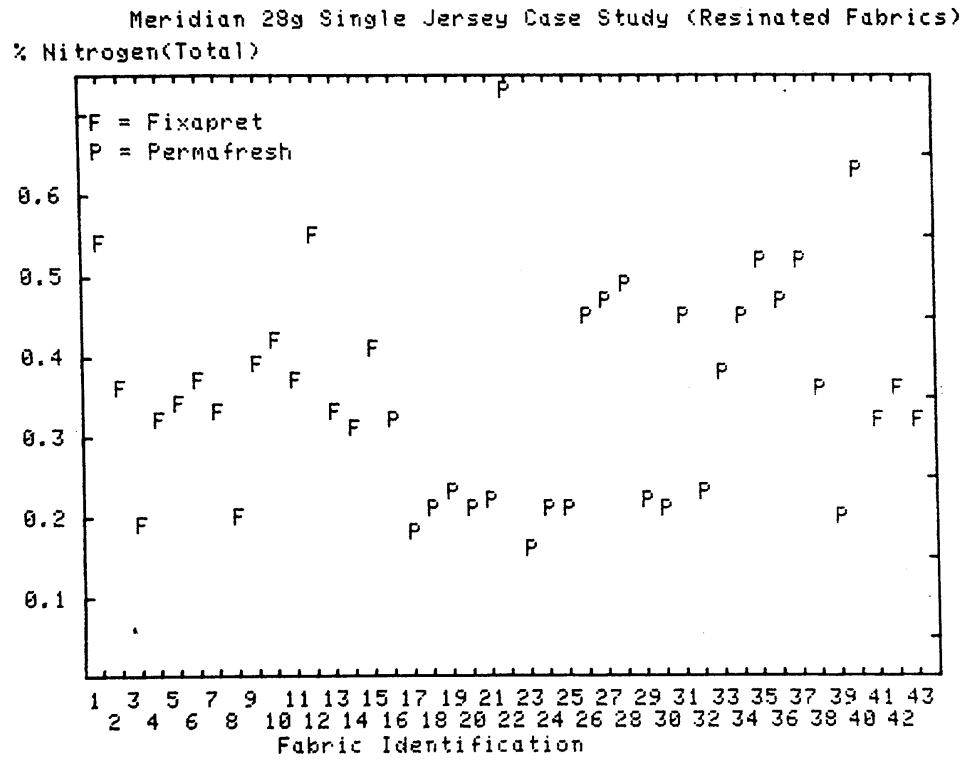


Figure 17

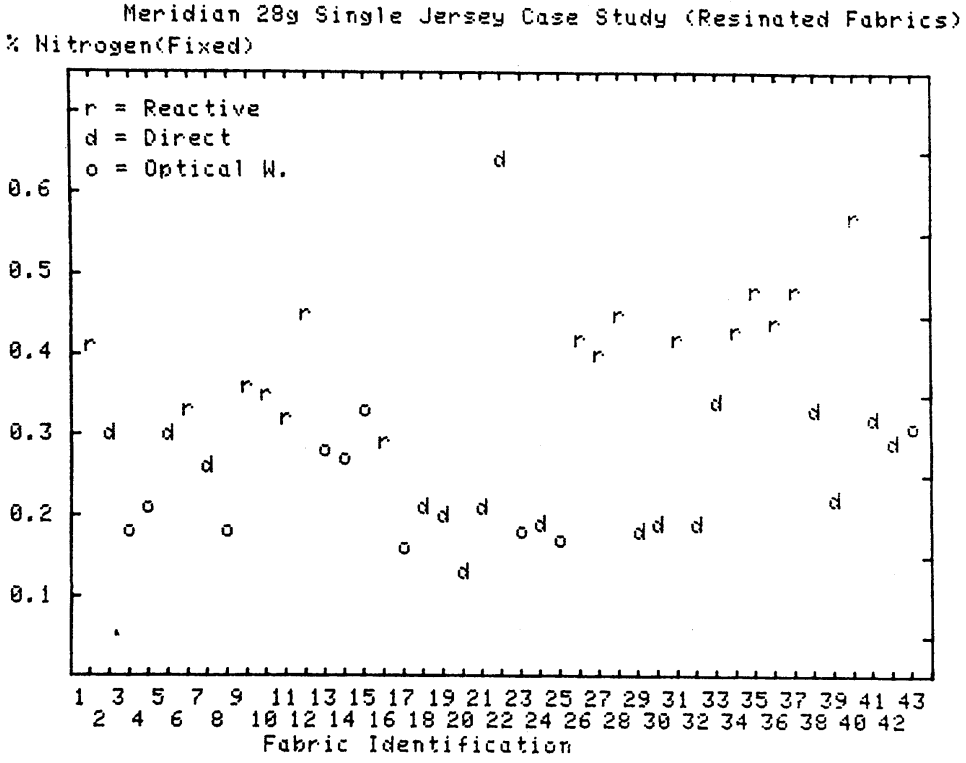


Figure 18

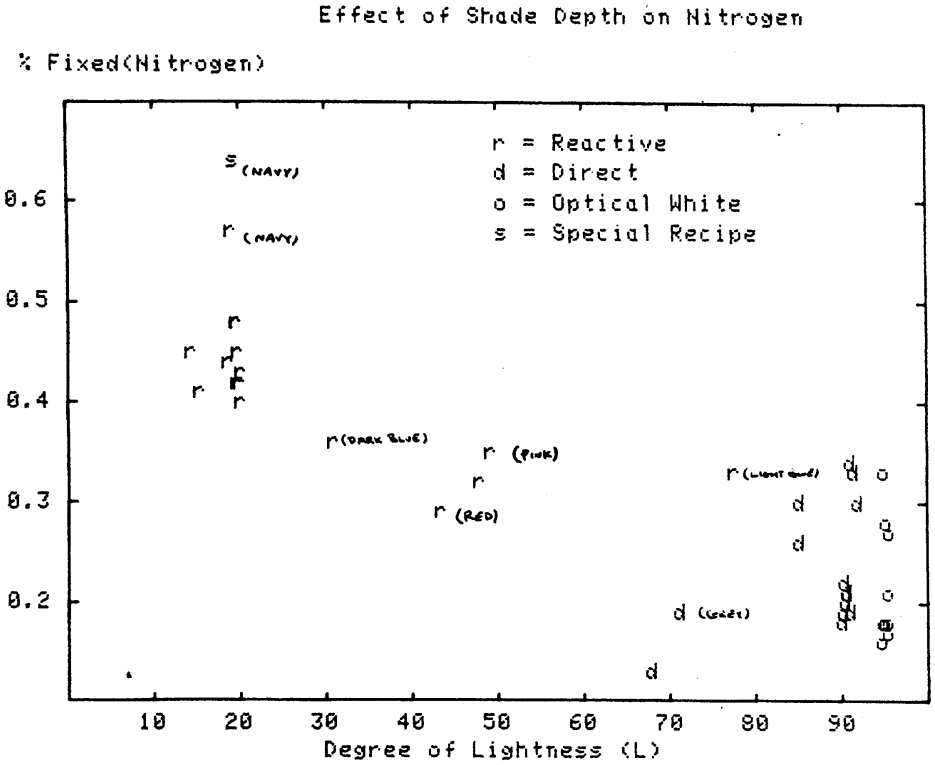


Figure 19

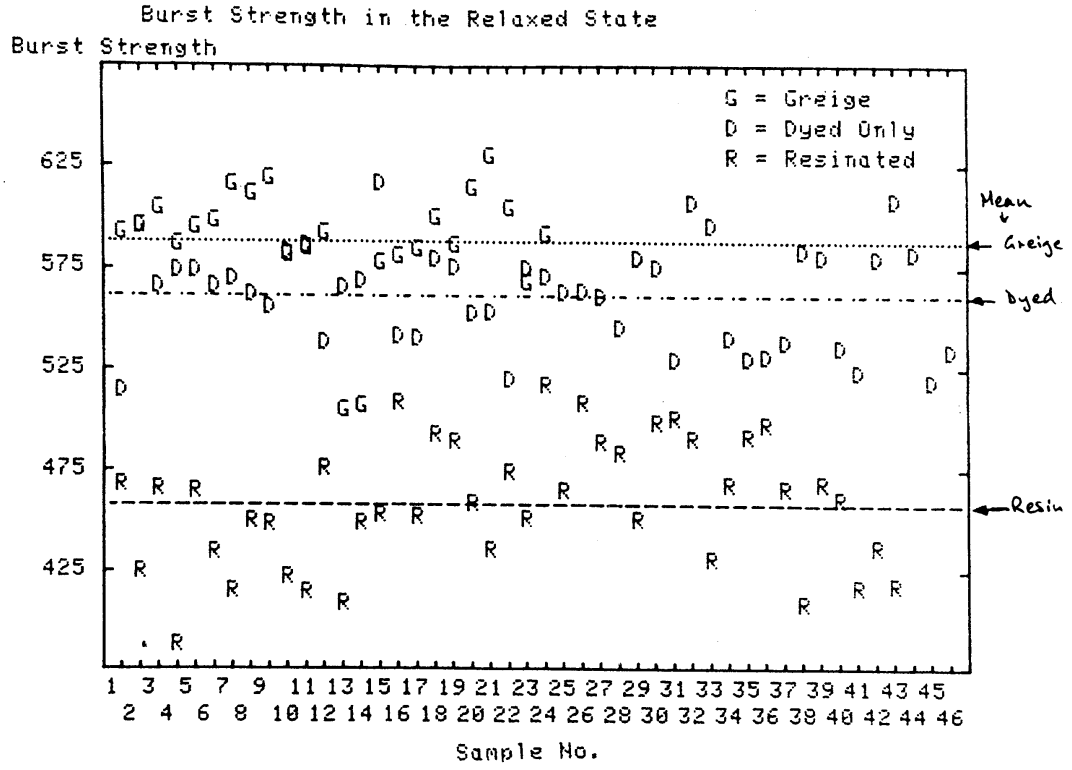


Figure 20

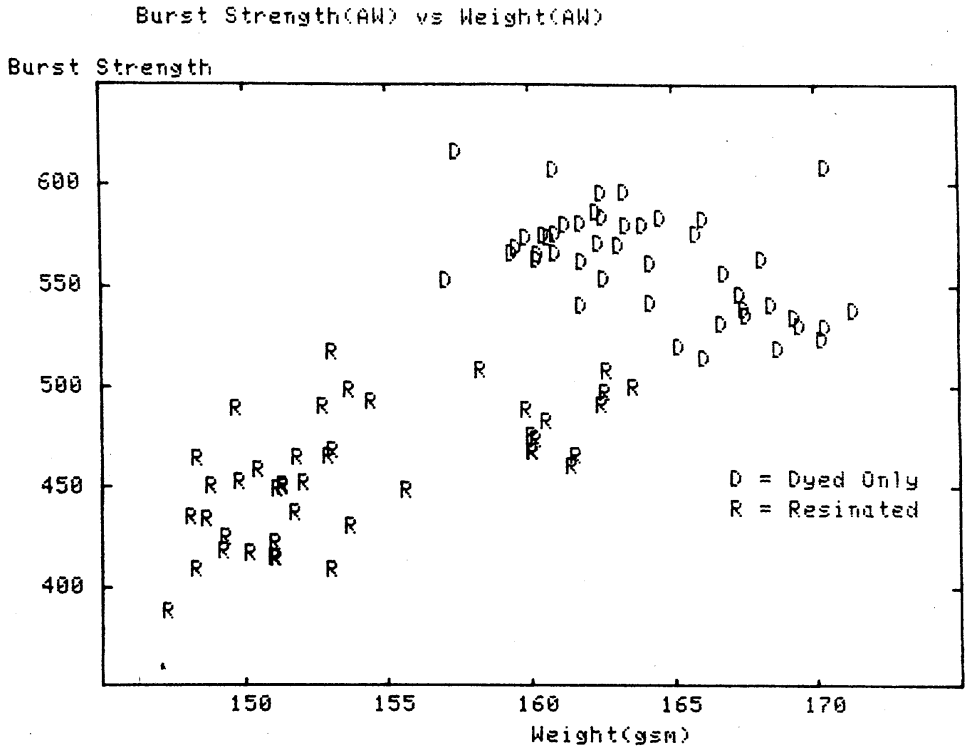


Figure 21

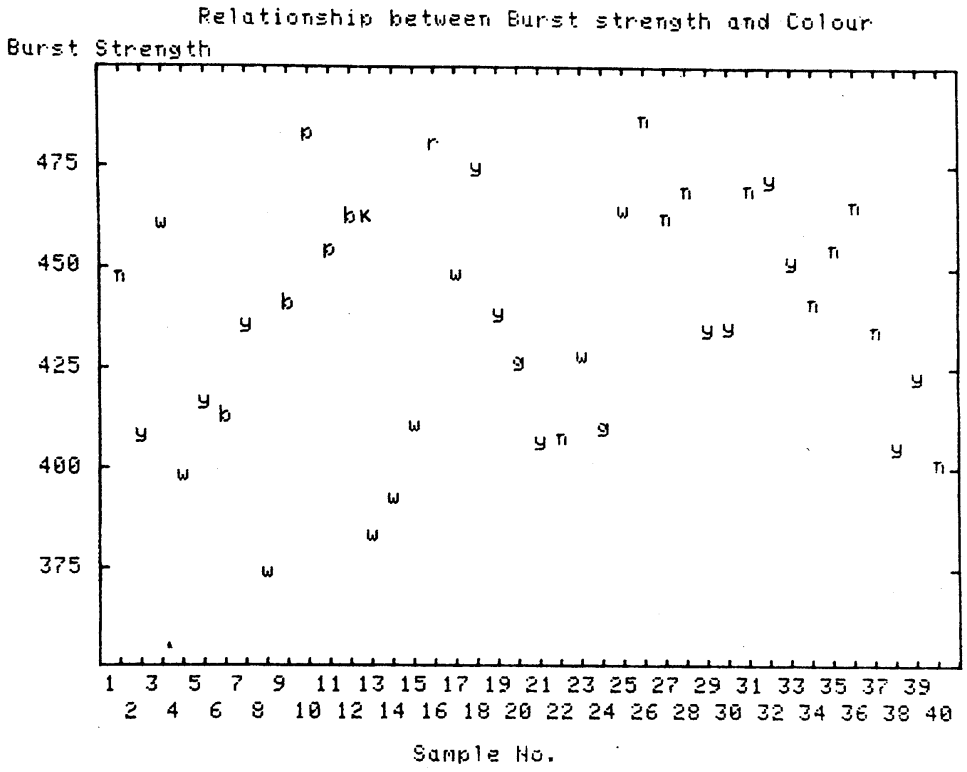


Figure 22

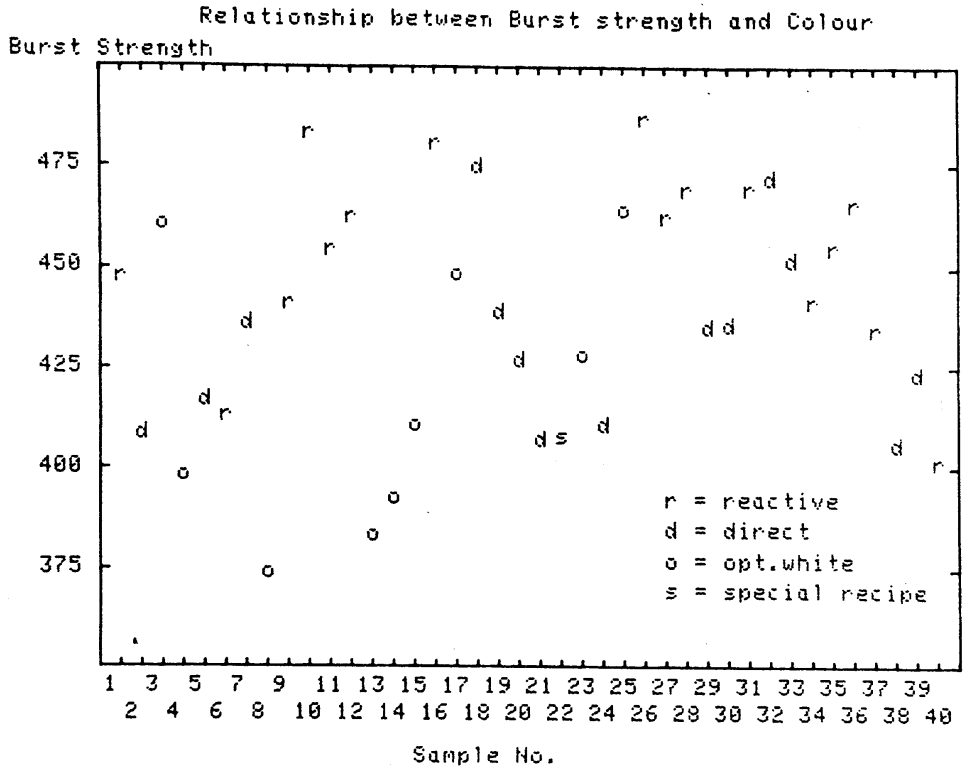
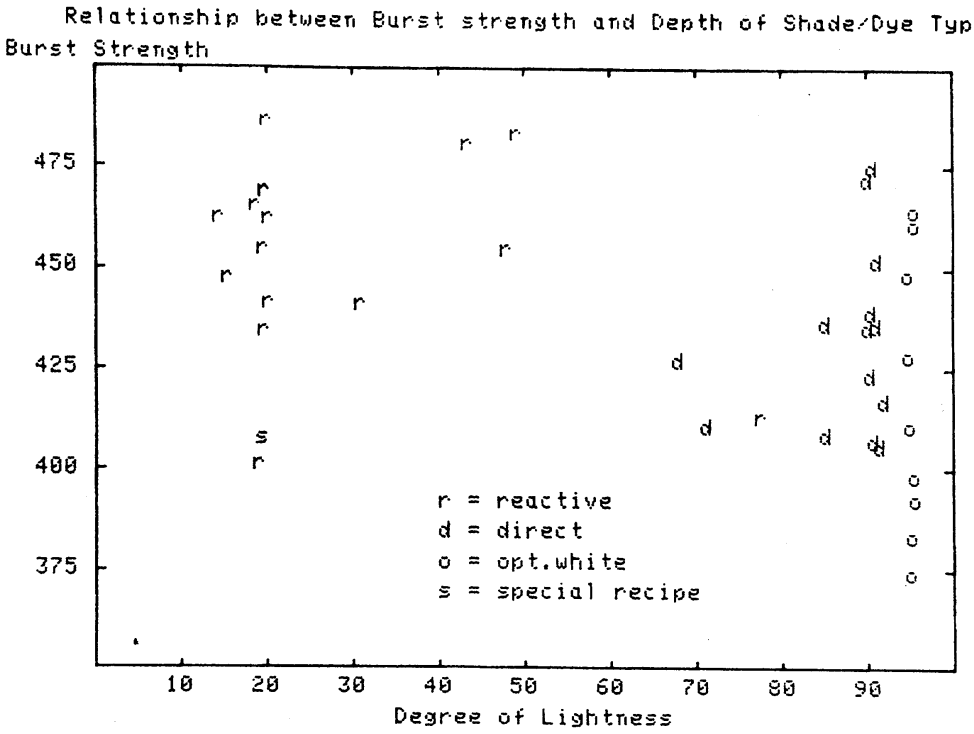


Figure 23


Relationship between Burst strength and Depth of Shade/Dye Type
Burst Strength
475
450
425
400
375
r = reactive
d = direct
o = opt.white
s = special recipe
10
20
30
40
50
60
70
80
90
Degree of Lightness