Cotton.
It's a lot more than a fiber.

Today, cotton is enjoying its strongest position in the market ever. Cotton's market share has grown to 60% in the United States. Cotton's steady rise in market share has been the result of innovative marketing strategies and continuous product research, both targeted to the needs of the consumer. Our scope is global, providing advanced cotton technology and strategies for improved cotton product performance to mills and manufacturers worldwide.

Cotton Incorporated

Cary, NC • New York • Los Angeles • Osaka • Singapore • Mexico City • Shanghai
www.cottoninc.com

Global Product Marketing

Staffed with professionals who understand product development, manufacturing and sourcing, Global Product Marketing is the primary point of contact for companies interested in utilizing our vast array of technical, economic and fashion resources.

Technical Services

Our hands-on technical support teams offer invaluable assistance to mill and brand customers – from education about fiber processing to problem solving in yarn and fabric products.

Strategic Planning

Strategic Planning provides analysis of the markets for cotton – from raw cotton to consumer trends. The division's publications and industry briefings help textile and retail executives make more informed business decisions about using cotton.

Product Development

Mills and manufacturers worldwide look to our Textile Research Group for ways to improve product performance. Engineered cotton knits, 100% cotton stretch woven fabrics and innovative functional finishes are the latest results of our textile research.

Agricultural Research

Our contributions in crop management and biotechnology have led to improved productivity and fiber quality. This has enabled upland cotton to stay competitive in world markets today.

Fashion Marketing

Fashion Marketing forecasts and presents color, fabric and silhouette trends globally for the apparel and home fashion industries.

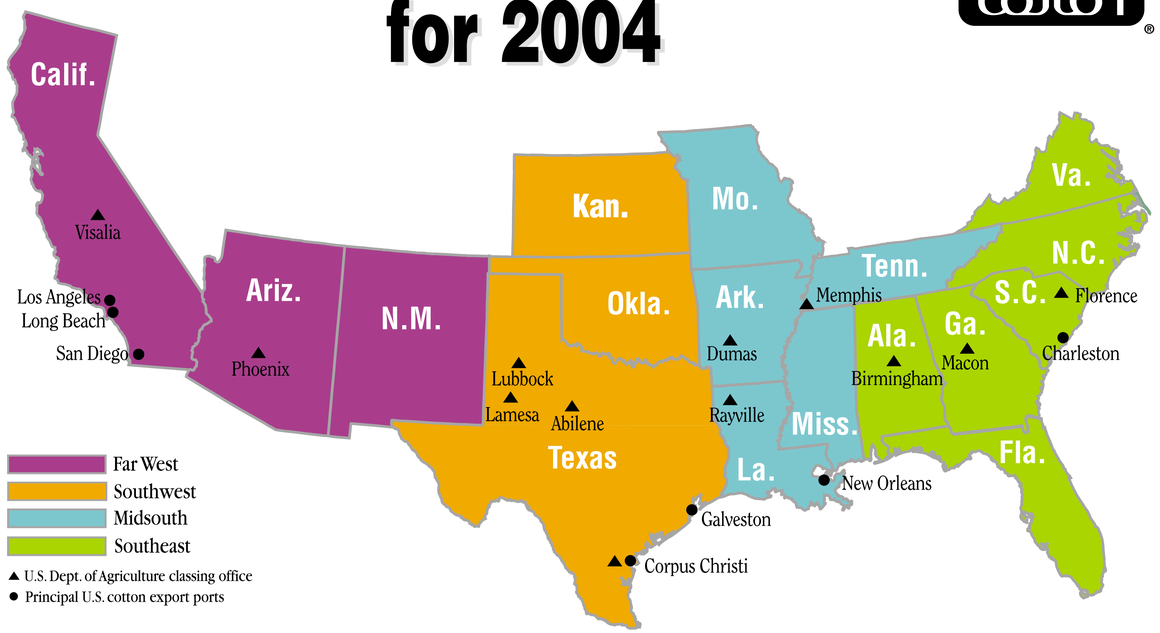
Advertising & Retail

Cotton Incorporated reinforces the consumer's positive image of cotton with a multimillion-dollar television advertising campaign, retail promotions and public relations efforts – all designed to stimulate consumer demand.

Fiber Processing

Our EFS® Cotton Management System software is used by more than 95% of the cotton spinning industry in the United States and is gaining rapid international acceptance. Mills, merchants, co-ops, gins and growers benefit from this revolutionary electronic information exchange.

U.S. Cotton Fiber Chart for 2004



Properties of the Growing Regions

Data from 2003-2004 Crop Season (current information available at www.cottoninc.com/fiberquality)

Explanation

Classing Office Location
(Cotton Growing area classed by this office)
Number of bales classed
Average micronaire
Average staple length (32nds)
Average length uniformity index (%)
Average HVI strength (grams-force/tex)
Two most frequent grades classed (%)
Two most frequent varieties planted (%)

Visalia
(CA)
1,388,288 Bales

Micronaire	4.1
Length (32's)	37.3
Length (100's)	1.17
LUI	82.0%
Strength	32.6
Grade (11 & 21)	76.4%
Grade (31)	17.9%
PHY 32 Acala	43.1%
Acala Riata RR	19.6%

Phoenix
(AZ, S. CA, NM)
658,890 Bales

Micronaire	4.7
Length (32's)	35.5
Length (100's)	1.11
LUI	80.6%
Strength	29.0
Grade (11 & 21)	44.9%
Grade (31)	38.8%
DP 449 BG/RR	28.7%
DP 422 B/RR	11.0%

Abilene
(N. Cent. TX, OK, KS)
1,176,189 Bales

Micronaire	4.4
Length (32's)	34.0
Length (100's)	1.06
LUI	80.6%
Strength	28.3
Grade (11 & 21)	41.4%
Grade (31)	35.8%
DP 5415 RR	6.7%
PM 2145 RR	5.2%

Corpus Christi
(AZ, S. CA, NM)
1,174,138 Bales

Micronaire	4.5
Length (32's)	35.4
Length (100's)	1.11
LUI	81.6%
Strength	30.6
Grade (31)	38.2%
Grade (11 & 21)	25.0%
FM 832	43.0%
FM 989	7.3%

Lamesa
(NW. TX)
647,770 Bales

Micronaire	4.4
Length (32's)	34.2
Length (100's)	1.07
LUI	80.7%
Strength	29.1
Grade (11 & 21)	54.6%
Grade (31)	36.0%
FM 958	10.5%
DP 5690	8.6%

Lubbock
(NW. TX)
1,511,037 Bales

Micronaire	4.4
Length (32's)	33.9
Length (100's)	1.06
LUI	80.9%
Strength	29.1
Grade (11 & 21)	70.4%
Grade (31)	23.8%
PM 2326 RR	18.2%
FM 958	17.7%

Dumas
(AR, MO)
2,422,792 Bales

Micronaire	4.7
Length (32's)	34.7
Length (100's)	1.08
LUI	81.7%
Strength	28.3
Grade (31)	60.5%
Grade (41)	30.0%
ST 4892BR	26.3%
DP 451 B/RR	12.1%

Memphis
(TN, AR, MS)
2,826,604 Bales

Micronaire	4.5
Length (32's)	34.6
Length (100's)	1.08
LUI	81.8%
Strength	28.0
Grade (31)	68.1%
Grade (41)	21.2%
PM 1218 BG/RR	28.5%
ST 4892BR	25.2%

Rayville
(LA)
1,106,557 Bales

Micronaire	4.8
Length (32's)	34.6
Length (100's)	1.08
LUI	81.0%
Strength	28.5
Grade (31)	60.0%
Grade (41)	29.7%
DP 555 BG/RR	30.6%
DP 451 B/RR	10.6%

Birmingham
(AL)
876,784 Bales

Micronaire	4.3
Length (32's)	34.3
Length (100's)	1.07
LUI	81.2%
Strength	28.1
Grade (31)	53.0%
Grade (41)	39.6%
DP 555 BG/RR	14.4%
DP 451 B/RR	12.5%

Macon
(GA, FL)
2,088,257 Bales

Micronaire	4.3
Length (32's)	34.2
Length (100's)	1.07
LUI	80.5%
Strength	27.9
Grade (41)	59.6%
Grade (31)	30.6%
DP 555 BG/RR	33.2%
DP 458 B/RR	19.5%

Florence
(SC, NC, VA)
1,425,577 Bales

Micronaire	4.1
Length (32's)	34.6
Length (100's)	1.08
LUI	81.3%
Strength	27.9
Grade (41)	52.0%
Grade (31)	44.9%
DP 451 B/RR	21.0%
DP 555 BG/RR	15.8%

Bale Size

Average net bale weight is 493 lb
(for statistical purposes average net bale weight is 480 lb.)

	Universal Densities	
	Gin	Recompressed
Length, in. (mm)	55 (1,400)	57 (1,450)
Width, in. (mm)	21 (535)	25 (635)
Thickness at bale ties, in.(mm)	28 (710)	21 (535)

Far West
Total
(CA, AZ, NM)
2,047,178 Bales

Micronaire	4.3
Length (32's)	36.7
Length (100's)	1.15
LUI	81.6%
Strength	31.4
Grade (11 & 21)	66.3%
Grade (31)	24.6%
PHY 72 Acala	27.8%
Acala Riata RR	12.6%

Southwest
Total
(TX, OK, KS)
4,509,134 Bales

Micronaire	4.4
Length (32's)	34.4
Length (100's)	1.07
LUI	81.0%
Strength	29.3
Grade (11 & 21)	48.8%
Grade (31)	32.4%
PM 2326 RR	9.8%
FM 958	9.6%

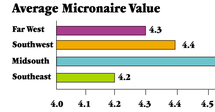
Midsouth
Total
(AR, MO, TN, MS, LA)
6,355,953 Bales

Micronaire	4.6
Length (32's)	34.6
Length (100's)	1.08
LUI	81.6%
Strength	28.2
Grade (31)	63.8%
Grade (41)	26.0%
ST 4892BR	22.2%
PM 1218 BG/RR	18.2%

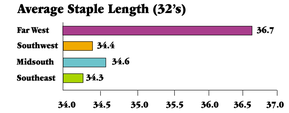
Southeast
Total
(AL, GA, FL, SC, NC, VA)
4,390,618 Bales

Micronaire	4.2
Length (32's)	34.3
Length (100's)	1.07
LUI	80.9%
Strength	27.9
Grade (41)	53.1%
Grade (31)	39.7%
DP 555 BG/RR	22.9%
DP 458 B/RR	13.7%

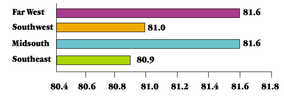
Average Micronaire Value



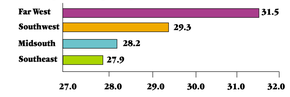
Average Staple Length (32's)



Average Length Uniformity Index (%)



Average Strength (g/tex)



Ratings of Fiber Properties

Length & Uniformity

Upper Half Mean Length

Below 0.99	Short
0.99-1.10	Medium
1.11-1.26	Long
Above 1.26	Extra Long

Uniformity Index

Below 77	Very Low
77-79	Low
80-82	Average
83-85	High
Above 85	Very High

Length Uniformity Index (UI) = 100 x Mean Length / Upper Half Mean Length

Fiber Strength

(1/8 in. gauge strength in grams/tex)

20 and below	Very Weak
21-25	Weak
26-29	Base
30-32	Strong
32 and above	Very Strong

Fiber Elongation (%)

Below 5.0	Very Low
5.0-5.8	Low
5.9-6.7	Average
6.8-7.6	HighHigh
Above 7.6	Very High

Fiber Fineness

Fineness (millitex)	Description
Below 135	Very Fine
135-175	Fine
175-200	Average
200-230	Coarse
Above 230	Very Coarse

Fiber Maturity

Maturity Ratio	Description
Below 0.7	Uncommon
0.7-0.8	Immature
0.8-1.0	Mature
Above 1.0	Very Mature

Grades of U.S. Cotton

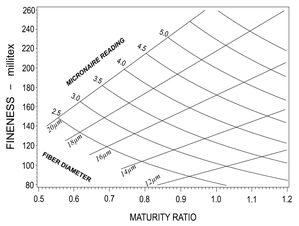
Official Standards of the U.S.

Color Grade	Symbols	Classer Color Grade	Classer Leaf Code
White			
Good Middling	GM	11	1
Strict Middling	SM	21	2
Middling	Mid	31	3
Strict Low Middling	SLM	41	4
Low Middling	LM	51	5
Strict Good Ordinary	SGO	61	6
Good Ordinary	GO	71	7
Light Spotted			
Good Middling	GM Lt Sp	12	
Strict Middling	SM Lt Sp	22	
Middling	Mid Lt Sp	32	
Strict Low Middling	SLM Lt Sp	42	
Low Middling	LM Lt Sp	52	
Strict Good Ordinary	SGO Lt Sp	62	

Color Grade	Symbols	Classer Color Grade
Spotted		
Good Middling	GM Sp	13
Strict Middling	SM Sp	23
Middling	Mid Sp	33
Strict Low Middling	SLM Sp	43
Low Middling	LM Sp	53
Strict Good Ordinary	SGO Sp	63
Tinged		
Strict Middling	SM Tg	24
Middling	Mid Tg	34
Strict Low Middling	SLM Tg	44
Low Middling	LM Tg	54
Yellow Stained		
Strict Middling	SM YS	25

Each bale receives a separate grade for color and for leaf (trash). Color grade is determined by the classer with reference to a set of samples that are in custody of the U.S. Department of Agriculture. The Light Spotted Grades, Yellow Stained Grades or grade codes 13 and 24 have no physical standards. Leaf grades, identified by numbers 1 through 7, are represented by the amount of leaf trash in the White Grade standards. For example, a bale graded 31-4 has a Middling-White color grade and a leaf grade equivalent to the trash content of the Strict Low Middling White standard. Plus grades and gray grades have been eliminated from the grading standards.

Ratings of Fiber Properties



The chart shows the relationship between micronaire, fiber fineness, maturity ratio, and theoretical fiber diameter.

Fiber cross-section is assumed to be circular, which makes the fiber diameter lines on the graph approximate. Curves for micronaire level are empirical and therefore contain experimental error.

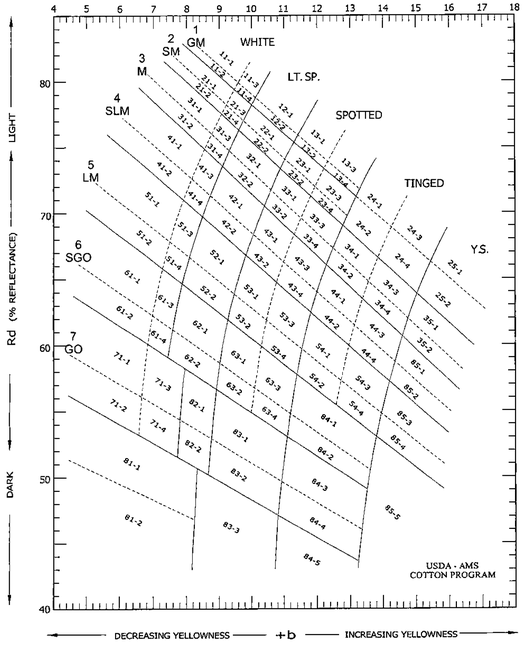
Fiber fineness (fiber linear density) is expressed in micrograms/in. or in millitex (mg/m). The practical range of fineness for U.S. Upland cotton is about 125 - 225 millitex.

Micronaire is expressed in dimensionless micronaire units. The practical micronaire range for U.S. Upland cotton is 2.0 - 6.0.

Maturity ratio is a measure of the relative amount of cellulose in the fiber cross-section. Values are dimensionless numbers in the 0.7 - 1.2 range.

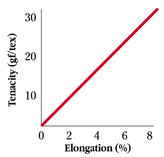
Fiber Properties

HVI Color Chart for American Upland Cotton



Typical Stress/ Strain Curve

(load=grams-force/tex)



Breaking Tenacity

(gf/tex)	(gf/den)
Std. 27-44	Std. 3.0-4.9
Wet 28-57	Wet 3.3-6.7

Specific Gravity

Cellulosic polymer	1.54
Cotton fiber	1.27

Breaking Elongation
Std. 3-9.5%

Effects of acids
Disintegrated by hot dilute acids or cold concentrated acids. Unaffected by cold weak acids.

Effects of alkalis
Swelling (mercerization) in caustic, but no damage.

Effect of organic solvents
Resistant to most common industrial and household solvents.

Effects of other chemicals
Bleached by hypochlorites and peroxides; oxidizes into oxycellulose. Swells and disintegrates into cuprammonium hydroxide.

Effects of heat
Highly resistant to thermal deformation and degradation. Onset of decomposition in air (TGA) 555°F (290°C). Safe hot-plate (ironing) temperature 425°F (218°C). Yellows after 5 hours at 248°F (120°C).

Sunlight and Mildew Resistance
Excellent resistance to sunlight. Fabrics subjected to excessive mildew are laundered to minimize residual effects.

Average Stiffness
513-540 gf/tex;
57-60 gf/den

Tensile Strength
44,000-109,000 psi

Moisture Regain
7% (std. conditions).

Moisture Absorbency
24-27% to 95% R.H.

Dyes, Used
Direct, vat, azoic, mordant, pigment, sulfur, reactive.

Average toughness
1.44 gf.cm/tex.cm
0.16 gf.cm/den.cm

Elastic Recovery
74% recovery after 2% elongation
45% recovery after 5% elongation

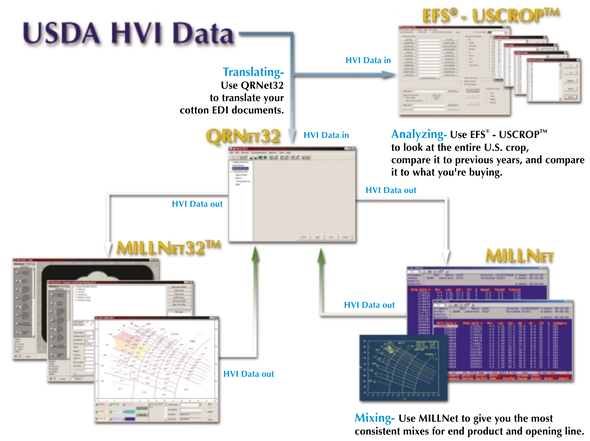
Identification
Upon ignition, fiber leaves fine gray ash and no bead. Longitudinal appearance is flat and ribbon-like with convolutions. Dissolves in 80% cold sulfuric acid.

Typical Cotton Properties for Selected Fabrics

Fabric	Yarn Count (Ne)	Upper Half Mean Length (in.)	Strength (g/tex)	Micronaire Reading	Maturity Ratio
Fabric					
Denim	4/1 to 20/1	0.92-1.10	24-30	3.0-5.0	0.80-0.90
Toweling	8/1 to 22/1	0.93-1.10	24-30	3.5-5.5	0.80-0.90
Twill	15/1 to 30/1	1.03-1.12	24-32	3.5-4.9	0.85-0.95
Corduroy	15/1 to 30/1	1.06-1.14	24-32	3.8-5.5	0.90-1.00
Velvets	20/1 to 40/1	1.06-1.16	24-32	3.7-4.9	0.90-1.00
Sheeting	20/1 to 60/1	1.07-1.16	24-32	3.8-4.6	0.90-1.00
Shirting	20/1 to 60/1	1.10-1.18	26-32	3.7-4.4	0.90-1.00
Rugs	3/1 to 6/1	0.95-1.08	24-30	5.0 & higher	0.80-1.00
Home Furnishings					
Sheer	15/1 to 60/1	1.06-1.16	24-32	3.5-4.9	0.90-1.00
Heavy	3/1 to 12/1	0.95-1.10	24-30	3.2-5.0	0.80-0.90
Knit (18-28 cut)					
Single	16/1 to 40/1	1.04-1.14	24-32	3.5-4.9	0.85-1.00

EFS Cotton Flow

HVI/EFS® System Advantage



On-line version available at: www.cottoninc.com/fiberquality