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# SITRA

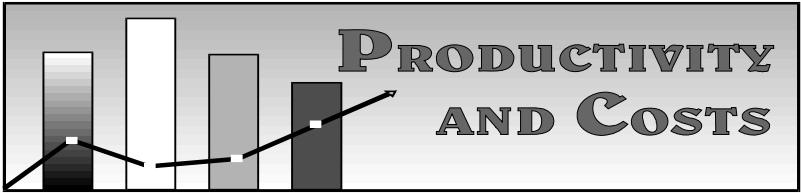
# News



**THE SOUTH INDIA TEXTILE RESEARCH ASSOCIATION  
COIMBATORE - 641 014**

*This issue of SITRA NEWS  
covers the following topics:*

	Page no.
PRODUCTIVITY AND COSTS	
Revised productivity norms - 2010	1
TECHNICAL NOTES	
Water vapour resistance of compact yarn fabrics – some studies	4
MEDICAL TEXTILES - 2	6
CONSULTANCY SERVICES OFFERED BY SITRA DURING MARCH – APRIL 2010	8
STAFF NEWS	9
TRAINING PROGRAMMES	11
ABSTRACT OF A TECHNICAL ARTICLE	12



## **Revised productivity norms - 2010**

The productivity norms are being upgraded from time to time, depending upon the actual increase registered in the industry. The first productivity norm was brought-out in the year 1959 with 88 HOK up to ring frames and 64 g production per spindle shift (both the figures adjusted to 40s count). The number of operatives per 1000 spindles amounted to 7. Since then the norms were revised 10 times. The last revision was done in 2004 with 15 HOK up to ring frames and 105 g production per spindle shift (both the figures adjusted to 40s count). The number of operatives per 1000 spindles is just around 2.

In the last productivity survey in spinning mills (32<sup>nd</sup> survey-2008), one-third of the mills excelled the standard HOK of 15 and about one-fifth of the mills exceeded the standard production rate of 105 g. Hence, the productivity norms have been upgraded. Table 1 shows the revised HOK for standard mill.

As can be seen from Table 1, the revised norm of a total HOK of 12 up to ring frames represents about 25% higher labour productivity when compared to the previous norm of 15 HOK. The revised production rate is about 5% more than the previous norm.

In the case of conventional cone winding, in view of the low cop content (50 g), the revised HOK is 10% more than the previous norm. Due to higher winding-on speed (1400 mpm as against the previous standard speed of 1200 mpm), though the cop content assumed is low at 50 g, the automatic cone winding HOK is 17% lower at 2.0.

Table 1 Revised productivity norms – 2010  
(Standard mill for productivity survey)

40s count

Department/category of operatives	Previous norms (2004)	Revised norms (2010)	Level of modernisation/work assignments for the revised productivity levels
<b>Up to ring frames</b>			
	HOK	HOK	
Mixing attendant	1.2	0.6	9 bales (each 170 kg) per worker per 8 hours.
Blow room tenter		0.2	1 tenter to feed 4000 kg of mixing per 8 hours.
Card tenter	1.4	0.2	Up to 20 chute feed cards subject to a maximum of 4500 kg of sliver production per 8 hours
Draw frame tenter	0.6	0.3	I passage: 4 machines per tenter (450 mpm delivery speed and 2 deliveries per machine) II passage: 6 machines per tenter (single delivery machine with autoleveller and 500 mpm delivery speed)
Fly frame Tenter	1.2	0.4	4 machines (120 spindles each) per tenter (1100 rpm spindle speed) 1200 spindle doffs per doffer per 8 hours
Doffer		0.5	
Ring frame Tenter	6.4	3.1	2520 spindles per tenter; 15% relievers 6000 spindle doffs per doffer per 8 hours
Doffer		2.7	
Ancillary operatives (blow room to ring frames)	4.2	4.0	50 operatives per day for a 30000 spindle mill which include maintenance operatives, bobbin carriers, etc.
<b>Total</b>	<b>15.0</b>	<b>12.0</b>	
Production per spindle per 8 hours (g)	105	110	18000 rpm spindle speed, 27.51 tpi and 93.5% machine efficiency
<b>Post spinning</b>			
<u>Conventional cone winding</u>			
Tenter HOK	8.2	9.0	550 mpm winding-on speed, 30 drums per tenter and 76% machine efficiency (mechanical yarn clearers)
Prodn./tenter/8 hours (kg)	97	89*	
<u>Automatic cone winding</u>			
Tenter HOK	2.4	2.0	1400 mpm winding-on speed, 50 drums per tenter and 80% machine efficiency
Prodn./tenter/8 hours (kg)	332	397*	

\* Cop content: 50 g; previous norm: 60 g cop content

## Norms for very hi-tech mills

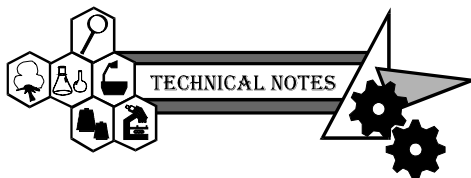
For very hi-tech mills having bale pluckers, chute feed blow room line, high speed draw frames and fly frames, and ring frames with autodofer, the standard HOK is fixed at 9 in 40s count (Table 2).

Table 2 HOK for different categories of operatives of a very hi-tech mill – up to ring frames  
(for a 30000 spindle mill manufacturing 40s count)

Department/category of operatives	HOK	Level of modernisation/work assignment
Bale handler	0.3	3 operatives per day
Blow room tenter	0.3	1 bale plucker per tenter
Card tenter	0.2	Up to 20 chute feed cards subject to a maximum of 4500 kg of sliver production per 8 hours
Draw frame tenter	0.3	I passage 4 machines per tenter (2 delivery machine up to 450 mpm delivery speed) II passage 6 machines per tenter (Single delivery machine fitted with autoleveller and up to 500 mpm delivery speed)
Fly frame Tenter	0.4	4 machines of 120 spindles each per tenter (1200 rpm spindle speed)
Doffer	0.5	1200 spindle doffs per doffer per 8 hours
Ring frame Tenter	2.5	3024 spindles per tenter - 15% relievers - Production per spindle per 8 hours: 115 g
Doffer	0.5	Built-in auto doffer: 2 operatives per 8 hours for arranging cops and gaiting
Ancillary operatives*	4.0	52 operatives per day
Total	9.0	

\* Blow room to ring frames, including maintenance operatives, materials handlers, roller coverers, bobbin carriers, etc.

**D. Shanmuganandam**  
-Liaison & Consultation Division



## WATER VAPOUR RESISTANCE OF COMPACT YARN FABRICS – SOME STUDIES

The yarn structure formed by the compact spinning method is different from that spun in conventional ring spinning.

The Elitwist compact spinning process, for the production of doubled yarn directly in ring spinning, is an enhancement of the flexibility of compact spinning process.

Doubled yarn gassing is an established route for producing value added products meant for specific end uses. This gassing process burns out the protruding hairs from the yarn body and hence improves the final doubled yarn quality in terms of hairiness.

Fabric manufacturers produce fabrics from these two types of yarns (CDG and CEC). Earlier SITRA has conducted some investigations on the fabric properties made out of these two yarns<sup>1</sup>. In the present study, the water vapour resistance of the fabrics made out of these two yarns was evaluated using Sweating Guarded Hot Plate Method (SGHM).

The details of fabrics used in the study are given in Table 1.

**Table 1** Construction particulars of fabrics used

S.No.	Yarn type	Count	Fabric construction (ends / inch x picks / inch)	No. of fabrics produced
1	Combed Doubled Gassed yarn (CDG)	2/40s	44 x 40	6
		2/60s	56 x 52	
2	Combed Elitwist Compact yarn (CEC)	2/80s	76 x 72	

## Test Method

The Sweating Guarded Hot Plate (often referred to as the skin modal) described in ASTM F1868 is intended to stimulate the heat and water vapour transfer processes that occur next to human skin.

The specimen to be tested is placed on an electronically heated porous plate with conditioned air ducted to flow across and parallel to its upper surface.

The heated porous plate is covered by a water vapour permeable but liquid water impermeable membrane. Water fed to the heated porous plate evaporates and passes through the membrane as vapour. The water vapour resistance of the test specimen is determined by subtracting the  $R_{et}^*$  of the boundary air layer above the surface of the membrane from that of the test specimen plus the boundary air layer. (The heat flux required to maintain a constant temperature of the porous plate is a measure of the rate of water evaporation from which water vapour resistance can be determined).

\* Water vapour permeability is tested by measuring the resistance to water vapour, expressed as a  $R_{et}$  value. Lower the  $R_{et}$ , higher the water vapour permeability (breathability) of the material and thus its physiological characteristics.

The Sweating Guarded Hot Plate is available at SITRA and cloth samples up to 70mm thickness can be tested in this instrument for water vapour resistance.

The  $R_{et}$  value of the six fabric samples under consideration are given in Table 2.

**Table 2** Ret values of the fabric samples

Count	Fabric construction (ends/inch x picks/inch)	Water vapour resistance ( $R_{et}$ value)	
		CDG yarn fabrics	CEC yarn fabrics
2/40s	44 x 40	2.00	2.60
2/60s	56 x 52	1.75	2.50
2/80s	76 x 72	2.10	2.50

Ret Values are higher for Elitwist compact yarn fabrics by 20% to 40% as compared to equivalent doubled gassed yarn fabrics.

This is accounted for by

1. Lower hairiness of CDG yarns  
And
2. Lower packing density of CDG yarns.

## REFERENCE

1. K.P.Chellamani, G.Nagarajan and M.K.Vittopa, “ **Studies on Gassing and Mercerising of Combed Cotton Yarns**, SITRA Research report, Vol 54, April 2009 No.2.

**K.P. Chellamani and M.K. Vittopa**  
-Spinning Division.

## MEDICAL TEXTILES - 2

Textile materials and products designed for use in healthcare, also known as medical textiles, can be divided into the following categories according to their applications :

- Non-implantable materials such as wound dressings, bandages, plasters and absorbent pads;
- Implantable products, which include sutures, vascular grafts, artificial ligaments, artificial tendons, artificial skin and scaffolds;
- Extracorporeal devices, including artificial kidneys and artificial livers; and
- Healthcare and hygiene materials, such as gowns, caps, masks, drapes, uniforms and other operating room garments, hospital bedding and clothing, babies' diapers, incontinence products and feminine hygiene products.

Textiles for healthcare applications are made chiefly from:

- Fibres obtained either from natural resources or produced artificially.
- Yarns including staple fibre yarns, filament yarns, twisted yarns and braided yarns.
- Fabric structures including woven, non woven, knitted, crochet and embroidered and numerous types of composite materials.

## **FIBRES**

### **DEGRADABLE, NON-DEGRADABLE AND RESORBABLE FIBRES**

Fibres may be degradable, non-degradable or resorbable.

**Degradable fibres** are those which can be absorbed by the body within two or three months, and include:

- Natural fibres such as alginate, chitin, chitosan, cotton and viscose; and
- Other protein fibres.

**Non-degradable fibres** are those which take more than six months to degrade and be absorbed by the body. They include synthetic fibres such as:

- Polyamide
- Polyester
- Polypropylene and
- Polytetrafluoroethylene (PTFE).

**Resorbable fibres** are those which are fully biodegradable, produce no harmful degradation products and are completely absorbed in the body. Resorbable fibres include materials obtained from the following polymers:

- Polydioxanone (PDS)
- Polyglycolic acid (PGA) AND
- Polylactic acid (PLA).

PGA products are absorbed faster into the body than those made using PLA and PDS. In fact it can take only a few weeks for implants made from 100% PGA to be absorbed.

### **SPECIALITY MEDICAL FIBRES**

Speciality medical fibres include those made from the following:

- Alginates
- Chitin and chitosan
- Collagen
- Catgut
- Branched ferulate
- Superabsorbent materials
- Carbon and
- Resorbable materials

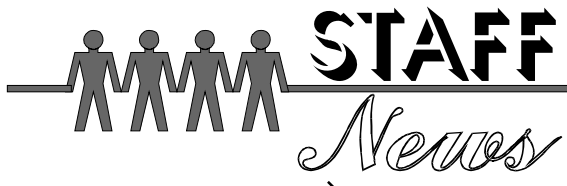
To be continued ...

**K.P. Chellamani and M.K. Vittopa**  
-Spinning Division.

## **Consultancy services offered by SITRA during March - April 2010**

S.no.	Type of study	No. of mills
1.	Techno-economic viability study	2
2.	Work study in conventional cone winding	1
3.	Productivity and waste management in jute mills	2
4.	Machinery valuation	1
5.	Reducing invisible loss and optimisation of yarn recovery	1

Besides the above major consultancy studies, SITRA also offered solutions to as many as 8 adhoc problems in the areas of spinning process, quality, energy etc. Fifty six instruments were calibrated, five instruments were certified and 150 accessory samples were tested.



## **Conference / Seminar / Meetings attended**

### **Meetings attended**

#### **Dr.Arindam Basu, Director attended the following meetings:**

Meeting to discuss review the Centre of Excellence including their progress, setting up, revenue, training, R&D etc., and Annual plan 2010-11 for Technical Textiles at Ministry of Textiles, Government of India, New Delhi.

Meeting with the Ministry of Trade and Industry, Addis Ababa, Ethiopia regarding Twinning Partnership with Textile and Apparel Industry Institute.

### **Papers presented**

Dr.K.P.Chellamani and S.Kadirvel presented papers on 'Studies at SITRA in the area of meditech' and 'Testing methods for medical textile products' at two day workshop on medical textiles jointly organised by Office of the Textile Commissioner, Ministry of Textiles, Government of India, Mumbai and SITRA held at Rajapalayam in March 2010.

Dr.K.P.Chellamani presented a paper on "Manufacture of different jute and jute blended yarns / fabrics for home textiles and other jute diversified products" at the Jute seminar on "Midterm Assessment of JTM R & D projects of IJT & SITRA organised by IJT, Kolkata in March 2010.

Dr.K.P.Chellamani, S.Thiruppathi and D.Veerabramanian presented a paper on "Design and fabrication of a bacterial filtration efficiency tester" at 51st Joint Technological Conference held at NITRA in April 2010.

A.Sivaramakrishnan, G.Ilango and H.Balasubramanian presented a paper on "Design and development of a micro controller based energy saving and information system for air compressors used in textile mills" at 51st Joint Technological Conference held at NITRA in April 2010.

### **Papers published**

Indra Doraiswamy and K.P.Chellamani "Textile Research in the World - A Bird's Eyeview" , Textile Review, Vol.5 No.3, March 2010, p27-33.

D.Shanmuganandam, Cone winding : Optimisation of labour and machine productivity, The Indian Textile Journal Vol.120 No.6, March 2010, p16-20.

### **Recognition**

A.Sivaramakrishnan, Research Associate, Incharge of Textile Engineering & Instrumentation Division, is now a qualified "Energy Auditor", certified by Bureau of Energy Efficiency (Government of India, Ministry of Power), New Delhi.

#### **LICENCES GIVEN**

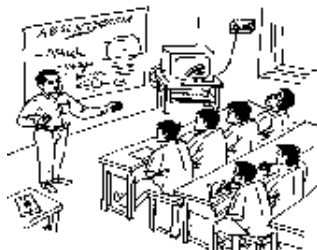
*High Performance Jute Flyer Spinning Frame - **SITRA Jute FlySpin***  
&

*Micro controller based energy saving and information system for air compressors used in Textile Mills - **SITRA PCRA ENERCOMP***

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# TRAINING



## **Pre-employment training and retraining programmes for textile workers**

Two mills in Tamil Nadu, one mill in Karnataka and one mill in Kerala availed SITRA's services for training their workers. In all, 107 operatives were trained in 5 batches for tenting jobs in ring spinning and cone winding.

## **Orientation Training programme**

Three day programme was conducted for textile students in the following topics to enhance their technical skills. Twenty persons attended the programme.

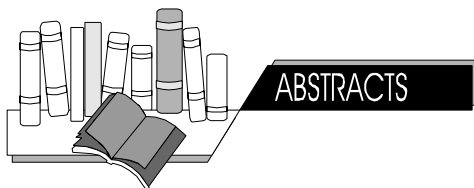
- Norms, Fibre yarn relationships, compact spinning, Modern testing instruments, statistical techniques, interpretation of test data, Nano and plasma technology, technical and medical textiles.

## **Supervisory Development Programme**

A two day Supervisory Development Programme was conducted for twelve supervisors of a textile mill in Tamilnadu at the mill premises.

### **Visitor**

*Mr.V.Chandrasekaran, I.A.S., Director of Handlooms and Textiles, Department of Handlooms and Textiles, Government of Tamil Nadu.*



**EFFECT OF CLOTHING THERMAL PROPERTIES ON THE THERMAL COMFORT SENSATION DURING ACTIVE SPORTS**  
Fan J and Tsang H W K, *Textile Research Journal*, 2008, 78/2, p. 111 - 118

This paper reports an experimental investigation on the effect of clothing thermal properties on the comfort sensations of wearers during sport activities. A sweating manikin “Walter” was used to measure the clothing thermal properties (namely, thermal insulation, moisture vapor resistance and moisture accumulation within clothing) of five tracksuits. The average comfort sensations of five men wearing each of the five tracksuits were correlated with the thermal properties of the tracksuits measured from the sweating manikin – “Walter”. It was found that the thermal comfort sensations during active sports were strongly related to the moisture vapor resistance and moisture accumulation within clothing. The overall comfort of sportswear during sports activities was very much related to the moisture related comfort sensations and clothing properties.

**M.K. Vittopa**