



Research Record No 175

The Finishing Of 28 Gauge Interlock

**A description of the processing carried out at Meridian
during 7th - 11th February 1983**

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September 1983

Classification: **Fabrics/Knitted/Processing**
Key Words: **Interlock, Dyeing, Bleaching, Finishing**
Digital Version: **May 2014**

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1. Introduction

Research Record No. 162 describes the production of two complete 15-quality blocks of 28g interlock fabric at the Courtaulds Research Group at Spondon. The knitting was directly supervised by TRD personnel and individual pieces of length approximately 50 metres were produced.

The reasons for wishing to carry out a 28g series are described in Research Record No. 182, but briefly, the main reason was to establish conclusively whether or not there is an independent gauge effect. With the single jersey exercise three gauges were examined whereas with the double jersey project only 20g interlock was initially examined.

2. Trial Outline

Since carrying out the Central Project processing in 1978 there have been a number of changes in the way in which Meridian process their fabrics. In particular, wet stretching of fabrics on the Calator Airtex is now almost routine. To adopt their current processing route would introduce another variable into the scheme and therefore since the main aim was to examine gauge effect it was decided to process these two sets of 28g interlock fabrics in as near an identical manner to the 20g interlock fabrics as possible. In addition, it was felt that more information was required on winch processing since in the original CP78 project winch processing was only considered as a minor route.

Since two complete sets of fabric were available for processing it was decided that one set should be winch dyed and the other set winch bleached.

3. Fabric Coding

Each individual fabric variant was coded using the system established at the start of the central project processing, i.e. a combination of yarn count and stitch length: e.g. 60/248

yarn count 1/60's Ne

stitch length 0.248 cms

4. Calculation of Finishing Targets

In Research Record No. 162, a series of equations is given to describe the behaviour of grey interlock fabrics, in the range 20-28 gauge, during a relaxation treatment, and to provide predictions for the relaxed structures of these fabrics in the grey state.

From previous experience, it could be expected that these equations would not, by themselves, provide a sufficiently accurate basis for the calculation of finishing targets (widths and course spacings) for winch processed goods. It was thought, however, that these equations might be used if suitable correction factors could be derived.

In Research Record No. 121, Tables 23, 24, 27 and 28, results are given for the relaxed courses and wales of a series of 20g interlock fabrics in the grey, winch-bleached and winch-dyed states. Although only six fabric structures were included in this study, it was considered that these results should give some insight into the relative behaviours of grey and winch processed interlock, and

a study of these data produced the following approximate relationships.

1. Courses/3cm (winch-processed, relaxed) = 0.91 x courses/3cm (grey, relaxed)
2. Wales/3cm (winch-processed, relaxed) = wales/3cm (grey, relaxed)

The equations given in Table 8, Research Record No. 162, for 20 and 28g fabrics, were then used to calculate, for the 28g fabrics.

1. grey, relaxed course and wale spacings;
2. winch processed, relaxed course and wale spacings, using equations 1 and 2 above
3. targets for finishing, assuming residual shrinkages of 10% in both length and width.

The results of these calculations are given in the table below.

		GREY RELAXED		FINISHED RELAXED		TARGETS	
		Courses/3cm	Wales 3 cm	Courses/3cm	Wales 3 cm	Courses/3cm	Width cm tub
1.	70/236	70.2	62.1	63.9	62.1	57.6	70.6
2.	70/248	66.3	61.1	60.3	61.1	54.5	71.9
3.	70/260	62.8	60.0	57.1	60.0	51.6	73.1
4.	60/236	71.1	59.7	64.7	59.7	58.3	73.5
5.	70/273	59.3	59.0	54.0	59.0	48.8	74.4
6.	60/248	67.2	58.6	61.2	58.6	55.2	74.9
7.	70/287	56.0	58.2	51.0	58.2	46.1	75.6
8.	60/260	63.7	57.6	58.0	57.6	52.3	76.2
9.	60/273	60.2	56.6	54.8	56.6	49.4	77.6
10.	50/236	72.2	56.6	65.7	56.6	59.2	77.6
11.	60/287	56.9	55.6	51.8	55.6	46.7	79.2
12.	50/248	68.3	55.4	62.2	55.4	56.2	79.0
13.	50/260	64.8	54.4	59.0	54.4	53.2	80.7
14.	50/273	61.4	53.4	55.9	53.4	50.4	82.2
15.	50/287	58.0	52.4	52.8	52.4	47.6	83.7

During the actual processing, difficulties were experienced which are described later in the report.

New target width figures were therefore assigned which were calculated from the measured grey relaxed wales/3cm by building in a 15% width shrinkage figure.

5. Description of Processing

Prior to processing in the winches, the individual rolls of fabric were plaited off and marked at both ends with their identifier. To augment the dye lots, half-pieces of standard 20g interlock were added to each winch load. As well as contributing to total fabric weight they would also be replicates for the original CP78 processing of this particular fabric variant.

Dyelot 1 was designated for dyeing to a blue shade using 2% Procion Blue HE GN. To obtain the brightness of shade it is usual at Meridian to pre-bleach the fabric as part of the preparation sequence in the winch. Following dyeing, the fabric is softened in the winch using cationic softener/lubricants.

Lot 2 was subjected to the full Meridian treatment for obtaining a good optic white. This consisted of a combined hypochlorite/peroxide bleach in which an optical brightening agent was included. Following rinsing, a cationic softener was again applied in the winch.

Details of the dyeing of the blue shade are given in Table 1 and details of the bleached lot are given in Table 2.

After removal from the winches the fabrics were dewatered in the centrifuge and sorted into order of ascending width ready for dyeing. Drying was carried out on the Pegg drying/finishing machines with target widths 2cm below the finished target width to allow sufficient scope for the calender.

It became obvious that the fabric wanted to be considerably wider than the target widths. In order to attain the required widths from the dryer, the level of overfeed applied had to be kept to a minimum to prevent jamming and creasing on the stretcher frame. As a consequence the number of courses that it was possible to attain was well below what should be possible from the dryer.

To ensure consistency, both winch lots were dried to the same targets even though it was clearly obvious that the width targets were too low.

Prior to calendaring, the width targets were reviewed but this meant that a considerable number of the variants would now be too wide for the Tubetex compactor. The decision was therefore taken to omit compaction from the sequence and to attempt to calender the fabrics to the new finished targets which in most cases meant an increase in width of around 4-5cms.

Even though the fabrics were calendered without any trouble it was clear that the fabrics needed to be finished even wider.

In fact, when the fabrics were sampled some two hours later, many of the fabrics had increased their width by up to 1½ cm.

Measurements of courses/3cm and width were taken for all fabric variants at every stage of processing. These are given in Table 3 (Winch-dyed) and Table 4 (Winch-bleached).

6. Conclusions

The major problem experienced during the processing of these two winch-lots was one of width

control. At all stages the fabrics seemed to want to be wider than their calculated target widths. Consequently, great difficulty was experienced in obtaining sufficient courses in the fabric to ensure low length shrinkage figures. Even when the targets were increased the fabric showed a tendency to grow in width between calendering and sampling by up to 1½ cm.

It would therefore seem reasonable to expect the fabrics to have low residual width shrinkage figures at the testing stage.

Table 5 shows the actual shrinkage figures and in fact relatively high width shrinkage figures have been obtained (11-18%) which is rather surprising and to some extent disconcerting.

Further investigation into this problem is necessary.

WINDY



WINDY DYELOT 000001 1 WEIGHT 141
ORDER 25 1 WEIGHT 141

QUALITY CORRECT

DO NOT MAKE
ANY DYE ADDITIONS

MACHINE a

Procedure JBPSHE13 Target Time 10

PRE BLEACH

			GRM	ADD	ADD
00009	1.00	MICROVIN CA SPECIAL CONTAMINANT	1670		
00015	5.00	CAUSTIC SODA LIQ.	8050		
00041	4.00	HYDROGEN PEROXIDE STORE	6440		

TO THE BOIL TAKING 30 MINUTES, BOIL FOR 30 MINUTES AND SHOW.
PALIZE WITH

			GRM	ADD	ADD
00042	2.00	HYDROGEN ACETIC ACID	400		

FOR 20 MINUTES AT 100%, WASH OFF WELL.

BATH DYE
ION PROCION DYES 1/2 80 GPL SALT
AT 50 C

			GRM	ADD	ADD
010108	2.0000	PROCION BLUE HECH	3220.000		

ER 10 MINS, RUN FOR 20 MINS
TE TO 85°C. RUN FOR 20 MINS

			GRM	ADD	ADD
00062	99.00	P.D.U. SALT BAGGED	193200		

SALT OVER 20 MINS, RUN 10 MINS

TABLE 1.

PA 1 ... OVER 20 MINS ... 10 ...
 01 ... OVER 20 MINS ... 10 ...

			GRM	ADD	ADD
000000					

IN SODA ASH IN TWO PARTS OVER 20 MINS
 IN FOR 40 MINS AND SHOW
 TON BACK GROUP

			GRM	ADD	ADD
000000					

TO THE 6011 - BOIL FOR 20 MINUTES.
 SH OFF WELL. REPEAT IF NECESSARY.

TON SOFTEN SANDOLUBE
 GET COLD ADD SANDACID RAISE TO 40°C
 SANDOLUBE RUN TO MINS AND SHOW

			GRM	ADD	ADD
000102	.00 %	SANDACID 8218E	3220	1	1
000103	2.00 %	SANDOLUBE LSC	3220	1	1

TABLE 1 (CONT.)

2

MACHINE WIE 1	CUSTOMER I.J.C.	DYELOT IIC00	WEIGHT 157
QUALITY COCC	SHADE CODE OPTIC	401 ORDER TRIAL	VOLUME 3140
SHADENAME	OPTIC STANDARD		
QUALITY COMMENTS	Y		
MACHINE COMMENTS	MACHINE 2		

Weins Procedure COOPTICW Target Time 5

DYE BATH - BLEACH/DYE
 BLEACH/OPTIC WHITE
 START COLD

			GRM	ADD	ADD
7000019	1.00 %	CONTAVAN HW	1570		

ADD, RUN 10 MINS

			GRM	ADD	ADD
13000092	12.00 %	SODIUM HYPOCHLORITE	15810		

ADD, RUN 20 MINS

			GRM	ADD	ADD
21000015	5.00 %	CAUSTIC SODA LIQ.	7850		

ADD 1/2. RUN 15 MINS
 RAISE TO 60°C OVER 15 MINS; RUN 15 MINS
 ADD REST OF CAUSTIC AND

			GRM	ADD	ADD
23000041	0.00 %	HYDROGEN PEROXIDE STORE	8420		

ADD, RUN 10 MINS

			GRM	ADD	ADD
15060106	0.7000 %	PHOTINE EXT	1099 000		

TABLE 2.

RAISE TO BOIL OVER 30 MINS
BOIL FOR 60 MINS AND SHOW

O. TIC HYDROS

WASH OFF WELL, COLD AND HOT

			GRM	ADD	ADD
0/000042	1.50 %	HYDROS R	355		

A D, RUN 20 MINS AT 60°C
WASH OFF WELL AGAIN

C TTON SOFTEN ALCOLUBE NO EULYSIN

A D

			GRM	ADD	ADD
01000007	1.50 %	ALCOLUBE BSL 100	355		

RAISE TO 40°C RUN FOR 30 MINUTES AND SHOW.

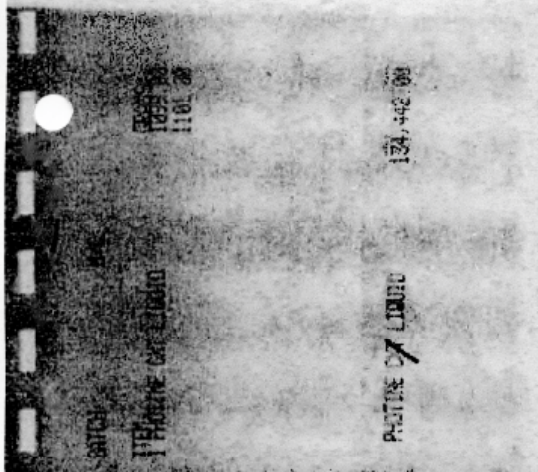


TABLE 2 (CONT.)

VARIANT	TARGETS			PEGG DRYER		CALENDER		SAMPLE NO.	
	C/3	WIDTH		C/3	WIDTH	C/3	WIDTH	C/3	WIDTH
		ORIGINAL	REVISED						
38/338		61	61	34½	59½	37	61	37	61
70/236	57½	70½	75½	52½	68½	53½	75½	55	77
70/248	54½	72	76½	46½	70	49	76½	49½/50	78½
70/260	51½	73	77½	44½	71½	45½	77½	47½	79
60/236	58½	73½	78	53	71½	55	78	56½	79
70/273	49	74½	79	40	72½	43	79	44	81½
60/248	55	75	80	47½	73	51	80	51	80
70/287	46	75½	80½	36½	73½	42½	80½	40	81
60/260	52½	76	80½	44½	74	50	80½	47½	81
60/273	49½	77½	81½	40	75½	44	81½	45	85
50/236	59	77½	82	54½	75½	56½	82	56½	83½
60/287	46½	79	82	39½	77½	42½	82	41	85
50/248	56	79	83½	51	77	53½	83½	54½	84
50/260	53	80½	85	48	78½	50	85	50	87
50/273	50½	82	86	43½	80	46	86	46	88
50/287	47½	83½	87	41½	81½	45	87	44	89½

WINCH DYED

TABLE 3

VARIANT	TARGETS			PEGG DRYER		CALENDER		SAMPLING	
	C/3	WIDTH		C/3	WIDTH	C/3	WIDTH	C/3	WIDTH
		ORIGINAL	REVISED						
38/338		61	61	37	59	37	61	37	61½
70/236	57½	70½	75½	51	68½	51	75¾	53	77½
70/248	54½	72	76½	47	70	49	76½	49	77½
70/260	51½	73	77½	42	71	44	77½	45	79½
60/236	58½	73½	78	51	71½	53	78	54	79½
70/273	49	74½	79	42	73	42	79	42	80
60/248	55	75	80	48	73	49	80	50	80
70/287	46	75½	80½	38½	74	38½	80¾	38½	82
60/260	52½	76	80½	44	74	45	80¾	45	80½
60/273	49½	77½	81½	42½	75½	42½	81	43	81
50/236	59	77½	82	55	75½	58	82¾	58	83
60/287	46½	79	82	40	77½	40	82	39½	85
50/248	56	79	83½	51	77	53	83½	52½	84
50/260	53	80½	85	47	78½	49	85	49	87
50/273	50½	82	86	42½	80½	44½	86	44	87½
50/287	47½	83½	87	40	81½	42	87	41½	88½

WINCH BLEACHED

TABLE 4

INTERLOCK FABRICS

TABLE 5

SAMPLE	%Shr. L		%Shr. W	
	WB	WD	WB	WD
150/236	14.8	16.7	14.2	15.1
150/248	15.8	15.4	15.5	15.6
150/260	16.3	16.7	16.6	15.4
150/273	18.8	13.8	17.9	15.9
150/287	19	13.9	17.9	16.1
160/236	17.7	14.2	15.4	15.4
160/248	20.3	12.4	16	13.4
160/260	18.8	13.4	17.2	14.9
160/273	19.3	15.1	17.3	16.7
160/287	20.7	15	18.6	15.1
170/236	17.9	14.5	15.2	15.5
170/248	19.3	13.4	17.4	14.5
170/260	20.8	13.6	19.6	12.7
170/273	23.4	12.1	20.1	14.9
170/287	23.9	11.1	19.7	15.3
138/338	19.2	16.6	19.7	15.8