

Classing

By **JANINE POWELL**

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The quality of cotton can be expressed by a number of different measurements which are performed by cotton classers. These measurements are described in a wide range of grades (Table 1), and affect the final price that is paid for a bale of cotton.

Once cotton is ginned, and while it is being baled, a sample (of at least 120g) is taken from both sides of every bale and bulked together and sent to the specialist classers.

Historically, the cotton industry has employed both visual and mechanical methods to determine quality. Most aspects of visual cotton classing are gradually being replaced by the HVI (High Volume Instrument) system which determines most quality specifications by instrument.

Visual methods based on definite and specific grades

BE AWARE OF

- Classing is a complex process, whilst this chapter gives an overview, a more detailed understanding can be gained from visiting your nearest classing facility.

established by the United States Department of Agriculture (USDA) for upland cotton determine the differing qualities and describe cotton for buying and selling when samples are not available. Cotton classers are skilled in determining those grades visually, but now also use HVI systems. A classer's grade is colour, leaf and preparation.

The price received for cotton is dependent on the quality of each bale of cotton. Cotton prices are quoted for 'base grade' 31-3-36, G5 (see Figure 1). Premiums and discounts apply for higher and lower grades respectively. These pricing adjustments reflect the change in suitability for the spinning and dyeing process (see Chapter 7, Table 1, page 31 'Consequences of poor fibre quality' right column). For this reason, variability in any quality characteristic may influence the price. Some of the key quality characteristics are outlined below:

- Colour
- Leaf
- Staple length
- Micronaire
- Strength
- Preparation

Colour

The colour of a sample is currently measured visually by a trained cotton classer. The true colour can only be assessed under specific light conditions and via comparison to a 'standard' sample of universal standards provided by the USDA.

The colour grade considers how bright or dull a sample is and the degree of colour pigmentation from white through to spotted and to yellow stained. A colour of 31 is Australian base grade.

FIGURE 1.
Interpretation of Base Grade: 31-3-36, G5

BASE GRADE: 31		3	36,	G5					
Colour		Colour	Leaf	Staple Length,	Micronaire				
Descriptor	Code	Descriptor	Code	Measurement	Code				
Good Middling (GM)	1	White	1	1 inch	↑ 32	2.4 and below	↑ G0		
Strict Middling (SM)	2	Light Spotted	2	Level 2	2	1 1/32"	33	2.5 through 2.6	G1
Middling (MID)	3	Spotted	3	Level 3	3	1 1/16"	34	2.7 through 2.9	G2
Strict Low Middling (SLM)	4	Tinged	4	Level 4	4	1 3/32"	35	3.0 through 3.2	G3
Low Middling (LM)	5	Yellow Stained	↓ 5	Level 5	↓ 5	1 1/8"	36	3.3 through 3.4	G4
Strict Good Ordinary (SGO)	6					1 5/32"	37	3.5 through 4.9	G5
Good Ordinary (GO)	7					1 3/16"	38	5.0 through 5.2	G6
Below Grade (BG)	↓ 8					1 7/32"	39	5.3 and above	↓ G7

Actual length applies so this table is just an example of possible staple lengths

Leaf

Also known as 'trash' is a measure of the amount of leaf material (from the cotton plant) remaining in the cotton sample. While the gin removes the majority of trash, some remains in the sample. The remaining trash is removed in the spinning process which reduces lint yield and increases cost. So cotton with high levels of trash attracts a discount. Leaf grades range from 1 (lowest) to 5 (highest), with level 3 as 'base grade'.

Staple length

Length is measured on a sample of fibres known as a 'pull' when hand classing, and is measured to the nearest 1/32 inch. HVI determine length in 100ths of an inch or on a 'beard' or tuft of lint formed by grasping fibres with a clamp. Australian cotton is all classed using HVI measurements. Under raingrown conditions, staple length tends to range from similar to irrigated cotton (1 1/8 inches) down to very short (1 inch or less). Base grade is 36 or (1 1/8").

Micronaire

Micronaire is measured by placing lint in a chamber, compressing it to a set volume and subjecting it to a set pressure. The reading, when related to a variety, it is an approximate guide to fibre thickness and has been used as a measure of fibre maturity. Other, more accurate, fibre maturity testing methods and devices are being tested

and may soon be introduced but for now the general guidelines below still apply:

- Low (<3.5) micronaire indicates fine (immature) lint.
- High (>4.9) micronaire indicates coarse lint.

The desired range is 3.5 to 4.9 (G5) and discounts apply for micronaires outside that range. Discounts for low micronaire can be heavy.

Common causes of low micronaire include:

- Cool temperatures during fibre wall development;
- Potassium deficiency;
- Dense plant stands;
- High nitrogen;
- Excess irrigation/rainfall;
- Favourable fruit set and high boll retention; and,
- Early cut-out due to frost, hail, disease or early defoliation.

The most common causes of high micronaire include:

- Poor boll set;
- Small boll size due to hot weather or water stress; and,
- Variety.

Ginning has little or no effect on micronaire although low micronaire cotton is more susceptible to entanglement and nepping which can affect preparation and subsequently grade.

Raingrown cotton normally falls into the acceptable micronaire range, but under hot, dry conditions some

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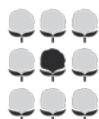
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varieties are prone to produce high micronaire. Late planted crops are susceptible to low micronaire and heavy discounts sometimes apply.

Management practices that open immature bolls such as pre-mature defoliation can contribute to the inclusion of immature fibres and an increase in neps. Experiments conducted at the Australian Cotton Research Institute confirmed that defoliating before 60% bolls open lowers micronaire (reduced fibre maturity) and increases neps.

Fibre strength

Fibre strength is highly dependent on variety although environmental conditions can have a small effect. Raingrown cotton strength is usually not adversely affected by growing conditions. Most Australian varieties are of high strength and local plant breeders have agreed to eliminate varieties that do not meet a minimum standard, thus keeping Australian cotton highly competitive in the world market. Fibre strength is measured by clamping a bundle of fibres between a pair of jaws and increasing the separation force until the bundle breaks.

Strength is expressed in terms of grams force per tex with the following classifications:

- Less than 17 very weak;
- 18 – 21 weak;
- 22 – 25 medium strong;
- 26 – 29 strong (most current Australian varieties); and,
- More than 30 very strong.

Preparation

Preparation (often referred to as 'prep') relates to the evenness and orientation of the lint in the sample. Factors contributing to poor preparation include spindle twist or wrapping during picking or roping or knotting (neps) of immature or very fine fibres in the ginning process.

Other quality characteristics

Pricing adjustments (premiums or discounts) may be made for other undesirable quality characteristics including (but not limited to):

- Grass or bark in the sample;
- An un-uniform sample;
- Sugars (honeydew);
- Neps; and,
- Short Fibre (below 32).

A number of other fibre characteristics measured in HVI testing which, whilst of increasing importance to spinners, do not have a direct impact on price at present include:

- Upper Half Mean Length (UHML);
- Span Length;
- Uniformity Ratio (UR);
- Elongation (EL);
- Short Fibre Index (SFI);
- Maturity; and,
- Fineness.

Cotton grade and price

The price received for cotton is dependent on the quality of each bale. Cotton prices are quoted for 'base grade' 31-3-36, G5. Premiums and discounts apply for higher and lower grades respectively.

Cotton merchants generally present actual classing results in an easy to read report displaying the AUD \$/ bale premiums or discounts.

These pricing adjustments are calculated using their 'Premiums and Discount (P&D) Schedules' or 'Differential Sheets'. Australian merchants P&D schedules are formatted similarly and the adjustments are generally quite similar, but there may be some differences. P&D schedules often change between seasons and sometimes within the season – the merchant will generally set the season's P&D around ginning time. From this time they can be requested from your merchant.

Premiums or discounts may be displayed in either USD \$/lb or USD points/lb. There is 100 points in a cent. For example a 300 point discount is equivalent to -\$0.03. To convert from per pound to per bale, multiply by 500. To convert into Australian dollars, divide by the USD / AUD exchange rate (ask your merchant the exact exchange rate which is applicable).

For example: A total discount of 800pts/lb

=	-\$0.08/lb
=	-\$0.08 x 500
	.85
=	AUD -\$47.06/bale

Multiple adjustments may apply to one bale of cotton. There is one adjustment for colour – leaf – staple length, while all other characteristics have their own adjustments

For more information talk to your merchant, their classing facility or look at the following websites:

FIBREpak: http://www.cottoncrc.org.au/content/Industry/Publications/Fibre_Quality/FIBREpak.aspx

Australian Cotton Shippers association:
<http://www.austcottonshippers.com.au/>

Cotton Classers Association of Australia contact Greg Parle, Auscott Ltd,
Ph: 02 9439 0514