

Don Etkin 1/92

MS 2132

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**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
COTTON DIVISION**

**COTTON
CLASSIFICATION
RESULTS**

UNDERSTANDING THE DATA

**Explanation of High Volume Instrument
(HVI) Fiber Measurements**

July 1994



USDA, AMS, COTTON DIVISION

UNIVERSAL CLASSIFICATION DATA FORMAT

(Applicable to All Methods of Data Dissemination
Offered by the Cotton Division)

<u>FIELD NAME</u>	<u>COLUMN</u>
GIN CODE NUMBER	1-5
GIN BALE NUMBER	6-12
DATE CLASSED	13-18
MODULE, TRAILER, OR SINGLE BALE	19
MODULE/TRAILER NUMBER	20-24
BALES IN MODULE/TRAILER	25-26
PRODUCER ACCOUNT	27-29
COLOR GRADE	30-31
FIBER LENGTH (32ND)	32-33
MIKE	34-35
(Blank)	36
STRENGTH	37-40
LEAF GRADE	41
EXTRANEIOUS MATTER	42-43
REMARKS	44-45
(Blank)	46
HVI COLOR CODE	47-48
COLOR QUADRANT	49
HVI RD	50-51
HVI +B	52-54
(Blank)	55
HVI TRASH PERCENT SURFACE	56-57
(Blank)	58
FIBER LENGTH (100TH)	59-61
(Blank)	62
LENGTH UNIFORMITY PERCENT	63-64
UPLAND OR PIMA	65
RECORD TYPE	66
CCC LOAN PREMIUMS AND DISCOUNTS	67-71

The High Volume Instrument (HVI) classification system consists of the classer's color grade, leaf grade, extraneous matter (if any), and instrument measurements for fiber length, micronaire, strength, color, trash, and length uniformity.

Most classification data is provided to the industry by telecommunications, computer tapes, diskettes, and computer punch cards. In order to provide classification data for individual bales, the incoming bale identification tag must meet certain requirements which are discussed below. For ease of explanation, the Universal Classification Data Format is used as an example for explaining the various quality measurements.

GIN CODE NUMBER (Columns 1-5)

The gin code number is composed of five digits. The first two digits denote the Classing Office, and the last three digits identify the gin. The local Classing Office assigns this code number and can provide codes for any gin.

GIN BALE NUMBER (Columns 6-12)

The seven-digit bale numbers are assigned by the gin. A bar-coded bale identification tag, preprinted with the gin code number and gin bale number, is placed between the two halves of the sample for identification purposes. The Classing Office scans the bar codes to enter the bale identification into its computer prior to classing the sample.

DATE CLASSED (Columns 13-18)

This is the date the bale was classed in the Classing Office.

MODULE, TRAILER, OR SINGLE BALE (Column 19)

This one digit code indicates whether the sample was outturned as a single bale or from a bale that was module/trailer averaged.

Single bale = 0
Module = 1
Trailer = 2

Detailed information on Module Averaging is shown on pages 9-10.

MODULE/TRAILER NUMBER (Columns 20-24)

A five digit number identifies the module/trailer number assigned at the gin.

BALES IN MODULE/TRAILER (Columns 25-26)

A two digit number identifies number of bales in the module/trailer that were averaged to determine the value of all the bales in the module/trailer.

PRODUCER ACCOUNT (Columns 27-29)

The producer account number space is reserved for USDA use.

COLOR GRADE (Columns 30-31)

The color grade that appears on the classification record is determined by the classer, based on the official color grade standards. Color refers to the gradations of whiteness and yellowness in the cotton. Codes that identify extraneous matter and special condition cotton are shown in the extraneous matter and remarks section. The codes that identify American Upland color grades and American Pima grades are as follows:

<u>Upland Color Grade and HVI Color Codes</u>	<u>Pima Grades</u>
11, 21, 31, 41, 51, 61, 71, 81	01, 02, 03, 04, 05, 06, 07
12, 22, 32, 42, 52, 62, 82	
13, 23, 33, 43, 53, 63, 83	
24, 34, 44, 54, 84	
25, 35, 85	

Special Condition Codes for Upland Cotton

- 96 - Mixture of Upland and Pima
- 97 - Fire Damaged
- 98 - Water Damaged

Special Condition Codes for Pima Cotton

- 93 - Mixture of Pima and Upland
- 94 - Fire Damaged
- 95 - Water Damaged

FIBER LENGTH - 32NDS (Columns 32-33); 100THS (Columns 59-61)

The HVI system measures length in hundredths of an inch. Length is reported on the classification record in both 32nds and hundredths of an inch. Length measurements listed below have been converted to 32nds of an inch.

Upland Length Conversion Chart

<u>Length 32nds</u>	<u>HVI Length (Inches)</u>	<u>Length 32nds</u>	<u>HVI Length (Inches)</u>
24	0.79 & shorter	36	1.11 - 1.13
26	0.80 - 0.85	37	1.14 - 1.17
28	0.86 - 0.89	38	1.18 - 1.20
29	0.90 - 0.92	39	1.21 - 1.23
30	0.93 - 0.95	40	1.24 - 1.26
31	0.96 - 0.98	41	1.27 - 1.29
32	0.99 - 1.01	42	1.30 - 1.32
33	1.02 - 1.04	43	1.33 - 1.35
34	1.05 - 1.07	44 & Longer	1.36 & Longer
35	1.08 - 1.10		

American Pima Length Conversion Chart

<u>Length 32nds</u>	<u>HVI Length (Inches)</u>
40	1.20 and lower
42	1.21 - 1.25
44	1.26 - 1.31
46	1.32 - 1.36
48	1.37 - 1.42
50	1.43 - 1.47
52	1.48 and above

MIKE (Columns 34-35)

An airflow instrument is used in the HVI system to measure fiber fineness. The measurements, commonly referred to as micronaire or "mike" readings, are the same as those that have been provided for many years in cotton classification. Micronaire and maturity are highly correlated within a variety.

STRENGTH (Columns 37-40, Decimal in Column 39)

The fiber strength measurement is made by clamping and breaking a bundle of fibers, with a 1/8-inch spacing between the clamp jaws. Results are reported in terms of grams per tex to the nearest tenth. A tex unit is equal to the weight in grams of 1,000 meters of fiber. Therefore, the strength reported is the force in grams required to break a bundle of fibers one tex unit in size. The following table shows some general descriptions of HVI 1/8-inch gage strength measurements in grams per tex.

Fiber Strength Table

Descriptive Designation	:	HVI 1/8" Gage Strength (grams per tex)
Weak	:	23 & below
Intermediate	:	24 - 25
Average	:	26 - 28
Strong	:	29 - 30
Very Strong	:	31 & above

LEAF GRADE (Column 41)

Leaf refers to small particles of the cotton plant's leaf which remain in the lint through the ginning process. Leaf grades are determined by the classer and are identified in numbers 1 through 7, all represented by physical standards. Leaf grade 8 (Below Grade) is used to identify samples having more leaf than leaf grade 7.

EXTRANEOUS MATTER (Columns 42-43)

Extraneous matter is any substance in the cotton other than fiber or leaf. Examples of extraneous matter are bark, grass, spindle twist, seed coat fragments, dust, and oil. The kind of extraneous matter, and an indication of the amount (light or heavy), are noted by the classer on the classification record. The amount of extraneous matter in the cotton is reported as level 1 and level 2, with level 2 indicating the heavier contamination. The code numbers identifying the presence and level of extraneous matter in a sample are as follows:

Extraneous Matter

- 01 Prep Level 1
- 02 Prep Level 2
- 11 Bark Level 1
- 12 Bark Level 2
- 21 Grass Level 1
- 22 Grass Level 2
- 31 Seed Coat Fragments Level 1
- 32 Seed Coat Fragments Level 2
- 41 Oil Level 1
- 42 Oil Level 2
- 51 Spindle Twist Level 1
- 52 Spindle Twist Level 2
- 61 Other Level 1
- 62 Other Level 2

REMARKS (Columns 44-45)

Classers identify special condition cotton. Some of these items cause processing problems and lower yarn quality. The following remarks codes identify special condition cotton.

- 75 Other Side Two or More Color Grades and/or Color Groups or One Color Grade and One Color Group Higher
- 76 Reginned
- 77 Repacked
- 91 Upland Ginned on Roller Gin
- 92 Pima Ginned on Saw Gin

HVI COLOR CODE (Columns 47-48)
COLOR QUADRANT (Column 49)
HVI Rd (Columns 50-51)
HVI +b (Columns 52-54)

The HVI color measurements are in terms of grayness and yellowness. Grayness (HVI Color Rd) indicates how light or dark the sample is, and Yellowness (HVI Color +b) indicates how much yellow color is in the sample. The Nickerson-Hunter cotton colorimeter color diagram on page 11 is based on current official standards for American Upland cotton and shows how these measurements are coded and how they relate to the color of the grade standards. Each color grade is subdivided into quadrants to denote color differences within a color grade for more precise measurements. This information is reported as a two digit Color Grade Code and a single digit grade quadrant. This three digit number is derived by locating on the diagram the intersection of the Rd and +b readings.

The Nickerson-Hunter cotton colorimeter color diagram on page 12 is based on the official standards for American Pima cotton. Color grades shown in the chart are the one-digit color grades of American Pima. Two digits are shown on the classification record, the first digit being zero (0). Grade quadrants are not used for American Pima.

HVI TRASH PERCENT SURFACE (Columns 56-57)

The two-digit trash code reported on the classification record is the percent of the sample surface covered by trash particles as determined by a video scanner. For example, a reading of 04 indicates that trash particles cover 0.4 percent of the sample surface. Trash particles include extraneous matter such as grass, bark, etc.. However, the classer will continue to identify samples containing extraneous matter. Listed below is the relationship of leaf grade to the percent surface area measured by the HVI trashmeter for the 1993 crop.

Relationship of Classer's Leaf Grade to HVI Trash Reading for the 1993 Crop

<u>Classer's Leaf Grade</u>	<u>HVI Trash Reading</u>
1	01
2	02
3	03
4	04
5	06
6	08
7	11
8	15

HVI trash readings will not be made for American Pima cotton for the 1994 crop.

LENGTH UNIFORMITY PERCENT (Columns 63-64)

Length uniformity is a two-digit number that is a measure of the degree of uniformity of fibers in a sample. The descriptive terms listed below may be helpful in explaining the measurement results.

Descriptive	:	HVI Length
Designation	:	Uniformity

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

UPLAND OR PIMA (Column 65)

The one digit code indicates whether the sample is Upland or American Pima.

- 1 = Upland
- 2 = Pima

RECORD TYPE (Column 66)

The one digit code gives the type of record according to the following:

- 0 = Original
- 1 = Review
- 2 = Rework
- 3 = Duplicate
- 4 = Correction

CCC LOAN PREMIUMS AND DISCOUNTS (Columns 67-71)

The five digit code gives the CCC loan premium and discount points for Upland cotton. The physical loan price for Pima cotton is shown in cents per pound.

Upland - Column 67 (+) if Premium, (-) if Discount

Columns 67-71 will be left blank if the quality is not eligible for loan.

MODULE/TRAILER AVERAGING FACT SHEET

BACKGROUND

The Cotton Division offered Module/Trailer Averaging to the cotton industry in 1991 as a means to improve the accuracy of HVI strength readings. The success of this 1991 pilot project resulted in increased industry participation and the expansion of Module/Trailer Averaging to include additional HVI measurements for the 1992 and 1993 crops. Results from the three-year project show conclusively that Module/Trailer Averaging significantly improves the laboratory-to-laboratory reproducibility of HVI measurements. The Cotton Division will continue to offer Module/Trailer Averaging to the cotton industry on a voluntary basis for the 1994 crop for the measurements of micronaire, strength, length, and length uniformity. Listed below are some important facts regarding Module/Trailer Averaging:

Participation

<u>Crop Year</u>	<u>Number of Gins</u>	<u>Number of Bales Module/Trailer Averaged</u>	<u>Percent of Bales Classed by USDA</u>
1991	99	1.2 million	8
1992	212	2.2 million	15
1993	242	3.1 million	20

Reproducibility Results - 1993 Crop

<u>HVI Measurement</u>	<u>Individual Bale Percent</u>	<u>vs</u>	<u>Module/Trailer Average Percent</u>
Micronaire	76		80
Strength	69		79
Length	74		86
Length Uniformity	80		90
Color (Rd)	88		89
Color (+b)	90		95
Trash (Percent Area)	80		88

(Continued)

MODULE/TRAILER AVERAGING - 1994 CROP

- In keeping with a majority of recommendations received from the industry, Module/Trailer Averaging in 1994 will include the HVI measurements of micronaire, strength, length, and length uniformity. HVI color and trash will not be averaged.
- All bales having measurements that fall within three standard deviations of the average will be included in the module/trailer average. Bales having measurements outside this range will be excluded as outliers, and their measurements will not be used in determining the module/trailer averages. Outlier bales will be assigned their own individual HVI readings. The table below shows the range of measurements that will be accepted in the module/trailer average:

<u>HVI Measurement</u>	<u>Permitted Range</u> <u>1994 Crop</u>	<u>Range Used for</u> <u>1993 Crop</u>
Length	0.06 inches	0.06 inches
Strength	3.3 gm/tex	3.9 gm/tex
Micronaire	.40 units	.40 units
Uniformity	3.0%	3.0%

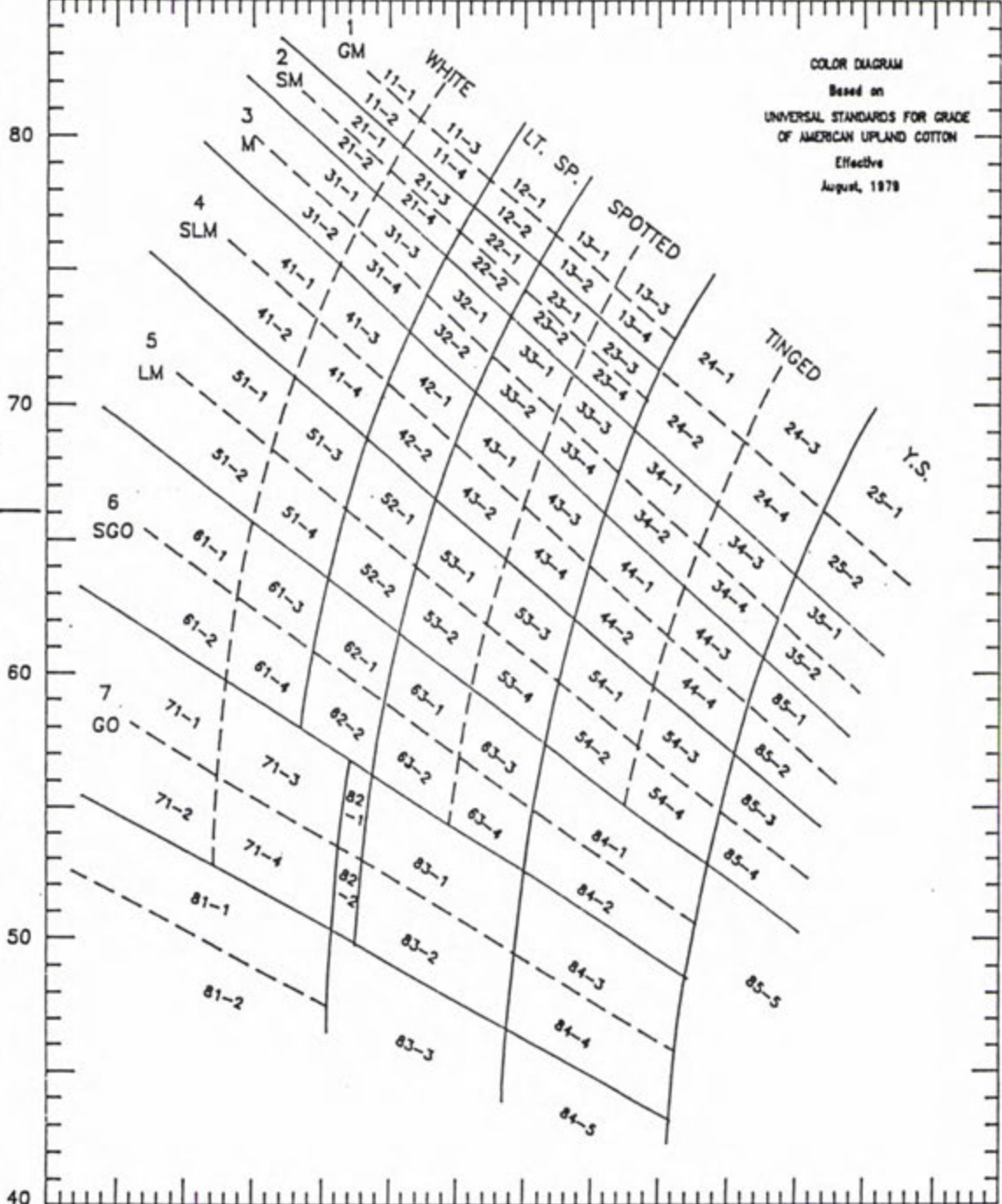
- The classer-assigned quality factors -- color grade, leaf grade, and extraneous matter (if any) -- will not be averaged, and each bale will stand on its own for these factors.
- Review classification for individual bales in a module or trailer will be permitted for classer color grade, classer leaf grade, classer extraneous matter, HVI color, and HVI trash. All of these quality factors will be reviewed, and the review classification will retain the original module/trailer averages for micronaire, strength, length, and length uniformity.
- If a review classification is desired for the module/trailer averaged factors of micronaire, strength, length, and length uniformity, samples from all bales (excluding outliers) in the module or trailer must be submitted together for review classification. All quality factors including classer-assigned values will be reviewed.
- If review classification is desired for outlier bales, all quality factors will be reviewed.

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4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

LIGHT
↑
Rd (% REFLECTANCE)
↓
DARK

COLOR DIAGRAM
Based on
UNIVERSAL STANDARDS FOR GRADE
OF AMERICAN UPLAND COTTON
Effective
August, 1978



← DECREASING YELLOWNESS HUNTER'S +b INCREASING YELLOWNESS →

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