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BLENDS OF WOOL AND COTTON For many years wool has been blended with other fibers to achieve certain desired effects in the resulting fabric. It has been found that wool processes and can be utilized quite well when blended with a number of fibers such as acrylics, polyesters, and even cotton. The spinning of yarns from wool/cotton blends is not a recent development, as this has been done well on different spinning systems for quite some time; particularly notable has been the blending of these two fibers by manufacturers in England.

A significant volume of wool-blended yarns has been produced in the United States utilizing the cotton system of spinning. As this system processes fibers up to 1.5 inches in length, it has not been suitable for the normal length of wool. For this reason, wool has been broken or cut to more nearly the length of the cotton, which has resulted in high quality yarns that have been utilized with considerable success in the knitting industry.

One American company in particular has done a remarkable job in blending cotton and wool. We understand this began in 1946 and has continued without interruption to this date. That company processes cotton separately through combing, and after the short fibers have been removed the cotton is returned to the opening room where it is intimately blended with cut wool. The blend is then processed through standard cotton system equipment into low-twist, ring-spun yarns.

Within the past four or five years, yarn production from wool/cotton blends has become rather commonplace, and we have found this is done on both ring and rotor spinning machines. Research at the Textile Research Center has indicated that this blend processes with a reasonably high degree of efficiency and makes quality yarns, as long as the percentage of wool is not too great. Further, we have learned that ring spinning gives stronger yarns than rotor spinning. This is the same result that has been found when processing other fibers — in blends or in 100% form — unless considerable attention is given to precise selection of fiber that has optimum characteristics for rotor spinning. Because of the relatively large diameter and low strength of wool, the selection of a particular wool to improve rotor-spun yarn strength is considerably more limited than is found with other fibers.

A study conducted at the Textile Research Center last year for the Natural Fibers & Food Protein Commission of Texas (NFFPC) generated some interesting data, although no previously unknown information resulted from it. The program involved the use of a long and strong cotton blended with a relatively fine wool that was clipped short directly from the sheep. This was approximately 1.5 inches long and was irregular in length when compared to either broken or cut wool. (At the conclusion of this project, it was felt that the length irregularity gave a lower quality and weaker yarn than might have resulted from cut wool. This feeling was based on past experiences in spinning wool on the cotton system.) The full report on this study is too extensive to be carried in *Textile Topics*, but we would like to reprint part of it. We hope this will be of interest to our readers and many friends in the manufacturing industry.

The original research was designed to spin yarns from both 100% cotton and 100% short-clipped wool, and then to use various percentages of these two fibers in blends to determine yarn characteristics at different blend levels. However, the 100% wool would not process at all, and that phase of the program was discontinued. In the end, we spun the 100% cotton and two different blends with wool.

In the following tables, we are giving the results of spinning the 100% cotton, a 60% cotton/40% wool blend, and finally a blend of 40% cotton/60% wool. Tables I and II present the cotton and wool fiber properties. Table III gives the testing results of the 100% cotton yarn, and Tables IV and V give data collected from spinning the blends. It will be noted that yarn strength deteriorated quite rapidly with the increasing percentage of wool. This was expected, for the cotton was a much stronger fiber than the wool to begin with.

We appreciate the cooperation of the Natural Fibers & Food Protein Commission of Texas in allowing us to publish the results of this research.

TABLE I

Cotton Fiber Properties

2.5% Span Length (in)	1.26
Length Uniformity (%)	44.5
Micronaire	4.10
Strength (1/8" gauge) (g/tex)	31.47
Elongation (%)	5.83
Non-lint Content (%)	2.20
USDA Grade	SLM

TABLE II

Wool Fiber Properties

Mean Diameter (microns)	19.68
CV% of Mean Diameter	17.43
Mean Length (in)	1.38
CV% of Mean Length	55.15
Grade	70's

TABLE III

Yarn Properties (100% Cotton)

Type of Spinning	Ring	O-E	Ring	O-E
Nominal Yarn Number (N_e)	11.00	11.00	22.00	22.00
Actual Yarn Number (N_e)	11.51	11.01	22.20	21.85
(tex)	51.26	53.59	26.58	27.00
CV% of Yarn Number	0.88	0.94	1.90	1.24
Twist Multiplier	3.25	4.58	3.25	4.52
Skein Test:				
Strength (lbs)	254.5	251.0	117.3	111.4
CV% of Strength	2.86	4.15	4.67	3.39
Count-Strength-Product	2937	2763	2608	2432
CV% of CSP	2.84	4.34	3.37	3.57
Single Yarn Strength Test:				
Strength (g)	1026.0	856.5	606.0	380.4
CV% of Break	7.89	7.18	10.89	10.25
Tenacity (g/tex)	20.02	15.98	22.80	14.09
Elongation (%)	6.9	7.5	5.7	6.3
Uster Evenness Test:				
Non-Uniformity (CV%)	15.74	15.16	19.38	15.78
Thin Places/1,000 yds	9	8	78	20
Thick Places/1,000 yds	162	97	849	168
Neps/1,000 yds	93	210	432	347
Hair Count/100 yds	1762	417	1371	177

TABLE IV

Yarn Properties (60% Cotton/40% Wool)

Type of Spinning	Ring	O-E	Ring	O-E
Nominal Yarn Number (N_e)	11.00	11.00	22.00	22.00
Actual Yarn Number (N_e)	11.51	11.23	22.32	22.21
(tex)	51.30	52.58	26.46	26.59
CV% of Yarn Number	1.42	0.80	1.16	0.94
Twist Multiplier	3.25	4.52	3.25	4.55
Skein Test:				
Strength (lbs)	155.0	140.4	74.8	54.1
CV% of Strength	4.19	1.88	3.38	2.38
Count-Strength-Product	1792	1581	1675	1205
CV% of CSP	3.21	1.61	3.10	2.35
Single Yarn Strength Test:				
Strength (g)	551.0	483.0	313.8	191.2
CV% of Break	11.80	8.70	14.34	10.88
Tenacity (g/tex)	10.74	9.19	11.86	7.19
Elongation (%)	6.4	6.9	6.4	5.5
Uster Evenness Test:				
Non-Uniformity (CV%)	22.18	15.19	24.06	16.88
Thin Places/1,000 yds	284	8	522	79
Thick Places/1,000 yds	507	105	1180	191
Neps/1,000 yds	62	38	393	212
Hair Count/100 yds	2637	1286	1975	1748

TABLE V

Yarn Properties (40% Cotton/60% Wool)

Type of Spinning	Ring	O-E	Ring	O-E
Nominal Yarn Number (N_e)	11.00	11.00	22.00	22.00
Actual Yarn Number (N_e)	11.29	11.10	22.25	21.92
(tex)	52.30	53.20	26.54	26.94
CV% of Yarn Number	1.37	0.77	2.18	3.55
Twist Multiplier	3.25	4.52	3.25	4.55
Skein Test:				
Strength (lbs)	125.7	111.9	59.7	42.7
CV% of Strength	5.00	2.25	5.53	5.96
Count-Strength-Product	1425	1244	1333	939
CV% of CSP	4.15	1.68	4.33	2.51
Single Yarn Strength Test:				
Strength (g)	511.0	405.0	226.8	145.2
CV% of Break	18.40	10.86	15.87	11.85
Tenacity (g/tex)	9.77	7.61	8.55	5.39
Elongation (%)	6.2	6.5	5.0	5.3
Uster Evenness Test:				
Non-Uniformity (CV%)	23.70	15.42	26.33	17.78
Thin Places/1,000 yds	409	11	843	122
Thick Places/1,000 yds	646	96	1620	234
Neps/1,000 yds	92	26	524	247
Hair Count/100 yds	3422	1310	2840	1711

VISITORS We were pleased to have a number of visitors with us during November. Among these were Walter Hrivnatz of Santista Textiles, Sao Paulo, Brazil and, on the same day, a group of textile executives from Argentina. Their primary interest was in the high volume instrument testing of cotton, and they are shown in the photo studying one of our HVI systems.

Aldo Ricciardi, INTA, Chaco, Argentina (gesturing, center), discusses operation of the Spinlab 800 Series HVI system with members of his group. Others in the photo are (l to r) Walter Hrivnatz, Santista Textiles, Sao Paulo, Brazil; TRC's Gustavo Abdalah; Jorge Vicini, Ministerio Agricultura, Chaco; Juan Larramendy, UCAL, Chaco; Miguel Chercasky, Fibral Chaco S.A., Buenos Aires; Norberto Pepe, Fibramalva SAIC, Buenos Aires; and Nell Powell, TRC staff.

Other visitors to the Textile Research Center included Rita Davis, Philip Sronce, Carol Skelly and Gary Scavogelli, USDA, Washington, DC; Judy A. Apel, IBM, Austin, TX; Dieter Ollinger, Sulzer Brothers, Inc., Spartanburg, SC; Robert Manley, Natural Fibers & Food Protein Commission of Texas, Dallas, TX; Ed Borden and Charles Marshall, Borden Manufacturing Co., Goldsboro, NC; Steve Clarke, Robert Sallavanti and Dana Godwin, Gentex Corporation, Carbondale, PA; Michael R. Straka and Michael L. Lewis, Hanes Knitwear, Inc., Winston-Salem, NC; Harvey Campbell, Harvey Campbell Associates, Bakersfield, CA; Lester J. Smith and Larry Dennis, Cone Mills Corp., Greensboro, NC; Napoleon Hurtado, Continental Gin Co., Prattville, AL; Myint Swe and Hla Yin, Myittha Ginning Project, Meiktila, Burma; Hein Schroder, Department of Agriculture, Pretoria, South Africa; and Jim Prendergast, Namoi Cotton Co-op, Wee Waa, NSW, Australia.