

TEXAS COTTON QUALITY EVALUATION



Crop of 1997

International Textile Center
Texas Tech University
Lubbock, Texas

*Sponsored by
Texas Food and Fibers Commission*

INTERNATIONAL TEXTILE CENTER
Texas Tech University

Director:

M. Dean Ethridge, Ph.D.

Assistant Director:

Eric Hequet

Textile Engineer:

James Simonton

Materials Evaluation Lab Manager:

Pauline Williams

Short Staple Spinning Manager:

William D. Cole

Chemical Testing Manager:

Bobby G. Wyatt

Mailing Address:

P.O. Box 5888

Lubbock, Texas 79408-5888

Shipping Address:

1001 E. Loop 289

Lubbock, Texas 79403-6518

Phone:

806-747-3790

Fax:

806-747-3796

e-mail:

itc@ttu.edu

Web page:

<http://www.ttu.edu/~itc>

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TEXAS COTTON QUALITY EVALUATION -- CROP OF 1997

INTRODUCTION

This is the eighteenth in a series of annual reports to provide interested parties with information regarding the quality of cotton produced in Texas. All testing, processing and evaluations were performed on commercial-sized equipment at the International Textile Center.

A sample of nineteen representative cotton bales was obtained in collaboration with key people in the production and marketing sectors within Texas. Also, USDA data on cotton varieties planted were used to ensure that the sample included the dominant Texas varieties. At least two bales were selected from each of the major production areas of Texas. All bales are identified by their ginning locations as well as by the production area. For the fourth time, we have included a bale of roller-ginned Pima cotton from the Rio Grande Valley area.

Fiber samples from each of the nineteen bales were tested using individual instruments, high-volume instruments (HVIs), the Peyer Texlab AL-101, and the Zellweger Uster AFIS. These results are given in virtually the same format as has been used in previous reports.

Stickiness testing was done on each sample for this year's crop study. A sample of each cotton was processed through a Hollingsworth card with exposed crush rolls and the fibers are subjectively rated according to how well they form and hold a web coming out of the card. Also, HPLC analysis was performed on each sample to determine if complex sugars were present, indicating honeydew-trehalulose from silverleaf whiteflies or melezitose from aphids. The results of stickiness testing indicated that there would be not problems with textile processing and this was confirmed in the spinning tests.

The sequence and types of machinery used for processing the Upland cotton fibers into yarns are shown in Figure 1. The corresponding sequence for the Pima cotton is shown in Figure 2. Each of these processes is typical for the Upland and ELS types, respectively.

Five of the longer staple Upland cotton varieties were processed both with and without combing, in order to document the impact of combing on yarn quality. This marked the fifth consecutive year for selective combing of Upland cotton. The spinning specifications are summarized in Table 1. Five Upland varieties were combed for testing. Comparative results for these varieties are shown in Tables 3-7, with the results for the combed cottons in Tables 3a-7a. All other test lots were carded only.

SUMMARY COMMENTS ON COMBING

For evaluating the combed yarns, a N_e 30 yarn size was used. This count is on the high side of those usually spun commercially on the rotor spinning system, but is frequently produced on the ring spinning system. Therefore, this count should provide a good indicator of the improvements that may be obtained by combing.

Major impacts on combing of yarn properties are the following:

- The count-strength-product (CSP) by the skein method increased significantly for ring-spun yarns, but only marginally for rotor-spun yarns (Figure 2). The same conclusion applies to single-yarn strength as measured by the Uster Tensorapid (Figure 3).
- The non-uniformity (CV%) of rotor-spun yarns was unaffected by combing for rotor yarns, but it was greatly reduced for the ring-spun yarns (Figure 4). It is noteworthy that combing was needed to make the non-uniformity measurements for ring-spun yarns compare favorably with those for rotor-spun yarns.
- Neps were decreased in number for both types of spinning; the impact of combing was huge for ring spinning, but considerably less for rotor yarns (Figure 5).

The conclusion is that combing may be beneficial to some mills producing ring-spun yarns, but is of dubious value for those using rotor-spinning technology. These results corroborate the data reported previously for the 1993, 1994, 1995 and 1996 crops.

FIGURE 1: OUTLINE OF MECHANICAL PROCESS FOR UPLAND COTTON

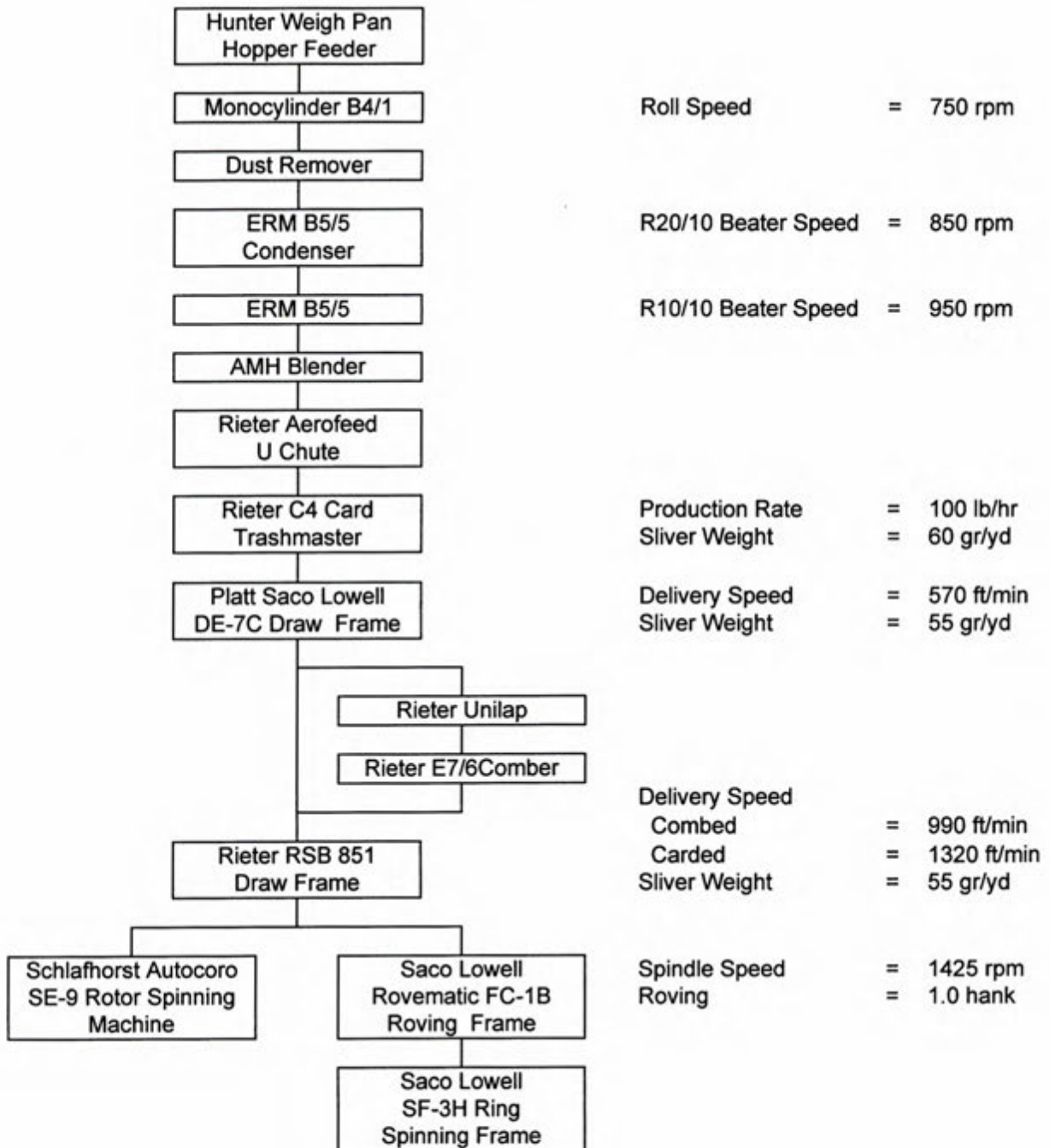


FIGURE 2: OUTLINE OF MECHANICAL PROCESS FOR PIMA COTTON

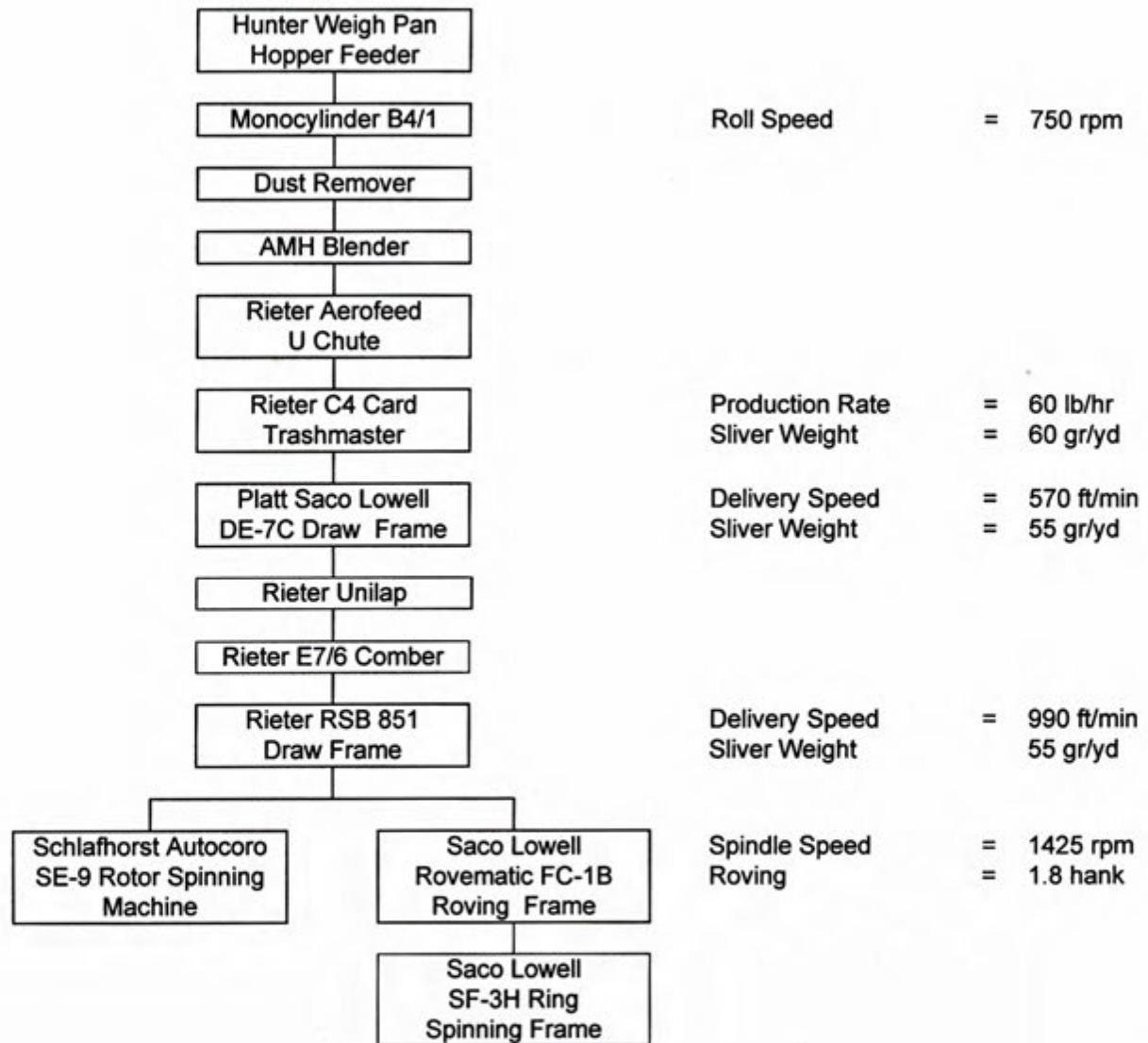


TABLE 1
SPINNING SPECIFICATIONS

(a) ROTOR SPINNING

Sliver	55 gr./yd Finisher Drawframe		
Machine	Schlafhorst Autocoro SE-9		
Nominal Yarn Size	10	22	30
Rotor Type	T 231 D		
Rotor Speed (rpm)	100,000		
Opening Roller Type	B 174 DN		
Opening Roller Speed (rpm)	7,500		
Draft (approximate)	66	145	198
Twist Multiplier	4.80	4.80	4.80
Yarn Speed (yd/min.)	167.8	123.6	105.5
Navel	4-grooved Ceramic (KN4) + 1.5		
Torque Stop	TS 37		

(b) RING SPINNING

	Upland	Pima
Roving Frame	Saco Lowell FC-1B	Saco Lowell FC-1B
Flyer Speed (rpm)	1425	1425
Roving	1.0 hank	1.8 hank
Ring spinning Frame	Saco Lowell SF-3H	Saco Lowell SF-3H
Spindle Speed (rpm)	10,000	10,000
Ring Diameter (in)	2	2
Twist Multiplier	4.00	3.80

Figure 2: Count-Strength-Product for Texas Cottons, Carded and Combed
Yarn Size = N_e 30/1
 (Settings 200% Ring Spun 280% Rotor Spun)

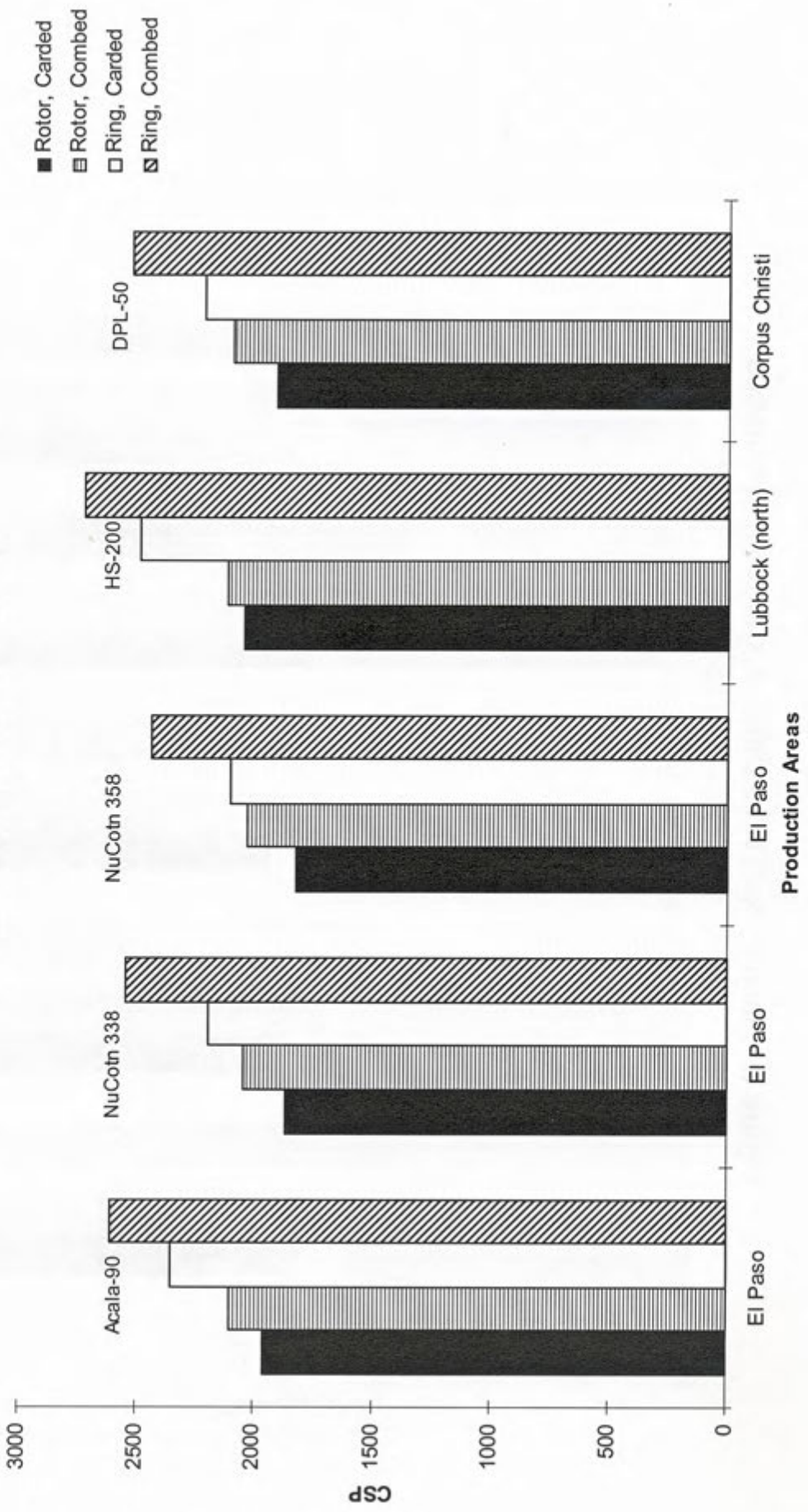


Figure 3: Tenacity for Texas Cottons, Carded and Combed

Yarn Size = N_e 30/1

(Settings 200% Ring Spun 280% Rotor Spun)

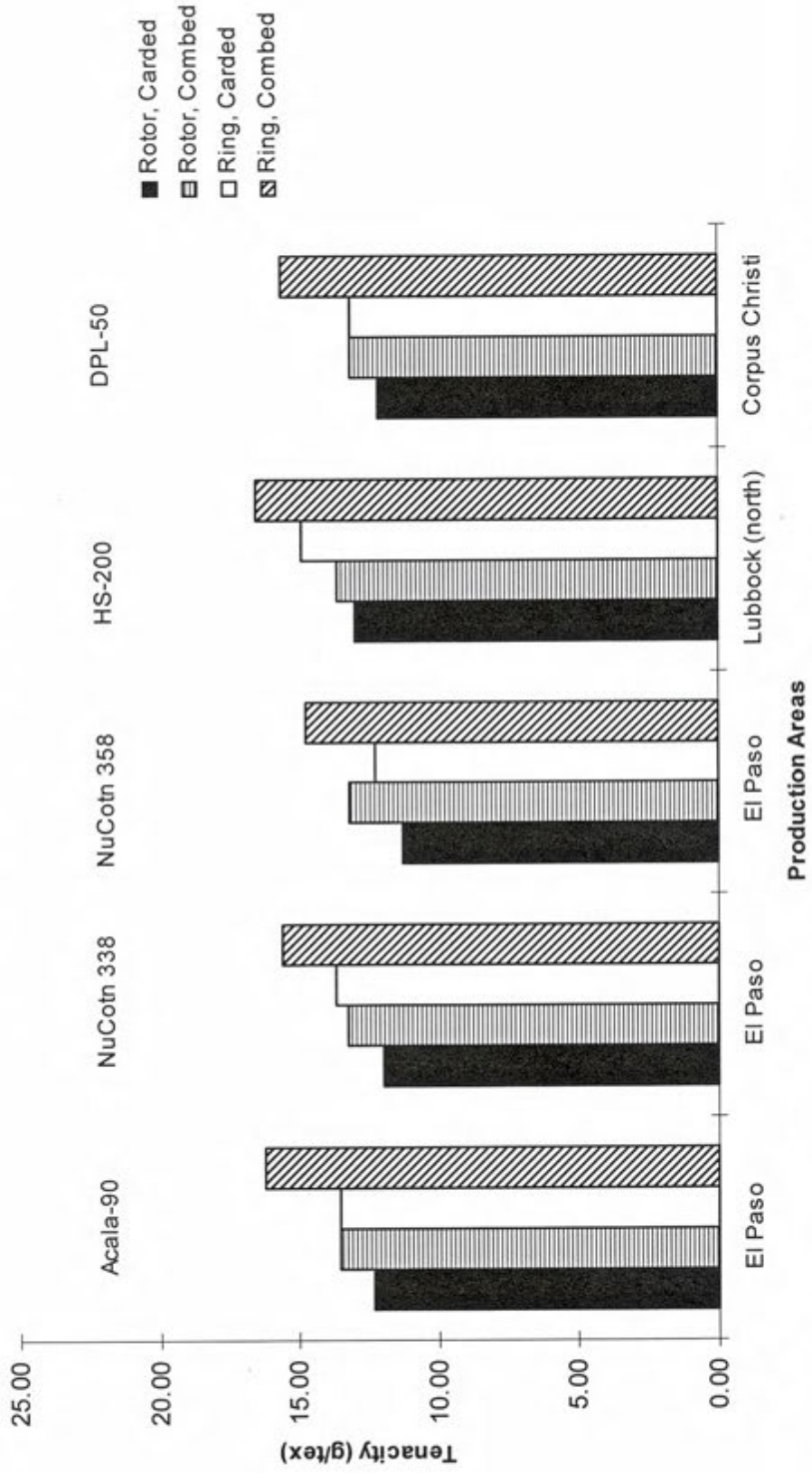


Figure 4: Non-Uniformity for Texas Cottons, Carded and Combed

Yarn Size = N_e 30/1

(Settings 200% Ring Spun 280% Rotor Spun)

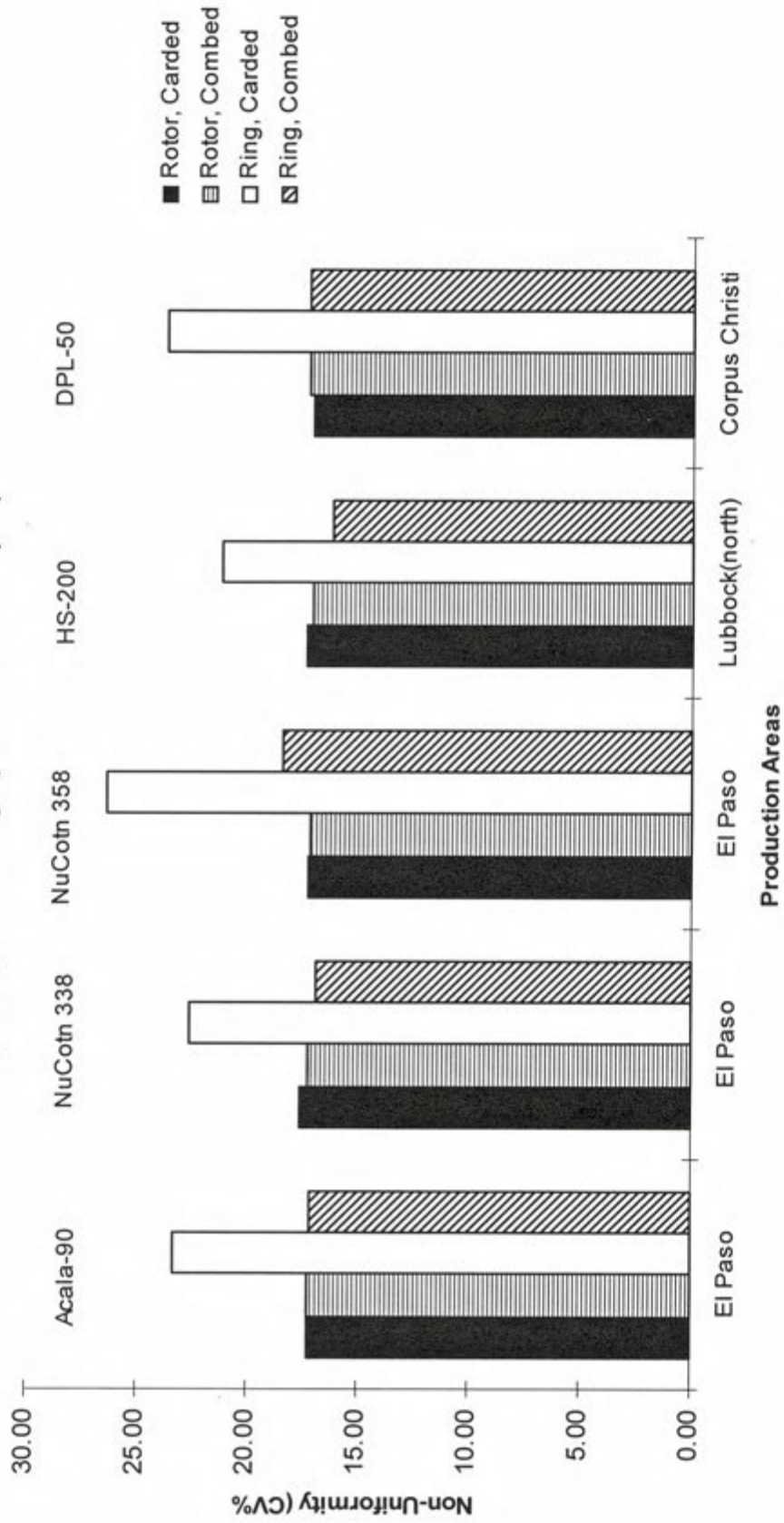
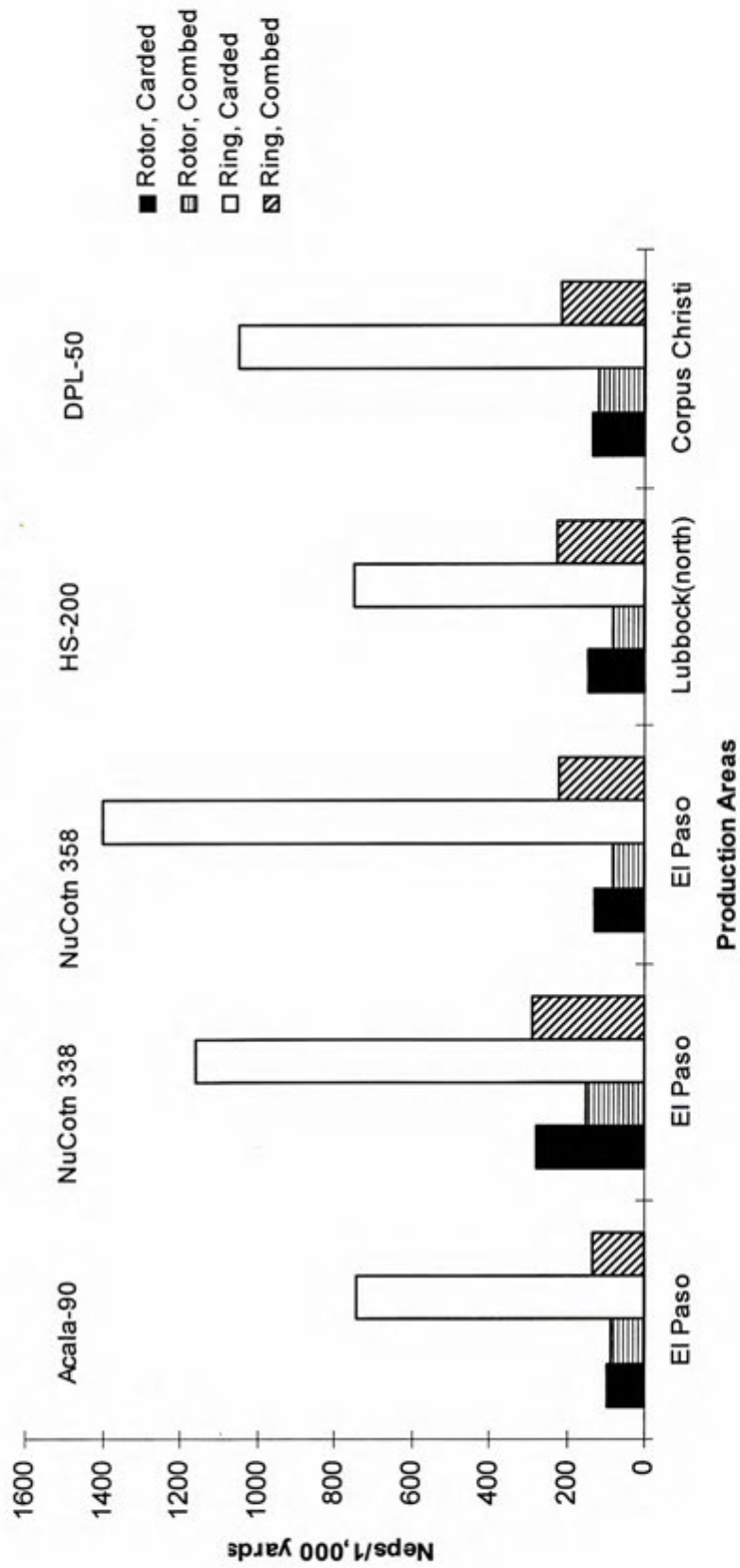


Figure 5: Neps for Texas Cottons, Carded and Combed
Yarn Size = N_e 30/1
 (Settings 200% Ring Spun and 280% Rotor Spun)



FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	28.6	1/8" Gauge Strength (g/tex)	39.8	Upper Quartile Length (w) (in)	1.35
Elongation (%)	6.8	Elongation (%)	7.8	Mean Length (in)	1.15
2.5% Span Length (in)	1.32	Upper Half Mean Length (in)	1.34	Percent Short Fibers (mtex)	4.0
Uniformity Ratio (%)	49.0	Uniformity Index	86.7	Fineness	157
Micronaire	4.2	Micronaire	4.3	Maturity Ratio	.94
Shirley Non-Lint Content	2.51	Reflectance (Rd)	65.6	Nep (cnt/g)	145
<u>Peyer AL 101</u>		Yellowness (+b)	13.1	Seed Coat Nep (cnt/g)	10
Upper Quartile Length (w) (in)	1.29	Color Grade	2	Dust (cnt/g)	569
Mean Length (in)	1.10	Leaf Grade	2	Trash (cnt/g)	66
CV% of Mean	24.4				
Percent Short Fibers	2.6				
Card Rating	very slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0014	Melezitose (whitefly and aphid marking sugar) (%)	.0192
Opening, Carding Waste (%)	4.8	Combing Waste (%)	13.4	Total Waste (%)	17.5

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		80/1
Yarn Number (N _e)	30.0	29.8
CV% of Count	.60	.51
Count-Strength-Product	2780	3796
CV% of CSP	1.52	1.70
Single-Yarn Test:		
Tenacity (g/tex)	18.00	22.74
Mean Strength (g)	361	460
CV% of Break	8.1	11.6
Elongation (%)	6.85	7.03
CV% of Elongation	5.9	6.9
Uster Evenness Test:		
Non-Uniformity (CV%)	15.22	13.10
Thin Places/1,000 yds	39	4
Thick Places/1,000 yds	145	13
Neps/1,000 yds (200%)	211	22
Neps/1,000 yds (280%)	18	
Hairiness	3.06	3.42
ASTM Yarn Grade	A	A
		B+

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	21.5	1/8" Gauge Strength (g/tex)	28.7	Upper Quartile Length (w) (in)	1.12
Elongation (%)	6.6	Elongation (%)	6.5	Mean Length (in)	.90
2.5% Span Length (in)	1.05	Upper Half Mean Length (in)	1.09	Percent Short Fibers (mtex)	13.8
Uniformity Ratio (%)	44.0	Uniformity Index	81.0	Fineness (cnt/g)	159
Micronaire	4.4	Micronaire	4.4	Maturity Ratio (cnt/g)	.84
Shirley Non-Lint Content	1.66	Reflectance (Rd)	79.9	Nep (cnt/g)	338
Peyer AL 101		Yellowness (+b)	8.0	Seed Coat Nep (cnt/g)	14
Upper Quartile Length(w) (in)	1.14	Color Grade	21-2	Dust (cnt/g)	221
Mean Length (in)	.91	Leaf Grade	1	Trash (cnt/g)	30
CV% of Mean	32.5				
Percent Short Fibers	11.5				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0014	Melezitose (whitefly and aphid marking sugar) (%)	.0172
Opening, Carding Waste (%)	6.3				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.2	21.6	29.8	16.4	22.1	30.2
CV% of Count	.47	.57	.57	.68	.99	.67
Count-Strength-Product	2591	2140	1962	2777	2405	2352
CV% of CSP	1.35	2.92	1.99	2.08	2.23	3.25
Single-Yarn Test:						
Tenacity (g/tex)	14.62	13.44	12.33	15.30	14.47	13.52
Mean Strength (g)	861	374	249	560	395	270
CV% of Break	7.0	8.1	9.1	8.7	8.5	10.9
Elongation (%)	6.88	6.51	6.16	6.73	6.31	5.90
CV% of Elongation	6.4	7.5	7.6	6.5	6.9	7.7
Uster Evenness Test:						
Non-Uniformity (CV%)	12.87	15.04	17.21	18.43	20.36	23.32
Thin Places/1,000 yds	0	24	115	112	255	648
Thick Places/1,000 yds	17	134	258	523	956	1712
Neps/1,000 yds (200%)	14	230	778	85	193	744
Neps/1,000 yds (280%)	1	28	95			
Hairiness	4.05	3.95	3.68	6.18	5.62	4.94
ASTM Yarn Grade	B+	C	A	C	D+	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	21.5	1/8" Gauge Strength (g/tex)	28.7	Upper Quartile Length (w) (in)	1.12
Elongation (%)	6.6	Elongation (%)	6.5	Mean Length (in)	.90
2.5% Span Length (in)	1.05	Upper Half Mean Length (in)	1.09	Percent Short Fibers	13.8
Uniformity Ratio (%)	44.0	Uniformity Index	81.0	Fineness (mtex)	159
Micronaire	4.4	Micronaire	4.4	Maturity Ratio	.84
Shirley Non-Lint Content	1.66	Reflectance (Rd)	79.9	Nep (cnt/g)	338
Peyer AL 101		Yellowness (+b)	8.0	Seed Coat Nep (cnt/g)	14
Upper Quartile Length (w) (in)	1.14	Color Grade	21-2	Dust (cnt/g)	221
Mean Length (in)	.91	Leaf Grade	1	Trash (cnt/g)	30
CV% of Mean	32.5				
Percent Short Fibers	11.5				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0014	Melezitose (whitefly and aphid marking sugar) (%)	.0172
Opening, Carding Waste (%)	6.3	Combing Waste (%)	16.9	Total Waste (%)	22.1

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		
Yarn Number (N _e)	29.7	29.7
CV% of Count	.84	.83
Count-Strength-Product	2104	2607
CV% of CSP	3.12	1.75
Single-Yarn Test:		
Tenacity (g/tex)	13.53	16.25
Mean Strength (g)	274	329
CV% of Break	8.5	9.6
Elongation (%)	6.18	6.38
CV% of Elongation	7.1	6.7
Uster Evenness Test:		
Non-Uniformity (CV%)	17.25	17.12
Thin Places/1,000 yds	136	69
Thick Places/1,000 yds	278	350
Neps/1,000 yds (200%)	683	134
Neps/1,000 yds (280%)	83	
Hairiness	3.56	4.26
ASTM Yarn Grade	A	B+

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.4	1/8" Gauge Strength (g/tex)	28.5	Upper Quartile Length (w) (in)	1.22
Elongation (%)	6.5	Elongation (%)	6.6	Mean Length (in)	.97
2.5% Span Length (in)	1.12	Upper Half Mean Length (in)	1.15	Percent Short Fibers	11.9
Uniformity Ratio (%)	43.0	Uniformity Index	80.2	Fineness (mtex)	156
Micronaire	3.6	Micronaire	3.5	Maturity Ratio	.82
Shirley Non-Lint Content	2.66	Reflectance (Rd)	77.4	Nep (cnt/g)	482
<u>Peyer AL 101</u>		Yellowness (+b)	9.3	Seed Coat Nep (cnt/g)	16
Upper Quartile Length(w) (in)	1.16	Color Grade	21-4	Dust (cnt/g)	269
Mean Length (in)	.93	Leaf Grade	3	Trash (cnt/g)	61
CV% of Mean	33.1				
Percent Short Fibers	12.0				
Card Rating	slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0118	Melezitose (whitefly and aphid marking sugar) (%)	.0220
Opening, Carding Waste (%)	6.4				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.1	21.8	29.9	16.2	22.2	30.0
CV% of Count	.73	.55	.80	.64	.87	1.39
Count-Strength-Product	2445	2094	1870	2528	2412	2198
CV% of CSP	2.01	2.33	1.72	1.72	2.32	1.69
Single-Yarn Test:						
Tenacity (g/tex)	14.04	12.93	11.96	14.77	13.78	13.64
Mean Strength (g)	839	357	241	548	374	274
CV% of Break	5.8	6.3	8.4	8.1	8.1	9.3
Elongation (%)	7.64	7.13	6.39	7.50	6.80	6.62
CV% of Elongation	6.0	6.7	8.1	6.3	7.3	6.5
Uster Evenness Test:						
Non-Uniformity (CV%)	12.62	14.93	17.61	17.62	20.19	22.56
Thin Places/1,000 yds	1	18	132	63	210	525
Thick Places/1,000 yds	21	125	368	458	1006	1608
Neps/1,000 yds (200%)	26	258	1476	143	345	1160
Neps/1,000 yds (280%)	3	41	276			
Hairiness	3.92	3.81	3.70	6.08	5.58	4.89
ASTM Yarn Grade	B+	C	C+	D+	D	D+

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.4	1/8" Gauge Strength (g/tex)	28.5	Upper Quartile Length (w) (in)	1.22
Elongation (%)	6.5	Elongation (%)	6.6	Mean Length (in)	.97
2.5% Span Length (in)	1.12	Upper Half Mean Length (in)	1.15	Percent Short Fibers	11.9
Uniformity Ratio (%)	43.0	Uniformity Index	80.2	Fineness (mtex)	156
Micronaire	3.6	Micronaire	3.5	Maturity Ratio	.82
Shirley Non-Lint Content Peyer AL 101	2.66	Reflectance (Rd)	77.4	Nep (cnt/g)	482
Upper Quartile Length (w) (in)	1.16	Yellowness (+b)	9.3	Seed Coat Nep (cnt/g)	16
Mean Length (in)	.93	Color Grade	21-4	Dust (cnt/g)	269
CV% of Mean	33.1	Leaf Grade	3	Trash (cnt/g)	61
Percent Short Fibers	12.0				
Card Rating slightly sticky		Trehalulose (whitefly marking sugar) (%)	.0118	Melezitose (whitefly and aphid marking sugar) (%)	.0220
Opening, Carding Waste (%)	6.4	Combing Waste (%)	15.7	Total Waste (%)	21.1

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		
Yarn Number (N _e)	29.9	29.9
CV% of Count	.79	1.10
Count-Strength-Product	2044	2543
CV% of CSP	2.19	2.28
Single-Yarn Test:		
Tenacity (g/tex)	13.22	15.58
Mean Strength (g)	266	313
CV% of Break	8.0	8.7
Elongation (%)	6.60	6.82
CV% of Elongation	7.3	6.9
Uster Evenness Test:		
Non-Uniformity (CV%)	17.27	16.89
Thin Places/1,000 yds	118	46
Thick Places/1,000 yds	347	377
Neps/1,000 yds (200%)	1002	288
Neps/1,000 yds (280%)	148	
Hairiness	3.47	4.38
ASTM Yarn Grade	B	B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.3	1/8" Gauge Strength (g/tex)	28.7	Upper Quartile Length (w) (in)	1.12
Elongation (%)	6.6	Elongation (%)	5.7	Mean Length (in)	.86
2.5% Span Length (in)	1.08	Upper Half Mean Length (in)	1.10	Percent Short Fibers	18.4
Uniformity Ratio (%)	41.0	Uniformity Index	79.2	Fineness (mtex)	155
Micronaire	3.9	Micronaire	3.7	Maturity Ratio	.82
Shirley Non-Lint Content	1.61	Reflectance (Rd)	80.3	Nep (cnt/g)	442
Peyer AL 101		Yellowness (+b)	8.6	Seed Coat Nep (cnt/g)	22
Upper Quartile Length(w) (in)	1.10	Color Grade	21-1	Dust (cnt/g)	222
Mean Length (in)	.85	Leaf Grade	1	Trash (cnt/g)	32
CV% of Mean	38.9				
Percent Short Fibers	18.5				
Card Rating	slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0017	Melezitose (whitefly and aphid marking sugar) (%)	.0194
Opening, Carding Waste (%)	6.3				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.7	30.3	16.5	22.2	29.5
CV% of Count	1.02	.58	.90	1.03	1.34	2.10
Count-Strength-Product	2370	2059	1826	2491	2165	2099
CV% of CSP	1.40	2.73	2.22	3.33	2.42	3.83
Single-Yarn Test:						
Tenacity (g/tex)	13.58	12.61	11.29	13.98	13.15	12.28
Mean Strength (g)	816	349	224	510	356	250
CV% of Break	7.4	8.1	9.7	8.7	11.3	13.7
Elongation (%)	6.83	6.44	5.87	6.56	5.98	5.66
CV% of Elongation	6.4	7.2	8.9	6.1	8.3	8.5
Uster Evenness Test:						
Non-Uniformity (CV%)	13.00	14.88	17.23	20.93	23.68	26.37
Thin Places/1,000 yds	2	18	104	304	733	1353
Thick Places/1,000 yds	16	103	244	988	1752	2546
Neps/1,000 yds (200%)	15	202	982	207	482	1399
Neps/1,000 yds (280%)	1	20	129			
Hairiness	4.16	3.99	3.88	6.63	6.08	5.37
ASTM Yarn Grade	B+	C+	B	D+	D	D

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.3	1/8" Gauge Strength (g/tex)	28.7	Upper Quartile Length (w) (in)	1.12
Elongation (%)	6.6	Elongation (%)	5.7	Mean Length (in)	.86
2.5% Span Length (in)	1.08	Upper Half Mean Length (in)	1.10	Percent Short Fibers (mtex)	18.4
Uniformity Ratio (%)	41.0	Uniformity Index	79.2	Fineness (cnt/g)	155
Micronaire	3.9	Micronaire	3.7	Maturity Ratio	.82
Shirley Non-Lint Content Peyer AL 101	1.61	Reflectance (Rd)	80.3	Nep (cnt/g)	442
Upper Quartile Length (w) (in)	1.10	Yellowness (+b)	8.6	Seed Coat Nep (cnt/g)	22
Mean Length (in)	.85	Color Grade	21-1	Dust (cnt/g)	222
CV% of Mean	38.9	Leaf Grade	1	Trash (cnt/g)	32
Percent Short Fibers	18.5				
Card Rating slightly sticky		Trehalulose (whitefly marking sugar) (%)	.0017	Melezitose (whitefly and aphid marking sugar) (%)	.0194
Opening, Carding Waste (%)	6.3	Combing Waste (%)	20.5	Total Waste (%)	25.5

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		
Yarn Number (N _e)	29.8	30.2
CV% of Count	.57	.78
Count-Strength-Product	2029	2440
CV% of CSP	3.09	1.44
Single-Yarn Test:		
Tenacity (g/tex)	13.19	14.72
Mean Strength (g)	266	293
CV% of Break	8.5	9.4
Elongation (%)	6.30	6.13
CV% of Elongation	6.6	8.0
Uster Evenness Test:		
Non-Uniformity (CV%)	17.10	18.35
Thin Places/1,000 yds	113	126
Thick Places/1,000 yds	258	553
Neps/1,000 yds (200%)	713	218
Neps/1,000 yds (280%)	78	
Hairiness	3.60	4.56
ASTM Yarn Grade	B+	B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.4	1/8" Gauge Strength (g/tex)	30.8	Upper Quartile Length (w) (in)	1.20
Elongation (%)	6.7	Elongation (%)	6.4	Mean Length (in)	.98
2.5% Span Length (in)	1.13	Upper Half Mean Length (in)	1.13	Percent Short Fibers (mtex)	9.8
Uniformity Ratio (%)	47.0	Uniformity Index	82.6	Fineness	166
Micronaire	4.4	Micronaire	4.3	Maturity Ratio	.89
Shirley Non-Lint Content	3.86	Reflectance (Rd)	74.5	Nep (cnt/g)	257
<u>Peyer AL 101</u>		Yellowness (+b)	9.7	Seed Coat Nep (cnt/g)	29
Upper Quartile Length(w) (in)	1.17	Color Grade	32-1	Dust (cnt/g)	576
Mean Length (in)	.97	Leaf Grade	3	Trash (cnt/g)	134
CV% of Mean	28.3				
Percent Short Fibers	6.9				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0033	Melezitose (whitefly and aphid marking sugar) (%)	.0246
Opening, Carding Waste (%)	7.7				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.9	30.0	16.4	22.3	30.1
CV% of Count	.31	.55	.78	.53	.94	1.09
Count-Strength-Product	2588	2246	2044	2807	2630	2489
CV% of CSP	1.53	1.49	1.71	2.24	2.21	3.05
Single-Yarn Test:						
Tenacity (g/tex)	14.76	13.64	12.96	16.24	15.21	14.88
Mean Strength (g)	885	374	260	596	410	298
CV% of Break	6.5	6.9	7.7	7.6	8.1	9.4
Elongation (%)	6.62	6.09	6.11	6.87	6.24	6.24
CV% of Elongation	5.8	6.0	6.8	5.8	6.9	6.9
Uster Evenness Test:						
Non-Uniformity (CV%)	12.44	14.93	17.31	16.38	18.74	21.12
Thin Places/1,000 yds	1	16	125	30	110	298
Thick Places/1,000 yds	17	120	321	291	708	1230
Neps/1,000 yds (200%)	24	218	976	114	278	746
Neps/1,000 yds (280%)	3	29	144			
Hairiness	3.96	3.82	3.60	5.85	5.18	4.60
ASTM Yarn Grade	B+	B	A	B	C+	C+

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.4	1/8" Gauge Strength (g/tex)	30.8	Upper Quartile Length (w) (in)	1.20
Elongation (%)	6.7	Elongation (%)	6.4	Mean Length (in)	.98
2.5% Span Length (in)	1.13	Upper Half Mean Length (in)	1.13	Percent Short Fibers (mtex)	9.8
Uniformity Ratio (%)	47.0	Uniformity Index	82.6	Fineness (cnt/g)	166
Micronaire	4.4	Micronaire (Rd)	4.3	Maturity Ratio (cnt/g)	.89
Shirley Non-Lint Content Pever AL 101	3.86	Reflectance (+b)	74.5	Nep (cnt/g)	257
Upper Quartile Length (w) (in)	1.17	Yellowness	9.7	Seed Coat Nep (cnt/g)	29
Mean Length (in)	.97	Color Grade	32-1	Dust (cnt/g)	576
CV% of Mean	28.3	Leaf Grade	3	Trash (cnt/g)	134
Percent Short Fibers	6.9				
Card Rating not sticky	Trehalulose (whitefly marking sugar) (%)	.0033	Melezitose (whitefly and aphid marking sugar) (%)	.0246	
Opening, Carding Waste (%)	7.7	Combing Waste (%)	13.4	Total Waste (%)	20.1

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		
Yarn Number (N _e)	29.3	30.2
CV% of Count	.91	.90
Count-Strength-Product	2113	2723
CV% of CSP	3.21	1.63
Single-Yarn Test:		
Tenacity (g/tex)	13.61	16.52
Mean Strength (g)	280	329
CV% of Break	8.7	8.5
Elongation (%)	6.30	6.27
CV% of Elongation	7.3	5.3
Uster Evenness Test:		
Non-Uniformity (CV%)	17.02	16.18
Thin Places/1,000 yds	106	36
Thick Places/1,000 yds	282	271
Neps/1,000 yds (200%)	656	224
Neps/1,000 yds (280%)	80	
Hairiness	3.46	4.06
ASTM Yarn Grade	A	A

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	19.6	1/8" Gauge Strength (g/tex)	26.5	Upper Quartile Length (w) (in)	1.09
Elongation (%)	6.4	Elongation (%)	5.8	Mean Length (in)	.92
2.5% Span Length (in)	1.08	Upper Half Mean Length (in)	1.09	Percent Short Fibers (mtex)	8.4
Uniformity Ratio (%)	43.0	Uniformity Index	81.5	Fineness (cnt/g)	161
Micronaire	3.9	Micronaire	3.8	Maturity Ratio (cnt/g)	.89
Shirley Non-Lint Content Peyer AL 101	2.54	Reflectance (Rd)	77.4	Nep (cnt/g)	233
Upper Quartile Length(w) (in)	1.10	Yellowness (+b)	10.0	Seed Coat Nep (cnt/g)	16
Mean Length (in)	.87	Color Grade	21-3	Dust (cnt/g)	500
CV% of Mean	35.0	Leaf Grade	2	Trash (cnt/g)	106
Percent Short Fibers	15.4				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0013	Melezitose (whitefly and aphid marking sugar) (%)	.0351
Opening, Carding Waste (%)	7.1				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.7	29.7	16.0	22.2	30.7
CV% of Count	.26	.47	.55	1.37	1.08	1.10
Count-Strength-Product	2438	2136	1911	2460	2366	2216
CV% of CSP	1.57	1.96	2.49	2.23	2.65	4.12
Single-Yarn Test:						
Tenacity (g/tex)	14.38	13.02	12.14	14.49	14.42	13.11
Mean Strength (g)	866	361	246	547	392	257
CV% of Break	5.8	8.3	8.3	7.8	9.5	11.3
Elongation (%)	7.18	6.15	6.09	6.71	6.40	5.92
CV% of Elongation	5.6	7.1	6.8	6.2	7.6	9.2
Uster Evenness Test:						
Non-Uniformity (CV%)	12.64	14.69	17.08	18.01	20.69	23.64
Thin Places/1,000 yds	0	12	95	89	276	765
Thick Places/1,000 yds	20	104	273	454	1066	1824
Neps/1,000 yds (200%)	12	206	955	103	283	1046
Neps/1,000 yds (280%)	2	23	132			
Hairiness	4.04	3.83	3.71	6.29	5.58	5.05
ASTM Yarn Grade	A	C+	B	C	D+	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	19.6	1/8" Gauge Strength (g/tex)	26.5	Upper Quartile Length (w) (in)	1.09
Elongation (%)	6.4	Elongation (%)	5.8	Mean Length (in)	.92
2.5% Span Length (in)	1.08	Upper Half Mean Length (in)	1.09	Percent Short Fibers (mtex)	8.4
Uniformity Ratio (%)	43.0	Uniformity Index	81.5	Fineness (cnt/g)	161
Micronaire	3.9	Micronaire	3.8	Maturity Ratio	.89
Shirley Non-Lint Content	2.54	Reflectance (Rd)	77.4	Nep (cnt/g)	233
Peyer AL 101		Yellowness (+b)	10.0	Seed Coat Nep (cnt/g)	16
Upper Quartile Length (w) (in)	1.10	Color Grade	21-3	Dust (cnt/g)	500
Mean Length (in)	.87	Leaf Grade	2	Trash (cnt/g)	106
CV% of Mean	35.0				
Percent Short Fibers	15.4				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0013	Melezitose (whitefly and aphid marking sugar) (%)	.0351
Opening, Carding Waste (%)	7.1	Combing Waste (%)	16.7	Total Waste (%)	22.6

COMBED YARN PROPERTIES

Spinning Machine	Rotor Spinning	Ring Spinning
Nominal Yarn Number (N _e)	30/1	30/1
Skein Test:		
Yarn Number (N _e)	30.2	30.0
CV% of Count	.93	1.05
Count-Strength-Product	2092	2521
CV% of CSP	3.13	1.32
Single-Yarn Test:		
Tenacity (g/tex)	13.08	15.55
Mean Strength (g)	261	312
CV% of Break	8.5	9.8
Elongation (%)	6.18	6.19
CV% of Elongation	7.4	6.9
Uster Evenness Test:		
Non-Uniformity (CV%)	17.19	17.21
Thin Places/1,000 yds	114	65
Thick Places/1,000 yds	290	374
Neps/1,000 yds (200%)	840	212
Neps/1,000 yds (280%)	119	
Hairiness	3.62	4.43
ASTM Yarn Grade	B+	A

FIBER PROPERTIES

Individual Instrument Data		HVI Data			Uster AFIS		
Stelometer Strength (g/tex)	21.4	1/8" Gauge Strength (g/tex)	27.5	Upper Quartile Length (w) (in)	1.14	Mean Length (in)	.95
Elongation (%)	6.6	Elongation (%)	6.3	Percent Short Fibers	8.4	Fineness (mtex)	172
2.5% Span Length (in)	1.03	Upper Half Mean Length (in)	1.07	Maturity Ratio	.88	Nep (cnt/g)	267
Uniformity Ratio (%)	46.0	Uniformity Index	82.8	Seed Coat Nep (cnt/g)	16	Dust (cnt/g)	275
Micronaire	4.5	Micronaire	4.5	Trash (cnt/g)	44		
Shirley Non-Lint Content	1.49	Reflectance (Rd)	75.1				
Peyer AL 101		Yellowness (+b)	9.8				
Upper Quartile Length(w) (in)	1.06	Color Grade	31-3				
Mean Length (in)	.86	Leaf Grade	1				
CV% of Mean	32.5						
Percent Short Fibers	13.4						
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0010	Melezitose (whitefly and aphid marking sugar) (%)	.0289		
Opening, Carding Waste (%)	6.5						

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.1	21.8	29.6	16.4	21.9	29.5
CV% of Count	.73	1.02	1.66	.64	1.75	1.20
Count-Strength-Product	2440	2086	1862	2635	2369	2172
CV% of CSP	2.36	2.12	3.23	2.01	1.98	2.45
Single-Yarn Test:						
Tenacity (g/tex)	13.70	13.27	12.68	14.60	14.77	14.06
Mean Strength (g)	817	367	254	536	406	207
CV% of Break	7.1	8.7	10.1	10.1	11.1	11.0
Elongation (%)	6.95	6.71	6.16	6.68	6.36	6.17
CV% of Elongation	5.9	6.7	9.0	6.9	7.9	7.3
Uster Evenness Test:						
Non-Uniformity (CV%)	13.14	15.43	17.98	17.82	19.76	22.13
Thin Places/1,000 yds	0	28	158	72	181	436
Thick Places/1,000 yds	16	122	312	368	756	1348
Neps/1,000 yds (200%)	15	199	1030	116	195	706
Neps/1,000 yds (280%)	1	20	139			
Hairiness	4.10	3.93	3.68	5.86	5.32	4.72
ASTM Yarn Grade	A	B	A	C+	C	B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.0	1/8" Gauge Strength (g/tex)	29.2	Upper Quartile Length (w) (in)	1.00
Elongation (%)	6.4	Elongation (%)	5.3	Mean Length (in)	.81
2.5% Span Length (in)	.97	Upper half Mean Length (in)	0.98	Percent Short Fibers	16.6
Uniformity Ratio (%)	.44	Uniformity Index	80.0	Fineness (mtex)	165
Micronaire	4.5	Micronaire	4.5	Maturity Ratio	.90
Shirley Non-Lint Content	3.11	Reflectance (Rd)	77.5	Nep (cnt/g)	281
Peyer AL 101		Yellowness (+b)	9.3	Seed Coat Nep (cnt/g)	18
Upper Quartile Length(w) (in)	1.00	Color Grade	21-4	Dust (cnt/g)	411
Mean Length (in)	.76	Leaf Grade	2	Trash (cnt/g)	76
CV% of Mean	39.8				
Percent Short Fibers	25.1				
Card Rating	slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0032	Melezitose (whitefly and aphid marking sugar) (%)	.0259
Opening, Carding Waste (%)	8.2				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	9.9	21.8	29.8	16.0	22.4	29.8
CV% of Count	.38	.74	1.53	1.14	1.60	1.33
Count-Strength-Product	2545	2256	1983	2411	2328	2052
CV% of CSP	1.10	2.10	1.87	2.88	2.71	3.69
Single-Yarn Test:						
Tenacity (g/tex)	15.02	13.19	12.72	15.15	13.24	13.47
Mean Strength (g)	910	364	257	568	356	272
CV% of Break	8.4	11.9	14.1	12.4	13.2	15.5
Elongation (%)	6.54	6.00	5.61	6.08	5.43	5.45
CV% of Elongation	5.4	7.5	8.7	8.7	7.3	10.2
Uster Evenness Test:						
Non-Uniformity (CV%)	13.90	15.59	18.05	20.70	23.34	26.42
Thin Places/1,000 yds	2	22	122	306	694	1340
Thick Places/1,000 yds	22	99	269	730	1439	2263
Neps/1,000 yds (200%)	16	171	928	118	278	812
Neps/1,000 yds (280%)	1	17	120			
Hairiness	4.65	4.33	4.17	6.66	6.03	5.37
ASTM Yarn Grade	B+	C+	A	C	D+	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.6	1/8" Gauge Strength (g/tex)	29.0	Upper Quartile Length (w) (in)	1.11
Elongation (%)	6.7	Elongation (%)	6.7	Mean Length (in)	.91
2.5% Span Length (in)	1.04	Upper Half Mean Length (in)	1.05	Percent Short Fibers (mtex)	10.9
Uniformity Ratio (%)	43.0	Uniformity Index	81.9	Fineness (cnt/g)	165
Micronaire	4.3	Micronaire	4.2	Maturity Ratio (cnt/g)	.84
Shirley Non-Lint Content	2.41	Reflectance (Rd)	78.2	Nep (cnt/g)	337
<u>Peyer AL 101</u>		Yellowness (+b)	9.3	Seed Coat Nep (cnt/g)	26
Upper Quartile Length(w) (in)	1.08	Color Grade	21-3	Dust (cnt/g)	286
Mean Length (in)	.89	Leaf Grade	3	Trash (cnt/g)	77
CV% of Mean	29.7				
Percent Short Fibers	10.2				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0023	Melezitose (whitefly and aphid marking sugar) (%)	.0258
Opening, Carding Waste (%)	6.3				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.5	30.1	16.3	22.2	30.0
CV% of Count	.88	.31	.60	1.16	1.15	1.20
Count-Strength-Product	2540	2179	1937	2606	2443	2264
CV% of CSP	1.93	2.61	2.17	3.01	1.58	2.91
Single-Yarn Test:						
Tenacity (g/tex)	14.67	13.48	12.24	15.19	14.01	13.77
Mean Strength (g)	882	377	245	561	380	277
CV% of Break	7.3	7.0	9.8	9.9	9.5	10.9
Elongation (%)	7.03	6.75	6.15	6.93	6.40	6.34
CV% of Elongation	6.9	6.1	8.5	7.3	7.0	7.6
Uster Evenness Test:						
Non-Uniformity (CV%)	12.70	15.09	17.57	17.49	19.92	22.34
Thin Places/1,000 yds	0	27	162	74	240	542
Thick Places/1,000 yds	15	133	294	352	828	1413
Neps/1,000 yds (200%)	8	192	968	66	159	540
Neps/1,000 yds (280%)	1	20	132			
Hairiness	4.08	3.88	3.62	6.02	5.51	4.79
ASTM Yarn Grade	A	C+	A	C+	C	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.6	1/8" Gauge Strength (g/tex)	30.3	Upper Quartile Length (w) (in)	1.15
Elongation (%)	6.7	Elongation (%)	6.7	Mean Length (in)	.96
2.5% Span Length (in)	1.09	Upper Half Mean Length (in)	1.10	Percent Short Fibers (mtex)	8.7
Uniformity Ratio (%)	45.0	Uniformity Index	83.2	Fineness (cnt/g)	163
Micronaire	4.4	Micronaire	4.4	Maturity Ratio (cnt/g)	.87
Shirley Non-Lint Content	2.08	Reflectance (Rd)	77.5	Nep (cnt/g)	344
Peyer AL 101		Yellowness (+b)	9.0	Seed Coat Nep (cnt/g)	41
Upper Quartile Length(w) (in)	1.09	Color Grade	31-3	Dust (cnt/g)	391
Mean Length (in)	.88	Leaf Grade	3	Trash (cnt/g)	65
CV% of Mean	32.5				
Percent Short Fibers	13.2				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0015	Meleizitose (whitefly and aphid marking sugar) (%)	.0273
Opening, Carding Waste (%)	4.7				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.1	21.5	30.2	16.4	22.4	30.1
CV% of Count	1.14	1.15	1.12	1.07	.68	1.98
Count-Strength-Product	2634	2231	1966	2711	2568	2342
CV% of CSP	1.02	3.62	3.08	2.02	2.62	2.19
Single-Yarn Test:						
Tenacity (g/tex)	15.03	13.21	12.70	16.28	14.75	14.41
Mean Strength (g)	896	371	253	597	395	288
CV% of Break	7.8	7.5	10.7	10.1	9.8	13.3
Elongation (%)	7.13	6.42	6.17	7.11	6.32	6.24
CV% of Elongation	6.1	6.2	6.8	6.8	7.3	9.2
Uster Evenness Test:						
Non-Uniformity (CV%)	13.13	15.47	17.95	18.05	20.25	22.55
Thin Places/1,000 yds	0	30	153	78	198	457
Thick Places/1,000 yds	21	122	302	424	879	1476
Neps/1,000 yds (200%)	18	218	979	194	369	1008
Neps/1,000 yds (280%)	2	29	154			
Hairiness	4.12	3.81	3.65	5.82	5.31	4.69
ASTM Yarn Grade	B+	C	B	C	B	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	21.2	1/8" Gauge Strength (g/tex)	28.1	Upper Quartile Length (w) (in)	1.04
Elongation (%)	6.7	Elongation (%)	6.3	Mean Length (in)	.83
2.5% Span Length (in)	1.01	Upper Half Mean Length (in)	1.01	Percent Short Fibers (mtex)	15.5
Uniformity Ratio (%)	43.0	Uniformity Index	80.7	Fineness (cnt/g)	162
Micronaire	3.9	Micronaire	3.8	Maturity Ratio (cnt/g)	420
Shirley Non-Lint Content	2.83	Reflectance (Rd)	78.0	Nep (cnt/g)	20
<u>Peyer AL 101</u>		Yellowness (+b)	8.8	Seed Coat Nep (cnt/g)	330
Upper Quartile Length(w) (in)	1.00	Color Grade	21-2	Dust (cnt/g)	84
Mean Length (in)	.78	Leaf Grade	4	Trash (cnt/g)	
CV% of Mean	36.8				
Percent Short Fibers	20.6				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0020	Melezitose (whitefly and aphid marking sugar) (%)	.0230
Opening, Carding Waste (%)	7.0				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	9.9	21.7	29.6	15.8	22.0	29.4
CV% of Count	.64	.48	1.49	1.12	1.56	1.30
Count-Strength-Product	2432	2112	1893	2315	2229	1970
CV% of CSP	1.91	2.28	3.23	3.03	2.79	2.51
Single-Yarn Test:						
Tenacity (g/tex)	14.01	13.22	12.27	14.15	13.35	13.10
Mean Strength (g)	851	366	249	539	365	268
CV% of Break	8.2	10.2	9.4	13.0	10.7	15.8
Elongation (%)	7.04	6.11	6.16	6.71	6.17	6.07
CV% of Elongation	5.9	8.4	7.4	7.9	6.8	9.7
Uster Evenness Test:						
Non-Uniformity (CV%)	13.47	15.65	17.92	20.41	23.18	25.71
Thin Places/1,000 yds	0	21	125	237	655	1200
Thick Places/1,000 yds	30	134	286	713	1433	2186
Neps/1,000 yds (200%)	11	253	1192	126	354	1052
Neps/1,000 yds (280%)	1	28	180			
Hairiness	4.33	4.09	3.88	6.56	5.86	5.31
ASTM Yarn Grade	B+	C+	B	C	D	D+

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.6	1/8" Gauge Strength (g/tex)	30.6	Upper Quartile Length (w) (in)	1.11
Elongation (%)	6.6	Elongation (%)	6.6	Mean Length (in)	.93
2.5% Span Length (in)	1.06	Upper Half Mean Length (in)	1.07	Percent Short Fibers	9.0
Uniformity Ratio (%)	45.0	Uniformity Index	83.1	Fineness (mtex)	168
Micronaire	4.7	Micronaire	4.7	Maturity Ratio	.87
Shirley Non-Lint Content	2.76	Reflectance (Rd)	77.2	Nep (cnt/g)	189
<u>Peyer AL 101</u>		Yellowness (+b)	8.8	Seed Coat Nep (cnt/g)	18
Upper Quartile Length(w) (in)	1.10	Color Grade	31-3	Dust (cnt/g)	388
Mean Length (in)	.92	Leaf Grade	3	Trash (cnt/g)	85
CV% of Mean	26.5				
Percent Short Fibers	6.0				
Card Rating	very slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0029	Melezitose (whitefly and aphid marking sugar) (%)	
Opening, Carding Waste (%)	6.5				.0312

CARDER YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning	
	10/1	22/1	30/1	16/1	30/1
Nominal Yarn Number (N _e)					
Skein Test:					
Yarn Number (N _e)	10.1	21.9	29.9	16.2	30.6
CV% of Count	.29	.92	1.90	1.03	1.53
Count-Strength-Product	2619	2208	1988	2785	2479
CV% of CSP	1.65	2.39	4.33	1.76	1.86
Single-Yarn Test:					
Tenacity (g/tex)	15.19	13.87	12.89	16.39	14.86
Mean Strength (g)	909	381	260	609	293
CV% of Break	6.4	9.3	11.4	7.9	14.3
Elongation (%)	7.13	6.36	6.26	7.03	6.44
CV% of Elongation	4.8	6.8	8.0	6.4	8.1
Uster Evenness Test:					
Non-Uniformity (CV%)	12.90	15.27	18.06	16.38	20.50
Thin Places/1,000 yds	0	28	166	32	240
Thick Places/1,000 yds	14	118	346	183	938
Neps/1,000 yds (200%)	14	186	1004	71	386
Neps/1,000 yds (280%)	1	23	144		
Hairiness	4.08	3.81	3.74	5.75	4.56
ASTM Yarn Grade	A	B	B	B	B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.4	1/8" Gauge Strength (g/tex)	28.7	Upper Quartile Length (w) (in)	1.07
Elongation (%)	7.1	Elongation (%)	6.7	Mean Length (in)	.88
2.5% Span Length (in)	1.01	Upper Half Mean Length (in)	1.05	Percent Short Fibers (mtex)	11.8
Uniformity Ratio (%)	45.0	Uniformity Index	81.0	Fineness (cnt/g)	165
Micronaire	3.9	Micronaire	3.9	Maturity Ratio	.84
Shirley Non-Lint Content Peyer AL 101	2.31	Reflectance (Rd)	74.3	Nep (cnt/g)	375
Upper Quartile Length(w) (in)	1.01	Yellowness (+b)	11.4	Seed Coat Nep (cnt/g)	27
Mean Length (in)	.81	Color Grade	23-1	Dust (cnt/g)	337
CV% of Mean	32.4	Leaf Grade	3	Trash (cnt/g)	121
Percent Short Fibers	15.2				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0019	Meleizotose (whitefly and aphid marking sugar) (%)	.0312
Opening, Carding Waste (%)	6.3				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.9	30.0	16.4	22.2	30.1
CV% of Count	.49	.66	1.70	.33	.96	1.64
Count-Strength-Product	2477	2162	1928	2530	2372	2130
CV% of CSP	1.66	1.87	2.25	2.32	2.12	1.97
Single-Yarn Test:						
Tenacity (g/tex)	14.52	13.22	12.13	14.38	13.96	13.08
Mean Strength (g)	877	363	243	528	378	261
CV% of Break	8.1	9.5	9.4	10.4	11.0	12.8
Elongation (%)	8.01	6.83	6.81	7.26	6.89	6.71
CV% of Elongation	5.5	8.6	6.5	8.6	8.2	8.5
Uster Evenness Test:						
Non-Uniformity (CV%)	13.39	15.56	17.89	18.68	21.11	23.41
Thin Places/1,000 yds	2	30	144	122	360	708
Thick Places/1,000 yds	27	132	287	421	932	1529
Neps/1,000 yds (200%)	10	212	899	76	185	613
Neps/1,000 yds (280%)	0	21	106			
Hairiness	4.35	4.03	3.79	6.24	5.44	5.10
ASTM Yarn Grade	B	B	A	B	C	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.4	1/8" Gauge Strength (g/tex)	28.3	Upper Quartile Length (w) (in)	1.11
Elongation (%)	6.8	Elongation (%)	6.5	Mean Length (in)	.89
2.5% Span Length (in)	.98	Upper Half Mean Length (in)	0.97	Percent Short Fibers	13.1
Uniformity Ratio (%)	45.0	Uniformity Index	81.5	Fineness (mtex)	150
Micronaire	3.9	Micronaire	3.8	Maturity Ratio	.81
Shirley Non-Lint Content	4.94	Reflectance (Rd)	75.9	Nep (cnt/g)	545
Peyer AL 101		Yellowness (+b)	8.3	Seed Coat Nep (cnt/g)	32
Upper Quartile Length(w) (in)	.98	Color Grade	31-2	Dust (cnt/g)	722
Mean Length (in)	.78	Leaf Grade	4	Trash (cnt/g)	172
CV% of Mean	35.5				
Percent Short Fibers	20.0				
Card Rating	very slightly sticky	Trehalulose (whitefly marking sugar) (%)	.0015	Melezitose (whitefly and aphid marking sugar) (%)	.0190
Opening, Carding Waste (%)	7.7				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _a)						
Skein Test:						
Yarn Number (N _a)	10.1	21.7	30.5	16.3	22.2	30.3
CV% of Count	1.29	.66	.63	.72	1.15	1.55
Count-Strength-Product	2678	2296	2094	2637	2455	2253
CV% of CSP	1.81	2.50	2.59	2.68	2.58	2.89
Single-Yarn Test:						
Tenacity (g/tex)	15.01	13.86	12.59	15.45	15.10	13.97
Mean Strength (g)	895	384	248	572	409	278
CV% of Break	6.8	8.6	9.5	10.2	11.5	11.5
Elongation (%)	7.03	6.69	6.18	7.15	6.78	6.43
CV% of Elongation	6.0	6.5	8.2	8.7	7.7	7.6
Uster Evenness Test:						
Non-Uniformity (CV%)	12.93	14.88	17.22	18.44	20.72	23.47
Thin Places/1,000 yds	1	15	98	141	356	774
Thick Places/1,000 yds	26	119	240	447	926	1658
Neps/1,000 yds (200%)	18	188	975	96	223	714
Neps/1,000 yds (280%)	2	20	126			
Hairiness	4.62	4.17	3.90	6.30	5.68	5.08
ASTM Yarn Grade	B	C	A	B	C	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	21.9	1/8" Gauge Strength (g/tex)	29.0	Upper Quartile Length (w) (in)	1.10
Elongation (%)	6.6	Elongation (%)	6.6	Mean Length (in)	.89
2.5% Span Length (in)	1.08	Upper Half Mean Length (in)	1.06	Percent Short Fibers (mtex)	11.3
Uniformity Ratio (%)	42.0	Uniformity Index	80.7	Fineness (cnt/g)	163
Micronaire	3.1	Micronaire	3.1	Maturity Ratio (cnt/g)	.87
Shirley Non-Lint Content Peyer AL 101	4.19	Reflectance (Rd)	78.1	Nep (cnt/g)	270
Upper Quartile Length(w) (in)	1.06	Yellowness (+b)	8.8	Seed Coat Nep (cnt/g)	21
Mean Length (in)	.82	Color Grade	21-2	Dust (cnt/g)	894
CV% of Mean	38.0	Leaf Grade	3	Trash (cnt/g)	222
Percent Short Fibers	20.5				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0029	Melezitose (whitefly and aphid marking sugar) (%)	.0126
Opening, Carding Waste (%)	7.7				

CARDER YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	9.9	21.8	29.8	16.1	22.4	29.7
CV% of Count	.53	.94	1.31	1.18	1.68	2.94
Count-Strength-Product	2559	2238	2033	2542	2435	2195
CV% of CSP	1.84	1.86	2.15	3.20	4.13	4.08
Single-Yarn Test:						
Tenacity (g/tex)	15.16	13.44	13.21	15.62	14.27	13.55
Mean Strength (g)	919	371	267	585	383	275
CV% of Break	6.9	7.8	7.7	10.5	11.8	11.4
Elongation (%)	7.63	6.51	6.62	7.23	6.62	6.30
CV% of Elongation	5.3	7.1	6.4	8.3	7.8	8.6
Uster Evenness Test:						
Non-Uniformity (CV%)	12.88	14.73	17.23	19.84	22.62	24.78
Thin Places/1,000 yds	0	8	68	168	503	938
Thick Places/1,000 yds	16	82	267	673	1448	2005
Neps/1,000 yds (200%)	14	170	1128	161	514	1252
Neps/1,000 yds (280%)	1	20	191			
Hairiness	3.96	3.94	3.83	6.39	5.75	5.17
ASTM Yarn Grade	B	C+	B	C	C	D

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	22.2	1/8" Gauge Strength (g/tex)	27.7	Upper Quartile Length (w) (in)	1.10
Elongation (%)	6.4	Elongation (%)	5.5	Mean Length (in)	.89
2.5% Span Length (in)	1.04	Upper Half Mean Length (in)	1.05	Percent Short Fibers (mtex)	11.7
Uniformity Ratio (%)	44.0	Uniformity Index	81.5	Fineness (cnt/g)	164
Micronaire	4.7	Micronaire	4.7	Maturity Ratio (cnt/g)	.86
Shirley Non-Lint Content	4.40	Reflectance (Rd)	73.0	Nep (cnt/g)	321
Peyer AL 101		Yellowness (+b)	9.0	Seed Coat Nep (cnt/g)	15
Upper Quartile Length(w) (in)	1.04	Color Grade	41-3	Dust (cnt/g)	477
Mean Length (in)	.85	Leaf Grade	4	Trash (cnt/g)	110
CV% of Mean	31.3				
Percent Short Fibers	12.3				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0030	Melezitose (whitefly and aphid marking sugar) (%)	.0227
Opening, Carding Waste (%)	8.3				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning	
	10/1	22/1	30/1	16/1	30/1
Nominal Yarn Number (N _e)					
Skein Test:					
Yarn Number (N _e)	10.2	21.7	30.4	16.4	30.5
CV% of Count	.85	.55	.48	.97	1.02
Count-Strength-Product	2500	2161	1917	2783	2403
CV% of CSP	2.18	1.63	3.87	2.62	2.13
Single-Yarn Test:					
Tenacity (g/tex)	14.19	13.03	12.17	15.25	13.82
Mean Strength (g)	842	362	241	559	272
CV% of Break	6.4	10.0	8.8	8.5	10.1
Elongation (%)	6.22	5.84	5.54	6.16	5.45
CV% of Elongation	6.1	8.6	6.2	5.8	7.7
Uster Evenness Test:					
Non-Uniformity (CV%)	12.86	15.22	17.89	17.70	22.49
Thin Places/1,000 yds	0	26	159	80	529
Thick Places/1,000 yds	29	157	374	408	1477
Neps/1,000 yds (200%)	22	279	1250	123	728
Neps/1,000 yds (280%)	4	42	185		
Hairiness	4.29	3.97	3.75	6.22	4.94
ASTM Yarn Grade	A	B	B+	C+	B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.2	1/8" Gauge Strength (g/tex)	29.1	Upper Quartile Length (w) (in)	1.10
Elongation (%)	6.3	Elongation (%)	6.1	Mean Length (in)	.90
2.5% Span Length (in)	1.04	Upper Half Mean Length (in)	1.05	Percent Short Fibers (mtex)	11.2
Uniformity Ratio (%)	45.0	Uniformity Index	81.7	Fineness (cnt/g)	162
Micronaire	4.0	Micronaire	4.0	Maturity Ratio (cnt/g)	.85
Shirley Non-Lint Content	2.79	Reflectance (Rd)	76.0	Nep (cnt/g)	267
<u>Peyer AL 101</u>		Yellowness (+b)	8.9	Seed Coat Nep (cnt/g)	16
Upper Quartile Length(w) (in)	1.08	Color Grade	31-3	Dust (cnt/g)	511
Mean Length (in)	.86	Leaf Grade	3	Trash (cnt/g)	98
CV% of Mean	33.5				
Percent Short Fibers	14.7				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0027	Melezitose (whitefly and aphid marking sugar) (%)	.0189
Opening, Carding Waste (%)	6.4				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _a)						
Skein Test:						
Yarn Number (N _a)	10.0	21.8	30.0	16.1	22.5	29.9
CV% of Count	.59	.74	1.28	1.06	1.31	1.44
Count-Strength-Product	2493	2156	1955	2578	2440	2207
CV% of CSP	1.28	2.01	2.61	2.42	2.11	1.79
Single-Yarn Test:						
Tenacity (g/tex)	14.46	13.04	12.44	14.99	14.93	13.63
Mean Strength (g)	871	360	252	560	399	274
CV% of Break	6.1	10.1	10.8	10.7	10.2	11.9
Elongation (%)	6.78	5.95	6.07	6.43	6.22	5.83
CV% of Elongation	5.1	7.1	7.7	7.0	7.1	9.0
Uster Evenness Test:						
Non-Uniformity (CV%)	13.03	15.06	17.64	18.98	21.83	23.74
Thin Places/1,000 yds	0	20	108	116	404	694
Thick Places/1,000 yds	18	96	248	536	1216	1699
Neps/1,000 yds (200%)	10	205	816	120	362	979
Neps/1,000 yds (280%)	0	21	106			
Hairiness	4.16	3.93	3.74	6.20	5.55	5.10
ASTM Yarn Grade	B+	C+	B	C	C+	C

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	23.0	1/8" Gauge Strength (g/tex)	28.6	Upper Quartile Length (w) (in)	1.14
Elongation (%)	6.4	Elongation (%)	5.7	Mean Length (in)	.93
2.5% Span Length (in)	1.02	Upper Half Mean Length (in)	1.04	Percent Short Fibers	10.8
Uniformity Ratio (%)	44.0	Uniformity Index	82.4	Fineness (mtex)	161
Micronaire	4.3	Micronaire	4.2	Maturity Ratio	.83
Shirley Non-Lint Content	2.83	Reflectance (Rd)	78.1	Nep (cnt/g)	352
Peyer AL 101		Yellowness (+b)	9.5	Seed Coat Nep (cnt/g)	16
Upper Quartile Length(w) (in)	1.06	Color Grade	21-3	Dust (cnt/g)	271
Mean Length (in)	.87	Leaf Grade	2	Trash (cnt/g)	60
CV% of Mean	29.5				
Percent Short Fibers	10.5				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0029	Melezitose (whitefly and aphid marking sugar) (%)	
Opening, Carding Waste (%)	6.8				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning	
	10/1	22/1	30/1	16/1	22/1
Nominal Yarn Number (N _e)					30/1
Skein Test:					
Yarn Number (N _e)	10.0	21.8	30.0	16.2	22.0
CV% of Count	.47	1.08	1.66	.68	1.13
Count-Strength-Product	2510	2218	2001	2578	2415
CV% of CSP	2.62	2.53	3.89	2.19	2.03
Single-Yarn Test:					
Tenacity (g/tex)	15.04	13.48	12.11	15.26	14.28
Mean Strength (g)	905	373	243	569	390
CV% of Break	7.2	9.3	10.5	12.9	13.1
Elongation (%)	6.92	6.07	5.95	6.57	6.12
CV% of Elongation	5.5	5.8	7.3	8.4	8.6
Uster Evenness Test:					
Non-Uniformity (CV%)	13.32	15.29	17.76	17.95	20.46
Thin Places/1,000 yds	2	21	112	66	238
Thick Places/1,000 yds	19	118	255	314	829
Neps/1,000 yds (200%)	7	190	680	42	153
Neps/1,000 yds (280%)	0	20	78		
Hairiness	4.16	3.94	3.99	6.14	5.50
ASTM Yarn Grade	B+	B	A	B	B
					5.01
					B

FIBER PROPERTIES

Individual Instrument Data		HVI Data		Uster AFIS	
Stelometer Strength (g/tex)	25.0	1/8" Gauge Strength (g/tex)	28.8	Upper Quartile Length (w) (in)	1.10
Elongation (%)	6.0	Elongation (%)	5.5	Mean Length (in)	.91
2.5% Span Length (in)	1.03	Upper Half Mean Length (in)	1.05	Percent Short Fibers (mtex)	9.2
Uniformity Ratio (%)	46.0	Uniformity Index	82.6	Fineness (cnt/g)	163
Micronaire	4.1	Micronaire	4.1	Maturity Ratio (cnt/g)	.89
Shirley Non-Lint Content	3.00	Reflectance (Rd)	75.0	Nep (cnt/g)	210
Peyer AL 101		Yellowness (+b)	10.1	Seed Coat Nep (cnt/g)	23
Upper Quartile Length(w) (in)	1.06	Color Grade	32-1	Dust (cnt/g)	466
Mean Length (in)	.87	Leaf Grade	3	Trash (cnt/g)	99
CV% of Mean	30.1				
Percent Short Fibers	11.1				
Card Rating	not sticky	Trehalulose (whitefly marking sugar) (%)	.0009	Melezitose (whitefly and aphid marking sugar) (%)	.0306
Opening, Carding Waste (%)	6.0				

CARDED YARN PROPERTIES

Spinning Machine	Rotor Spinning			Ring Spinning		
	10/1	22/1	30/1	16/1	22/1	30/1
Nominal Yarn Number (N _e)						
Skein Test:						
Yarn Number (N _e)	10.0	21.9	29.6	16.1	22.5	29.6
CV% of Count	.76	.59	1.35	1.54	.88	1.51
Count-Strength-Product	2768	2438	2163	2891	2890	2606
CV% of CSP	1.81	1.50	2.74	2.71	1.92	2.24
Single-Yarn Test:						
Tenacity (g/tex)	16.52	14.57	13.42	17.64	16.99	16.91
Mean Strength (g)	990	400	273	658	454	343
CV% of Break	7.3	7.7	10.0	8.2	11.4	10.4
Elongation (%)	6.32	5.60	5.55	6.22	5.86	5.81
CV% of Elongation	5.7	6.9	7.1	6.0	7.8	6.6
Uster Evenness Test:						
Non-Uniformity (CV%)	12.78	15.08	17.70	16.35	18.80	20.18
Thin Places/1,000 yds	0	14	119	24	94	221
Thick Places/1,000 yds	18	124	323	215	558	899
Neps/1,000 yds (200%)	25	229	1075	165	280	545
Neps/1,000 yds (280%)	5	39	172			
Hairiness	4.10	3.86	3.69	5.80	5.20	4.65
ASTM Yarn Grade	B	B	B	B	C+	B

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