

PRELIMINARY EVALUATION OF THE MARKS & SPENCER

MEASURING FRAME

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DATE: APRIL 1985  
CLASSIFICATION: APPARATUS/EVALUATION  
KEY WORDS: MARKS & SPENCER, SHRINKAGE, GARMENTS, KNITTED

## INTRODUCTION

The Marks and Spencer measuring frame was purchased following a visit from Mr. David Wheatcroft of Marks and Spencer. He claimed, at their request, many of their suppliers were using this method of assessing garment stability and were very satisfied with the results obtained.

The frame is designed to simulate the effect of fitting the garment on to the body by altering the frame to the appropriate chest size. The change in length after laundering would then be recorded.

## METHOD

The Marks and Spencer method of test can be found in Appendix 1. Their method was still under investigation at the time of purchase.

The apparatus is shown in Figure 1. It consists of two moving sides with screws to slot into the appropriate size notch. The front and back centre pillars have a scale in cm to read off the length measurements.

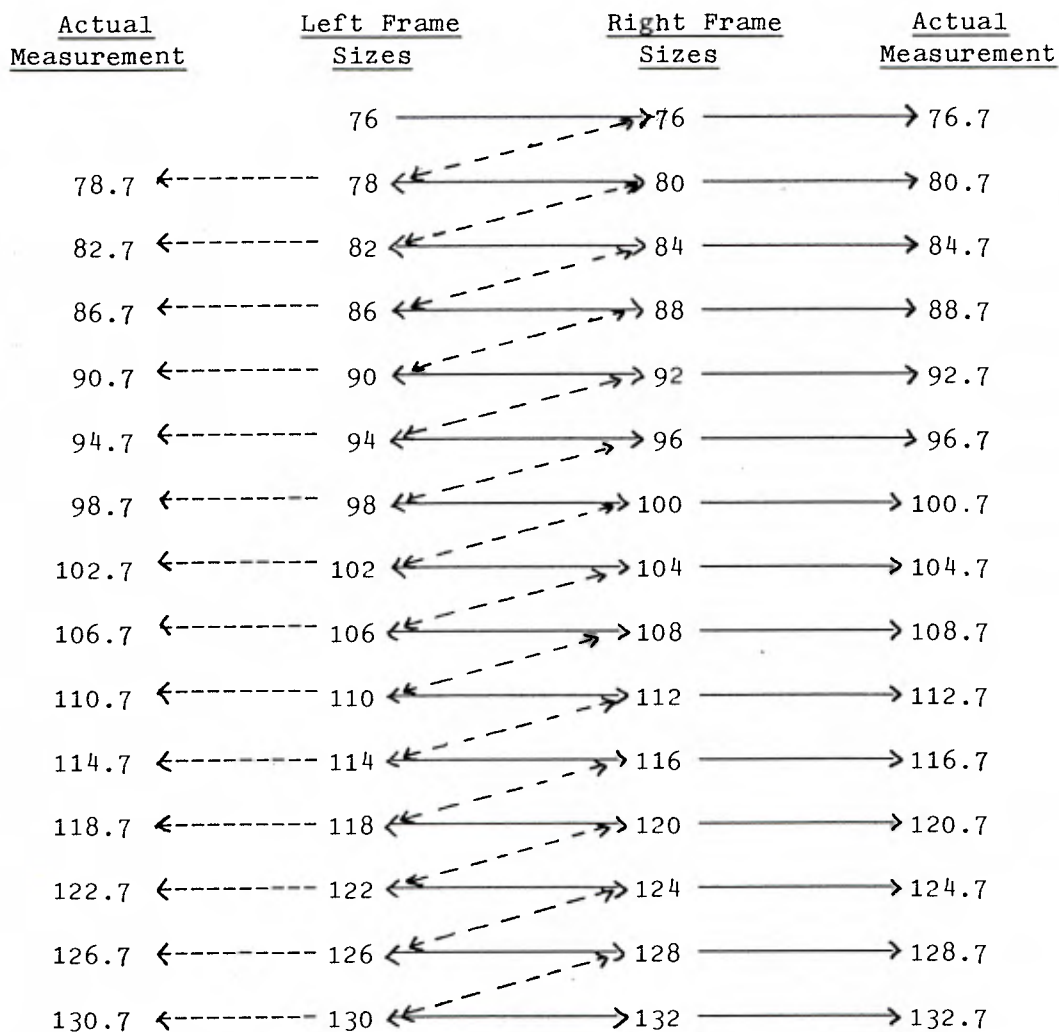
## EVALUATION

The Marks and Spencer evaluation can be found in Appendix 2.

It was decided to use the frame in the next garment trial using garments supplied by British Home Stores. These garments were ladies 1 x 1 rib round neck, short sleeve T-shirts. On following their method of test difficulty was encountered in selecting the appropriate frame size for the garments. In the method it states to set the frame to the nearest circumference the garment is designed to fit. For dual sized garments the higher circumference should be selected, e.g. 10/12 - the frame should be set to 86cm. To set the frame to this size one would expect each side of the frame to have an 86 notch but on trying to set this size it was found that one could have the left side on 84 and the right side on 86, which on actual measuring would give 86.7cm; or the left on 86 and the right on 88, which would actually measure 88.7. So, in this example, the nearest measurement was chosen to the nominal size, i.e. 86.7cm, left on 84 and right on 86.

Due to finding this problem of frame size selection, it was found necessary to calibrate the frame.

On actually measuring the circumference of the frame with a tape measure it was found that each garment size (circumference) selected had a 7mm discrepancy. On calibrating the frame for every combination of sizes we were likely to come across, it was found that a 7mm discrepancy occurred throughout the range. From this calibration we were able to produce a chart for use with the frame. For each garment tested, the frame size selected was based on the actual measurement.



From the second garment trial with BHS garments, a comparison of the M & S frame method results were made with the conventionally measured shrinkage values.

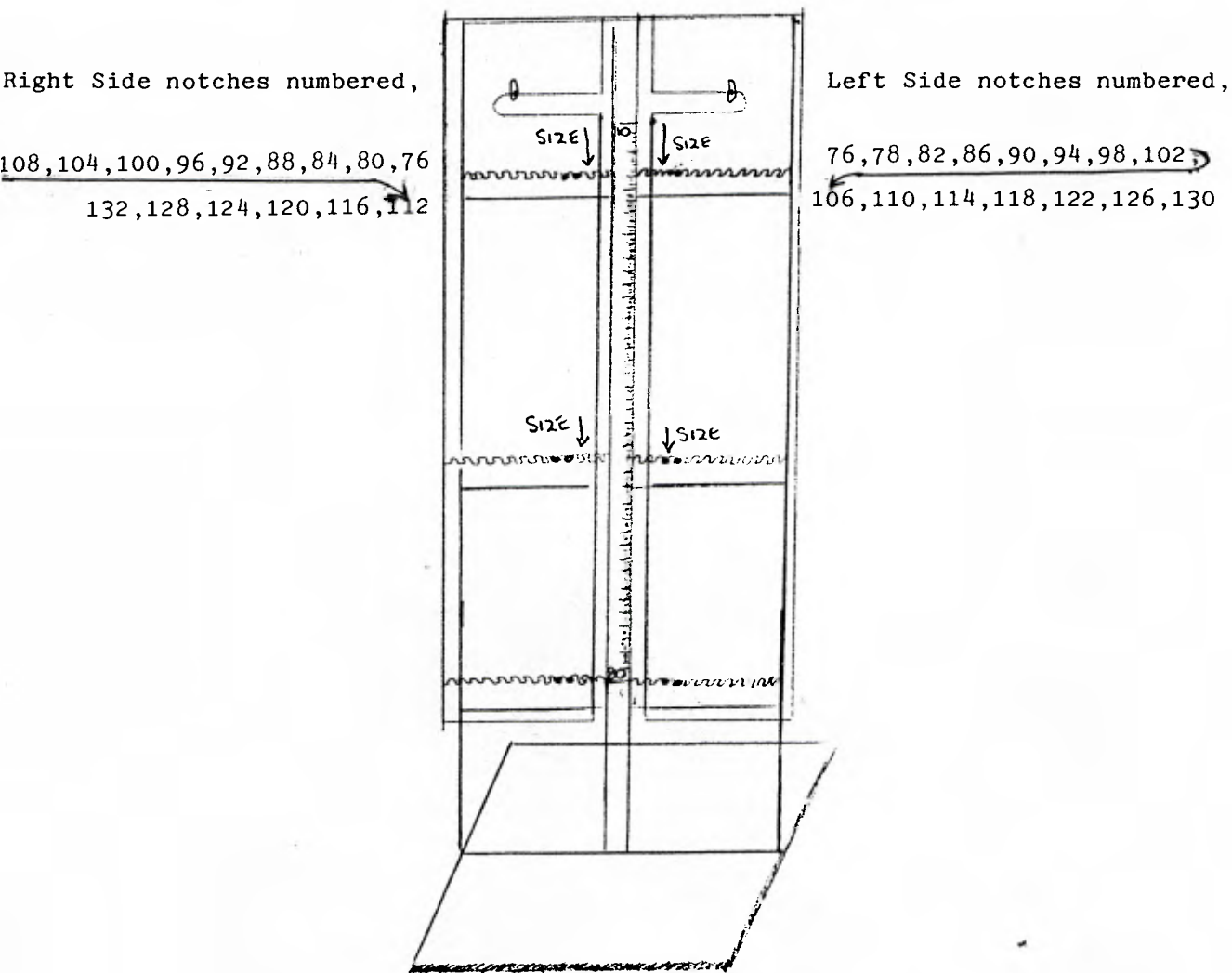
No. Washes	W+L			W+T			W+L+P			W+T+P		
	L+W	L	MF	L+W	L	MF	L+W	L	MF	L+W	L	MF
1	5.9	0.4	2.0	19.3	8.2	6.9	6.1	0.02	2.2	14.8	5.5	6.4
2	5.9	0.1	1.9	18.4	8.8	8.2	5.4	0.5	3.0	14.0	5.6	7.3
3	6.1	0.3	2.6	19.4	9.7	8.7	5.0	0.3	3.2	14.0	5.9	7.3
4	6.0	0.3	2.2	19.6	9.5	9.5	6.2	1.4	3.1	14.7	6.1	7.5
5	6.1	0.1	2.4	19.5	9.4	9.3	5.9	1.2	3.2	14.9	6.9	8.2
REVERSING DRYING PROCEDURE ON SAME GARMENTS												
	W+L/W+T			WT/WL			WLP/WTP			WTP/WLP		
6	13.9	5.2	5.9	11.0	4.2	5.0	13.3	5.5	6.4	8.2	4.6	4.6
7	13.9	5.9	7.4	13.0	3.1	5.0	12.8	5.9	7.3	6.8	4.8	4.8
8	13.8	6.3	7.0	12.1	3.8	4.9	13.1	6.0	7.8	7.1	4.8	4.8
9	14.2	6.1	7.0	13.5	3.7	4.9	13.3	6.5	7.8	7.1	4.6	4.6
10	15.1	7.5	7.4	12.3	5.0	5.2	15.0	7.2	8.4	6.6	4.9	4.9

For each laundering method the figures given are a mean of five garments. From this limited comparison it would appear that even though the values are different between the methods of measuring, they correlate well in showing the differences between the laundering methods. The actual figures appear to be in better agreement with the conventionally measured % length shrinkage.

To obtain a clearer picture of what these figures actually mean a continuing assessment of any subsequent results will be necessary to determine whether we are able to correlate this piece of apparatus with our conventional routine measurements of shrinkage.

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MARKS & SPENCER MEASURING FRAME



MARKS AND SPENCER p.l.c.

INVESTIGATIVE METHOD OF TEST

STABILITY MEASUREMENTS USING THE MARKS AND SPENCER  
MEASURING FRAME

PURPOSE To measure knitted fabric/garments on an adjustable frame to give results which take fit potential into account.

APPARATUS 1. The Marks and Spencer Measuring Frame and clamps (see note)  
2. Marking template (see note)

TEST SPECIMENS Garments  
No preparation is necessary prior to measuring on the frame.

Fabric  
On a double thickness of fabric draw the outline of a Marks and Spencer template with one edge parallel to the length and avoiding fabric within 50mm of the selvedge. Following the marked line, make a bag of the two pieces of fabric by overlocking along the two sides in the length direction and across one in the width direction. Overlock around the single thicknesses, at the open end.

METHOD Adjust the frame to the nearest circumference the garment is designed to fit - see charts below.

Jumpers, Cardigans, Tops and Vests:

	<u>Childrens Ages/Sizes</u>	<u>Ladies Size</u>	<u>Mens Size</u>	<u>Frame Centimetre Circumference</u>
	4			56
	5			58
	6			60
	7			62
Childrens garments to fit small size frame	8			66
	9			68
	10			72
	11			74
	12		8	76
	31"		10	82
			12	86
	33"			88
	35"		14	92
			16	98
			18	102
	Adult sizes to fit large size frame		20	38"
		22	40"	112
		24	42"	116
			44"	120

For dual sized garments, set the measuring frame to the higher circumference, e.g. ladies size 10/12, set the measuring frame to 86cm circumference.

## Mens Pants and Ladies Underwear:

<u>Ladies Size</u>	<u>Mens Size</u>	<u>Frame Centimetre Circumference</u>
34-36		76
36-38	Small	80
38-40	Medium	84
40-42	Large	88
	Ex Large	92

1. Gently place the fabric/garment over the frame so the side seams fit down the edges of the frame. For pants/underwear, pull onto the frame waist first, so that the crotch is at the top of the frame.
2. With the weighted side of the clamp against the frame, hang the clamps on the bottom of the fabric/garment, two on the front, and two on the back gripping approximately 5mm in. Place them so they distribute their weight evenly over the fabric/garment.
3. After approximately 5 seconds carefully remove the clamps in the sequence they have been hung, i.e. first on, first off.
4. Wait 5 seconds, record the average of the 2 lengths to the nearest mm where the back and front of the fabric/garment aligns with the measure on the frame.
5. Wash and dry the specimen according to the requirements of the performance specification. For procedure see Method of Test Pl "Wascator Stability Washes" (Note: After drying there is no need to relax the sample).

### For garments which are designed to be a loose fit, or drape:

If point 1 has been carried out and the garment hangs loose and untensioned in the width, re-adjust the frame to a circumference which will gently tension the garment width and record this. Then proceed with points 2,3,4 and 5. After washing repeat point 1. Check if the garment still hangs loose when framed to the correct garment circumference before, re-adjusting the frame to the size of the tensioned width, and repeating points 2,3 and 4 to re-measure the garment lengths.

### Fabric

Set the frame to 102cm circumference. This should gently tension the fabric square in the width. Repeat points 2 to 5 above. Re-measure the fabric after repeating points 1 to 4 above.

## RESULTS

### Report

1. The stability wash carried out
2. The frame circumference

3. The average of the two lengths before washing.
4. The average of the two lengths after washing.
5. The percentage change between 3 and 4.

If any distortion is observed after washing, e.g. excessive shrinkage of the front stolling on a cardigan, record this length independently from the back measurement.

For garments which extend in width after washing  
Some knitted constructions may extend in width after washing. If this is so this should be reported additionally.

For garments which are designed to be a loose fit or draped  
Also quote the frame circumference on which the garment was tensioned.

NOTE

All available from;  
Gabriel (Engravers) Ltd.  
Linford House  
44 Linford Street  
LONDON, SW8

DECEMBER, 1983



## NOTES ON THE MARKS AND SPENCER MEASURING FRAME

The frame was conceived in 1979 following extensive work on improving the washability of knitted cotton 1 x 1 rib and interlock. Initial work concentrated on improving the techniques for measuring garments by standardising the dimensions of the garment which have been distorted due to handling and ultimately improving inter-laboratory agreement for stability testing.

The work has progressed to a point where, not only is the equipment capable of giving improved agreement on stability testing between laboratories, but will give a result which is similar to a customer's expectations.

The conventional way to establish the stability of a garment is to record the length and width of the garment, wash it, re-measure and calculate the length or width change as a percentage. Charts 1 and 2 show how the dimensions of garments from the same batch can be effected by handling before and after washing.

We glibly quote that the garment has shrunk in length and width but what does this mean? The answer usually given is "it meets the specification".

The frame method is to copy the concept of fitting the garment on to the human body by adjusting the frame to the chest size the garment is designed to fit and recording the change in length of the garment before and after washing.

With the frame method you can now quote how much the garment shrank in centimetres and the percentage equivalent. This is a more realistic figure than the previous statement of "it meets the specification!" See chart 3.

The frame is capable of measuring the body of the garment quicker than conventional methods. After using for a while you may find your production is not as consistent as you thought, see chart 4. The garments shown are of different colours in three sizes from the same manufacturer in the same quality. The lengths range from 57.7cm to 66.2cm - they are supposed to be the same length. Look at garments B and G on the chart. B is shown to have shrunk 7.8% L + W, G shrunk 9.4% L + W. However, the frame shows B to have shrunk 6.5% and G 2.5%, a significant contradiction of results. Examination of the garments shows B is felting, G is not. The conventional method of recording shrinkage cannot distinguish between recoverable shrinkage (collapsing) and unrecoverable shrinkage (felting). The frame can distinguish.

Chart 5 is another example of difference between measuring procedures. These garments were specially made from one blend, one spin, one knitting machine and one finishing lot. Using the conventional measuring procedure these ten garments vary in length by 2.6cm or 5.0% and in width 1.8cm or 4.7% (these figures are not shown), before washing. The frame shows the same garments vary 1.7cm or 2.5% in length, confirming the better consistency of this set of garments (as would be expected) over the garments in chart 4.

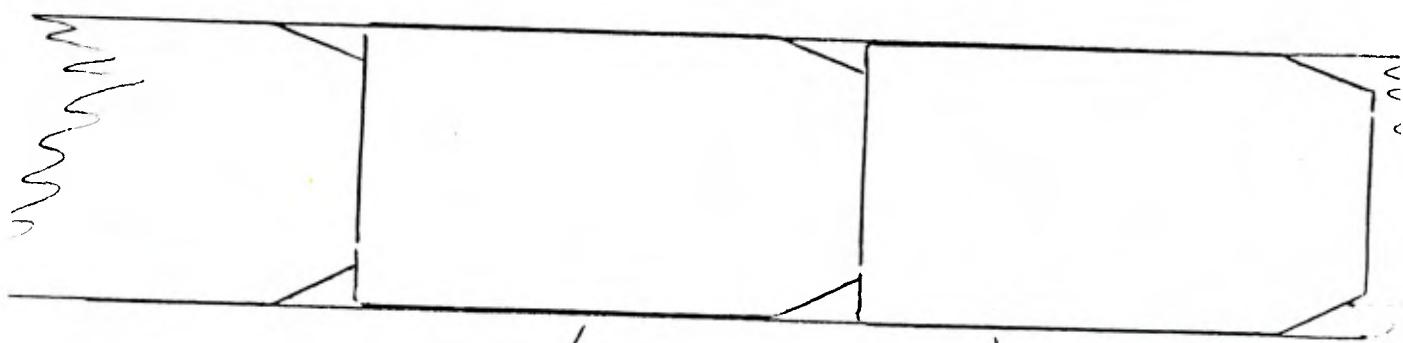
Charts 6 and 7 are included to give an indication of the differences between the different knitwear tests using the two measuring procedures.

Chart 8 shows three washed squares cut from the same piece of wool cloth. It is interesting to note that the conventional percentage results for the MSF and MSD wash appear incorrect, we know the MSD is almost twice the severity of MSF (25 minute wash against 15 minute). The frame does put all three results in order of test severity.

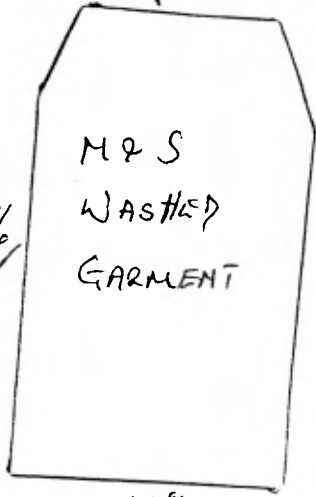
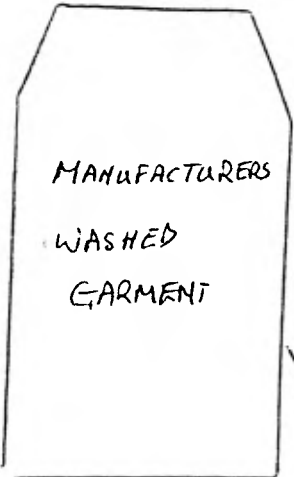
Chart 9 shows the results on two tests, the MSB is at least twice as severe as the MSA. If we had to decide which quality to purchase and washing procedure to specify using conventional measuring techniques, we would have selected viscose cotton quality and instructed HLCC6 wash. The frame however shows the viscose cotton lyc to perform better with no significant increase in shrinkage when washed to the most severe test. As with previous examples given the frame takes into account the recovery potential of the fabric and, in this instance, clearly identified the better fabrics. Marks and Spencer have been selling similar lycra fabrics for several years washed to HLCC4 with no restriction on tumble drying with no customer complaints.

The frame is capable of measuring any knitted pants, briefs, jumpers, vests and fabric etc. For instructions how to use refer to Marks and Spencer Method of Test Stability Measurements using the Marks and Spencer Measuring Frame P2.

*W.D. Marks/SP*

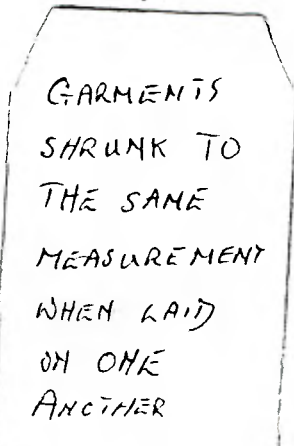


GARMENTS CUT FROM SAME PRICE OF CLOTH



22% L+W

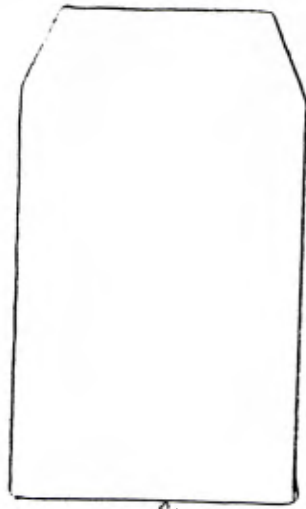
18% L+W





5%

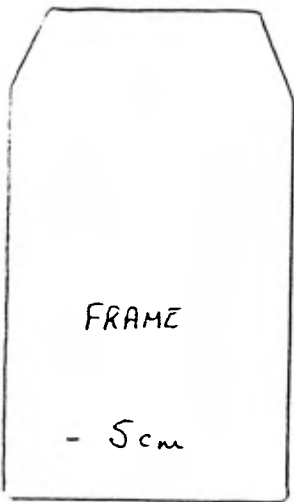
3%



3%

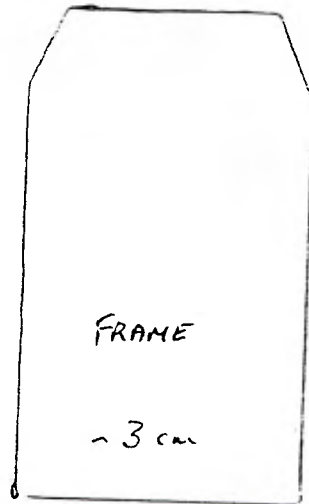
5%

SPECIFICATION LENGTH OR WIDTH  $\pm 5\%$   
LENGTH + WIDTH  $- 8\%$



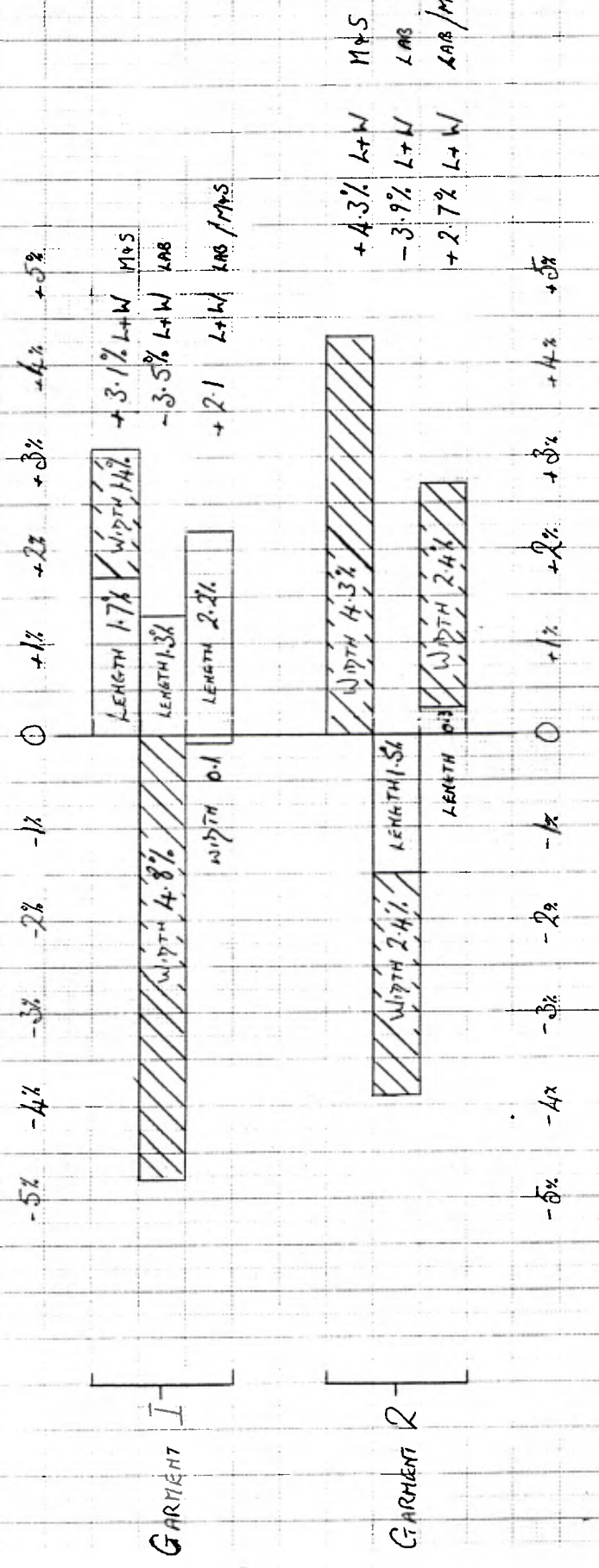
FRAME

- 5cm



FRAME

- 3cm



EACH GARMENT HAS BEEN WASHED BY THE SAME LABORATORY BUT MEASURED BY 3 DIFFERENT PEOPLE



CHART 3

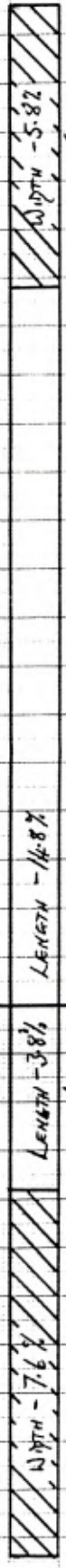
K 9051

2 1/2 G RACK STITCH  
WOOL MOHAIR ACRYLIC NYLON

MSK @ 40°C  
HAND WASH PERFORMANCE TEST

CATEGORY 'A' LAB

MTS LAB



THIS FABRIC IS BELIEVED TO HAVE BEEN HANDLED EXCESSIVELY & STRETCHED BEFORE TESTING AT MTS, THEREBY GIVING A HIGHER RESULT THAN SUPPLIERS LAB

- 20.6%

LENGTH + WIDTH

9.2% DIFFERENCE BETWEEN LABORATORY TESTS

TWO FABRICS AFTER WASHING WHEN MEASURED ON THE 'FRAME'

LENGTH 63.5 cm

63.4 cm LENGTH

0.1 cm

DIFFERENCE BETWEEN TESTS WHEN MEASURED ON THE 'FRAME'

HAND WASHABLE SHEETLAND 1 MONTH WEAR TRIAL

CONVENTIONAL PERCENTAGE CHANGE

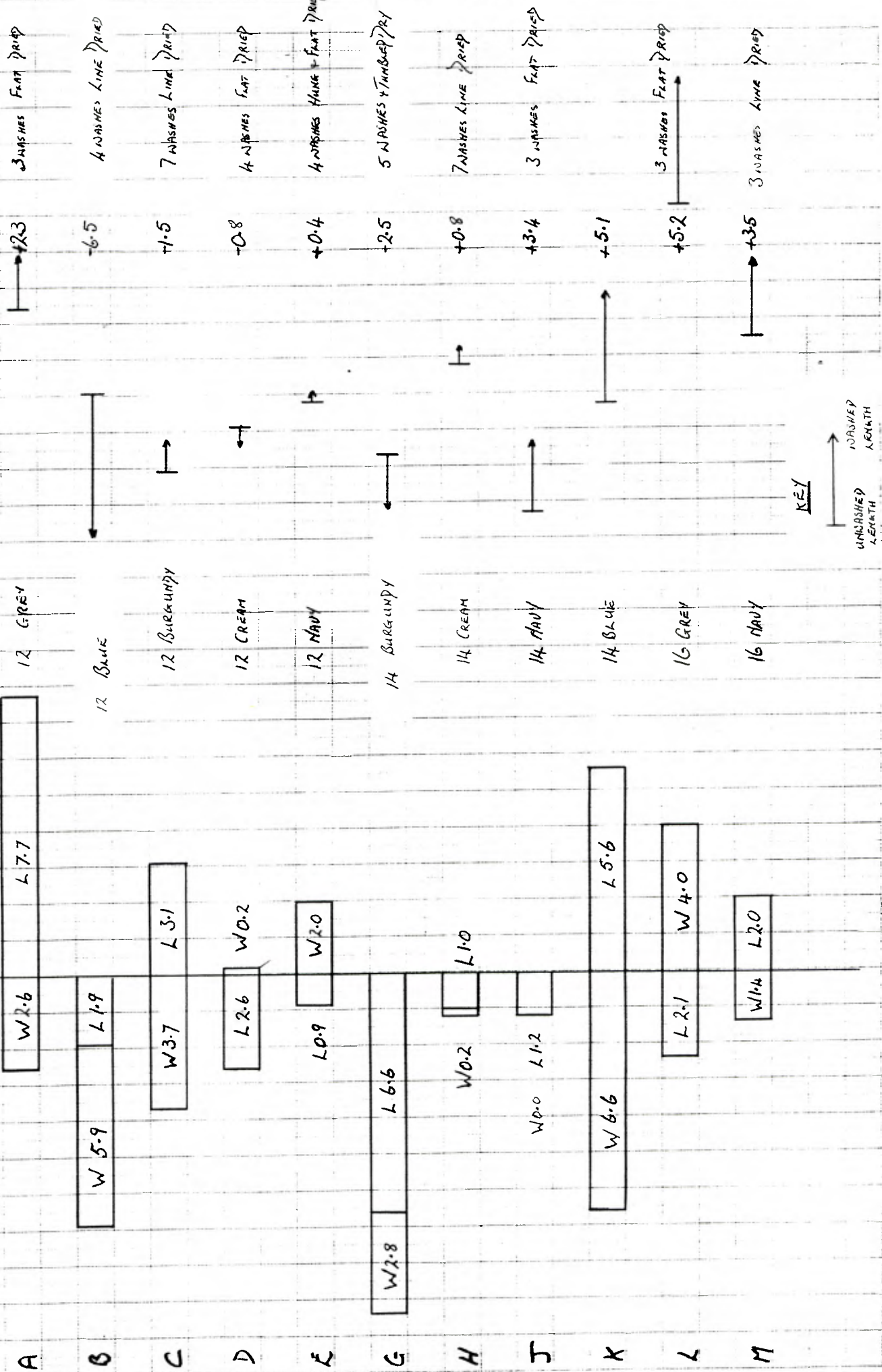
M/S. FRAME MEASUREMENTS IN CENTIMETERS

8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8

57 59 59 60 61 62 63 64 65 66 67 69

SIZE & COLOUR

% CHANGE



KEY

UNWASHED LENGTH

WASHED LENGTH



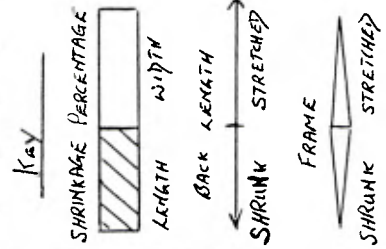
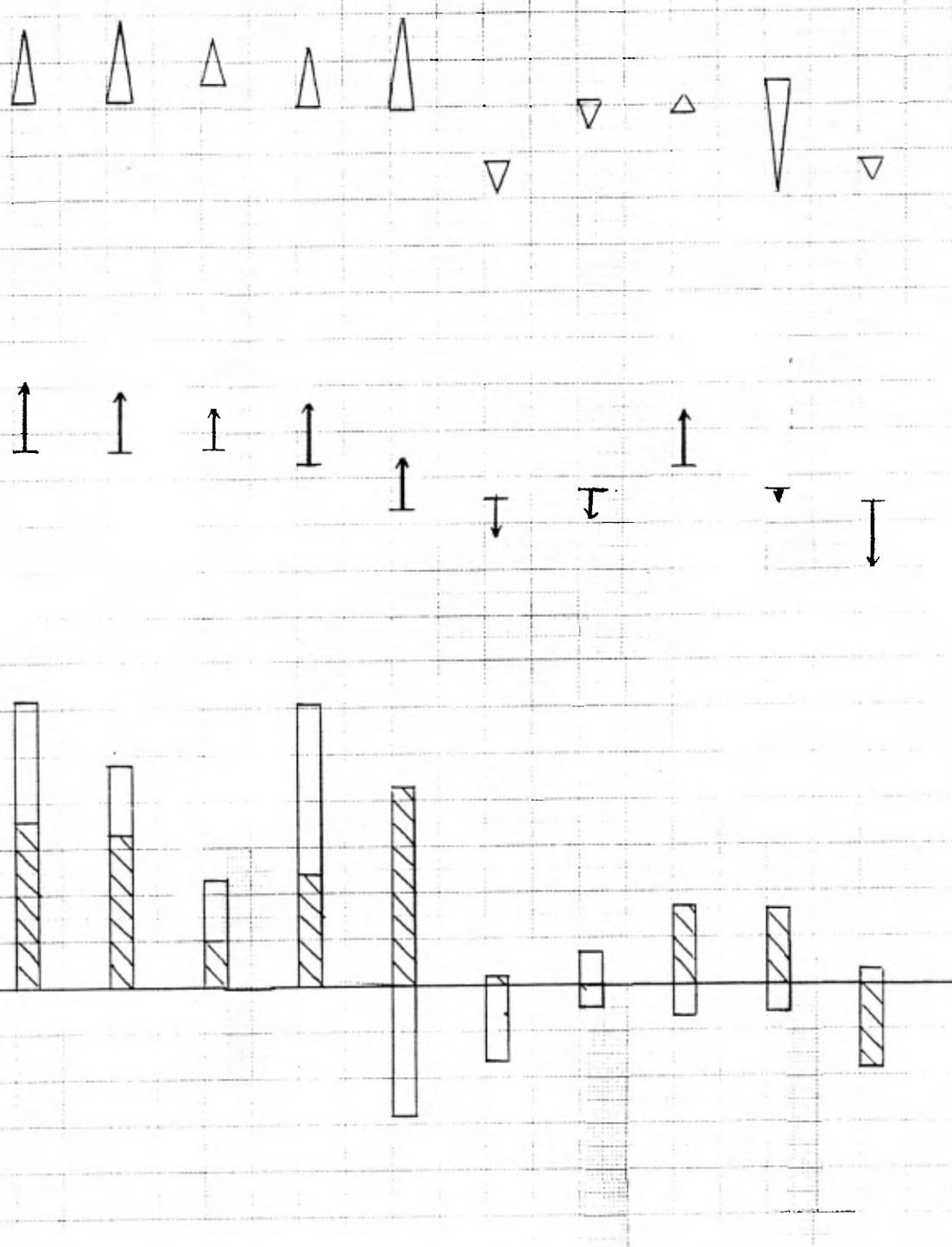
# CHARTS

WASHER BY MRS

FRAME MEASUREMENTS IN CENTIMETERS  
69 68 67 66 65 64 63 62 61 60 59 58 57 56 55

GARMENTS WASHED BY MRS  
6 5 4 3 2 1 2 1 2 3 4

GARMENT No WASHER No



GARMENT No	WASHER No
1	1
2	1
3	1
4	1
5	2
12	2
13	2
19	3
21	3
24	3



LADIES WOOL CARDIGAN / 1513

MSE @ 40°C

LENGTH - 6.3 %

WIDTH - 4.5 %

FRAME -4.3cm -7.3%K 8568

MENS COTTON/ACRYLIC PULLOVER / 4012

MSG @ 40°C

LENGTH - 5.8 %

WIDTH - 4.4 %

FRAME -3.0cm -4.4%

K 8333

CHART 7

MENS SHETLAND PULLOVER /2125

MSF @ 40°C

LENGTH	-9.3%	(-1.8 - 2.8)
WIDTH	-1.1%	(-3.6 + 2.5)

FRAME -3.2cm = -4.7%

K 8475

MSF @ 40°C /2132

LENGTH	-9.3%	(-1.7 - 9.0)
WIDTH	-1.2%	(-2.4 - 0.0)

FRAME -6.1cm -8.9%

24 g SINGLE JERSEY WOOL

MSE @ 40°C

HAND WASH  
(WOOL HAND WASH PERFORMANCE TEST)

LENGTH + WIDTH

- 8.9%

FRAME

- 2.2%

MSF @ 40°C

(HKCC 7 MACHINE WASHABLE WOOL  
PERFORMANCE TEST)

LENGTH + WIDTH

- 11.0%

FRAME

- 4.4%

MSD @ 40°C

(CHANDRAN SCHOOL NEAR MACHINE WASHABLE  
PERFORMANCE TEST)

LENGTH + WIDTH

- 9.5%

FRAME

- 4.6%

K 9515

COMPARISON OF 2 DIFFERENT PERFORMANCE TESTS ON 2 RASCHEL QUALITIES

MSA i @ 40°C  
(HACC 6 PERFORMANCE WASH)

	LENGTH + WIDTH	FRAME
VISCOSE COTTON	-13.9%	-10.6%
COTTON VISCOSE LYCRA	-22.9%	-9.8%

MSB iii @ 60°C  
(HACC 4 + TUMBLER DRY)  
PERFORMANCE WASH

	LENGTH + WIDTH	FRAME
VISCOSE COTTON	-23.2%	-17.5%
COTTON VISCOSE LYCRA	-27.4%	-12.0%