GRADE STANDARDS (M.H.RANA)

CHAPTER 2 - COTTON VALUE ADDITION - CLASSING AND GRADING

Grade standards are necessary in any grading system for maintaining the integrity of manual classing. They represent the various grade levels for such factors as colour, leaf and preparation. The most recognized and widely used grade standards are the Universal Upland Grade Standards. These standards are maintained and distributed throughout the world by the United States Department of Agriculture (USDA). In addition to the Universal Grade Standards, many cotton producing countries have developed their own grade standards in order to more closely represent their own cotton.

The Universal Grade Standards are universal because of wide international acceptance. Twenty-three of the world's major cotton associations, representing 21 countries, are delegates to the Universal Cotton Standards Agreement. This agreement gives the signatory delegates a voice in how the Universal Standards are governed. Every three years, the delegates meet in Memphis, Tennessee, United States, to discuss and consider any changes to the standards.

The established colour grading system for American Upland cotton is made up of 25 colour grades plus 5 below-grade designations as shown in table 2.3. Fifteen of these grades are represented by the Universal Grade Standards. The remaining 10 grades are based on descriptive standards. For leaf grade, the seven 'White' colour grade standards also serve as the seven official leaf grade standards. These are also notated in the table below.

Table 2.3 Official grades of American Upland cotton

	White	Light spotted	Spotted	Tinged	Yellow stained
Good middling	11-1**	12	13	—	—
Strict middling	21-2**	22	23*	24	25
Middling	31-3**	32	33*	34*	35
Strict low middling	41-4**	42	43*	44*	—
Low middling	51-5**	52	53*	54*	—
Strict good ordinary	61-6**	62	63*	—	—
Good ordinary	71-7**	—	—	—	—
Below grade	81	82	83	84	85

* Physical standards for colour grade only.
** Physical standards for colour grade and leaf grade.
All others are descriptive.

American Pima Grade Standards are also represented in physical form. They comprise six official grades (numbered 1 through 6) for colour and leaf. All are represented by physical standards. There is a descriptive standard for cotton which is below grade for colour or leaf. The American Pima Standards differ from the Universal Upland Standards. Pima cotton typically has a deeper yellow colour than Upland cotton. The leaf content of the American Pima Standards is unique to this type of cotton and does not match that of the Universal Upland Standards. The preparation of the Pima Standards is also very different from that of the Upland Standards due to the use of roller ginning.

Both Universal Upland and American Pima Grade standards are valid only for a period of one year because of gradual changes in colour that occur as cotton ages. The grade standards for both American Upland and American Pima cotton are reviewed periodically to ensure they are still representative of their basis, which is the United States

cotton crop.

COTTON COLOUR AND COLOUR GRADES

When Upland cotton opens under normal conditions, it is white in colour. Continued exposure to weather and micro-organisms can cause the white cotton to lose its brightness and become duller. Upland cotton that has its growth stopped prematurely by frost, drought or other weather conditions may have a yellow colour that varies in depth. Cotton can also become discoloured by insects, fungi and soil stains. Discolouration may also be caused by oil or grease used in mechanical harvesting equipment, or by green leaves or other parts of the cotton plant that have been crushed by the machinery.

Regardless of the cause, any movement of Upland cotton colour from the bright white colour indicates deterioration in quality. Based on the Universal American Upland Grade Standards, all of these colour differences are recognized, divided into categories and described. The varying amount of yellow colour found in cotton is the basis for the colour groups used in the Universal Standards for grading Upland cotton. As shown in table 2.4 and figure 27, the Universal Upland colour groups are white, light spotted, spotted, tinged and yellow stained. Each colour group is represented by a colour name and a corresponding colour number (the second digit of the number represents the colour group).

As the cotton in each of the colour groups is exposed to weathering, it becomes progressively duller. The degree of brightness or dullness is the principal basis for grade divisions within each colour group. The higher grades are brighter in colour than the lower grades. These divisions are also described through their name as well as a numerical designation. The grade divisions for brightness or dullness are represented by the first digit in the numerical name of the grade. The higher the number is, the duller or darker the colour will be. For example, a numerical colour grade of 11 represents very bright cotton in the white colour group whereas a colour grade of 61 represents very dull cotton in the white colour group.

In the Universal Upland Grade Standards, each of the 15 colour grade standards is made up of 6 cotton samples or ‘biscuits’. The six biscuits in a grade standard display the range of colour that is acceptable within each colour grade.

When grading cotton for colour by visual inspection, lighting conditions are very important in order to maintain uniformity in classing. Lighting should not only be uniform and constant, but any artificial lighting used should provide colour rendering equal to that of daylight. Lighting in the classing room or laboratory should be diffused, but with enough direction to allow depth perception as the classer looks into the cotton. It should be as uniform as possible over all working areas in the room, and there should be no glare or cross-lighting.

Surrounding conditions are also important. All colours used in classing rooms or laboratories should be neutral, white, grey or black. Walls should be very light in colour. Light grey, just off-white, is preferable, so as to conserve the light. For more information on lighting in classing rooms for colour grading, see the American Society for Testing and Materials International (ASTM) Standard Practice for Lighting Cotton Classing Rooms for Color Grading, ASTM D 1684-96 (Re-approved 2002).

Cotton trash and leaf grades

Cotton usually becomes contaminated by leaf and other trash because of exposure in the field and harvesting methods. The amount of trash or foreign matter remaining in the lint cotton after ginning is largely dependent on the trash content, the condition of the cotton at the time of harvest, and the amount of cleaning and drying machinery used in the ginning process. Even when cotton is carefully harvested under ideal field conditions, it is very difficult not to include at least some pieces of leaf and trash.

Leaf includes dried and broken plant foliage of various kinds. It can be divided into two general groups: large leaf; and ‘pin’ or ‘pepper’ leaf. Leaf grade is an important factor and represents a loss, since it must be removed in the manufacturing process. From the manufacturing standpoint, leaf content is all waste, and there is a cost factor associated with its removal. Large leaf is generally less objectionable because it is easier to remove in the manufacturer’s cleaning process.

The classer’s leaf grade is a visual estimate of the amount of cotton plant leaf particles in the cotton. In the Universal American Upland Grade Standards there are seven leaf grades, designated as leaf grade 1 through 7. All are

represented by the physical standards as previously discussed. In addition, there is a ‘below grade’ designation, which is descriptive.

REPARATION

Preparation is a term used to describe the degree of smoothness or roughness of the ginned lint cotton. As a general rule, smooth cotton has less spinning waste and produces a smoother, more uniform yarn than rough cotton. Various methods of harvesting, handling, and ginning cotton can produce readily apparent differences in preparation. Abnormal preparation in Upland cotton has greatly diminished in recent years because of improvements in harvesting and ginning practices.

Extraneous matter

Extraneous matter, also referred to as foreign matter, is any substance in the cotton other than fibre or leaf. Extraneous matter may consist of materials such as bark, grass, spindle twist, sand, dust, oil, whole seeds, seed coat fragments, motes or stems. Any sample containing an appreciable amount of such material should be designated with the proper classification remark annotating its type and contaminant level.