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Technical Analysis

Price outlook for Gujarat-ICS-105, 29mm and ICE cotton futures for the period 22/12/14 to 05/01/15

(The author is Director of Commtrendz Research and the views expressed in this column are his own and the author is not liable for any loss or damage, including without limitations, any profit or loss which may arise directly or indirectly from the use of above information.)

We will look into the Gujarat-ICS-105, 29mm prices along with other benchmarks and try to forecast price moves going forward.

As mentioned in the previous update, fundamental analysis involves studying and analysing various reports, data and based on that arriving at some possible direction for prices in the coming months or quarters.

Some of the recent fundamental drivers for the domestic cotton prices are:

- Cotton futures are trading marginally higher supported by CCI procurement under the MPS provision. Reasonable demand from mills and exports as a result of a stronger dollar is also underpinning prices.

- The Government-run Cotton Corporation of India (CCI) has been actively buying under a market intervention scheme and has also stepped up stocks and is estimated to procure close to 6 million bales.

EXPERT's Column

Shri Gnanasekar Thiagarajan

- The Cotton Association of India estimates domestic production in the 2014-15 season at over 40 million bales, but it is believed that exports could slide by as much as 40 per cent this year.

Some of the fundamental drivers for International cotton prices are:

- The Cotton Benchmark futures in New York edged higher on Friday in choppy, thin trade, pinned between short covering and producer selling. Cotton can rise and fall in sympathy with crops including corn and soybeans, with which it competes for acreage.

- Farmers in key producers, including the United States, have largely been withholding supply, awaiting a price recovery.

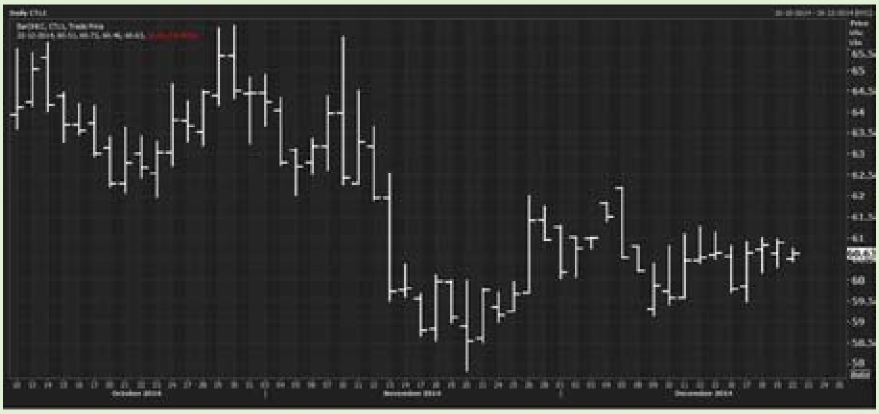
- The dollar rose to multi-year highs against a basket of major currencies, making dollar denominated commodities including cotton, more expensive to buyers.

- Private forecasts expect that U.S. cotton plantings will fall to 9.6 million acres in 2015, down 13 per cent from the previous year. Farmers are expected to plant fewer acres of fibre as benchmark futures have tumbled about 30 per cent this year to date.

Let us now dwell on some technical factors that influence price movements.

As mentioned in the previous update, ideally, a bounce back or a retracement to 9,700-10,000 levels look likely in the coming sessions. As expected we saw strong support at 9,100 /qtl levels. Only a fall below 9,100/qtl levels could now hint at further weakness targeting 8,800-8900 /qtl levels. No change in view. The present chart hints at a possible move towards 10,000/qtl levels as an upward correction within a downtrend.

As illustrated in the previous update, one should be cautious of becoming bearish at current levels. Indicators are once again displaying neutral tendencies, which warn of a possible decline again in prices. We saw prices declining upto 9,100/qtl levels and seem to have hit an intermediate bottom. A possible pullback to 9,500-700/qtl or even higher to 10,000/qtl still looks likely in the coming week/weeks. However, an unexpected decline below 9,100/qtl could weaken the technical picture once again and take prices lower towards 8,700/qtl or even lower.



We will also look at the ICE Cotton futures charts for possible direction in international prices.

As mentioned in the previous update, presently, recoveries to 62c could find it difficult to cross. Therefore, any pullbacks to 62-63c could find strong resistance again for a decline in the coming sessions. In the bigger picture, it looks like a possible bottom should be formed near 51-52c, or even lower to 48c from where prices could make a smart recovery higher. Only a close above 64c could change the picture to neutral. Such a move will hint that the expected fall to 51`-52c might not materialise and prices could start moving higher again.

CONCLUSION:

Both the domestic prices and international prices have pulled back from recent lows. As we have been maintaining, the pullback still cannot be interpreted as a trend reversal. For Guj ICS supports are seen at 9,000-100/qtl levels followed by 8,700 /qtl and for ICE Dec cotton futures at 58c followed by 53c. Only an unexpected rise above 10,400 /qtl could change the picture to neutral in the domestic markets while a push above 65c could turn the picture to neutral in the international prices, till then we expect this downtrend to continue to push prices lower. However, positive indications in charts presently make us believe the downside could be over for cotton futures, both domestic and international.

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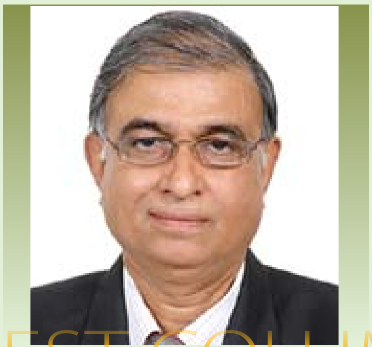
Towards Accounting Unexplained Factors of Cotton Quality in Determining Yarn Quality and Spinning Process Efficiency

Dr. Chattopadhyay, Principal Scientist and Head of the Mechanical Processing Division at CIRCOT has done his M. Tech in Textile Engineering from IIT, Delhi and a Doctorate in Textile Technology from Mumbai University. He has to his credit almost 160 research and technical papers as well as five patents filed for various innovations.



GUEST COLUMN

Dr. Chattopadhyay
Principal Scientist and Head of the Mechanical Processing Division, CIRCOT

Introduction

In India, cotton is cultivated in varied agro-climatic conditions, mainly for its fibre that constitutes about 67 percent [2012-13 (P), source: www.txcindia.gov.in] of the input raw material for the Indian textile industry. This speaks volumes of the importance of Indian cotton for the textile industry and to the national economy. Cotton fibre is mainly used for spinning pure and blended yarns currently, by employing the conventional ring-spinning system, including its latest improvised derivative – the compact spinning machine, the newer rotor spinning technology and the newest air-jet spinning system. Besides, cotton is being increasingly used for non-spinning applications, either in the loose or converted non-woven form, as a preferred natural absorbent for medical and personal hygiene, stuffing and similar applications.

Typically, the cotton fibre price constitutes about 50-70% of the yarn manufacturing cost in a spinning mill. Besides, like in the case of all other manufacturing sectors, the cotton lint quality significantly affects its out-put yarn quality and the spinning process efficiency. So, whether it's breeding or farming or ginning or spinning, efforts are always focused on improving the desirable properties of cotton and eliminating the undesirable ones. The desirable properties of cotton are those that produce the best quality of yarn using a particular spinning system, including its pre-processing, with the highest possible process efficiency and the lowest amount of wastage. Thus, it is hardly surprising that for over a century, much effort has gone into developing instruments and propagating instrumental methods for accurately measuring the cotton fibre characteristics, and quantitatively relating them to processing performance, and yarn and fabric properties. However, in spite of hundreds of extensive theoretical, experimental and practical researches reported so far, till date, no 'universal' relationship, either empirical or theoretical, linking the measured characteristics of cotton to the spinning processing performance and the yarn quality exactly, has been developed. The reasons cited for the same are also varied: (i) cotton fibre properties, even in the same field or ginned lots differ widely, (ii) they are highly correlated among themselves, (iii) the types, sequence of spinning machines, and the processing parameters adopted and their interactions with fibre properties are different from mill to mill, (iv) there is a choice of spinning system nowadays in yarn production, (v) there exists many hidden interactions between fibre and moving machine components, and (vi) certain complicated fibre properties, like friction, processability, etc. were excluded in the building of such a relation. Moreover, the researchers are highly critical about the regression based equations having found them ineffective in such type of studies, because of the large prediction errors, which are often larger than the optimisation range of a given process parameter.

Thus, the million dollar question is, will it be possible in the future to get a accurate 'generic' and universally accepted relationship to predict yarn quality from cotton fibre quality? While a straight answer to the question is quite difficult, we can examine some of the developments and research progress in this direction made recently.

Extent of Unexplained Factor

As far as the cotton fibre is concerned, the main characteristics which are of prime importance, when assessed by digital instruments are: 2.5% span length, uniformity ratio, fineness (micronaire) and fibre bundle strength. While there is considerable difference in views on the relative quantitative contribution by the main fibre characteristics to the

Table 1: Quantitative contribution of main fibre characteristics to yarn quality

Research by / Main Fibre Characteristics	Max preysch (1973)		Y. mogazhy *et al.* (1990)				*PE Sasser ((1988)*			
	Ring	Rank	Ring	Rank	Rotor	Rank	Ring	Rank	Rotor	Rank
1.Fibre length	39 (1 & 2)	Ist	26	Ist	14	3rd	22	Ist	12	4th
2.Length uniformity			12	4th	13	4th	20	2nd	17	2nd
3.Fineness (Micronaire)	18	3rd	15	3rd	22	Ist	15	3rd	14	3rd
4.Fibre bundle strength	20	2nd	18	2nd	20	2nd	20	2nd	24	Ist
5.Fibre elongation	-		-		-		5		8	
6.Trash content	-		-		-		3		6	
7.Colour reflectance	-		-		-		3		8	
Total	77		71		69		88		89	
Unexplained	23		29		31		12		11	

yarn quality, since it again varies with the particular spinning system employed for the conversion of fibre to yarn, however, the ranking presented in Table 1 can be taken as a guideline. Traditionally, the yarn breaking strength, particularly the count-strength product being a good indicator of overall yarn quality and spinning efficiency, has been taken as a measure of yarn quality in most cases.

It can be seen from the Table 1, that for the ring spinning, it is the fibre length and length uniformity contributing the maximum (about 40%) to yarn quality, followed by bundle strength (about 20%) and micronaire (16%). For rotor spinning also, fibre length and length uniformity contribute the maximum (28%), but much lower than what is observed with the ring spinning system, followed by fibre strength (22%) and micronaire (18%). While Sasser's analysis has accounted for some of the other minor characteristics of cotton like fibre elongation (5-8%), trash content (3-6%) and colour reflectance (3-8%), in general, about 10-30% of the yarn quality remained unaccounted by the fibre quality, depending on the spinning system employed for yarn making, and whether or not the above three minor characteristics have been included. Thus, the basic fibre properties (e.g., length, fineness and strength) do not fully account for processing performance or yarn quality. This means there are other factors of cotton quality and processing parameters, as yet unmeasured, for enhancing the accuracy in fibre-to-yarn modeling. The practical spinners have since long experienced the role of such fibre properties and processing parameters during the production of a defect-free yarn with the highest possible process efficiency. But due to lack of instruments to measure those minor properties objectively and quickly in a practical scenario backed by adequate R&D evidences, these aspects remained understated. With the introduction of newer fibre characterisation instrumenst like AFIS and other rapid instrument based on image processing, and due to the newer researches in the area, the understanding of yarn engineering using more details of fibre and machine parameters and their interactions, for the production of a near 'perfect' yarn is continuously enriching.

Some New Factors of Yarn Quality and Yarn Engineering

Processability or processing propensity of cotton

Spinners have for long been telling us about their mysterious experiences, that all cottons can not be processed with the same ease, particularly on the carding and the drawing machines at elevated speeds. Feedback received from the industry also states that certain foreign origin cottons are easier to process on the drawframe compared to Indian cottons with similar fibre properties. While screening breeders' samples through spinning tests at CIRCOT, we have also observed this phenomena occasionally. For examples, the fibres in samples A & B or C & D though exhibited seemingly normal characteristics, the fibres did not process equally (Table 2).

Table 2: Processing Problem (CIRCOT Study)

Sample	2.5% SL (Mm)	UR (%)	MIC	Strength (g/tex) (ICC)	Lea CSP
A	28.3	48	4.3	18.4	2314 **(30s NE)**
B	28.1	48	4.6	18.8	N. S.
C	24.4	51	4.6	18.8	1918 **(16sNE)**
D	25.0	48	4.3	18.8	N. S.

The role of inter-fibre coherence and fibre bulk resiliency may be attributed to such differential behaviour from cotton to cotton, because during spinning the fibres are subjected to various tensions, bending and compression deformation caused due to dragging and rubbing action against each other and/or against the machine surfaces, before a yarn is consolidated. In a more systematic study by using a modified rotor-ring system as a simulator, Y. Mogahzy et al. (1998) have attempted to provide an index of fibre propensity (in terms of rotor-ring energy), as a measure of fibre cohesion/ fibre resiliency influencing the opening of the fibres. A lower rotor-ring energy and sliver cohesion, and a higher near infrared reflectance (NIR) wax content of the cotton fibre were found beneficial, as such fibres offered better and smoother spinning process and fabric assistance, i.e., yarn to yarn interaction.

While increased cohesion or low resiliency among the fibres in a bundle will require more energy for their separation and slow stress recovery during mechanical processing, a very high resiliency or low cohesion will result in strand discontinuity and fibre loading on the moving machine elements. In practice, the parameters of processability need to be just adequate.

Fibre Friction

Because of its unique nature, fibre friction is one of the less understood and almost an unmeasured parameter of cotton quality. The 'friction' is defined as the resistance encountered, when two bodies are brought into contact and allowed to slide against each other. The role of friction in textile processing is well recognised. Since the fibres are spun into a yarn through a series of drafting processes, there happens interaction between different groups of fibres and between fibres to other materials like steel, rubber, etc. These interactions determine the relative fibre position during processing and their arrangement in forming the yarn. The mechanism that governs such interaction is known as the friction.

A number of laboratory studies have been reported in the literature citing different values of friction indices varying with cotton, and its surface treatment. In general, fibre to fibre friction is more than double the values of fibre to metal friction. While a reliable and quicker method of measuring fibre/ fibre and fibre/ metal friction for practical applications is yet to be developed, nonetheless, this parameter of cotton fibre quality is getting increased attention with the advent of newer spinning technologies such as rotor, air-jet and friction spinning, where fibres move by some frictional contact, rather than by any positive control like in the conventional ring spinning system.

Short Fibres and Floating Fibres

The quantity of short fibres in cotton is an important fibre property that influences spinning processing and yarn characteristics. The most commonly used parameter characterising short fibres in cotton is short fibre content (SFC), which is artificially defined as the percentage of fibres less than a predefined length, and as per US standards, it is the percentage (by weight or by number) of cotton fibres shorter than ½ inch (12.7 mm). Since long, the spinners know that such fibres are a source of process waste, and those that escape removal during pre-spinning operations can reduce the yarn quality badly. Thus, its mitigation is of keen interest before the yarn is spun. The SFC in cotton is affected by many factors, like cotton variety, growth condition, harvesting and particularly, the ginning process, including its pre- and post-cleaning systems that needs to be critically examined to minimise the fibre break-up. Spinners tend to remove some of the short fibres through the process of carding and combing. Probably, the high variation in the measured SFC has prevented its inclusion in the primary list of cotton characteristics, either for classing of cotton or as a determinant of yarn quality so far.

As mentioned above, SFC is based on a predefined length value, like 12.7 mm as per the US standards or 16 mm as per the Chinese standards. Both the practical spinners and the researchers have debated on the use of a fixed length of short fibres and their suitability in predicting the spinning process and yarn quality. This is the genesis of the alternate concept of 'floating fibres', those essentially escape control by either pair of rollers in the drafting zones during spinning. Therefore, they move in clusters and ensure more direct bearing on the yarn quality. As per Fransen (Bremen Conference, 1984), the floating fibre content is expressed as the Floating Fibre Index (FFI), which can be calculated by fibre length distribution by the array method, as follows:

FFI = [(Upper quartile length/ Mean length) -1] x 100.

The same can also be calculated from Fibrogram as follows:

FFI = [(Upper Half Mean length (UHML) / Mean Length (ML) -1] x 100

It may be noted that, the ratio, UHML/ ML is the Uniformity Index (UI), such that FFI is the inverse of UI. It can also be calculated as below,

FFI = [[2.5% SL/ 2 (50% SL - 0.075)] -1] x 100

[Ref: Handbook of Methods of Tests (2002), Part I (CIRCOT)]

More recently, Y. Cai et al. (2011) have proposed a new measure of using the Lower Half Mean Length (LHML), defined as the mean length by number of the short half of the fibres by weight, as a suitable alternative to SFC, having lower variation and a high correlation with SFC and yarn properties. It may be noted that LHML is a complement of the Upper Half Mean Length (UHML).

Non-Lint Content (NLC)

The very presence of high non-lint (trash) in cotton not only degrades the market value of the cotton, but also, if not brought down to a tolerable limit, will deteriorate the spinning process efficiency and quality, in terms of higher manufacturing waste, and ring frame end-breaks and increased thick places, neps and yarn faults. Ultimately, it will influence the end-use of the yarn and the fabric. While the trash content in hand-picked Indian cotton may be around 2-7%, it is 13-35% in the machine harvested cotton in the USA and Australia. If the trash present in the lint during spinning gets fragmented, it becomes more difficult to remove it effectively by the cleaning machines, and it gets attached to the yarn and is carried forward.

Trash content can be evaluated either by gravimetric or by geometric methods. Gravimetric methods include, trash analyser, trash separator and the AFIS system, while the geometric method is the HVI system, by area or count method. A strong positive correlation between the HVI trash and Analyser trash has been reported.

Immature Fibre Content (IFC)

Immature fibres have less cell-wall thickening with a larger lumen. Such fibres are undesirable, because they reflect light differently and do not uptake dye as effectively as the mature fibres, and will appear a lighter hue. Immature fibres will cause lapping of fibres on rollers, stoppage of production and excessive waste, and thus, deteriorating the process efficiency. They will also entangle more easily and form neps, which, if not, removed during processing will lower the yarn appearance grade and appear as 'white specks' on the finished fabric. Delays in the boll and fibre maturity are caused by less than optimum crop growing conditions, excessive nutritional and other crop management decision including the application of harvesting aids.

Thus, cotton fibre maturity, the degree of secondary wall thickening relative to the perimeter is one of the most important fibre quality and processing parameters. Also, fibre fineness, measured in terms of fibre weight per unit length is a factor of greatest importance in determining the spinning quality and its limit, yarn strength, evenness, nep content and the ultimate fabric quality. Both in industry and breeding research, the micronaire instrument is used currently to determine the fibre fineness in terms of 'micrograms per inch', commonly known as the 'micronaire value'. However, the specific surface area which determines the flow of air through a cotton plug is dependent not only upon the linear density of the fibres (e.g., the intrinsic fineness or perimeter), but also in their maturity. Thus, only if the intrinsic fineness remains constant, as in the case of the cottons of the same variety, the micronaire value will serve as a good measure of maturity, and a higher value of it will indicate a higher level of maturity. Otherwise, it is a combined measure of the cotton's fineness and maturity.

However, with the advancement of instrumentation, it is now feasible to measure the quantum of immature fibre, more quickly and reliably. For example, the AFIS instrument directly provides a quick measurement of immature fibre content (IFC), defined as the percentage of fibres having $\theta < 0.25$ (i.e., the dead fibres) and maturity ratio (MR) defined as:

$$MR = \frac{N - D}{200} + 0.7$$

Where, N = Normal fibre ($\theta > 0.5$) and D = Dead fibre ($\theta < 0.25$).

Use of such an independent measure in yarn engineering will help in isolating the effect of fibre maturity from its fineness and develop a better yarn quality prediction equation.

Low fiber strength, particularly in Indian cotton

Though fibre strength occupies the second position after the length parameters in determining the yarn quality, however, the low fibre strengths of Indian cotton is indeed a concern, particularly when the speeds of the spinning, winding and weaving machines have already reached to high speed levels, and still continue to rise. Table 3 shows roughly the fibre strength of a few Indian

Table 3: Fibre bundle strength (HVI mode) comparison

S. No.	Cotton	Origin	Staple / 2.5% SL Mm	HVI strength (g/tex)
1	Sicot 71 BRB	Australia	31	32
2	Sicot 74 BRF	Australia	31	29
3	Delta OPAL	Brazil	30	31
4	BRS ITA 90-2	Brazil	29	30
5	K 37	Burkina Faso	30	32
6	BA-119	Turkey	30	33
7	Giza 90	Egypt	28	34
8	Giza 86	Egypt	32	43
9	PHY 375 WRF	USA	28	30
10	ICS-105-LRA	India	27	25
11	ICS-105-H4/MECH-1	India	28	27
12	ICS-105-Shankar-6	India	29	28
13	ICS-105-Bunny/Brahma	India	31	29
14	ICS-106-MCU.5 /Surabhi	India	33	30

(Note: Data Source from Trade & Spinning mills, may differ from source to source)

cottons vis-à-vis some of their their foreign counterparts.

Cotton fibres mainly consist of the natural polymer cellulose (96%). A polymer displays consistent relationship between its molecular weight (Mw) and physical properties, like tensile strength, toughness and abrasion résistance. J. Timpa et al. (1994), while studying four sets of HVI calibration cottons with more or less same uniformity and Micronaire values, but varying in fibre length and strength demonstrated a relationship of cotton fibre molecular weight (Mw) to fibre strength, such that the Mw values account for 36% of the variability in strength. No significant correlations between crystallinity and any fibre properties noted, and the ranking of HVI strength correlated well with the ranking by Mw. The study emphasised that weight average molecular weight

Table 4: Trials on development of high strength Indian cotton

Variety / strain	2.5% SL (mm)	U. R. %	MIC	Strength (Stelometer) (G/tex)	Lea (CSP)		RKM (g/tex)	
Ring Spinning								
					40s NE	60s NE	40s NE	60s NE
H.777 (control)	26.6	49	4.8	27.2	1891	N. S.	9.10	N. S.
Pusa 2-95 (1989 trial)	25.8	52	3.9	32.7	3016	2795	14.5	13.4
Rotor Spinning (20s count)								
H-4	27.1	51	3.9	23.4	1908		12.0	
Pusa 2-95 (1990 trial)	27.4	50	3.9	35.7	2806		17.0	

N. S. = Non-spinnable

(Mw) is a significant contributor to the strength of the cotton fibre, whereas many earlier researches have concluded that the crystallite or fabrillar orientation describing the inclination of cellulose molecules to the fibre axis, is the most important fine structural parameters that determines the strength of cotton fibres. Also, researchers have reported the influence of types, and distribution of flaws and weak zones along the fibre in determining the strength. In view of this, a detailed basic research needs to be formulated and pursued to understand the clear and quantified roles of all the structural parameters to satisfactorily explain the structure-property relationship in Indian cottons. Research result reported in an earlier varietal development trial, where a high strength strain Pusa-2 was isolated from Bikaneri Narma variety at IARI Farm, New Delhi and used for breeding new varieties (Munshi Singh et al. 1991, 1992) and tested by CIRCOT is reproduced below (Table 4) as a guiding evidence.

These trials showed that it is feasible to develop a high strength character in Indian cotton through appropriate breeding method.

Conclusion

With the development of many objective, quicker and reliable instruments and methods of cotton fibre characterisation, and due to the better understanding of the so-called hidden interactions of the fibre with the spinning processes, and the advanced R&D on yarn engineering conducted in many parts of the world in the recent past, we are sure that the march towards developing 'Universal' predictors for yarn engineering will continue with renewed vigour in this century also, as the value of cotton can only be effectively enhanced by its optimum utilisation in making various textiles.

Co-Writer : Bindu Venugopal,
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Courtesy: Cotton India 2014

PRODUCTION OF MAN-MADE FILAMENT YARN

(In Mn. Kgs.)

Month	Viscose Filament yarn	Polyester Filament yarn	Nylon Filament yarn	Poly propylene Filament yarn	Total
2012-13 (P)					
April	3.45	113.68	2.10	1.97	121.20
May	3.65	113.10	1.95	1.70	120.40
June	3.35	107.25	1.75	1.78	114.13
July	3.65	115.11	1.85	1.36	121.97
August	3.65	120.75	2.00	1.68	128.08
September	3.55	111.64	1.95	1.35	118.49
October	3.65	108.10	1.98	1.28	115.01
November	3.50	98.46	1.75	1.16	104.87
December	3.69	104.76	1.88	1.30	111.63
January	3.70	107.55	2.00	1.26	114.51
February	3.31	95.10	1.85	1.10	101.36
March	3.63	92.30	1.97	1.32	99.22
2013-14 (P)					
April	3.51	103.27	1.59	1.36	109.73
May	3.38	108.65	1.87	0.90	114.80
Jun	3.58	105.95	1.82	0.99	112.34
Jul	3.92	99.07	1.91	1.11	106.01
Aug	3.86	106.47	1.98	1.30	113.61
Sept.	3.72	102.65	1.94	1.03	109.34
Oct.	3.77	97.03	1.90	0.83	103.53
Nov.	3.46	93.13	1.88	1.14	99.61
Dec.	3.75	103.81	2.05	1.16	110.77
Jan.	3.72	103.11	2.37	1.14	110.34
Feb.	3.54	91.57	2.25	1.06	98.42
Mar.	3.78	98.36	2.44	0.89	105.47
2014-15 (P)					
April	3.74	94.92	2.30	1.12	102.08
May	3.72	100.28	2.63	1.00	107.63
June	3.60	102.29	2.14	1.01	109.04
July	3.83	107.71	2.49	1.12	115.15
August	3.85	103.92	2.82	1.06	111.65
September	3.85	86.63	2.79	0.99	94.26

P - Provisional *Source : Office of the Textile Commissioner*

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UPCOUNTRY SPOT RATES

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Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2014-15 Crop DECEMBER 2014					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	15th	16th	17th	18th	19th	20th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	8942 (31800)	8942 (31800)	9055 (32200)	9055 (32200)	9055 (32200)	9055 (32200)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	9083 (32300)	9083 (32300)	9195 (32700)	9195 (32700)	9195 (32700)	9195 (32700)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	7311 (26000)	7367 (26200)	7367 (26200)	7396 (26300)	7424 (26400)	7452 (26500)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	7536 (26800)	7592 (27000)	7705 (27400)	7817 (27800)	7930 (28200)	8014 (28500)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	8717 (31000)	8773 (31200)	8773 (31200)	8773 (31200)	8773 (31200)	8802 (31300)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	8830 (31400)	8830 (31400)	8802 (31300)	8802 (31300)	8830 (31400)	8858 (31500)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	7930 (28200)	7930 (28200)	7930 (28200)	7930 (28200)	7930 (28200)	7986 (28400)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	8155 (29000)	8155 (29000)	8155 (29000)	8155 (29000)	8155 (29000)	8211 (29200)
9	P/H/R	ICS-105	Fine	27mm	3.5.4.9	26	8914 (31700)	8914 (31700)	8886 (31600)	8886 (31600)	8914 (31700)	8942 (31800)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	8070 (28700)	8070 (28700)	8070 (28700)	8070 (28700)	8070 (28700)	8127 (28900)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	8577 (30500)	8577 (30500)	8577 (30500)	8577 (30500)	8577 (30500)	8633 (30700)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	9111 (32400)	9111 (32400)	9083 (32300)	9083 (32300)	9111 (32400)	9139 (32500)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	9195 (32700)	9195 (32700)	9195 (32700)	9195 (32700)	9139 (32500)	9195 (32700)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	9167 (32600)	9167 (32600)	9167 (32600)	9167 (32600)	9111 (32400)	9139 (32500)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	9392 (33400)	9392 (33400)	9392 (33400)	9392 (33400)	9336 (33200)	9392 (33400)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	9336 (33200)	9336 (33200)	9336 (33200)	9336 (33200)	9308 (33100)	9336 (33200)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	9448 (33600)	9448 (33600)	9448 (33600)	9448 (33600)	9448 (33600)	9448 (33600)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	9617 (34200)	9617 (34200)	9617 (34200)	9617 (34200)	9617 (34200)	9617 (34200)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	9870 (35100)	9870 (35100)	9870 (35100)	9870 (35100)	9870 (35100)	9870 (35100)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	12373 (44000)	12373 (44000)	12373 (44000)	12373 (44000)	12373 (44000)	12429 (44200)

(Note: Figures in bracket indicate prices in Rs./Candy)