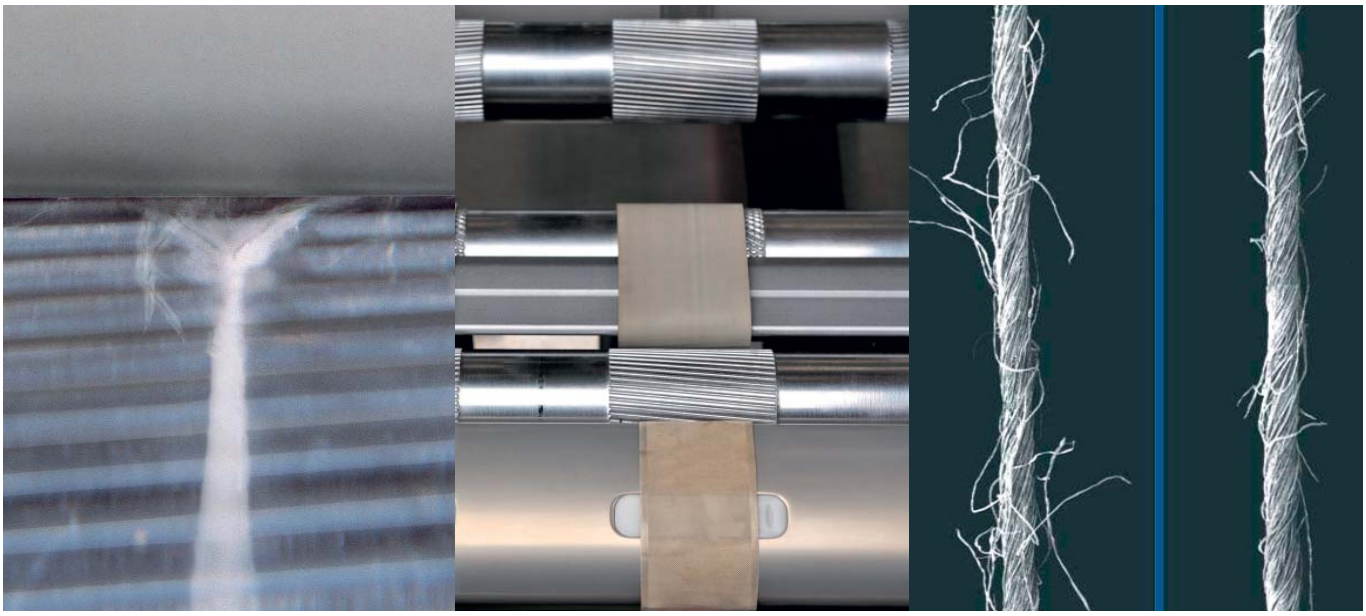
Suessen

EliTe®CompactSet V5
EliTwist®CompactSet V5

The EliTe®Spinning Principle



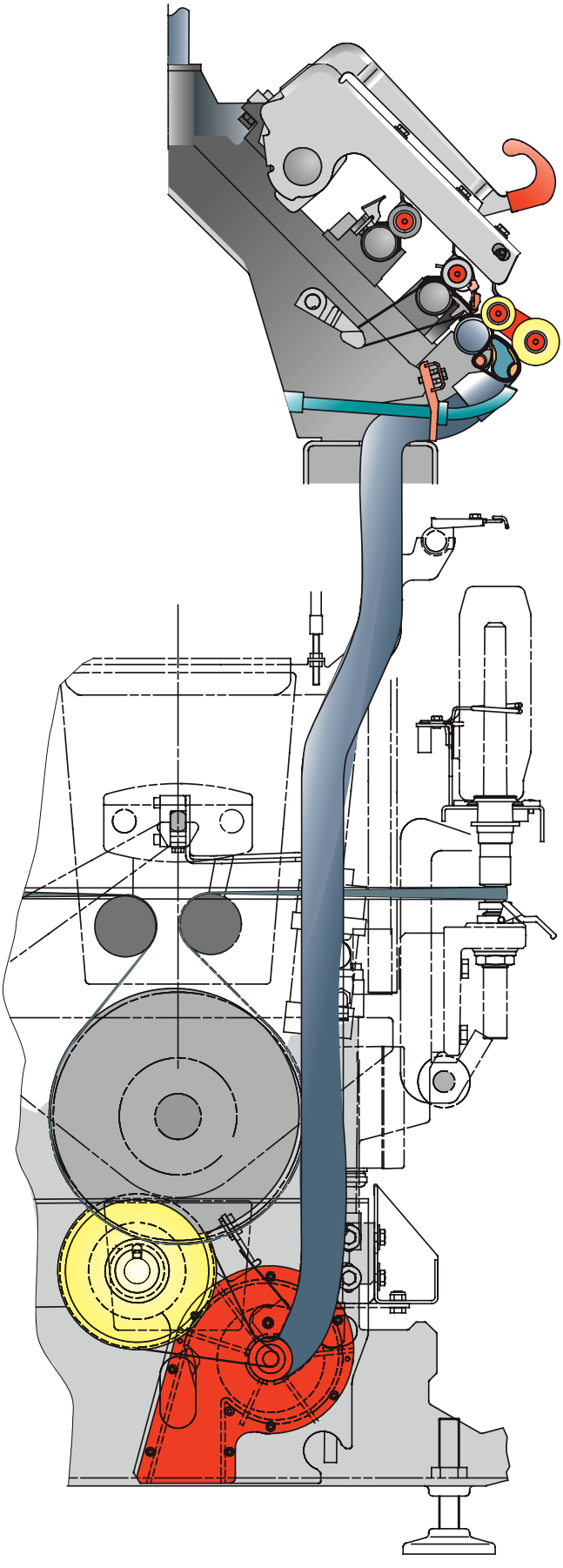
The purpose of a genuine compact spinning process is to arrange the fibres in a completely parallel andclose position before twist is imparted.

This is the most important criterion for perfect compact yarn. The eliminated spinning triangle is a by-product of this concept. This close and parallel arrangement of fibres immediately before twist is imparted is responsible for the characteristic advantages of compact yarn:

- Substantial reduction in hairiness
- Improved tenacity, as all fibres are twisted together with the same tension. (If there is a spinning triangle, the outer fibres are highly tensioned, while the ones in the core are not)
- Improved elongation
- More uniform helical structure. (In combination with the reduced hairiness, this leads to a very brilliant, lustrous appearance of the fabric)
- Reduced IPI values
- Improved evenness
- Reduced ends-down rate

All successful compact systems including EliTe® use *suction* and an *inclined suction slot* to compact the yarn.

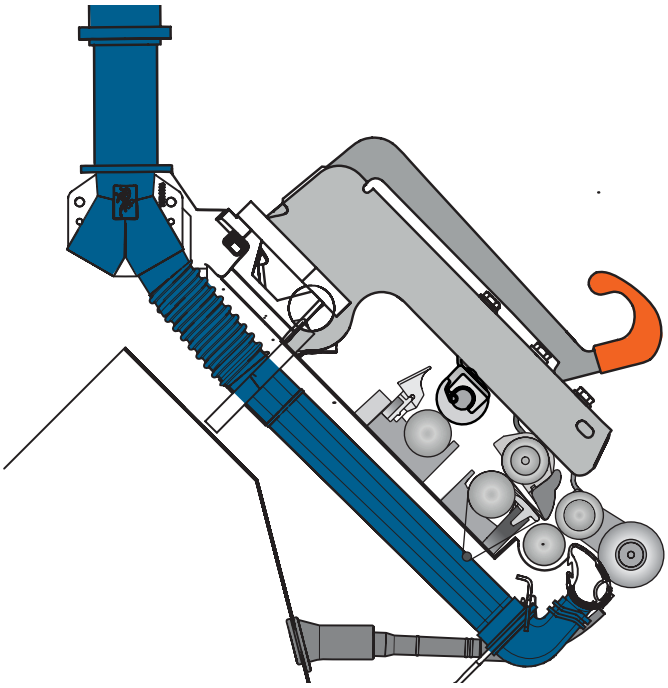
The EliTe®System is practically *independent of the basic ring spinning machine*, and can be fitted on many different models. SUESSEN supplies everything, which is needed to upgrade a conventional ring spinning frame, but also not more than is needed.

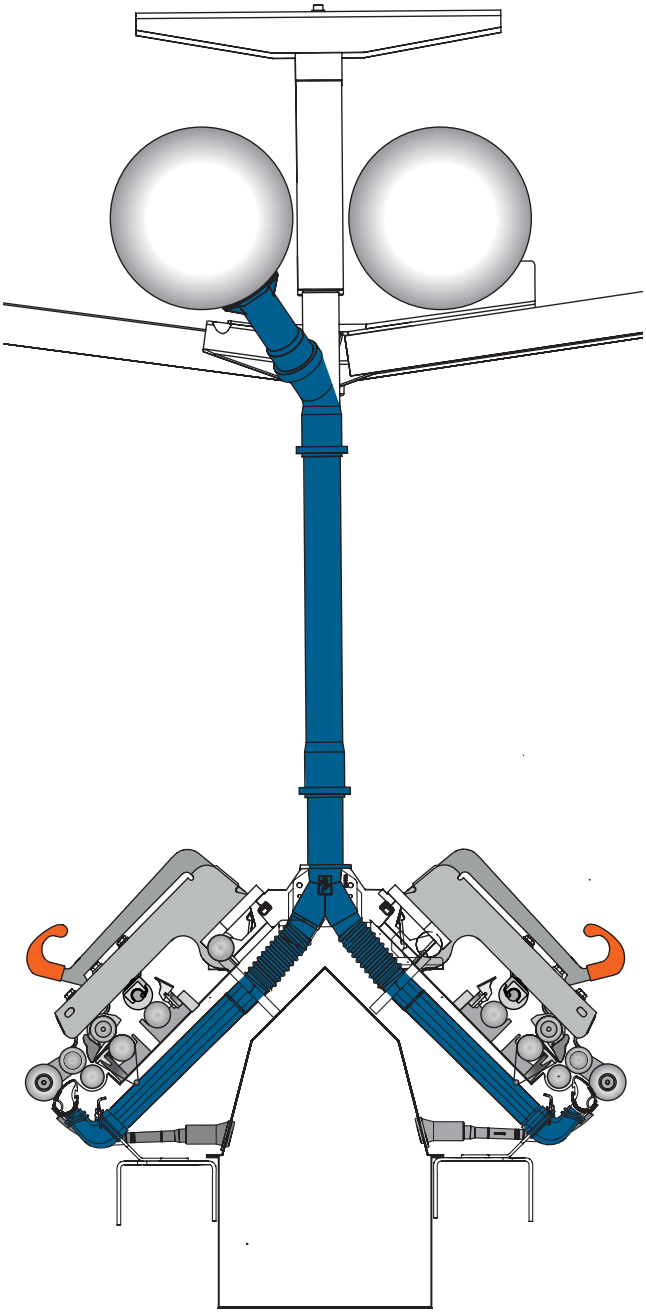


Brief description of the EliTe®System

The EliTube is attached at the exit ofthe conventional drafting system. It has one inclined slot for every spinning position, which is covered by a lattice apron. This lattice apron is driven by the EliTop. The EliTube is attached to the vacuum source, which is fitted under the machine. Each suction pump supplies 24 spinning positions (48 positions in case of RL system); hence the vacuum is completely uniform along the machine, and independent of the length of the machine. All vacuum pumps are driven by a central shaft,which in turn is driven by one or two electrical motors. The amount of vacuum can be adjusted.

General Requirements on a Good Compacting System



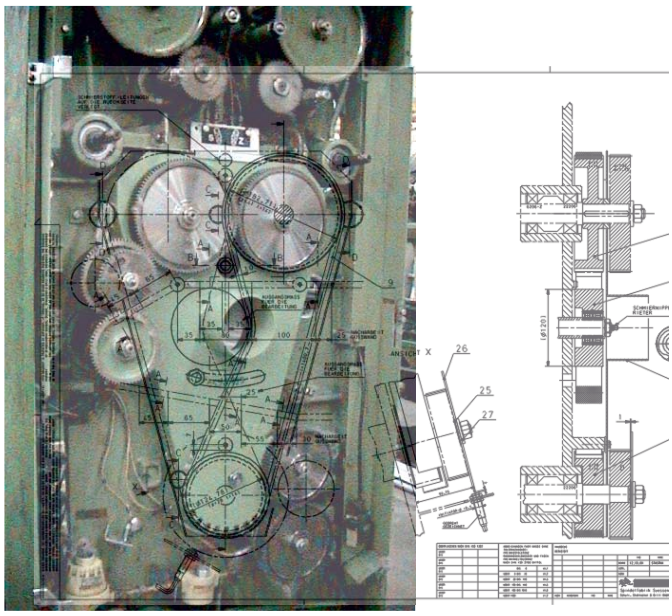


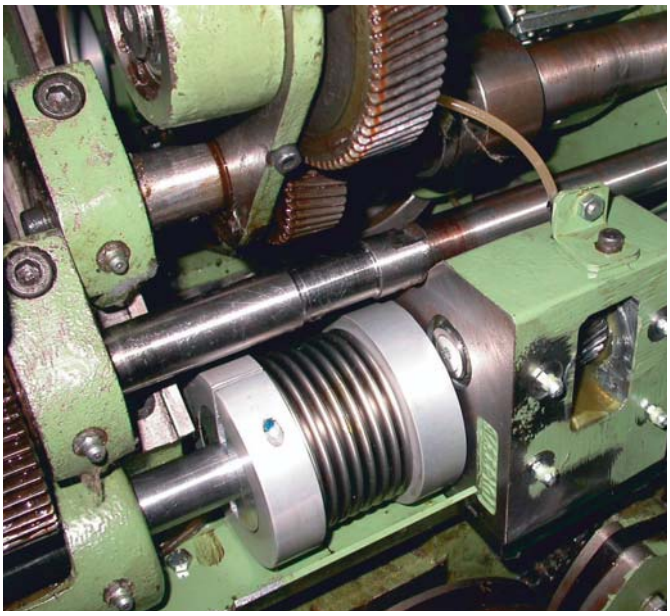
With the newly developed **Central Duct System** (CDS), the vacuum is produced by means of one or two central ducts. These ducts are usually fitted in the area of the creel. One EliTube on the left and on the right of the machine respectively are connected to the ducts with flexible hoses, tubes and a distributor.

The ducts are connected to a central filter box. The uniform vacuum at all spinning positions is realized with various orifices. The speed of the fan and the resulting vacuum can be adjusted by a frequency inverter. Reduced maintenance and energy consumption, as well as faster erection create a cost-saving effect.

Experience and theoretical considerations lead to the following requirements on any good compacting system:

- *Slot should be inclined.*
- *Slot should reach as closely as possible to the nipping point of the delivery roller:* It is clear that as soon as the fibres leave the grip of the slot, their natural tendency is to spread out again, reducing the effect of compacting.
- *Uniform suction along the length of the machine:* As the effect of compacting obviously depends on the suction, only uniform suction guarantees uniformly compacted yarn.
- *Tension draft must be adjustable:* Experience shows that it is important for maximum flexibility that the tension draft be adjustable.
- *Small perforations (holes) in the transporting means:* Needless to say that the smaller the openings, the better the effect of the collecting edge (downstream edge of the suction slot) is transmitted to the fibres.
- *Cleanliness of the compacting zone:* With any compacting system it is of the utmost importance to keep the compacting area clean. Fluff and fly are harmful to good yarn results.





Therefore:

- The compacting zone must be designed in such a way that it is easy to clean.
- It must be easily detectable, whether the compacting zone needs cleaning.
- It must be designed in such a way that there are as few elements as possible collecting fluff and fly.
- *Modular Design - Technology Components Easily Exchangeable:* Compact Spinning is a relatively new technology; hence rapid progress is to be expected. The design of the compact system must allow the customer to participate in this progress; otherwise he has outdated machines very quickly.
- *Secure Drive of the Perforated Means:* It is obvious that this drive must be uniform; otherwise defects will occur in the yarn.

It is clear that only SUESSEN EliTe® meets all these requirements in an ideal manner.

Two different „Scopes of Supply“ possible

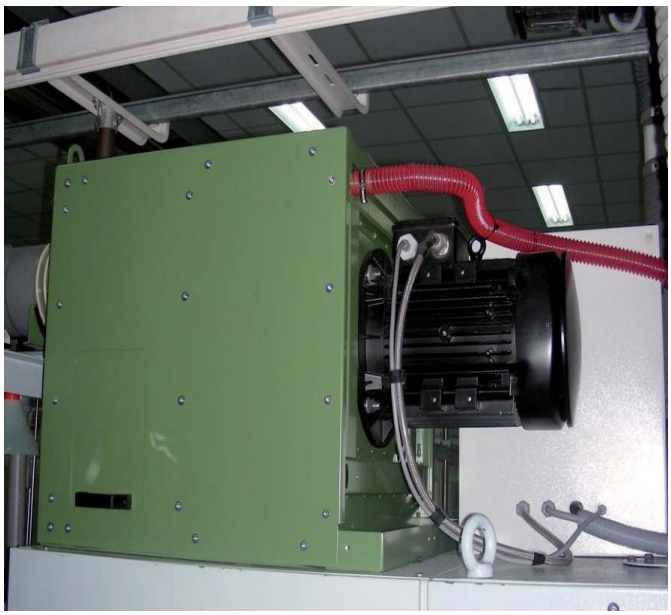
A) EliTe® CDS (Central Duct System)

B) „Reduced“ version RL (for LMW machines without doffer only)

With version “A” from Germany there are no additional parts the customer must procure from other sources. The complete scope consists of the following:

In the Drafting

- 5star®Tube with 5star®Q lattice aprons and tensioning bar
- EliTop complete with cots
- Pneumafil suction tube
- ACP Quality Package
- Optional: front bottom roller
- Optional: HP-GX 3010 Top Weighting Arm



In the Gear End

- Reinforcement of the gear end

Vacuum system

- EliVAC Central Duct System (CDS), including central filter box and ducts, frequency inverter, all hoses, brackets, manifolds, etc.

(Note: the creel modification necessary for EliTwist® should be procured locally).

With „Reduced“ version RL there are some alterations in the scope of supply that do reduce the cost, *but do not in any way influence the performance and quality of the compacting system*.

The high-precision technical and technological parts come from SUESSEN Germany, whereas more general parts as metall sheetings, screws, shafts, motor stand, brackets etc. are made in India by reputable suppliers and purchased through our representative VTS Venus Textile Systems - Cbe.

No matter what version is chosen, the EliTe®System is fitted on the ring spinning machine by experienced SUESSEN technicians.

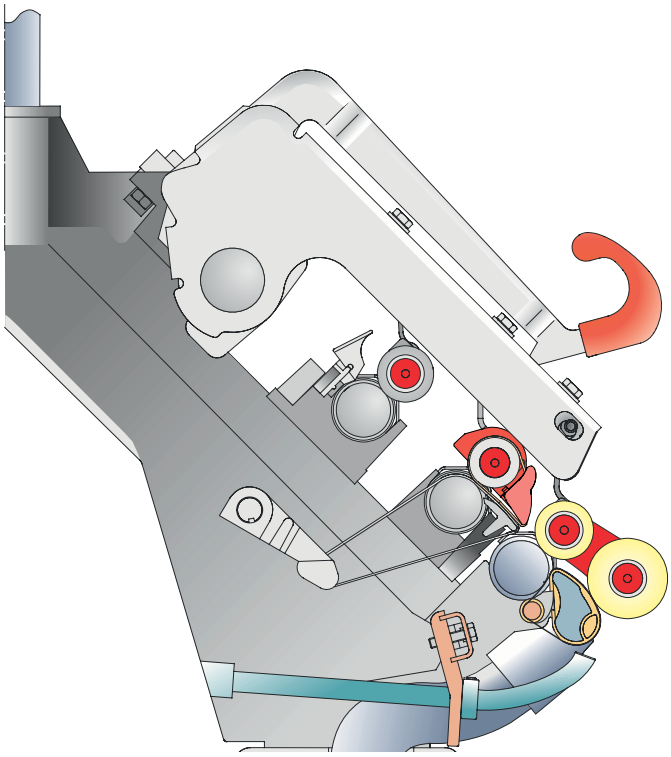
Basic technical data

- Exhaust approximately
  1.0 litres/spindle/sec (EliTe®)
  1.5 litres/spindle/sec (EliTwist®)
- Dynamic pressure at the exit of the filter box: 0.5 - 2.0 mbar
- Additional power consumption about 6 W/spindle
- Dispatch weight “CDS” without top weighting arms and front bottom roller:

  LMW machines: about 1.6 kg/spindle
  KTTM machines: about 1.8 kg/spindle

  0.75 kg/spindle for „RL“
- 9 x 1008 spindles for EliTe® RL in one 20‘ container
- 3 x 1200 spindles for EliTe® “CDS” in one 40’ container

EliTe®Compact Spinning



SUESSEN introduced EliTe®Compact Spinning at the ITMA ‘99 in Paris. Over the past several years, EliTe® has been accepted well by our customers, and today it is the undisputed market leader in compact spinning with over 5,500,000 spindles sold worldwide (as of January 2012).

Advantages of the EliTe®Compact Spinning System over competitive designs

a) SUESSEN does not sell the basic ring spinning frame together with the EliTe®Compact System, but only sells the technology components. Thus SUESSEN leaves the choice of the basic machine onto which the EliTe®Compact System is to be fitted up to the customer. A multitude of different machines may be upgraded with SUESSEN EliTe®CompactSet V5.

b) Compacting takes place in the compacting zone, where the fibres are transported by a perforated transporting means across an inclined slot under suction.While this principle is applied by various competitors, SUESSEN’s EliTe®Compact System exhibits various advantages:

- SUESSEN’s transporting means is an endless lattice apron. This allows for very small perforations, hence very uniform distribution of the vacuum, which cannot be achieved with large holes. Also, different lattice aprons for different applications can easily be fitted.
- The inclined slot reaches very closely to the front nipping pair. This is a prerequisite for uniform compacting of all different fibres, and this can only be achieved with the unique SUESSEN drive of the lattice apron via the EliTop
- As the lattice apron is driven by a rubber cot, which has a large coefficient of friction with the lattice apron, the driving of the lattice apron is very uniform, compared to some drive systems, which use steel rolls to drive it (the coefficient of friction between steel and the nylon of the lattice apron is very low!).
- The compacting forces are induced by aerodynamics. This means, the forces are applied gently to all fibres along their full length.

c) The fitting of the EliTe®Technology Components onto the machines of the customers is done by experienced SUESSEN technicians.

SUESSEN also has experienced technologists on staff, who visit the customers regularly and upon demand to help with problems.

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Advantages of EliTe®Compact Yarns

1. EliTe®Yarn

- Drastically increased yarn strength – up to 10 to 20% higher
- Drastically reduced hairiness - up to 30% lower (Uster H), up to 85% lower (Zweigle S3)
- Much improved elongation – up to 15% higher (Cotton), up to 20% higher (Wool)
- Much higher work capacity – up to 50% higher
- Often to better yarn evenness – CV% up to 5% better
- Lower IPI values – up to 35% less

2. Process Advantages

Ring Spinning

- Better spinning stability
- Less ends-down by 30 to 60%
- Less twist – up to 10% less for same yarn strength, thus higher production

Winding

- Higher winding speeds are possible

Twisting

- Single EliTe®Yarn instead of classic two ply yarn

Weaving preparation

- Less fly generation and less ends-down on warping machines, thus higher warping efficiency
- Less sizing – 30 to 50% less.

Weaving

- Higher efficiency on the looms - 40% less warp end-breaks, 30% less weft end-breaks
- Higher production – 10 to 15% higher
  Example in Air-Jet weaving Ne 30, 500–600 m/min weft insertion speed with conventional ring yarn, 700–800 m/min with EliTe®Yarn
- Less pollution on the looms
- Less singeing
- 5% less dye absorption

Knitting

- Higher production on the knitting machines
- Less pollution of the frames, thus less cleaning and less stops
- Reduced waxing
- Single thread construction instead of double thread construction
- Less spirality of knitted product, due to very low T.M. possible.
- Much improved dimensional stability
- 5% less dye absorption

3. Raw Material Savings

- Cheaper raw material can be used
- Carded EliTe®Yarn instead of conventional combed yarn
- Coarser wool
- Normal PES instead of non-pilling fibres
- Less comber noil extraction – up to 6% lower
- Singeing reduced or eliminated:
  considerable savings, as singeing means burning away finished yarn

4. Final Products

- Higher strength of the fabric
- Less pilling
- Better lustre
- Clearer print
- Much clearer loop structure
- Clearer weaving structure with well-defined contours
- Better hand
- Development of totally new products possible

Payback Strategies for EliTe®Compact Yarns

Production achieved by South Indian Spinning Mills using EliTe®Compact Spinning System		
Count (Ne)		GPSS - grams per spindle per shift of 8 hours
A. EliTe®Compact Hosiery Counts:		
1	Mill A - 20s CH	450
2	Mill A - 24s CH	335
3	Mill A – 30s CH	265
4	Mill B - 30s RL	240
5	Mill A – 40s CH	185
6	Mill B - 40s VL	168
7	Mill A – 60s CH	80
8	Mill B – 60s CH	82
9	Mill A - 70s CH	66
10	Mill A - 80s CH	54
B. EliTe®Compact Weaving Counts:		
1	Mill A - 8s CW	700
2	Mill A - 12s CW	620
3	Mill A – 40s CW (local)	149
4	Mill A – 40s CW (Export)	140
5	Mill A - 60s CW	72
6	Mill B - 80s CW	48
7	Mill A - 100s CW	33
8	Mill B - 100s CW	35
9	Mill A - 120s CW	24
10	Mill B - 120s CW	27
11	Mill A - 140s CW	16
12	Mill A - 170s CW	11
13	Mill A - 200s CW	6
14	Mill A - 220s CW	4
15	Mill A - 280s CW	2

Mills are taking EliTe®Compact Spinning System as a tool and are adopting different strategies like:

1. Marketing very high quality premium yarn say Ne 50 combed warp yarn with 26 RKM and 30 IPI
2. Saving in mixing and TPI say 60's from S4 mixing to replace MCU5 (selecting a mixing as per the customer requirement)
3. Saving in comber noil and TPI for local market say 2% saving in comber noil and employing 3TM for local hosiery instead of 3.7TM.
4. Marketing compact yarn for product development - Identify customer application and produce compact yarn to suit the purpose results in saving for both.
5. Replacing double yarn with single compact yarn.
6. Composite units – higher weaving efficiency contributes to saving.
7. New T-shirts from compact yarn introduced by major brands.
8. High quality woven shirts from compact yarn are marketed by major brands in India and elsewhere (Colour Plus, Park Avenue, e.tech fabric, ESPRIT, Camel,Wills, Allen Solly, Levi's etc.– see product pictures pages 11 and 12)

Additional cost for producing EliTe®Yarn is approx. INR 3/kg (USD 0.07) for 30s count including power and cost of consumables, for 80s count it is around INR 8/kg (USD 0.18).

In EliTwist® the saving in processing costs for 2/80s is around INR 75/kg (USD 1.75).

The payback in EliTe®CompactSet is often 16-18 months and in EliTwist® may be as low as 6 months (see also page 10 for further information).

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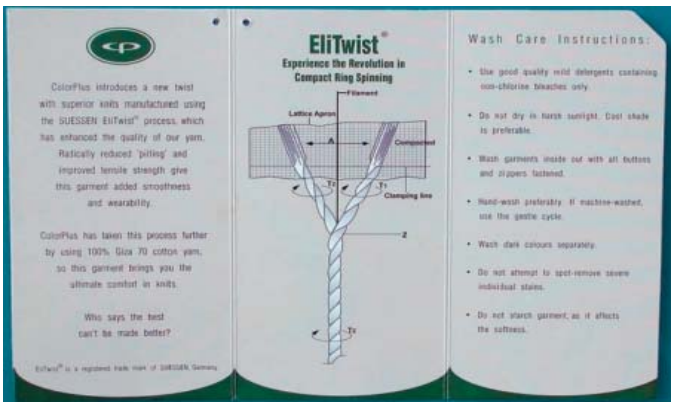
EliTe®CompactSet Pay-Back Calculation from an Indian Customer

Yarn Count (Ne)x	30s CH	30s CH	30s CH	40s CH	40s CH	40s CH	60s CW	60s CW	80s CW	100s CW	100s CW
A. Advantages of EliTe®Compact Spinning											
Higher productivity by	10%	10%	15%	10%	10%	15%	10%	10%	10%	10%	10%
Extra premium in Rs.	nil	7	nil	nil	7	nil	10	15	20	25	35
Reduction in pneumafil waste by	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%	0,70%
Improved raw material realization by	2%	nil	1%	2%	nil	1%	2%	nil	2%	2%	nil
B. Savings/machine/year in EliTe®											
Additional profit/machine/year in Rs. due to higher production	218.937	218.937	328.406	230.235	153.490	361.095	142.340	142.340	87.604	65.160	65.160
Net savings/machine/year in Rs. due to higher production thereby reduction in manufacturing cost (Rs)	781.920	781.920	1.173.966	638.872	638.872	1.002.812	521.540	521.540	420.499	416.300	416.300
Additional profit/machine/year in Rs. due to premium	0	1.710.450	0	0	1.170.708	0	781.920	1.172.880	955.680	905.000	1.267.000
Net saving/machine/year in Rs. due to reduction in pneumafil waste	61.641	73.631	64.378	49.261	57.558	51.766	50.318	50.318	39.096	34.209	34.209
Net saving/machine/year in Rs. due to improved raw material realization (approx.)	1.099.575	0	586.440	752.598	0	395.847	430.056	0	262.812	217.200	0
Total benefits/machine/year in Rs.	**2.162.073**	**2.784.938**	**2.153.190**	**1.670.966**	**2.020.628**	**1.811.520**	**1.926.174**	**1.887.078**	**1.765.691**	**1.637.869**	**1.782.669**
C. Maintenance cost:											
Maintenance cost/spindle/year in Rs. due to consumables	90	90	90	90	90	90	80	80	80	80	80
Power cost/spindle/year in Rs.	191	191	191	191	191	191	191	191	191	191	191
Tot. maintenance cost/machine/year in Rs.	283.248	283.248	283.248	283.248	283.248	283.248	273.168	273.168	273.168	273.168	273.168
Cost/kg in Rs.	1,15	1,15	1,10	1,70	1,70	1,60	3,47	3,47	5,70	5,90	5,90
D. Net savings due to EliTe®Compact Spinning machine/year (B.-C.) in Rs.	**1.878.825**	**2.501.690**	**1.869.942**	**1.387.718**	**1.737.380**	**1.528.272**	**1.653.006**	**1.613.910**	**1.492.523**	**1.364.701**	**1.509.501**
*** increased market share *** significant reduction in hairiness *** premium price for yarn with less hairiness *** *** cotton cost reduction *** new product developments *** branding of yarns ***											

Brands using
EliTe®Compact System



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Brands using
EliTe®Compact System

As the Market Leader, SUESSEN is at the Forefront of Technology

SUESSEN's market share of compact spinning spindles in India, the most demanding market in the world, exceeds 70%. To date, the EliTe®Compact Spinning System has benefitted over 3,500,000 compact ring spindles to the Indian market (as of January 2012).

Most of our valuable orders are repeat orders, showing that our customers are happy with the SUESSEN EliTe®Compact Spinning System.

SUESSEN is offering EliTe®CompactSet for many makes and models, included of course the ring spinning machines made by LMW and KTTM, Zinser (all models), G 32, Chinese machines, Toyota Japan machines. The list of available models is expanded on a continuing basis.

Mills have the option of buying

- The full EliTe®CompactSet V5 including complete HP-GX 3010 Top Weighting Arm with ACP Quality Package and front bottom roller
- Alternatively SUESSEN can supply EliTe®CompactSet suitable for LMW/ Texparts/ SKF India top weighting arms, also with ACP Quality Package.

SUESSEN is a company specializing in spinning technology – open-end rotor spinning, ring spinning and air-jet spinning.

With EliTwist® our customers produce two-ply yarns directly on their ring spinning machine with compact spinning technology, setting new quality standards in the field of compact spinning. This technology was well received in India with presently over 400,000 EliTwist®Spindles installed.

The yarn results are much superior to double yarn and our customers are getting 2.5 times production in ring frame apart from avoiding of doubling, TFO and double production in winding.

With commercial applications ranging from Ne 6/1 to Ne 300/1, in all kinds of fibres, the SUESSEN EliTe®Compact Spinning System is the most versatile compacting system available.

SUESSEN has continuously developed and upgraded the system and components over the years, which resulted in very significant reduction in cost of maintenance.

The power consumption is less with EliTe® compared to competitive systems, and the maintenance cost is also less, as customers with experience on various systems invariably confirm.

The quality with SUESSEN EliTe®Yarn is generally superior to competing systems, not only in the compact yarn but even more in the finished final textile product.

The modular design of the SUESSEN EliTe®Compact Spinning System allows our customers to easily follow any technological improvements, a most important feature for any new technology.

SUESSEN EliTe®Original Spare Parts

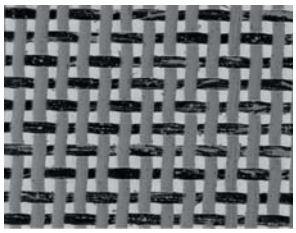


Fig. 1 Competitive Lattice Apron

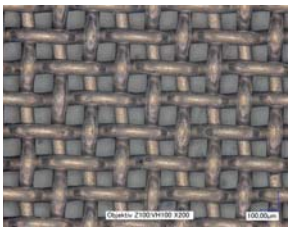


Fig. 2 Original SUESSEN Lattice Apron

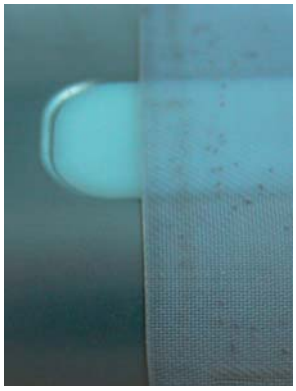
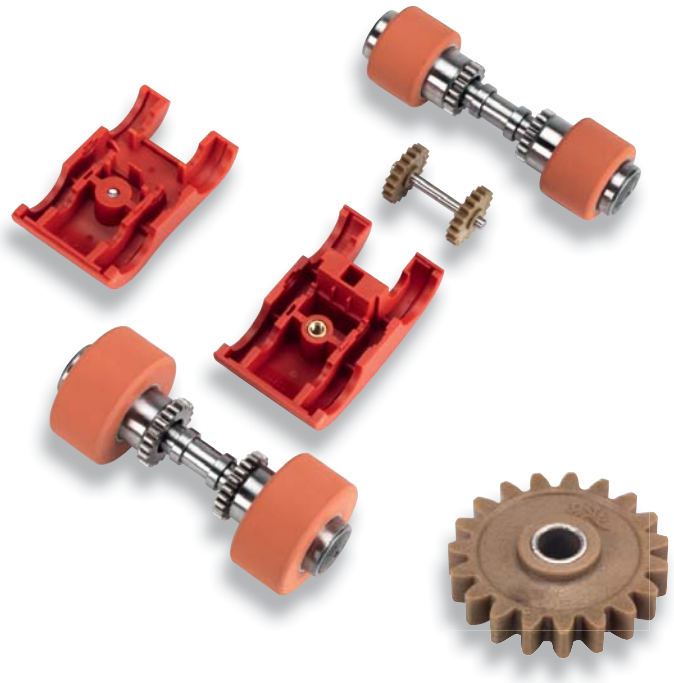


Fig 3: Competitive Design

Fig 4: Original SUESSEN Lattice Apron



For optimal results with the SUESSEN EliTe®Compacting System, it is highly important to use SUESSEN Original spare parts only! SUESSEN has designed and manufactures the EliTe®Compacting System, hence the best spares can come only from SUESSEN.

Examples:

5*star*®Q Lattice Aprons

The proper coating is highly important to minimize the dust accumulation on the lattice apron, and to protect the surface of the EliTube.

In Fig. 1 (Competitive Lattice Apron) only the dark portions are coated, clearly insufficient.

In Fig. 2 (Original SUESSEN Lattice Apron) it is apparent that the coating is completely even.

It should be clear that the SUESSEN Lattice Apron will give much better results!

The proper design of the edges of the lattice aprons is also very important to avoid fraying of the edges.

Comparing Fig. 3 to Fig. 4, it is quite obvious that the SUESSEN lattice apron has much stronger edges compared to competitive designs.

EliGear: Intermediate Gear

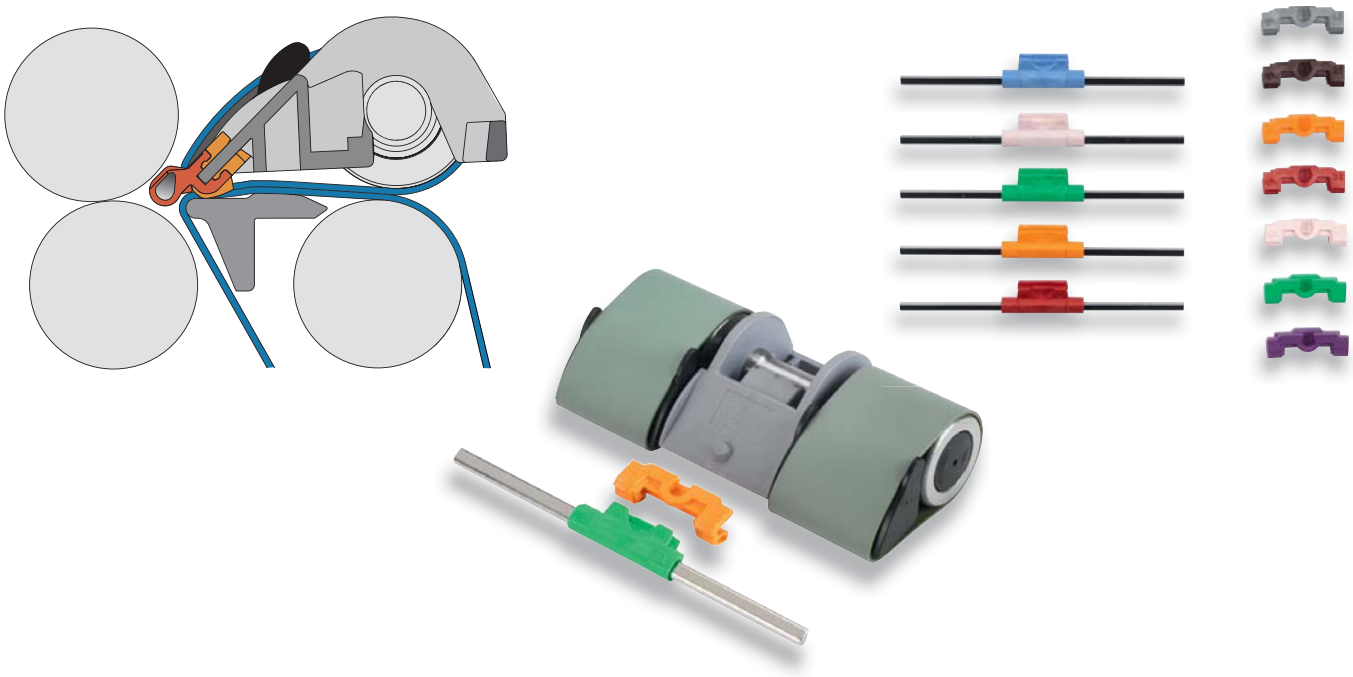
SUESSEN Original EliGear

Various variables determine the life of this important component:

- the basic material
- the correct shape of the teeth
- the correct material and size of the bush

Only SUESSEN, the manufacturer of the EliTe®Top Rollers, is in a position to determine these variables correctly. In the worst case, wrong intermediate gears may even damage the EliTe®Top Rollers.

Yarn Quality Improved by ACP Quality Package



The ACP Quality Package clearly improves the drafting process. The sector between the front cradle opening and the front roller nipping line now contributes additionally to the drafting process in the main zone.

This substantially raises the quality level of almost all yarn parameters which are influenced by the drafting process. No disadvantages to the running properties of the ring spinning frame have been found. It has to be pointed out, however that the correct setting is of utmost importance.

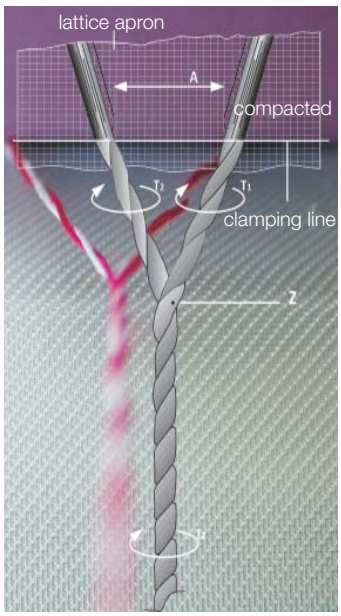
The ACP package clearly reduces both frequent yarn defects (IPI) and rare yarn faults (Classimat), so improvements can be registered in all fault classes. Therefore the number of clearer cuts is substantially reduced, maintaining the clearer settings.

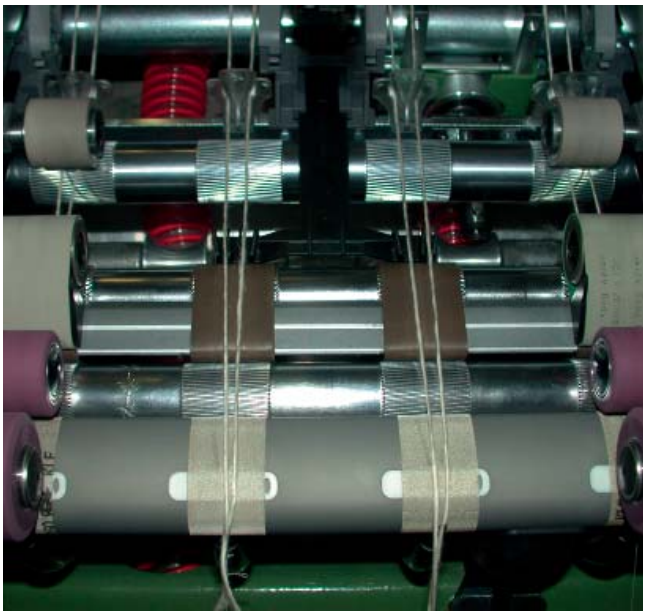
The optimized drafting process is further reflected by an improved mass irregularity (Uster value) and results in an optimized utilization of fibre substance (yarn strength). Improvements achievable in every individual case depend on the raw material, staple length, roving twist and total draft.

The table (next page) compares the spinning results from various spinning mills, once without and once with ACP.

Spinning Mill	Ne	Processing	CV%	IPI	IPI (sensitive)	Classimat (tot)	Rkm
A	34	EliTe® EliTe®+ACP	12.65 11.00	94 52	737 307	1322 909	18.96 19.60
B	40	EliTe® EliTe®+ACP	12.25 11.18	78 59	457 264	- -	22.30 23.56
C	40	EliTe® EliTe®+ACP	11. 62 10.50	40 30	296 148	- -	23.53 24.31
B	50	EliTe® EliTe®+ACP	13.12 12.08	91 63	681 407	- -	22.89 24.26
D	50	EliTe® EliTe®+ACP	12.70 11.60	68 42	1890 1104	81 60	22.23 22.93
C	60	EliTe® EliTe®+ACP	13.93 12.60	124 70	1224 666	- -	20.54 20.93
D	60	EliTe® EliTe®+ACP	13.36 12.51	179 122	2463 1797	434 278	18.75 20.12
D	80	EliTe® EliTe®+ACP	13.90 12.48	155 91	1063 540	- -	21.89 22.86
E	80	EliTe® EliTe®+ACP	14.52 13.68	226 152	1227 735	1377 735	28.00 28.46
E	100	EliTe® EliTe®+ACP	14.66 13.83	126 84	1162 835	- -	26.51 27.49
D	114	EliTe® EliTe®+ACP	16.43 15.41	448 277	2301 1573	- -	25.64 26.70
EliTwist®							
F	40/2	EliTwist® EliTwist®+ACP	9.33 8.61	16 4	45 20	1234 822	22.74 24.96
G	80/2	EliTwist® EliTwist®+ACP	12.50 12.17	45 36	443 384	632 411	25.48 27.04
G	100/2	EliTwist® EliTwist®+ACP	15.35 13.71	286 182	1809 1094	- -	26.68 28.81
H	100/2	EliTwist® EliTwist®+ACP	14.62 13.45	315 192	1715 893	- -	25.88 26.99
A	160/2	EliTwist® EliTwist®+ACP	13.20 12.61	99 67	647 457	- -	24.21 24.97

SUESSEN EliTwist®CompactSet V5





New revolutionary production of two-ply yarns directly on the ring spinning machine with compact spinning technology, setting new quality standards in the field of compact spinning

This is another SUESSEN Development break-through: two EliTe®Yarns are spun and plied directly on the ring spinning frame.

EliTwist®Yarns have the following distinctive features:

- very low hairiness
- high elongation and break strength
- very low IPI compared to equivalent single yarn
- round cross section

See comparative results on pages 18/19.

Indian Spinning Mills have been again at the forefront, and the highest population of this advanced technology is to be found here, presently over 350,000 EliTwist®Spindles.

At present some of the applications include

- high quality shirting
- high quality knitted polo shirts
- high quality bed linens
- high twist voile fabrics
- bottom weights
- Sari blouses

Please see the technical reviews which some of SUESSEN's major EliTwist®Customers have written, and which are enclosed on pages 18 to 39.

As EliTwist® may in certain applications replace conventional TFO yarn, potential savings are large, and payback periods of 6 months and less have been reported by our customers.

Suessen

EliTe®Compact Spinning:

Raw material saving – A review of Indian situation

By Mathew Jose, Venus Textile System, Coimbatore, India

Indian innovative customers were involved in Suessen EliTe®Compact Spinning nearly from the very beginning. This gave them a unique opportunity to fully exploit this new technology in ways the manufacturer of the equipment (Suessen) could not have dreamed about! They immediately understood what was meant by Mr. Peter Stahlecker, JMD of Suessen, when he stated: Suessen IS merely the builder of the piano. The Piano players and the creators of new and previously unknown symphonies are the customers only!

The successful installations of around 35 Lakhs EliTe®Compact Spindles in India have opened up numerous avenues of utilising the EliTe®Compact Spinning System. High quality spinners make Premium EliTe®Yarn like

- Ne 100s - 30 RKM, 80 IPI,
- Ne 70s - 31 RKM, 35 IPI,
- Ne 50s - 33 RKM, below 30 IPI.

Some others manufacture products with higher RKM, lower IPI, low hairiness to meet demands of corporate buyers for shirting and bed linen.

Many of our customers take advantage of EliTe® for higher RKM, lower hairiness along with saving in raw materials.

Many knitting yarn producers achieve higher spinning productivity up to 15% using EliTe®Compact Spinning System with less pneumafil waste and saving in raw material.

Our composite customers achieve more value for money by making yarn suiting their weaving and knitting with increased efficiency in down stream processes. They have also additional benefits like higher strength of the fabric, less pilling, better luster, clearer print, better feel & appearance, endurance of the fabric etc.,

Type of yarn manufacturing	Conventional ring spun yarn	EliTe®Yarn	EliTe®Yarn	EliTe®Yarn
Mixing	DCH – 60% MCU5 – 40%	DCH – 20% MCU5 – 80%	DCH – 10% MCU 5 – 90%	MCU 5 – 100%
Noil %	20%	15%	15%	18%
Quality Results:	Ne 100/1	Ne 100/1	Ne 100/1	Ne 100/1
I) Linear density				
Actual count (Ne)	98.82	99.9	99.81	98.64
Count CV%	1.76	1.72	1.64	1.9
Mean CSP	2582	2669	2557	2655
II) Uster Tester 4				
U %	13.47	12.45	12.54	12.86
Thin place (-50%)	151	56	69	96
Thick place (+50%)	260	158	155	152
Neps (+280%)	346	219	225	170
Total	757	433	449	418
Hairiness	3.42	2.46	2.80	2.53

Chart 1

Type of yarn manufacturing	Conventional ring spun yarn	EliTe®Yarn	EliTe®Yarn	EliTe®Yarn
Article Name 40s Mixing	Ne 40/1 combed weaving	Ne 40/1 combed weaving	Ne 50/1 combed weaving	Ne 60/1 combed weaving
Count	40.3	40.1	50.2	60.2
U%	10	9.8	10.5	11
Total IPI	75	60	100	150
RKM	18	20.2	19.3	18.8
Elongation%	5	5.4	4.53	4.34
Hairiness (H)	5.2	3.8	3.43	3.14

Chart 2

Our customers with knitting confirmed that some products are replaced with single EliTe®Yarn construction in place of normal double.

Less spirality, lower fly, and dust liberation in knitting, lower shrinkage of the fabric are some other benefits being experienced by them.

Some special products manufacturers take advantages of savings in singeing operation apart from developing new final products.

The success of EliTwist® is also being made use of by our customers with focused marketing efforts. Of course EliTwist® gives the quickest pay back.

EliTe® and EliTwist®Technology with the new ACP NT package (Active Cradle with PINSpacer NT) has evolved new standards of quality as

far as RKM, Uniformity, IPI values, hairiness etc., are concerned.

We have also come across some customers taking advantages of the hairiness reduction alone by substituting normal yarn parameters with EliTe®Yarn and saving the raw material to the maximum extend. The reduction in hairiness alone allows substantial advantages in subsequent processes like warping, weaving and processing. This production may not be meant for the top notch customers but the spinners are able to have a faster return on investment by taking this route also.

Below are several examples of what Suessen EliTe® customers are doing everyday!

Ne 120/140s:
Some of our customers make Ne 120/1 and Ne 140/1 CW from 50% PIMA and 50% either 33 mm MCU 5 or DCH. The saving in mixing is to the tune of Rs.15000 to Rs.20000 per candy. This is around Rs.70/Kg. They are achieving production of 20 gms per spindle shift. According to them around Rs.5040 savings per machine of 1200 spindle per day.

Ne 100's:
Until a decade back, it was never thought that Ne 100/1 could be spun from 100% MCU5 or by replacing DCH substantially. Chart 1 shows, what is being done today by some Indian spinning mills.

The third column of this table shows that mixing with 10% DCH / 90% MCU5 along with 15% comber noil has produced EliTe®Yarn which is superior in hairiness by 20% and imperfections by 40% in comparison to normal yarn from 60% DCH / 40% MCU5 with 20% noil. Our customers indicated that in this case the raw material saving due to 50% DCH and 5% comber noil is up to Rs.50/ Kg for 100s which is around Rs.6000 saving per machine (1200 Spindles) per day. This means the payback of EliTe®CompactSet is less than 2 years from raw material saving alone after adjusting the cost of EliTe®Yarn.

Certain other customers make Ne 100/1 EliTe®Yarn using 80% MCU5 and 20% DCH with same comber noil and managing premium. Depending upon the strength and imperfection requirement the mixing can be varied and the maximum saving is possible when the strength of the normal yarn is the target.

Ne 80/1:
Those who are with Ne 80/1, switched over to 100% MCU5 in place of 100% DCH saving around Rs.11000 to Rs.12000 per candy. In addition to this there is a saving of 1% comber noil is possible means saving of Rs.37 per kg by raw material which is Rs. 5300 saving per machine.

Ne 60/1:
For Ne 60/1 a combination of Mech + Sankar 6 replaces MCU5 with additional benefit of comber noil 1% to 2%, then the difference in mixing cost comes around Rs.15 per Kg. In place of Shankar – 6 Karnataka Bunny is used by some mills. The yarn produced out of this mixing is superior in terms of all properties and further raw material saving has not been observed. But mills prefer higher production and better price along with the above raw material saving. Most of our 60s yarn spinners are catering to weavers demanding higher RKM. They have not attempted to save raw material to the tune of equalising yarn strength with normal yarn as the pay back is comfortable in the above combination.

Some of our customer save 25% Giza 86 by using 75% MCU5 and 25% Giza 86 for 60s EliTe® mixing in place of normal yarn mixing of 50% Giza 86 and 50% MCU 5. They have stated that this will result in a saving of Rs. 15/- Kg apart from the Rs. 15/- premium possible due to better yarn strength and quality thus making around Rs. 30/- per Kg.

Ne 40/1:
For Ne 40/1 count up to 4% higher yarn realization is achieved which includes comber noil saving up to 3% along with this 10% production increase is commonly achieved. The tendency of increased Imperfections due to comber noil reduction is over come by using Suessen ACP package. The combination of savings in Raw

Material alone Rs.4000 per machine per day and 2 years pay back.

In the case of Ne 40/1 combed hosiery 15% more productivity and upto 3% more yarn realization% is being achieved.

Ne 30/1:
In case of Ne 30/1 combed hosiery 3% yarn realization and 15% additional productivity is the most commonly employed method.

In all the above practical cases the payback varies between 18 months to 24 months by employing different combinations of mixing, comber noil saving, pneumafil waste saving along with additional productivity. In majority of the cases a marginal premium is also possible for the better hairiness, imperfections even if the yarn is supplied with strength matching normal yarn.

A look at the brochures of the manufacturers of compact equipment will show that they added these advantages only AFTER they learned about them from their customers! This is really a new and previously impossible symphony!

It goes without saying that “Some pianos are better than others” and surely the one from Suessen is the best: no other supplier can claim that his customers have achieved such impossible feasts, only EliTe® can do this full range!

Of course, there are other “novel symphonies” created by our customers, which are not in the core of this article, and be mentioned only in passing.

With the help of EliTwist® and the Suessen PINSpacer NT, customers again managed to create previously impossible yarns, ultimately creating profits for themselves.

The tools of raw material savings are at hand which will give a cutting edge in competition and better leverage in managing present crisis of spinning mills.

We encourage our Suessen EliTe®Compact customers continue being innovative, for the advantage and the betterment of the whole industry! We encourage them to challenge Suessen to build better pianos!

Sri Nachammai Cotton Mills Ltd.

by P. Palaniappan, Managing Director, Sri Nachammai, India

Our History:

Sri Nachammai Cotton Mills Limited was founded in the year 1956 by Sri. M.A. Palaniappa Chettiar at Chettinad, Sivaganga District, Tamilnadu, India. Originally it was known as "The Jawahar Mills Limited, Chettinad Branch". The Jawahar Mills Limited was bifurcated in the year 1980 into "Salem & Chettinad Units". The Chettinad unit was renamed as Sri Nachammai Cotton Mills Limited.

The units have been expanded and now consist of 'A' unit with 33,600 spindles, 'B' unit with 9,072 spindles and a leased unit at Salem consisting of 10,944 spindles and 504 rotors.

The units have been modernized over the years and consist of machinery predominantly from LMW and also a few machines from Rieter, Truetzschler, Crosrol, Schlafhorst, Murata, Uster and now, naturally, Suessen.

The units have been catering mainly to the local hosiery and powerloom markets. Now our focus is to allocate 30 to 40% of our production for exports. Future focus of the units will be on value addition.

Suessen Story:

First we conducted trials with the Suessen Active Cradles and PINSpacers where we found substantial improvement in quality.

Then we installed Suessen EliTe® CompactSet for the entire spindleage in A & B units.

Now we are conducting trials with Suessen Top Weighting Arms HP-GX 3010 and EliTwist® for another 2000 spindles.

With Suessen Top Weighting Arms we have achieved quality improvement and in our next phase of modernization we are planning to install these on our other frames. Our Suessen story has been one of success and hope to establish a long-standing relationship with Suessen.

Our experiences with EliTe®Compact:

Originally a niche product, the compact yarn has made advances into more and more applications in recent years, so that the survival of many manufacturers now depends on their ability to offer compact yarn.

Compact Spinning: in this system the fibres are arranged in a completely parallel and close position before twist is imparted. This is the most important criterion for a perfect compact yarn.

This system eliminates the spinning triangle of the conventional ring spinning. The fibres are arranged in a close and parallel position to one another with the help of

- an airflow produced by vacuum
- EliTop
- the lattice apron to guide the fibres over the inclined slot of the EliTube which is under negative pressure.

The fibres leaving the compacting zone are perfectly parallel and in close contact with one another and twist is inserted to this round fibre strand leaving the compact zone.

Since the fibres are parallel and in close contact with each other, each fibre contributes to the yarn strength which results in increased strength of yarn by about 10% to 15% and 85% hairiness reduction when compared to conventional ring yarn.

The compact yarn has made revolutionary advantages in many of the

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yarn parameters like strength, elongation, hairiness, etc. and has set new quality standards and proven to be cost effective in spinning process as well as in down stream processing.

Advantages of Compact Yarn

The warping and knitting performance increases by 10% to 15% due to higher strength.

Fly generation reduces considerably in the warping and knitting machine due to less protruding fibres. This eliminates the frequent cleaning work of warping and knitting machine, by which machine down-time is reduced thus increasing the machine utilization.

The sizing chemical consumption reduces due to less numbers of protruding fibres on the yarn. Some of our customers replace sizing process by waxing process and thereby saving in water and chemicals.

The yarn has low resistance at the reeds of the loom due to low protruding fibres, which increase the efficiency of looms and reduced fly generation.

The weight loss is minimized due to low fly generation.

The quantity of dye absorption of cloth made from compact yarn is reduced considerably due to low hairiness of yarn.

The dye absorption of cloth made from compact yarn is uniform and gives more aesthetic look than the cloth made from conventional yarn.

The dye absorption in the printing process is more uniform and has no bleeding effect; this increases the appealing effect of the fabric.

Hairiness causes pilling effect on the fabric, which reduces the softness and appearance of the cloth. To reduce this effect costly enzyme processes are done. This process is totally eliminated in the case of fabric made from compact yarn – this applies especially for knitted fabric.

Production Chart Sri Nachammai: besides the below given improvements there is a significant reduction in fly liberation in the spinning and winding department

Unit	Count	TPI		TM		CSP		Hairiness		Ends 100spl/hr		GMS/SPL		Production increase EliTe®
		conv.	EliTe®	conv.	EliTe®	conv.	EliTe®	conv.	EliTe®	conv.	EliTe®	conv.	EliTe®	
A	20s CHY	16.10	14.38	3.62	3.26	2820	2898	8.16	6.47	6-7	4-5	320	390	21.9 %
	24s CHY	17.74	15.87	3.64	3.24	2690	2722	7.49	4.82	6-7	4-5	240	292	21.7 %
	26s CHY	18.65	16.93	3.65	3.32	2607	2883	7.26	5.64	5-6	3-4	220	255	15.9 %
	30s CHY	19.08	17.34	3.59	3.26	2756	2712	6.09	5.52	5-6	3-4	192	232	21.0 %
	34s CHY	21.15	17.77	3.72	3.12	2620	2867	6.38	5.37	4-5	3.5-4.5	167	199	19.2 %
	40s CHY	24.46	20.06	3.95	3.16	2603	2853	6.03	4.38	4-5	3-4	125	148	18.0 %
	60s CHY	29.30	28.34	3.84	3.65	2321	2804	4.96	3.25	3-4	2.5-3.5	38	68	17.2 %
B	20s KWP	18.62	17.30	4.11	3.83	2470	2615	7.50	6.37	7-8	5.6	285	306	7.4 %
	24s KHY	18.62	16.90	3.82	3.47	2311	2593	8.12	6.83	7-8	5.6	220	235	6.8 %
	30s KHY	20.14	18.18	3.77	3.43	2214	2627	7.68	6.40	6-7	4.5	195	208	6.7 %

The Noman Group of Companies:

"Quality comes first, rests are consequences"

By Peter Stahlecker, Managing Director SUESSEN

This is not only a slogan, but the company policy and the philosophy of the Noman Group, Bangladesh.

The Noman Group of Companies has over 250,000 compact spindles, all SUESSEN EliTe®CompactSet. This makes Noman by far the largest compact spinner in Bangladesh – and one of the largest in the world!

I had the good fortune to meet Mr. Md. Nurul Islam, the founder and Chairman of the Noman Group for the first time on April 10, 2010 in his city office in Dhaka.

Mr. Islam is a very polite, soft spoken person, but you find out quickly that he has a very clear entrepreneurial vision – and the iron will and determination to make his vision a reality! You also better be prepared to know the technical details of your product, he has – understandably! – no much patience for salespeople who do not know their products very well.

The story of the Noman Group is worth to be told, it shows what determination and hard work can achieve.

The Noman Group was established in 1968 by starting a trading company in Dhaka as its first venture of business. Beginning in 1975, the company turned into manufacturing textile products by the present Chairman, producing mosquito nets for domestic sale and for exports. Apparently, his product was better than competing nets, the company flourished and grew larger..

Today the group operates six spinning mills (among some other mills in weaving, printing and dyeing, garmenting):

- Yasmin Spinning Mills Ltd. - Spinning unit with 77,376 spindles
- Sufia Cotton Mills Ltd. - Spinning unit with 42,504 spindles
- Talha Spinning Mills Ltd. - Spinning unit with 54,888 spindles
- Zaber Spinning Mills Ltd. - Spinning unit with 78,608 spindles
- Zubair Spinning Mills Ltd. - Spinning unit with 72,576 spindles
- Ismail Spinning Mills Ltd. - Spinning unit with 70,848 spindles

In 2002, the first weaving mill, Saad-Saan Textile Mill, was started, more spinning and weaving mills followed year by year.

Today, the Noman Group can proudly present these figures:

- Ring Spinning: 396,800 spindles, producing around 135,000kg/day
- Rotor Spinning: 6,344 rotors, producing around 35,000 kg/day
- Weaving: 3,269 looms (Airjet, Rapier, Projectile, Jaquard) producing 500,000 meter/day
- Total employment: 40,000+ employees

The count ranges from 12's to 100's in ring, and 7's to 30's in rotor. They use CIS, Shankar 6, MCU-5, DCH-32, also US cotton, cotton from Pakistan and from Australia.

Other than 100% combed and carded yarns, they also produce P/C, T/C and CVC blends. About 90% of the yarn production is consumed internally, 10% sold in the market.

On 15th July, 2009 Mr. Islam ordered a very large number – in fact the largest single order for EliTe®CompactSet SUESSEN had ever received so far! – of SUESSEN EliTe®Compact conversion, after having thouroughly tried EliTe® as well as competing systems before.

Within this project SUESSEN installed the 3,000,000th EliTe®Compact Spindle in 2009 – this happening was paid tribute with a small event and a little present on the premises of our customer.

The installation went on smoothly, as the mills are very well organized and were highly supportive of our technicians.

	EliTe®	Regular	EliTe®	Regular	EliTe®	Regular
yarn count in Ne	30		30		30	
code	KC		KC		KC	
TPI	20	23.6	20	19.76	20	22.7
CSP	2853	2524	2852	2274	2835	2691
U%	10.91	10.8	9.54	9.96	9.82	11.13
-50%	1	5.5	0.3	0.8	0.54	4
50%	164	181	39	57	57	78
200%	371	394	122	122	173	171
E%	4.5	3.69	3.87	3.48	3.93	-
H	-	6.61	4.01	5.74	4.47	4.65
gr per shift	197.6	150.0	197.6	186.1	194.2	156.0
increase in production through EliTe®	31.70%		6.16%		24.48%	

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All of the EliTe®Yarn is used for their own weaving, where an increase in efficiency of over 5% could be achieved, according to the Chairman himself.

In a figurative sense, SUESSEN's EliTe®CompactSet is merely the "piano", our customers are the piano players.

They soon learned to get the maximum out of their investment in EliTe®, as the data below, provided by Noman prove. (See chart below)

Never to be content with what has been achieved, always trying to find new products is a hallmark of the Noman Group, guided by its Chairman.

Consequently, they tried elastic core yarn with EliCoreTwist® – and soon over 20 machines will be producing just than.

The plans for 2012 and 2013 have been finalized and are being implemented:

Md. Nurul Islam, Chairman and Founder of the Noman Group

- a terry towel plant
- a denim plant
- more spinning and more weaving capacity
- a knitting mill.

It has been a great honour for everybody at SUESSEN, and for me personally, to be associated with this highly successful group!

	EliTe®	Regular	EliTe®	Regular	EliTe®	Regular	EliTe®	Regular	EliTe®	Regular
yarn count in Ne	40		40		40		40		40	
code	CW		CW		KC		KC		CW	
TPI	24.44	27.91	24.44	27.91	24.85	27.09	24.85	27.16	24.85	27.09
CSP	3304	2802	3230	2863	3198	2922	2802	2578	3651	3504
U%	8.87	8.98	8.68	8.89	8.77	9.04	10.79	11.85	8.97	8.88
-50%	0.5	0	0	0.8	0.3	0	3.4	16	1	0
50%	7.5	10.5	4.5	9	8	13	98	197	11	11
200%	64	71	65	69	47	47	398	493	58	53
E%	4.02	3.53	3.88	3.61	3.44	3.43	3.92	-	4.29	4.14
H	3.76	4.5	3.29	4.06	3.2	4.27	4.12	-	3.35	3.76
gr per shift	133.2	104.4	133.2	104.4	137.9	111.9	124.1	100.9	137.9	108.2
increase in production through EliTe®	27.63%		27.63%		23.18%		22.96%		27.50%	

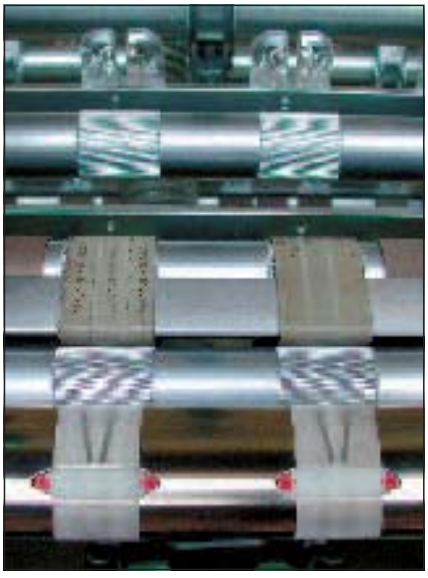
EliTwist® – Spinning of Two-Ply Weaving Yarns

S. Kanthimathinathan,
General Manager, Ramco Group Textile Division, India

Preamble

The weaving performance of warp yarn in a loom depends on the state of surface fibres. Fibres that are not firmly attached to the yarn can be abraded off the yarn easily. So, untreated single yarns are not suitable for direct use in weaving. To produce satisfactory warp yarn, it is necessary to improve the binding between the surface fibres and the body of the yarn. Hence, sizing is used in short staples and two folding in long staple fibres, but the yarn cost increases.

So, it has been the dream of the spinners to produce such weavable yarns at spinning itself. SIRO spinning was one such method tried earlier to produce such type of yarn in spinning. But, it has speed limitations especially for short staple spinning and again the production cost increases. With the invention of EliTwist®, the limitations in the SIRO spinning are eliminated.



Our Experience

For the past six months, we have started producing EliTwist®Yarns, which are sold under the brand name of Ultima-Duo. It is a sort of co-work between our customers and us for the promotion of such yarns. With the aim to replace existing doubled-yarns and to find different types of applications, we have been producing EliTwist® Yarns with different twist factors using different varieties of cotton.

Quality of EliTwist®Yarn and conventional TFO (two-for-one) yarn

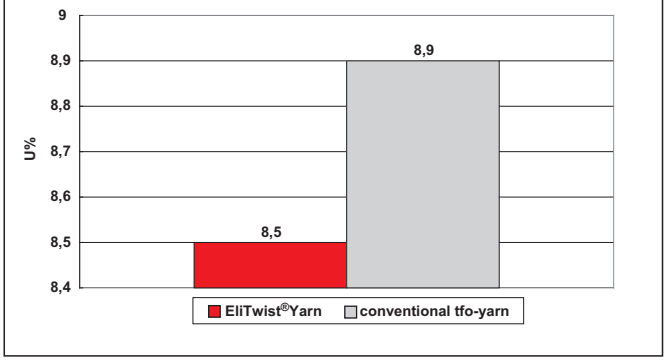
From the results in Table 1, we can clearly understand the improvement in most of the yarn properties for the EliTwist®Yarns. In hairiness, there is a reduction of about 1.7 in absolute value; yarn strength (RKM) has increased by about 20% and elongation by 10%. Because of the reduction in hairiness and improvement in roundness, appreciable improvement has been noticed in the fabric appearance. However, because of the unidirectional twist (i.e. S on S or Z on Z) on both the components of EliTwist® Yarns, the fabric feel is little bit harsher when compared to conventional two-ply yarns.

This can be avoided by reducing the twist factors. The trial results of the impact of different twist factors on the quality of yarn are presented in Table 2. This trial was conducted on EliTwist®Yarns using ELS Cotton.

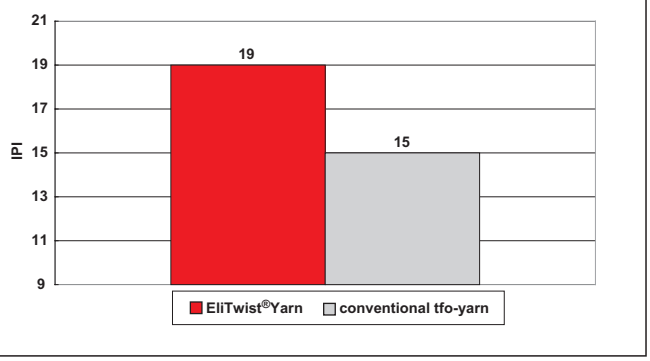
Table 1: EliTwist®Yarns & Two-for-one (TFO) Yarn Quality

Count: 80/2	Conventional Yarns (C.W. ⇨ A.W. ⇨ TFO ⇨ Rewinding)	EliTwist®Yarns
U%	8.88	8.53
Total imperfections	15	19
Hairiness Index	5.70	4.02
RKM	19.5	23.34
Elongation	4.04	4.44
Yarn diameter	0.220	0.191
Yarn density (Compactness)	0.39	0.51
Yarn roundness	0.73	0.81

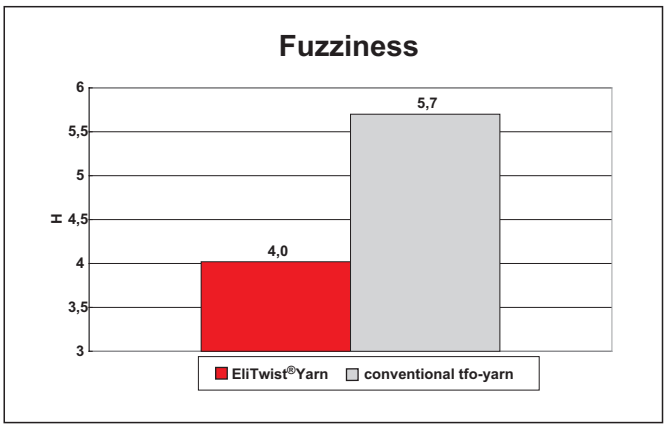
Yarn Evenness



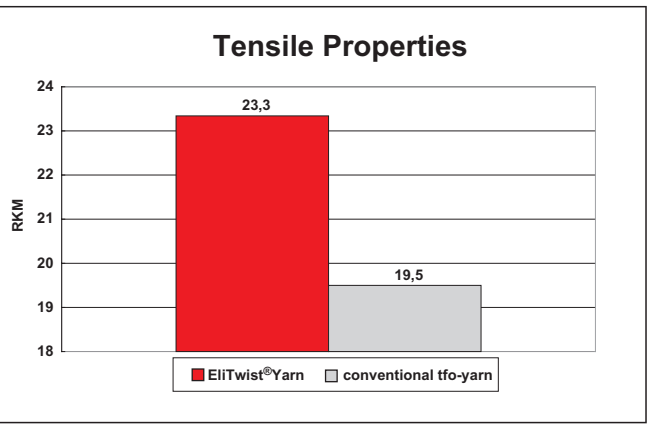
IPI Imperfections



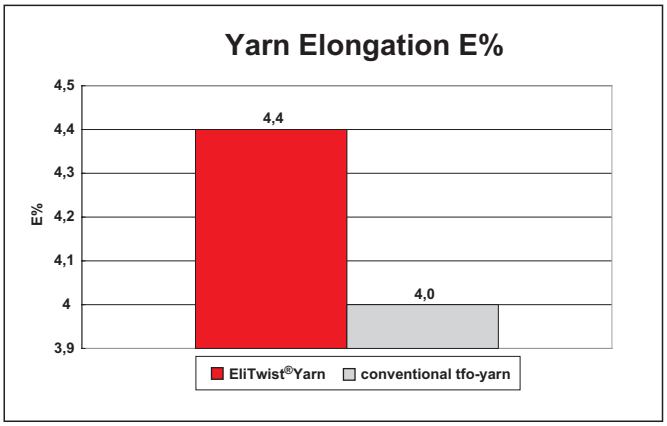
Fuzziness



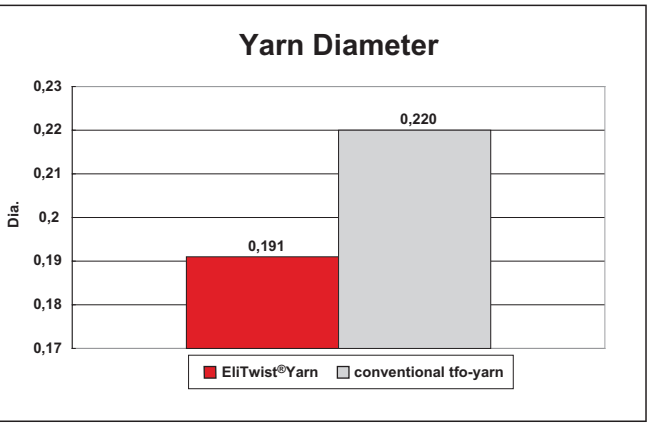
Tensile Properties



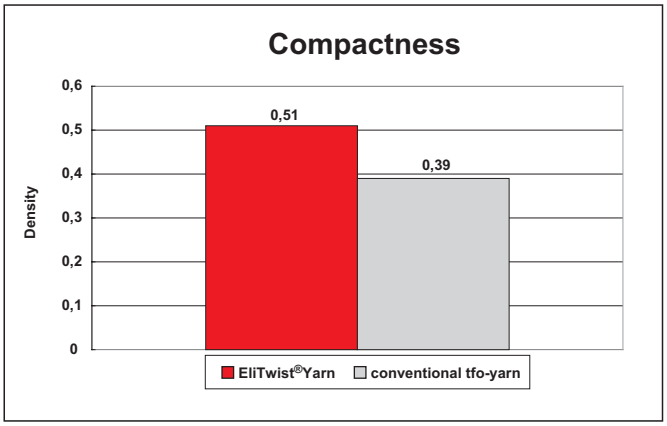
Yarn Elongation E%



Yarn Diameter



Compactness



Yarn Roundness

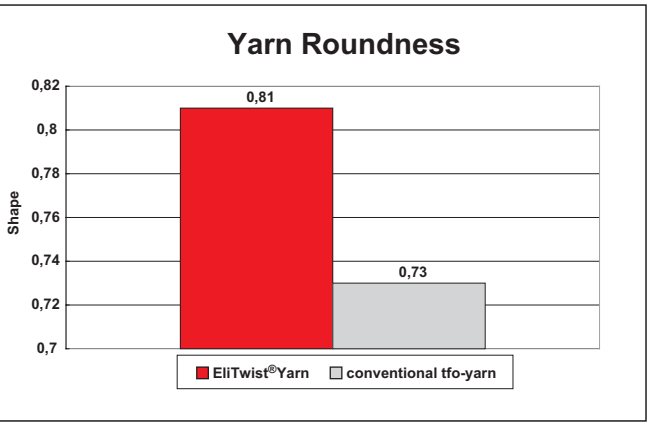
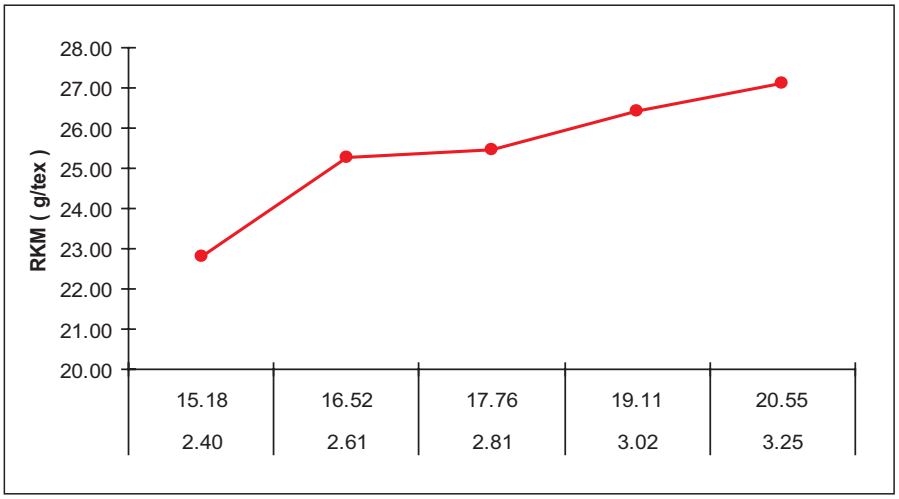


Table 2: Effect of Twist per Inch (TPI) on EliTwist® Yarn Quality. Count: 80/2

TPI	15.18	16.52	17.76	19.11	20.55
U%	8.1	8.15	8.1	8.09	8.07
Total Imperfection	13	12	10	12	10
Hairiness Index	4.28	3.98	3.77	3.49	3.33
RKM (g/tex)	22.81	25.26	25.46	26.42	27.1
Elongation (%)	4.85	5.21	5.05	5.10	5.36

Table 3: Effect of Twist per Inch (TPI) on EliTwist® Yarn Strength Count: 80/2



In U% and imperfections, there is no change due to increase in TPI, whereas hairiness gets reduced from 4.28 to 3.33, as the TPI increases from 15.10 to 20.55. Elongation is showing an increasing trend from 4.85 to 5.36. It can be noted from the results that when we increase the TM factor from 2.4 to 2.61, there are steep increases in yarn strength (i.e. 10%). Further increase in twist factors only marginally increases the strength. So, it can be concluded that 2.6 twist factor is the optimum one for this type of cotton. With this reduced TPI, we have significantly improved the fabric feel.

Productivity

Normally, with Indian long staple cottons, we'll obtain 45 grams/spindle/shift of 8 hours for 80/1 counts. For these 80/2 Ultima-Duo yarns, we could achieve 94 grams/spindle/shift even at 11500 rpm of spindle. This obviously explains that the production is more than two-fold, even with lesser spindle speed. The higher productivity is mainly because of lower twist factors.

In other words, for the same output of doubled counts, we require half the capacity of ring frame spindles besides the complete elimination of TFO or doubling machines. This is a huge cost saving for the spinners as well as for the weavers and knitters.

COMPARISON CHART
EliTwist®Yarn vs. Conventional Two-Ply Yarn (TFO Yarn)

	EliTwist®	**Conv. TFO Yarn**	**EliTwist®**	**Conv. TFO Yarn**
TM/TPI– Single Yarn **TM/TPI– TFO Yarn**	3.5 /22.2	3.6 /32.3 3.86 /24.4	4.11/23.9	4.26 /34.9 4.28 /24.8
Quality particulars	Cones Imported Cotton Blend Mixing	TFO Cones Imported Cotton Blend Mixing	Cones Indian Cotton	TFO Cones Indian Cotton
Count	2/80	2/80	2/66	2/66
Count CV%	0,7	1.2	1.8	0.9
STH	124.4	98.9	114.5	101.9
CSP	4951	3996	3790	3403
B.Force (gms)	437.4	346.6	413.2	351.3
RKM	29.6	23.5	23.1	20.1
B.Force CV%	5.9	6.2	6.3	10.3
Strength CV%	3.2	3.8	4.5	4.2
Yarn CV%	10.1	10.7	7.8	8.3
Thin (-40%)	2	7	2	5
Thin (-50%)	0	0	0	0
Thick (+35%)	36	73	29	62
Thick (+50%)	3	4	5	4
Neps (+140%)	104	110	67	86
Neps (+200%)	24	15	13	8
Hairiness/Sh	1.8 /0.5	4.1/1.3	3.06 /0.64	4.6 /1.5
Elongation E%	7.0	5.3	6.9	5.3
Variation of Elongation V%	5.8	7.9	6.7	8.5

EliTe® Compact Spinning System & Technology

The Gift of the 20th Century to the 21st

P.V. Chandran, Chairman/Managing Director, Ambika Cotton Mills Ltd., India

Ambika Cotton Mills Ltd.

The increasing demand of EliTe® Compact Yarn and EliTwist® Compact Yarn around the globe is clearly indicating that the EliTe® Compact Spinning System has become a success story.

In compact spinning the spreading of fibres at the front roller pair of the drafting system is minimized until the spinning triangle is virtually eliminated. Twist is imparted to a compacted bundle of largely parallel fibres. The technology of integrating all the fibres of the drafted strand into the yarn axis gives a tremendous improvement to the yarn properties.
Some of our customers have switched over to 100% compact yarn for their application instead of conventional ring spun yarns.

Spinners experience a whole range of improvements, depending on the use of the system – here our own experiences:

1. 30% reduction in end-breaks due to higher yarn strength
2. 50% reduction in pneumafil waste
3. Clean department and less fly liberation and hence clean yarn with much less Classimat faults
4. Spinning potential of cotton is improved: e.g. the cotton normally suitable up to Ne 40/1 in conventional ring spinning can be used to spin yarn counts up to Ne 60/1 comfortably (see Chart below). The quality of the yarn is much superior to the conventional yarn in terms of strength, hairiness, evenness
5. For the same quality of conventional yarn with the given raw material it is possible to get much higher production by reducing the spinning twist multiplier by 10% in compact spinning simultaneously.

Type of manufacturing	Conventional ring spun	EliTe® Compact	EliTe® Compact	EliTe® Compact
Article name	Ne 40/1 combed, weaving	Ne 40/1 combed, weaving	Ne 50/1 combed, weaving	Ne 60/1 combed, weaving
Count	40.3	40.1	50.1	60.2
U%	10.0	9.8	10.5	11.0
Total IPI	75	60	100	150
RKM	18.0	20.2	19.3	18.8
Elongation	5.0	5.4	4.53	4.34
Hairiness (H)	5.2	3.8	3.43	3.14

6. Gassing may be eliminated. Singeing processes help to reduce the hairiness of yarn. This process generally burns off 5 to 8% of the finally produced yarn, which has gone through the entire spinning process. E.g. to produce 100 kg of gassed yarn the required input is 105 to 108 kg. But with both, EliTe® Compact Spinning System and EliTwist®Compact Spinning System this wastage is eliminated.

Instrument evaluation has clearly revealed that there is about 20 to 30% reduction in Uster Hairiness (H) and 80% reduction in S3 value when measured on Zweigle Hairiness Tester.

Hence compact yarn may be used directly without singeing (gassing) for some applications.

Improvements in the knitted goods manufacturing with EliTe®Compact Yarns and EliTwist®Compact Yarns:

1. Less fly and dust liberation during knitting – due to less hairiness in the yarn
2. Less end-breaks and defect-free fabric production is possible
3. Unwaxed compact yarn can be used directly in knitting
4. Less shrinkage of the fabric during processing
5. Dimensional stability of the fabric is much improved

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6. Pilling tendency of the fabric is improved due to the absence of long hairs over 3 mm in length
7. Better fabric appearance due to improved uniformity and low yarn hairiness
8. Fabric is able to stand more washes than made of conventional yarn
9. Better realisation of raw material (yarn) up to 2% due to reduction in waste generation during washing, processing, etc.
10. The selection of yarn count for a given fabric weight has to be carefully evaluated with sufficient trials in knitting due to decrease in yarn diameter and improved yarn density with better stability of yarn.

Advantages in weaving with EliTe® Compact Yarns and EliTwist® Compact Yarns:

1. Compact yarn is a must for high-speed airjet and shuttleless looms.
2. The fabric appearance has improved, better lustre and very good sheen of the fabric is obtained.
3. In some applications with EliTwist® Yarn the fabric singeing process is eliminated due to improved surface coupled with high pilling resistance of the fabric.
4. The busting and tearing strength of the fabric made out of compact yarn is higher and these fabrics can be subjected to much harsher treatment in further processing depending on the application.
5. The reduction in diameter and high strength of the yarn help to create dense and light-weight fabrics of new variety which is becoming more popular these days.
6. Reduction in yarn diameter and improvement in the roundness of yarn have opened new avenues for the fabric designers, and new quality articles are produced in fine underwear and shirting sector.
7. Higher yarn strength, better elongation and less hairiness of yarn help to operate the looms at high speed; loom efficiency improves up to 10%.
   In addition better working and high efficiency is noticed in warping and sizing and in the entire processing.
8. Improved yarn properties along with a clean surface of the yarn give less loom stoppages and the fabric defects come down by 30 to 40% in yarn-dyed applications with very good improvement in loom efficiency.
9. Less pilling tendency and better lustre improve the fabric appearance.
10. For the same yarn strength of conventional yarn the twist required in compact spinning is less. The fabric made of yarn spun with low twist gives a better handle (softness) without any deterioration in other fabric properties such as tearing and bursting strength, etc.
11. The dye pick-up and printing clarity is very good due to the cleaner surface of the fabric. In yarn-dyed shirting this brilliant colour absorption is very well appreciated by its user.

EliTe® Compact Spinning System & Technology is the gift of the 20th Century to the 21st, which is providing better opportunity for creative designers.

The conventional yarn will gradually disappear from the market and compact yarns will replace it, since this technology is beneficial to spinners, knitters, weavers and also to textile machinery manufacturers.

K.P. Textiles Pvt., Ltd. Coimbatore – India

Peter Stahlecker, Managing Director, SUESSEN

K.P. Textiles is one of those success stories, which I cannot help but admire!

Mr. Padmanaban started K.P. Textiles in 1997 in Coimbatore, TN. He came from a modest background, but hard work, perseverance, and his entrepreneurial spirit made K.P. Textiles a shining success!

Initially, they only had weaving, but then ventured out into processing / finishing with the Sri Venkatesa Processors Ltd., also located in South India. In logical progression, Mr. Padmanaban next went into spinning.

Today K.P. Textiles is the world's leading supplier of fabrics for sari blouses.

This is a very specialized high twist voile material, usually made from Ne 100/2 highly twisted yarn. The quality is held in high regard all over India, and is also exported to all corners of the globe.

Mr. Padmanaban, owner K.P. Textiles

K.P. Textiles is organized into three divisions:

- The weaving division has over 2,000 automatic looms, and of course full preparatory, sizing, steaming and doubling facilities.
- The finishing division has all the modern machinery needed to finish the fabrics into any of the almost infinite number of colors and shades required by fashion-conscientious ladies in India and elsewhere.
- The spinning division will be described in more detail below.

In addition, Mr. Padmanaban soon realized that the cost of power was bound to increase, as India industrializes at a rapid pace, and power generation has a hard time keeping up that pace. Again Mr. Padmanaban acted in a decisive way, installing wind mills to reduce his power cost.

After some discussions with SUESSEN representative Mr. Mathew, Mr. Padmanaban quickly understood the economic advantages he could get out of SUESSEN's EliTwist®Technology. A lesser entrepreneur would have started with 2 or 3 thousand spindles, to test the waters, so to speak. Not so this mill owner: He ordered 36,288 spindles EliTwist® to be supplied over a period of several months!

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Table 1	Ring Doubled Yarn	EliTwist® Yarn
Count	Ne 96/2	Ne 96/2
C.S.P.	2,400	2,900
U%	10.8	10.07
Hairiness (USTER H)	3.5	2.5
Thin	0	0
Thick	25	12
Neps	80	30
Total IPI	105	42

Table 2		
Sector/Wrap/Strech:	350	350
Breaks / Million Meters	0.9	0.4
Weaving machine	Sulzer	Sulzer
Warp Breaks/10,000end/100,000 m	1.5	0.0
Weft breaks/100,000 m	1.9	1.5

Of course, there were some initial problems to be overcome, but for K.P. Textiles and his leader, problems are challenges to be solved. They have a very strong technical team as I could convince myself during a mills visit. The quality is monitored all the way from the cotton to the finished fabric, leaving nothing to chance. As the famous American Edison once said: "Success is 20% inspiration or luck and 80% hard work".

K.P. Textiles tell us about the following **advantages of EliTwist®** over their conventional ring doubled yarn:

- tenacity increased by 20% to 25%
- elongation increased by 2 – 3 percentage points.
- Hairiness reduced
- Spinning breaks / 100 h reduced by 20%
- Fly generation reduced by 50%

During the discussion the mill quality assurance leader shared with us the yarn parameters given in table 1.

The superior performance continues into weaving. Again, we are happy to share K.P. Textiles' results with our readers (table 2).

These values improve warping production by 20% to 30% and weaving production by 10% to 20%. According to the weaving master, the fly generation in weaving is much reduced compared to ring doubled yarn.

According to their finishing expert, the feel of the fabric is very good, it is of high quality, and very resistant.

Mr. Padmanaban would not be the successful entrepreneur he is, if he now decided to rest on his laurels. A further expansion by 100 looms and by 18,000 spindles will be undertaken very shortly.

It is always a very positive experience for any equipment supplier to be associated to a forward-looking enterprise like K.P. Textiles.

Figuratively speaking, equipment suppliers like SUESSEN are merely the makers of the piano. It is *only* our customers, who can perform a symphony using the piano – we cannot!

We at SUESSEN are proud to be a small part of K.P. Textiles' success, and I personally want to thank Mr. Padmanaban and his dedicated team of professionals for sharing all this information with us and with our readers.

Compact Spinning – Innovation of 21st Century

V.N. Balakrishnan, Senior Vice President Operations, GTN Textiles Ltd./India

Ring Spinning, still the most acceptable yarn spinning system, has undergone several changes to improve quality and productivity during these years. However, a major revolutionary change has taken place in 1999, Compacting System.

Much has been said about this great system and the tremendous population growth speaks about its acceptability and benefits. Today, more than 5 million compact spindles are working satisfactorily with a major contribution from SUESSEN EliTe®.

Looking at the speed at which compact is conquering the textile spinning industry, it is clear that this is going to be a normal spinning system for tomorrow. The tremendous benefits of this system are fully exploited both by yarn manufacturers as well as end users.

Compact spinning, the system that ensures better optimum utilisation of costly raw material with minimum loss and damages to the fibre, improves the yarn quality tremendously, more importantly on the hairiness aspect.

This helps the weaver, besides less consumption of costly wet processing ingredients, with better machine efficiency particularly on looms and with a much cleaner atmosphere. Contribution of compact yarn in making dense fabrics is quite rewarding.

Yarn quality improvement in our count ranges, ie., Ne 30s to 120s, achieved over a period is summarised as under:

Hairiness: by Zweigle S3 value – 60 to 80%, by Uster H – 20 to 30%.
Strength: improvement in RKM – 10 to 18%,
Elongation: improvement 10 to 15%
Unevenness: 0.3 to 0.6 reductions in U%.
IPI: 20 to 35% reduction in Imperfections.
Ring Frame Breaks: 40 to 50% reduction in ends down

Educating the end user to exploit the enormous advantages of this yarn needs further efforts from both yarn and machine manufacturer. In this regard, contribution of SPINNOVATION is praiseworthy in educating the Spinner as well as the Weaver / Knitter in making use of the compact yarn most profitably.

We, at GTN group,installed the first SUESSEN EliTe®Ring Spinning Machine as early as 1999 with just 3,000 spindles and today we are at almost 80,000 spindles and by 1st quarter 2008, we will be completing 100,000 spindles. Counts ranging from Ne 30s to 120s are regularly manufactured, practically maintaining the same normal Ring Frame speed, with far better yarn quality parameters.

The benefits accrued from this yarn were dealt with in greater details in most of the articles of SPINNOVATION or elsewhere. However, so far, the phenomena of **cop to cone** compact yarn quality difference have not been dealt with in any article in the SPINNOVATION. Therefore an attempt is made here to share our own experience on the subject with our fine and superfine yarns.

Cop to cone increase in imperfections

Upon the introduction of automatic winders two decades ago, a significant increase in yarn imperfections and hairiness was noticed in the final yarn, especially in counts above Ne 50s. Counts like Ne 100s and Ne 120s, the increase in imperfections was as high as 80–120%. This phenomenon of abnormal increase in imperfections was taken up with manufacturers of automatic winders as well as lab equipment manufacturers and several trials were conducted over these years. In spite of the best efforts by the manufacturers of automatic winders, no substantial reduction could be achieved till now.

But with the compact yarn, the adverse effect on the yarn quality after the winding process was found significantly reduced. For a spinner like us, who is marketing yarn in the cone form, it was a great relief. This advantage is accrued only due to the substantially lower hairiness in the parent compact cop yarns. In table 1 we have

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GTN TEXTILES

Table 1: Summary of difference in yarn quality parameters of various compact/normal yarn counts after winding

Count (Ne)	U% increase (unit)	IPI Increase%	RKM diff%	Elongation diff%	UT-3 H increase%	Zweigle S3 increase%
50/1 combed weaving (compact)	+0.1	20	0.0	+2.0	+17.7	+457
50/1 combed weaving (normal)	+0.7	50	+0.7	+2.7	+15.0	+88
60/1 combed weaving (compact)	+0.1	22	–1.9	0.0	+8.9	+377
60/1 combed weaving (normal)	+0.5	62	+0.4	0.0	+16.4	+79
70/1 combed weaving (compact)	0.0	24	+2.7	+5.1	+7.7	+380
70/1 combed weaving (normal)	+0.3	65	–1.1	+4.5	+25	+140
80/1 combed weaving (compact)	+0.1	22	+0.7	0.0	+23.6	+896
80/1 combed weaving (normal)	+0.4	62	–0.4	+4.9	+17.7	+84
100/1 combed hosiery (compact)	+0.1	25	+1.8	+3.3	+7.5	+208
100/1 combed hosiery (normal)	+0.5	82	–0.8	+2.0	+16.7	+77
Overall average of Compact yarn	+0.1	23	+0.8	+2.0	+13.0	+463
Overall average of normal ring spun yarn	+0.5	64	–1.2	+2.8	+18.2	+94

summarised the yarn deterioration in quality of both compact and normal yarns after cone winding.

As can be seen, there is a significant reduction in IPI increase in the Compact Yarn in all the counts compared to normal yarn, without any exception. However as far as hairiness is concerned, the increase in Zweigle S3 values is much higher than normal spun yarn; however the same trend is not noticed in UT3 Hairiness values. Of course the S3 value of compact cone yarn is still lower by 50% of normal cone yarn.

The data used in the table 1 is the overall average of the yarn quality tested at Ring Frame Bobbin stage and cone from the Autoconer for a period of two years.

EliTwist®Technology

We have added small capacity of EliTwist®Spindles and commercial production started recently in super fine counts and yarn is marketed under the brand **"WONDERTWIST"**.

Initially, the customers were hesitant to use this new concept yarn and have been informing that the real "doubled yarn effect" is not achieved in final finished fabric with this yarn. However later on, a few of them, realizing the price/performance advantage, started consuming. Here again, the education of the end users to exploit the maximum advantage of this yarn is to be undertaken by both yarn and m/c manufacturer. As far as a spinner is concerned, the elimination of assembly winder and double yarn twisting, result in saving in investment, power, labour, space etc. The end user is also benefited by lower yarn price

Table 2: Summary of difference in yarn quality parameters of various compact/normal yarn counts after winding counts after winding (cop to cone)

Count (Ne)	U% increase (unit)	IPI Increase%	RKM diff%	Elongation diff%	UT-3 H increase%	Zweigle S3 increase%
80/1 combed weaving wondertwist	–0.1	17	2.2	1.8	3.4	319
100/2 combed weaving wondertwist	–0.1	15	2.2	5.0	4.8	350
Overall average of wondertwist	0.1	16	2.2	3.4	4.1	355

Table 3

Count (Ne)	80/2 CW-WT (TM-4.0)	80/2 CWR (TM-4.0)	80/2 CWFG (TM-4.0)	% diff w.r.t.	% diff w.r.t.
Remarks	**Wondertwist yarn**	normal doubled yarn	normal gassed yarn	normal doubled yarn	normal gassed yarn
UTJ Results:					
Single yarn strength (cN)	**477.3**	425.6	464.9		
Rkm	**33.0**	29.4	32.1	+12.2	+2.8
Rkm CV%	**6.6**	7.1	7.2		
Elongation%	**5.7**	5.1	5.2	+11.8	+9.6
Elongation CV%	**5.7**	8.7	6.4		
B-work (cN.cm)	**714.8**	591.2	643.8	+20.9	+11.0
UT-3B Results:					
U%	**8.4**	8.5	8.3	–0.1 unit	+0.1 unit
Thin places (–50%)/km	**0**	0	0		
Thick places (+50%)/km	**6**	33	+100	+100	
Neps (+200%)/km	**19**	**13**	**10**	**+46**	**+90**
IPI/km (Normal sen.)	**25**	16	13	+56.2	+92
Thin places (–40%)/km	**8**	7		5	
Thick places (+35%)/km	**51**	53	47		
Neps (+140%)/km	**79**	101	75		
IPI/km (Higher sen.)	**138**	161	127	–14	+8
Hairiness H	**3.1**	4.9	2.6	–36.7	+19.2
Hairiness sh	**0.6**	1.0	0.5		
Classimat Results:					
Total classimat faults	**95.0**	51.0	50.0	+86.3	+90
Objectionable faults	**1.2**	0.1	0.0		
Slub	**1.4**	0.1	0.0		
Zweigle Results:					
S3	**383.2**	544.8	43.1	–29.7	+800
S3 CV%	**16.5**	34.6	39		

with well acclaimed advantages of compact yarn.

EliTwist® cop to cone difference in yarn quality, as done with single EliTe®Yarn, is summarisel in table 2.

The above results are limited in scope; also a strict comparison of cop to cone, as done earlier, could not be done, as the process involved here is different and not identical.

Despite the increase in S3 hairiness being high, the hairiness level of this yarn is far lower than RING DOUBLED AND TFO twisted yarns – thanks to compacting!

Table 4

Count (Ne)	100/2 CW-WT (TM-4.0)	100/2 CWR (TM-4.0)	100/2 CWFG (TM-4.0)	% diff w.r.t.	% diff w.r.t.
Remarks	**Wondertwist yarn**	normal doubled yarn	normal gassed yarn	normal doubled yarn	normal gassed yarn
UTJ Results:					
Single yarn strength (cN)	**374.7**	319.9		347.5	
Rkm	**32.4**	27.6	30.0	+17.4	+8.0
Rkm CV%	**7.7**	7.8	8.1		
Elongation%	**5.6**	4.9	4.8	+14.3	+16.7
Elongation CV%	**6.0**	7.2	7.6		
B-work (cN.cm)	**578.4**	269.3	475.8		
UT-3B Results:					
U%	**9.1**	9.6	9.2	–0.5 unit	+0.1 unit
Thin places (–50%)/km	**1**	0	0		
Thick places (+50%)/km	**12**	8	7		
Neps (+200%)/km	**46**	42	26		
IPI/km (Normal sen.)	**59**	50	33	+18	+78
Thin places (–40%)/km	**8**	7	5		
Thick places (+35%)/km	**95**	79	101		
Neps (+140%)/km	**164**	140	161		
IPI/km (Higher sen.)	**290**	242	294		
Hairiness H	**2.6**	3.0	2.4	–13	+8
Hairiness sh	**0.5**	0.7	0.5		
Classimat Results:					
Total classimat faults	**161**	50.0	63.0	+222	+155
Objectionable faults	**2.0**	0.2	0.1		
Slub	**2.2**	0.0	0.1		
Zweigle Results:					
S3	**266.6**	1195.0	22.9	–78	+1056
S3 CV%	**22.0**	14.1	39.8		

The tables 3 and 4 show the difference in yarn qualities with respect to traditional doubled yarn and gassed yarn. From these limited comparative studies, the superiority of EliTwist®Yarn with respect to RKM and elongation is well proved. Hairiness, obviously, is lower in EliTwist®Yarn compared to twisted grey yarn. However, gassed yarn hairiness is definitely lower than the EliTwist®Yarn. Similarly Classimat faults are also high in EliTwist®Yarn. However, looking to the greater scope of this system and resultant yarn, we are of the opinion that this yarn can replace conventional doubled yarn in certain sectors of end use.

Experience with EliTe® and EliTwist®CompactSet – A Practical Assessment

Arun Nijhawan, General Manager, Nahar Industrial Enterprises, India

The spinner earlier has always been perplexed with the simple question whether he was over-spinning, or under-spinning[1] with the cotton provided to him. He was always asking himself as a sensitive spinner whether he was doing justice to the cotton while he was spinning a yarn count – in terms of cost effectiveness, productivity, quality and sales revenue.

Cotton being a natural fibre has a considerable variation in its properties even in the same category – which is known to all. The spinner as a team leader had to optimize his process to get the best yarn from his cotton, but the question: "Well, am I doing this right?" always was coming to his mind. He had been in search all the time of a key process answering this highly important question.

Ring spinning as the most acceptable yarn spinning system has seen several changes to improve quality and productivity within the course of time but the changes so far could not satisfy the spinner's needs.

The revolutionary change came in 1999/2000 when SUESSEN and others introduced their compact spinning systems globally; the full exploitation of cotton fibre in terms of quality, productivity, end breakage rate became possible and gave relief to the spinner.

Compact spinning (the system ensures optimum utilization of costly raw material with minimum loss and damage to the fibre) improves the yarn quality tremendously, most importantly on the hairiness aspect.

We introduced SUESSEN's EliTe®Compact Spinning System in 2004, converting 2 ring frames and in due course of time, realizing the advantages of the system and the market acceptability of the yarn and end product, we ordered for total capacity for EliTe®CompactSet and EliTwist®CompactSet on 35,000 spindles.

The yarn results achieved with SUESSEN EliTe®Compact Yarn Ne 50/1 and Ne 40/1 compared to normal spun combed yarn of same counts are as tabulated in table No. 1.

The results achieved with SUESSEN EliTwist®Compact Yarn Ne 40/2 compared to normal TFO yarn Ne 40/2 are as per table 2.

These tables speak about the superior quality achieved with compact yarn and EliTwist® Yarn and apart from this quality improvement there is gain in

Table 1 (Cone Stage)

Count (Ne)	50/1 CW EliTe®	50/1 CW normal	40/1 CW EliTe®	40/1 CW normal
Count	**50.14**	50.12	**40.10**	40.12
Count CV%	**1.2**	1.2	**1.2**	1.24
CSP	**3265**	2985	**3350**	2925
U%	**10.85**	11.02	**9.65**	10.12
Thin places (–50%)/km	**4**	9	**0**	1
Thick places (+50%)/km	**25**	34	**15**	20
Neps (+200%)/km	**61**	110	**40**	63
Total IPI	**90**	125	**55**	84
Hairiness H	**3.48**	5.12	**3.9**	5.23
RKM	**20.84**	18.78	**20.24**	18.6
RKM CV%	**6.14**	6.95	**–**	–
Elongation E	**4.95**	4.4	**4.75**	3.98
S3	**231**	920	**475**	1350

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Table 2 (Cone Stage)

Count (Ne)	40/2 CW EliTwist®	40/2CW T.F.O.
Count	20.10	20.14
Count CV%	1.2	1.24
CSP	3634	2825
U%	7.04	7.62
Thin places (–50%)/km	0	0
Thick places (+50%)/km	3	2
Neps (+200%)/km	4	8
Total IPI	7	10
Hairiness H	4.56	7.13
RKM	21.02	18.50
Elongation E	5.96	4.08
S3	319	845

production in ring frame by applying optimum twist multiplier for a particular cotton, say: even with a twist multiplier of 3.5 one is able to spin the yarn.

Compared to TFO yarn, there are considerable savings when producing EliTwist®: As assembly winding and the TFO process are eliminated, the cost of power and labor associated with these processes is eliminated. Also the production rate of the ring spinning process is more than double.

We are marketing a very popular brand of garments. The compact yarn has enhanced the brand value of the product because of its excellent contribution to the fabric structure in terms of

- extra smoothness on fabric surface
- resistance against abrasion and pilling
- dense fabric
- superior draping characteristics
- lustrous appearance of fabric because of excellent dye pick-up.

We have replaced classical T.F.O. double yarn in certain market clusters with EliTwist® Yarn completely. In some other markets the EliTwist® Yarn has replaced the requirement of gassed hosiery yarn.

We find SUESSEN EliTe® and EliTwist®Systems very user friendly, easy to maintain and consistent viz-a-viz certain other compacting systems available in the market. Though rarely needed, SUESSEN Service Teams stand by the mill for quick help with queries and problems.

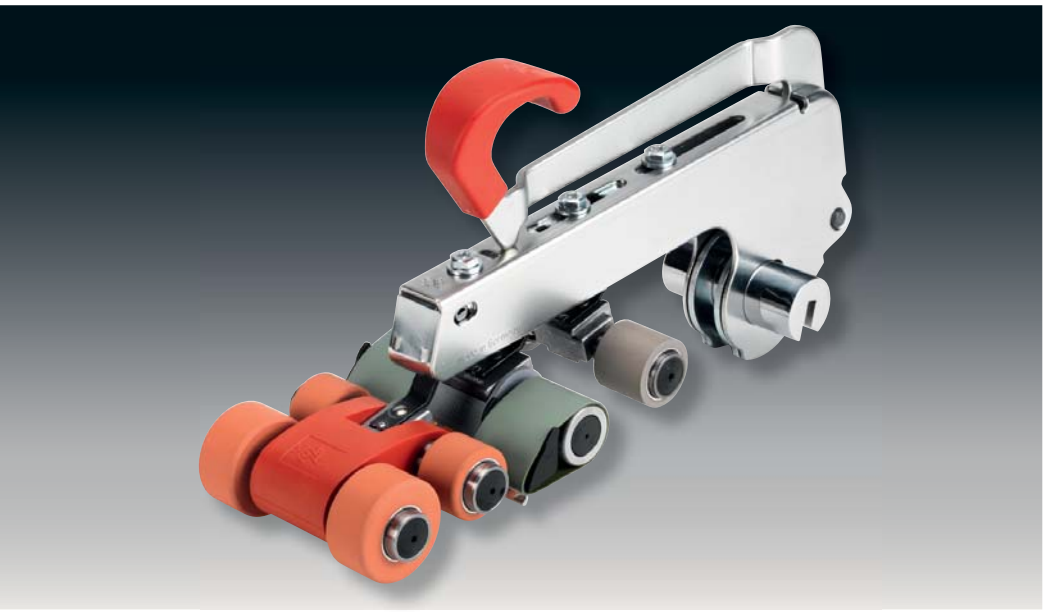
The added advantages we find with compact spinning systems is a clean atmosphere in department, better yarn realization because of less invisible loss, increased workers' job satisfaction due to less fatigue while maintaining negligible end breakage rate in ring frame and a sense of mental satisfaction having worked with a sophisticated instrument.

Of course, nonetheless, we feel a continuous training to the technicians, workmen, and laboratory personnel is necessary to get best results from the system and for this a joint venture from SUESSEN and mills management is the demand of the time and the endeavor should continue.

[1] Under-spinning: Using too good a cotton for a given yarn count
Over-spinning: The opposite.

Fig. 1

Fig. 2



Suessen is built on a solid foundation. In conjunction with the sister companies, Bräcker, Graf and Novibra, Suessen is securely embedded in the network of total solution and application expertise in yarn processing.

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