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SOUTH AFRICAN  
WOOL AND TEXTILE RESEARCH INSTITUTE  
OF THE CSIR

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## CONTENTS

	Page
INSTITUTE NEWS.....	1
SAWTRI PUBLICATIONS.....	5
TECHNICAL PAPER:	
Seersucker Fabrics in Wool and Wool/Cotton by <i>G.A. Robinson</i> .....	6

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**L to R: Dr J. Vorster Viljoen, with Messrs Hattingh, Smit and Vogt.**



**Dr J. Stewart, Left, with Dr Hunter, Mr Robinson (standing) Dr Turpie, Mr Shear and Mr Murray-Smith.**



The United States "People to People" contingent.

## **SAWTRI Publications**

Since the December, 1982 edition of "SAWTRI BULLETIN" the following have been published:

### **SAWTRI Technical Reports:**

- No. 511 Hunter, L. and Toggweiler, P., *The Processing of Blends of Cotton and Wool and the Cotton System. Part III: Preliminary Study using Chute feeding to the Card.*
- No. 512 Gee, E., *Mode Skewness and Kurtosis of Fibre Distribution and Some Practical Applications.*
- No. 513 Garner, E., *Continuous Dyeing using Radio Frequency Energy, Part III: Preliminary Study of the Effects of Disperse Dye Molecular structure on Fixation.*

### **Publications in Other Journals**

Shiloh, Miriam, Hunter, L. and Smuts, S., *The Effect of Fibre Properties and Weave Crimp on the Hygral Expansion of Woven Wool Fabrics. J. Text. Inst., 73 (5), 238 (1982).*



# SEERSUCKER FABRICS IN WOOL AND WOOL/COTTON

by G.A. ROBINSON

## ABSTRACT

*Seersucker fabric constructions are discussed and specifications for new constructions based on differential shrinkage of wool and cotton are given in detail. Emphasis is placed on lightweight fabrics for ladies outerwear and in all wool. The fabric structure details and fabric samples are presented.*

## INTRODUCTION

A seersucker fabric as defined by the Textile Institute<sup>1</sup> is one that is characterised by alternating puckered and relatively flat areas, particularly in the warp direction, although it can also occur in the form of checks. The effect may be produced in a variety of ways, e.g. either by weaving from two weavers beams, with the ground ends highly tensioned and the ends for the puckered stripes woven at a lower tension or by chemical treatment of a fabric, (in particular cellulosic fabrics), with caustic soda solution, which causes the treated parts to contract. Robinson and Marks<sup>2</sup> suggested a third method, using groups of ends or picks or both, which will contract differentially when the fabric is relaxed. They also discussed *differential shrinkage* where the puckering does not depend on differences in warp tension during weaving and it therefore is not necessary to use two weavers beams of different tensions. By using differential shrinkage, warp as well as weft-way stripes may be obtained. The necessary differences in shrinkage may be achieved by (a) normal twist yarns together with groups of yarns with crepe twist or (b) pre-shrunk and unshrunk thermoplastic yarns, or (c) thermoplastic yarns and any other type of yarn.

The advantages of using differential shrinkage as a means of producing seersucker fabrics are as follows:

1. Only *one* warp beam is necessary and therefore savings in warp preparation can be made.
2. There is no necessity for the use of different yarn linear densities and different stripe densities to achieve the differences in construction during finishing, although these options are still available and useful.
3. There is no need for special beam let-off motions.
4. An extension of the end-use range by using wool, e.g. ladies' outerwear.

## DISCUSSION

Work on wool/cotton yarn blends for shirtings and lightweight dress fabrics has been extended to make use of differential shrinkage of wool and cotton for seersucker fabrics and it was shown that such fabrics may be

produced with puckering in both warp and weft directions using these two types of fibres. In addition, all-wool seersucker fabrics have also been developed and this report describes some of these developments in detail.

In a preliminary experiment an ordinary striped fabric was produced from cotton and wool worsted yarns to simulate a general seersucker type fabric. During finishing treatments it was found that the wool puckered when the cotton shrank. It was immediately apparent also that because a constant tension was used throughout for both sets of yarns a check effect could be obtained by using these same yarns in the weft. Repeated wash tests showed that there was some fabric instability and that pilling of the wool occurred when shrinkresist treated wool was used. A variety of effects could also be produced by using different structures, e.g. cotton-plain weave, and wool in other weaves such as matt and twill (of small value of average float). By using sized single warp yarns<sup>3,4</sup> fabrics of lighter weight were also possible, and by incorporating Repco wrapped core-spun (RWCS) wool yarns<sup>5</sup> further reduction in fabric mass to as fine as 105 g/m<sup>2</sup> was possible.

Subsequent work involved using shrinkresist treated wool yarns to avoid felting. This has led to the development of 100% wool seersucker fabrics, whereas further variations included mixtures of woollen and worsted yarns. Samples of the fabrics and production details are shown in the appendix.

#### ACKNOWLEDGEMENTS

The author gratefully acknowledges the assistance of Messrs L. Layton and E. Barchietto who wove and finished the fabrics as well as the kind permission of the South African Wool Board to publish this paper.

## FABRIC DETAILS

**Fabric 1** : 100% wool worsted, ladies' lightweight cloth.

**Warping pattern** :

22 tex untreated wool (worsted)	36		36
22 tex shrinkresist treated wool (worsted)		36	36
TOTAL			72

**Weft pattern** : shrinkresist treated yarn only

**Weave** : plain

**Sett** : reed 945 dents/m with 2 ends/dent  
: weft density - 19 picks/cm

**Mass** : 135 g/m<sup>2</sup>

**Finish** : Scoured, lightly milled, stenter dried without tension and steamed.

**Fabric 2** : 100% wool, mixture of woollen and worsted, ladies' outerwear.

**Warping pattern** :

22 tex shrinkresist treated wool (worsted)	36		36
130 tex untreated wool (woollen)		18	18
TOTAL			54

**Weft pattern** : same as warp  
**Weave** : plain  
**Sett** : reed 472 dents/m of worsted 4 ends/dent  
           woolleen 2 ends/dent  
           : weft density worsted — 15,75 picks/cm  
   wool — 8 picks/cm  
**Mass** : 230 g/m<sup>2</sup>  
**Finish** : Scoured, dyed, milled, stenter dried without tension  
           and steamed.

**Fabric 3** : Wool/cotton dress material

**Warp pattern** :

		8x			
32 tex wool (worsted)		2		4	20
16 tex cotton	4		4		36
TOTAL					56

**Weft pattern** :

		6x			
32 tex wool (worsted)		2		4	16
16 tex cotton	4		4		28
TOTAL					44

**Weave** : plain  
**Sett** : reed 945 dents/m of wool — 2 ends/dent; cotton — 4  
           ends/dent  
           : weft density : 20 picks/cm  
**Mass** : 180 g/m<sup>2</sup>  
**Finish** : Scoured, wool dyed only, stenter-dried and steamed.



**Fabric 4** : Wool/cotton check (piece dyed)  
 This fabric is constructed using a matt weave for the cotton yarns and plain weave for the wool yarns.

**Warp pattern** :

32 tex wool (worsted)	36		12		48
16 tex cotton		24		24	48
TOTAL					96

**Weft pattern** :

32 tex wool (worsted)	48		16		64
16 tex cotton		16		16	32
TOTAL					96

**Weave** : cotton — matt; wool — plain

**Sett** : reed 945 dents/m, with wool — 2 ends/dent, cotton — 4 ends/dent (crammed)

:: weft density — 19 picks/cm of wool and 38 picks/cm of cotton

**Mass** : 155 g/m<sup>2</sup>

**Finish** : Scoured, piece dyed, stenter-dried without tension, steamed

**Fabric 5** : Wool/cotton dress material

**Warping pattern** :

32 tex wool (worsted)	12		6	6	4	2	1	1	1		33
16 tex cotton		12	6	6	3	1	1	1		1	31
<b>TOTAL</b>											<b>64</b>

**Weft pattern** : as warp

**Weave** : plain — pick and pick loom

**Sett** : reed 1 260 dents/m with 2 ends/dent

: weft density — 23,6 picks/cm

**Mass** : 180 g/m<sup>2</sup>

**Finish** : Scoured, rinsed, dried, liquid ammonia mercerised, bleached, rinsed, stenter dried and steamed.

**Fabric 6** : Wool/cotton ladies' lightweight dress fabric

**Warping pattern** :

12 tex S676 RWCS wool (polyester core and wrapper)	42		42
16 tex Z957 cotton (crammed)		24	24
<b>TOTAL</b>			<b>66</b>

**Weft pattern** : as warp pattern

**Weave** : 2/2 Twill

**Sett** : reed 1 260 dents/m, with 3 and 2 ends/dent alternately

: weft density wool 19 picks/cm, cotton 28,5 picks/cm (crammed)

**Mass** : 125 g/m<sup>2</sup>

**Finish** : Scoured, rinsed, dried, liquid ammonia mercerised, bleached, rinsed, stenter dried and steamed.

**Fabric 7** : 100% wool, mixture of woollen and worsted ladies' skirt material

**Warping pattern** :

110 tex untreated woollen — Green	8		8										16
110 tex untreated woollen — Brown		4					8		8				20
110 tex untreated woollen — Grey								4					4
32 tex shrinkresist treated wool worsted — Beige				22		22						8	52
32 tex shrinkresist treated wool worsted — undyed					8					22		22	52
<b>TOTAL</b>												<b>144</b>	

**Weft Pattern** :

110 tex untreated woollen — Grey		4					8		8				20
110 tex untreated woollen — Brown	8		8					4					20
32 tex shrinkresist treated wool worsted — Beige				16		16						8	40
32 tex shrinkresist treated wool worsted — undyed					8					16		16	40
<b>TOTAL</b>												<b>120</b>	

**Weave** : plain

**Sett** : reed 472 dents/m of worsted 4 ends/dent, woollen 2 ends/dent.

: weft density : worsted — 15,75 picks/cm  
wool — 8 picks/cm

**Mass** : 265 g/m<sup>2</sup>

**Finish** : Scoured, milled, stenter dried without tension and steamed.

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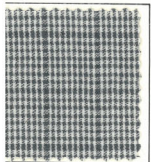
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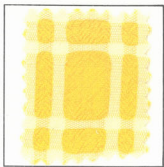
1. mass 135 g/m<sup>2</sup>



2. mass 230 g/m<sup>2</sup>



3. mass 180 g/m<sup>2</sup>



4. mass 155 g/m<sup>2</sup>



6. mass 125 g/m<sup>2</sup>



5. mass 180 g/m<sup>2</sup>



7. mass 265 g/m<sup>2</sup>