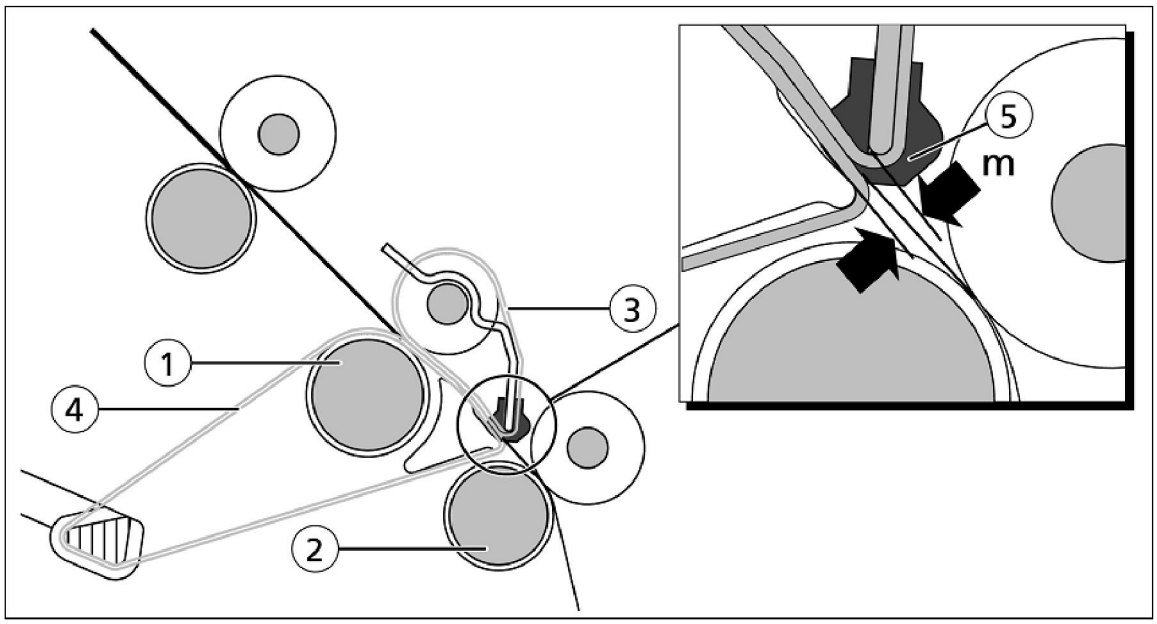
Known values	Sought values				
	tex	Nm	Ne_B	grains/yard	NE_K
tex		$\frac{1{,}000}{\text{tex}}$	$\frac{590}{\text{tex}}$	$\frac{\text{tex}}{70.92}$	$\frac{885.8}{\text{tex}}$
Nm	$\frac{1{,}000}{\text{Nm}}$		$\frac{\text{Nm}}{1.69}$	$\frac{14.1}{\text{Nm}}$	$\frac{\text{Nm}}{1.129}$
Ne_B	$\frac{590}{Ne_B}$	$1.69 * Ne_B$		$\frac{8.34}{Ne_B}$	$Ne_B * 1.5$
grains/yard	$gr/yd * 70.92$	$\frac{14.1}{gr/yd}$	$\frac{8.34}{gr/yd}$		$\frac{12.48}{gr/yd}$
NE_K	$\frac{885.8}{NE_K}$	$NE_K * 1.129$	$NE_K * 0.68$	$\frac{12.48}{NE_K}$	

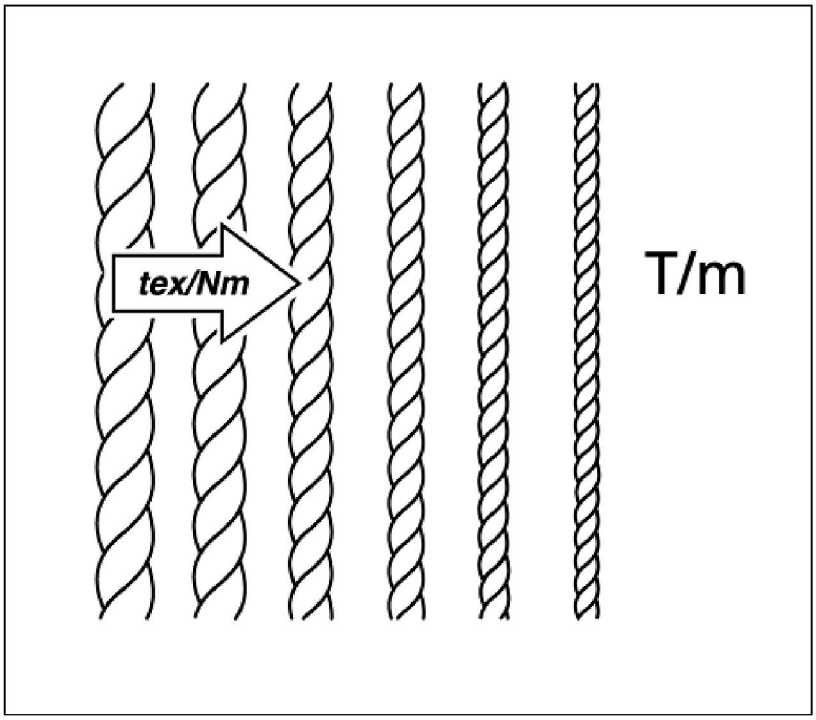
جدول تبدیل نمره های سیستم مستقیم و غیر مستقیم

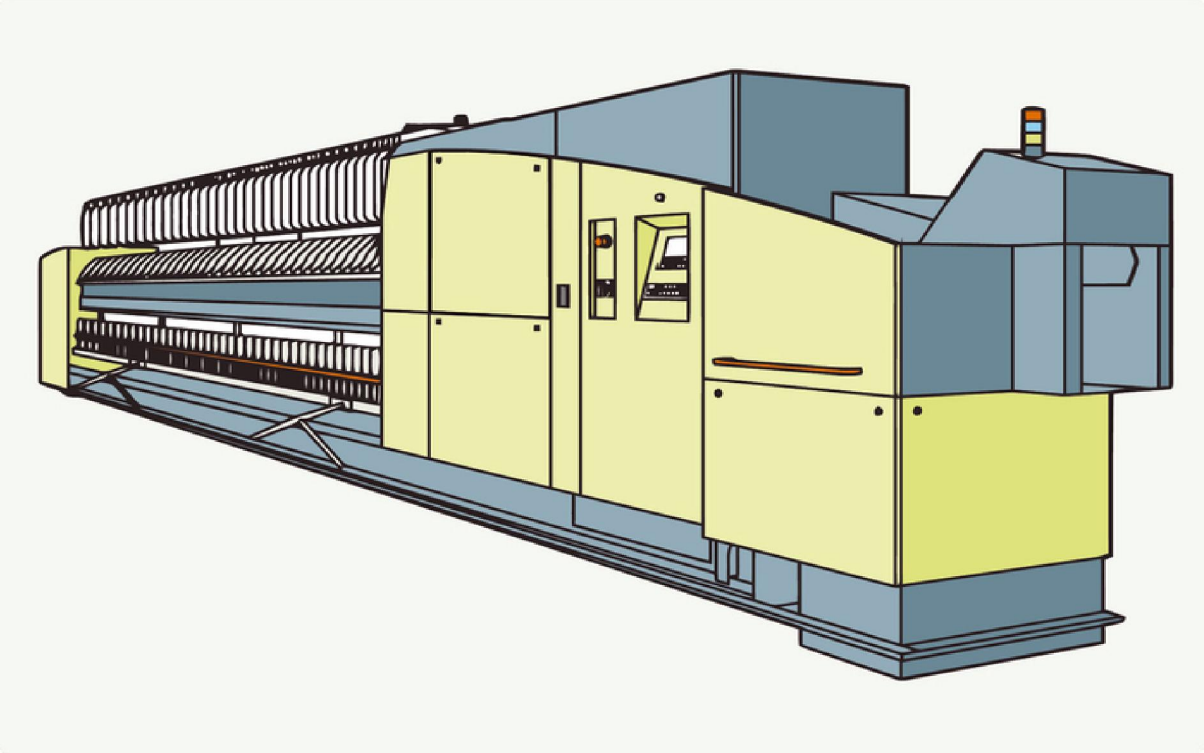
Application	Name	Dimension name
Fibers	Decitex (dtex)	$\frac{1\ g}{10{,}000\ m} = 0.1\ tex$
Roving or yarn	Tex (tex)	$\frac{1\ g}{1{,}000\ m} = 1\ tex$
Slivers, laps, ropes	Kilotex (ktex)	$\frac{1\ g}{1\ m} = 1{,}000\ tex$



Adjusting the cradle opening

1	Middle rollers	4	Bottom apron
2	Front rollers	5	Distance clip
3	Top apron	m	Cradle opening


tex/Nm
T/m



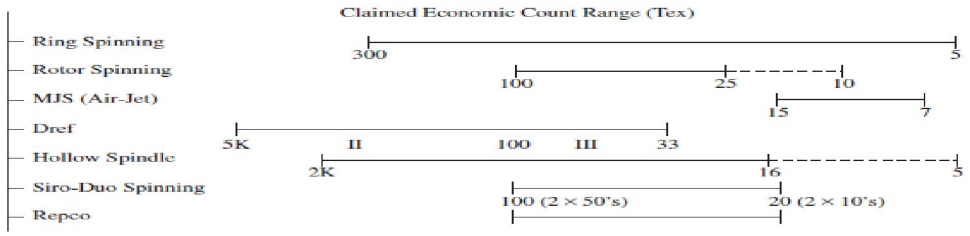
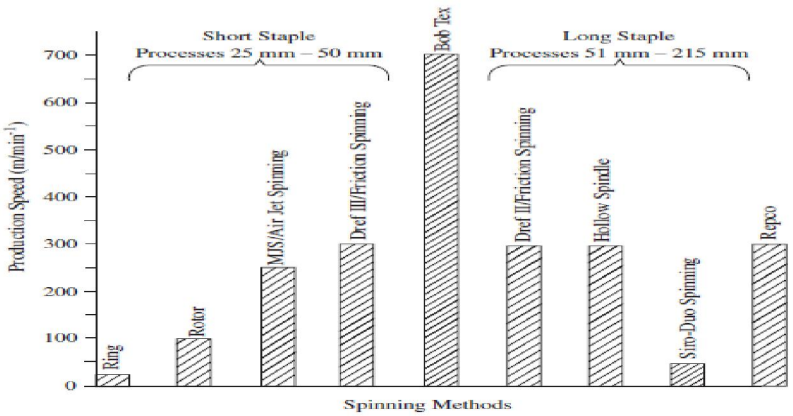
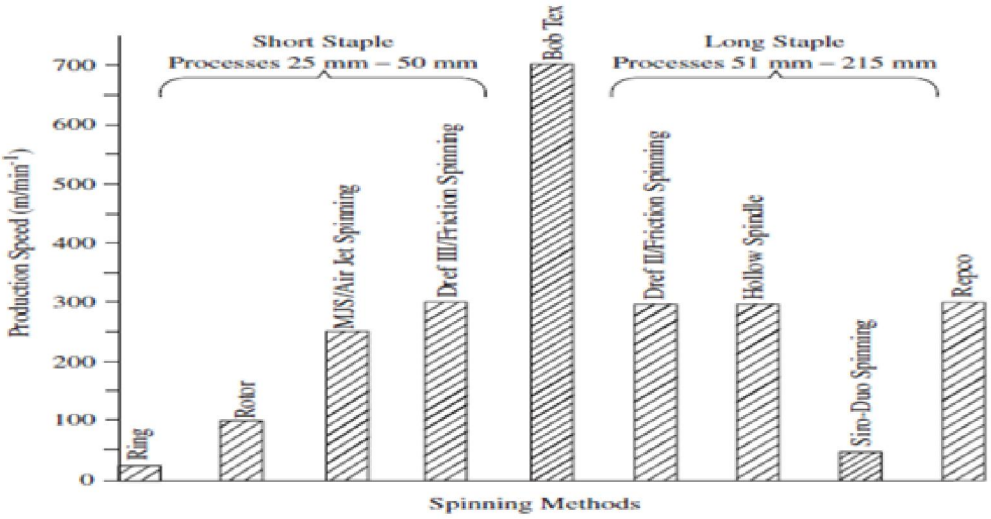
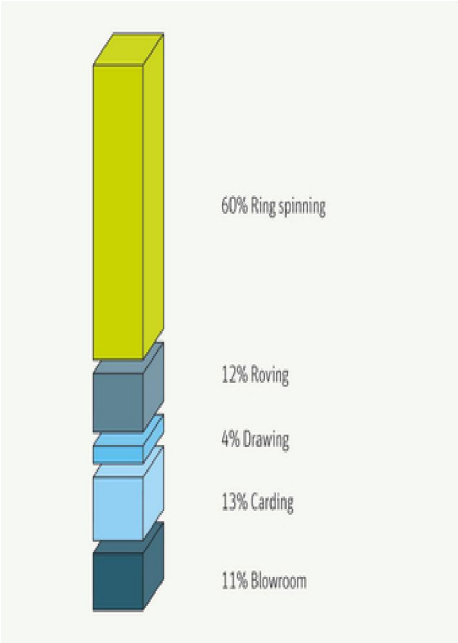
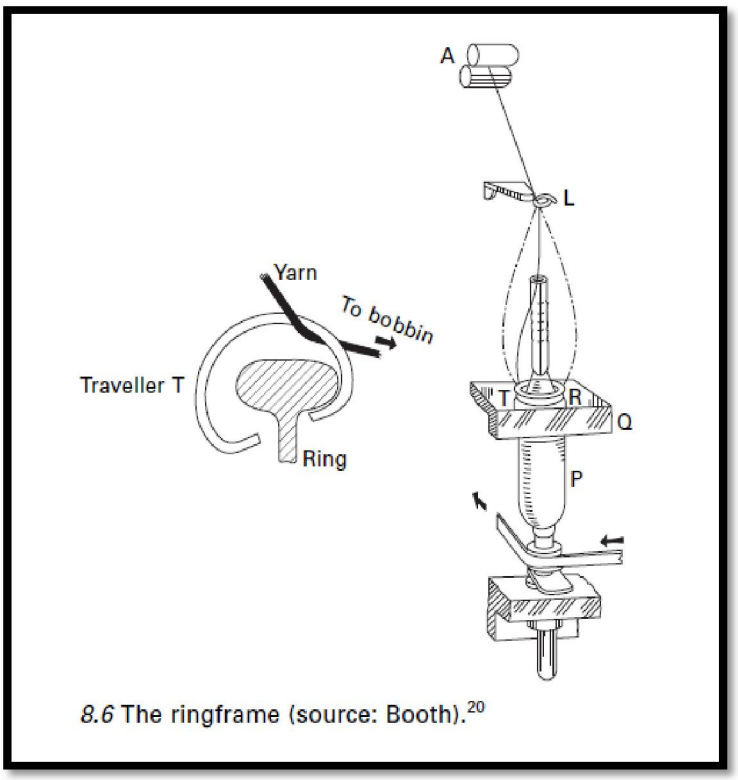


FIGURE 6.1 Economic count range of spinning systems.

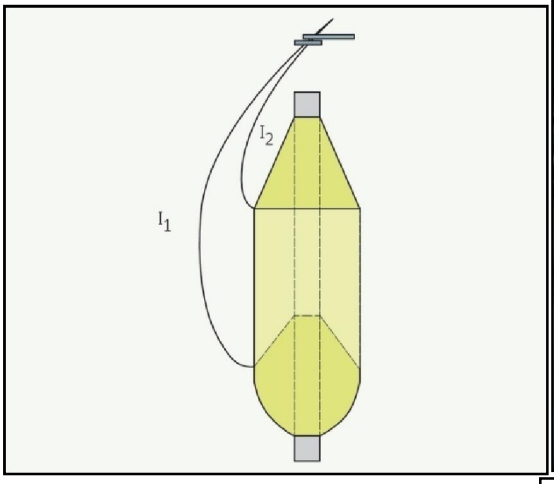



Short Staple
Processes 25 mm – 50 mm
Long Staple
Processes 51 mm – 215 mm
Production Speed (m/min-1)
0
100
200
300
400
500
600
700
Ring
Rotor
MJS/Air Jet Spinning
Dref III/Friction Spinning
Bob Tex
Dref II/Friction Spinning
Hollow Spindle
Siro-Duo Spinning
Repco
Spinning Methods


60% Ring spinning
12% Roving
4% Drawing
13% Carding
11% Blowroom



8.6 The ringframe (source: Booth).[20]



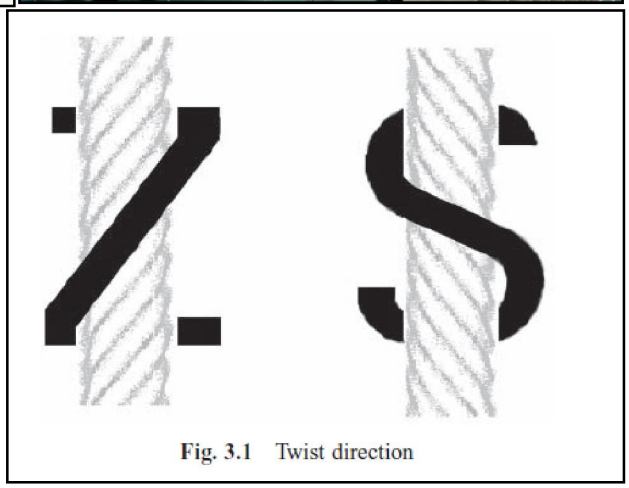
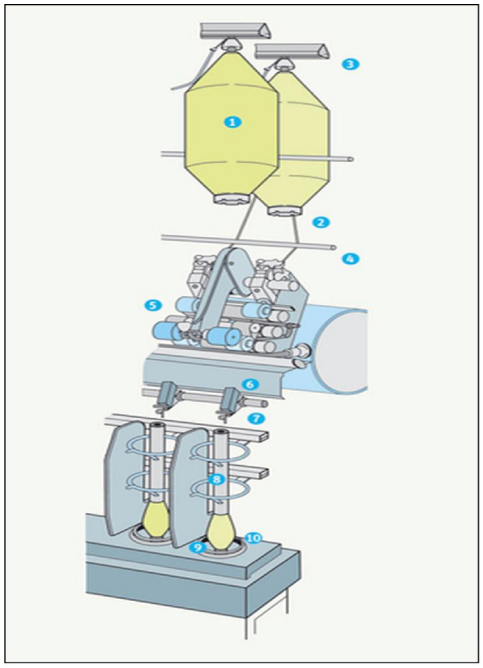
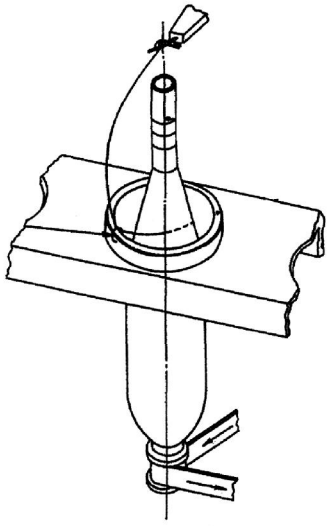
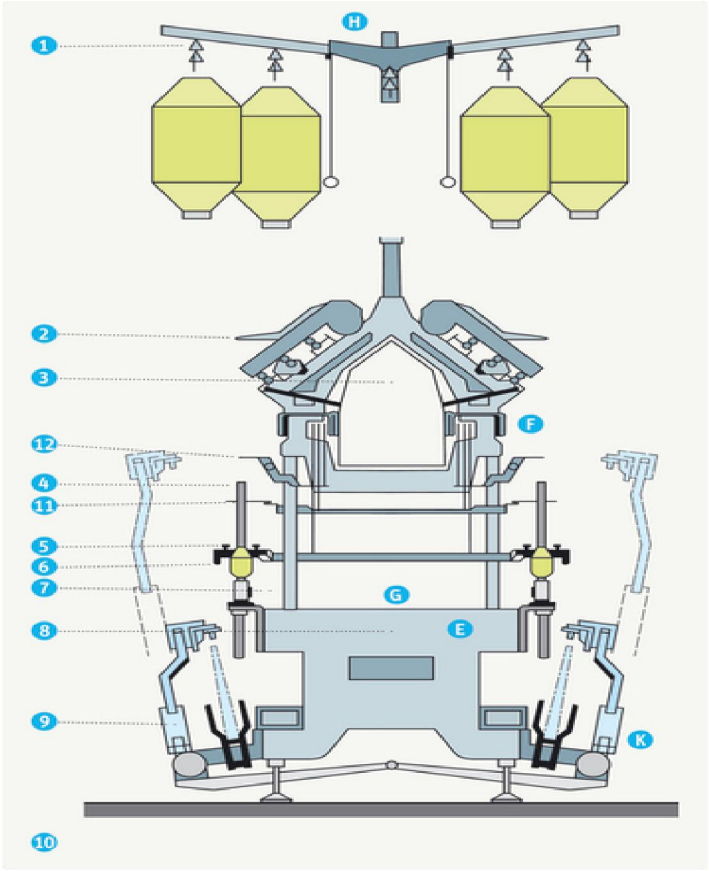


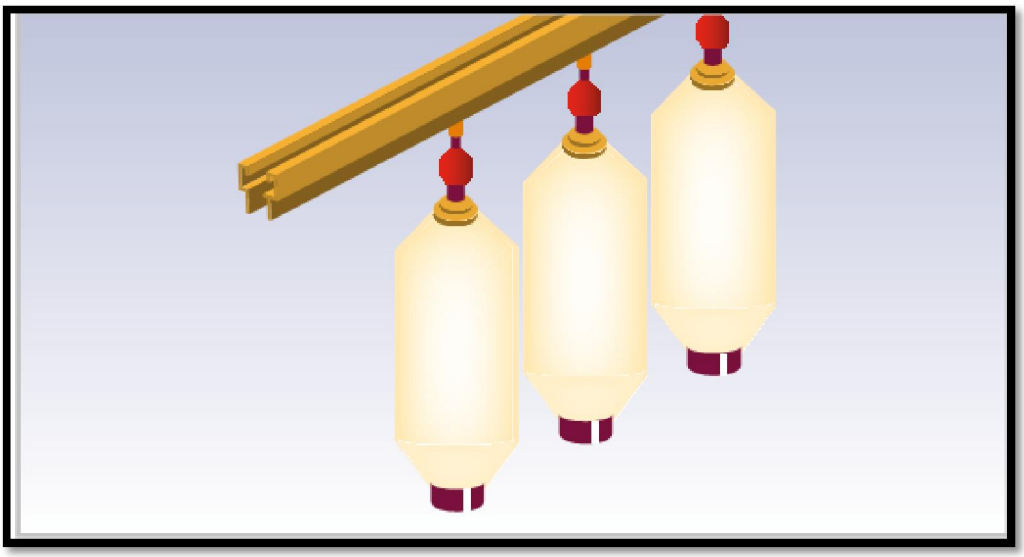
Fig. 3.1 Twist direction

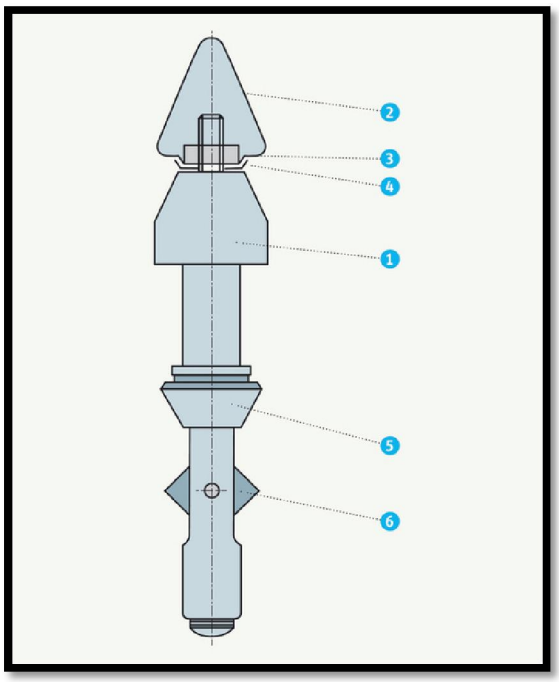


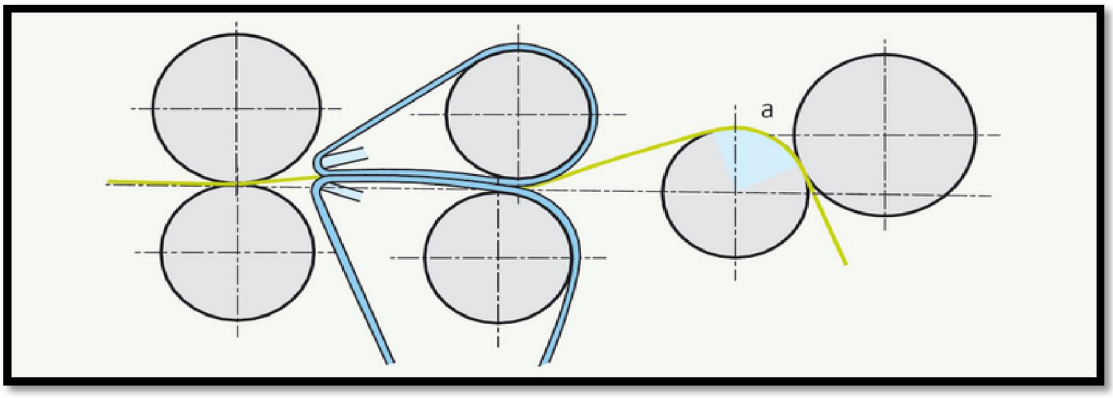


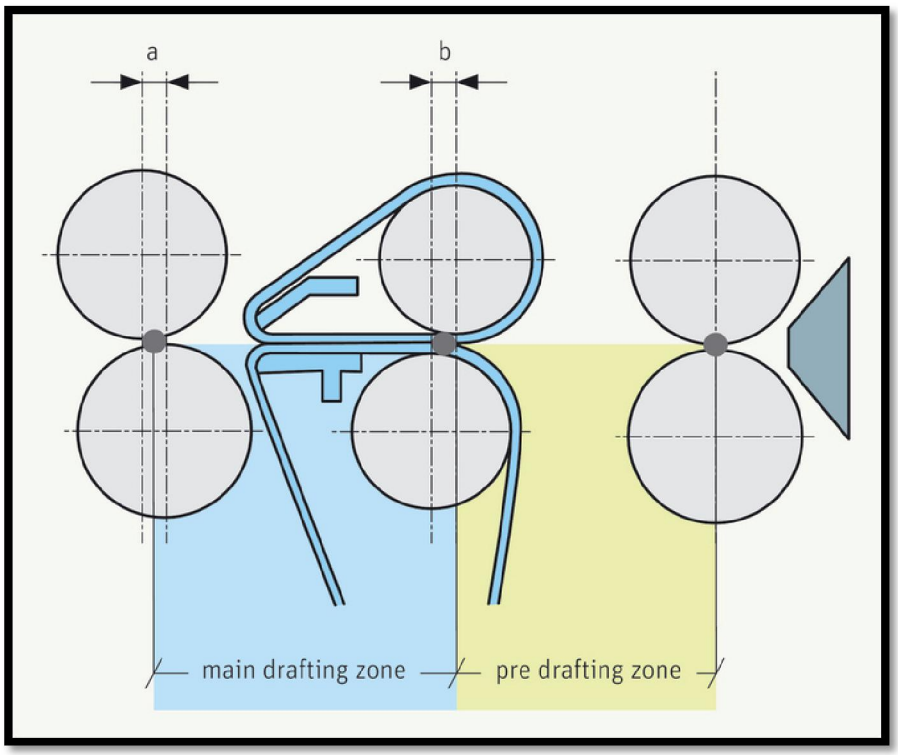
شیطانک از خود حرکتی ندارد و حرکت خود را از نخ در حال دوران می گیرد.

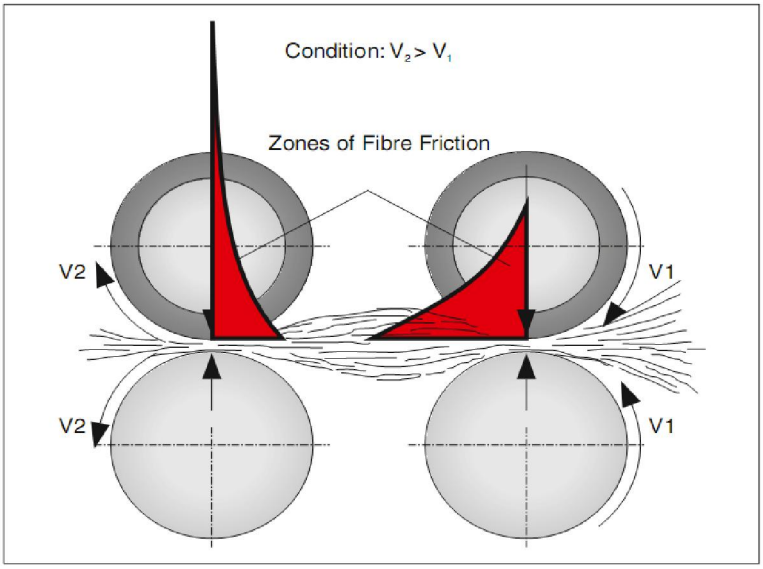

H
1
2
3
F
12
4
11
5
6
7
G
8
E
9
K
10




2
3
4
1
5
6


a


a
b
main drafting zone
pre drafting zone



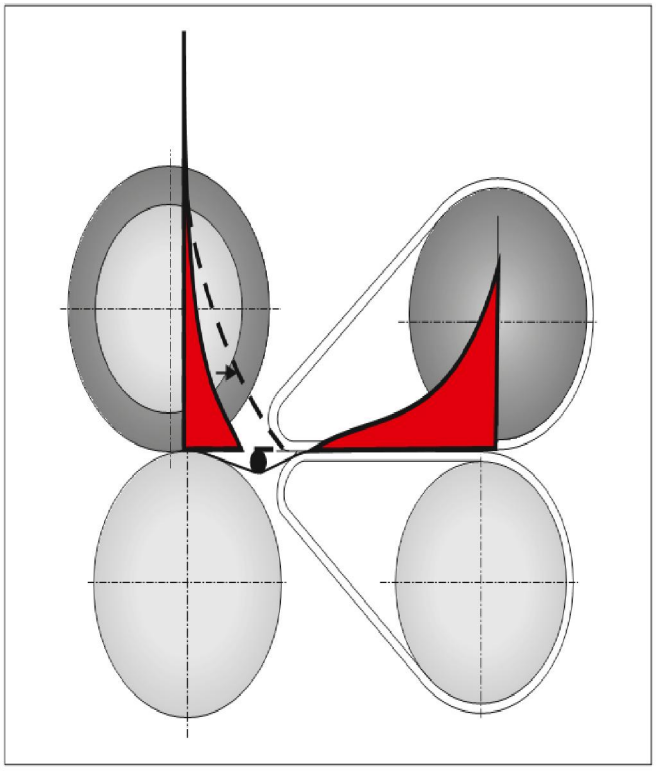
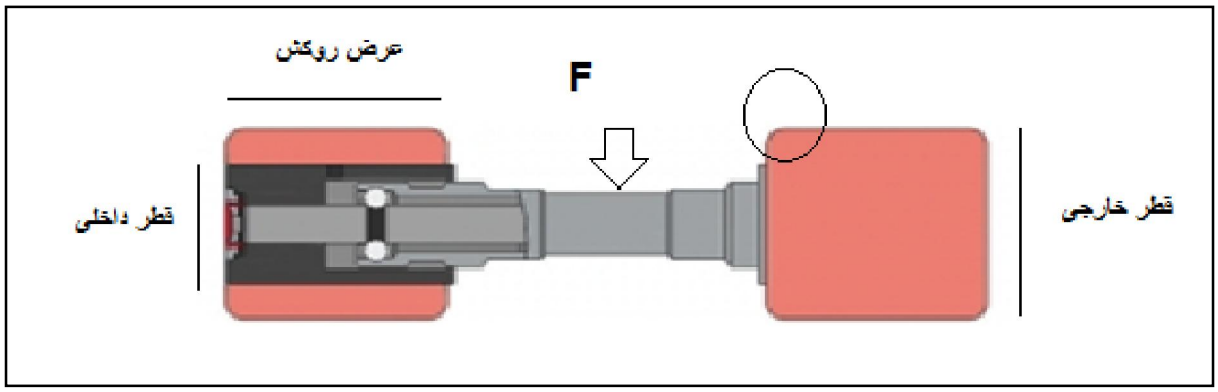


Fig. 6 Increased inter-fibre friction zones



Shore hardness testing device

HPSA R 35 M

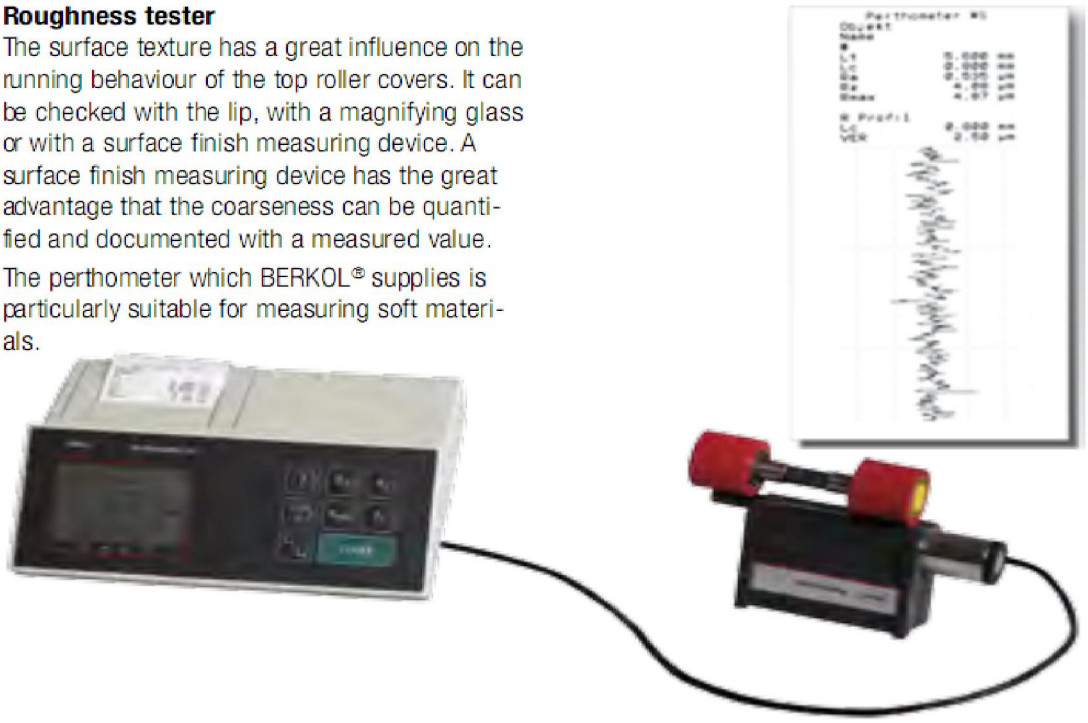
The hardness of top roller covers has a great influence on the draft performance and thus on the yarn quality. It is usually measured in Shore A. The standard measurement in accordance with DIN 53505 prescribes a coating thickness of minimum 5 mm and a press-on force of 1 kg. The measurement on a drum therefore usually differs from the effective value.

The BERKOL® hardness checking device is fitted with an appliance which shows the right press-on force.

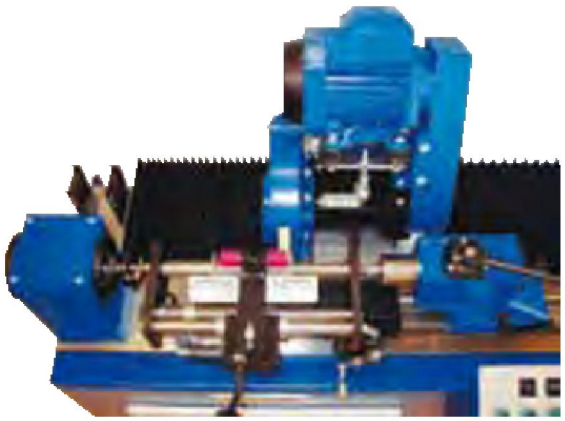
Roughness tester

The surface texture has a great influence on the running behaviour of the top roller covers. It can be checked with the lip, with a magnifying glass or with a surface finish measuring device. A surface finish measuring device has the great advantage that the coarseness can be quantified and documented with a measured value.

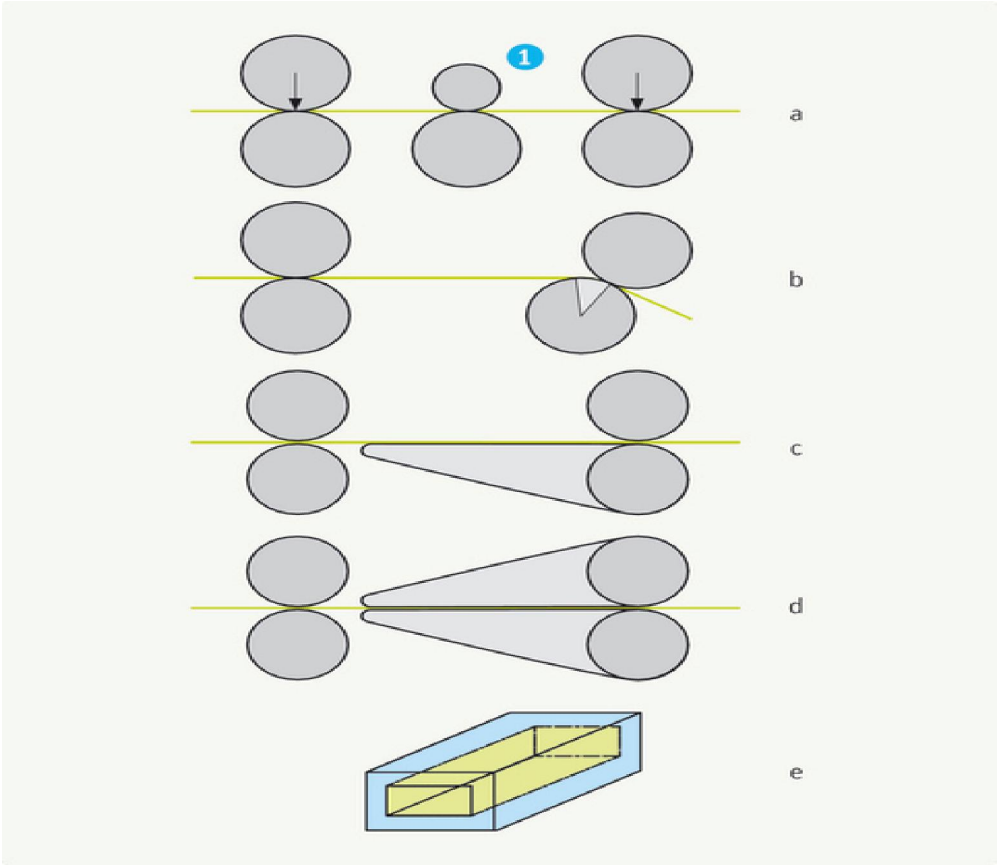
The perthometer which BERKOL® supplies is particularly suitable for measuring soft materials.

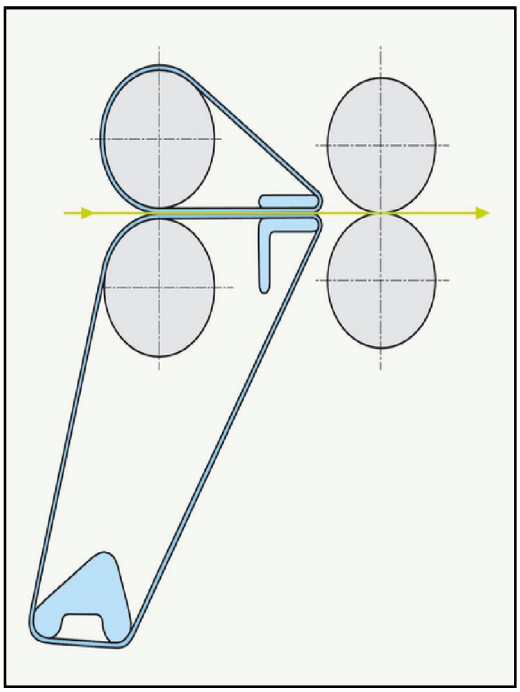


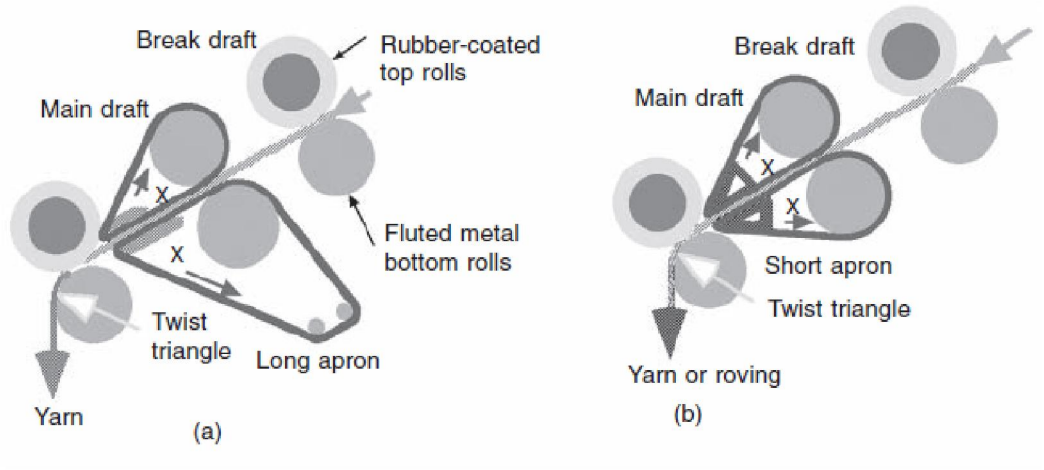
BERKOL® circular grinding machine Type BGU

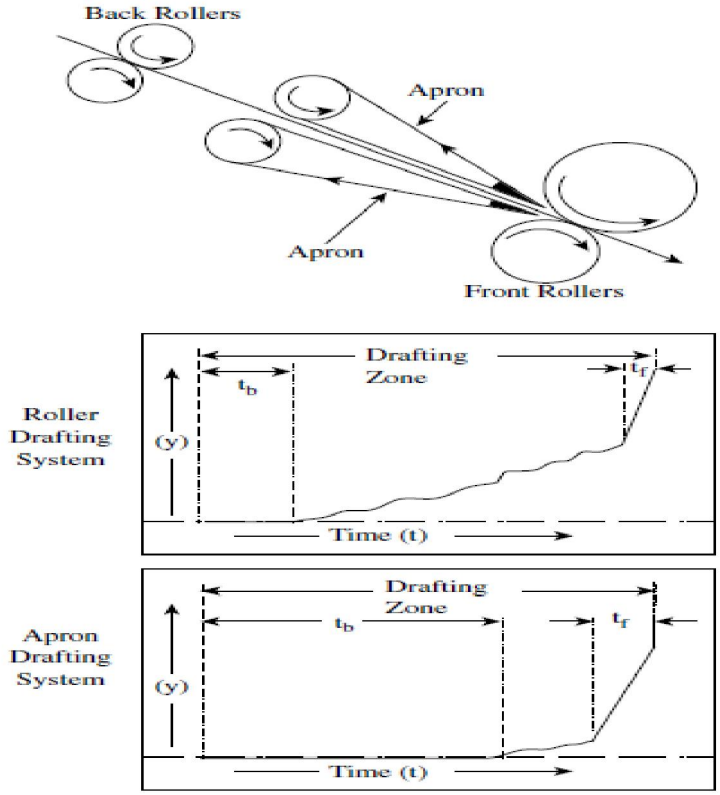


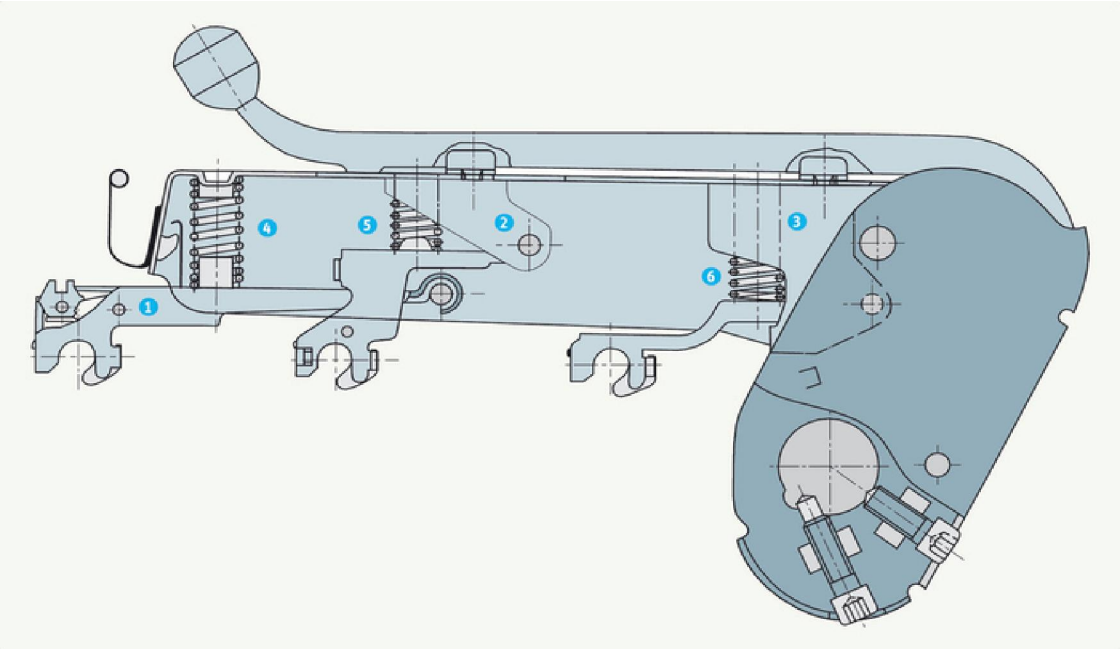
BGU with top roller grinding attachment

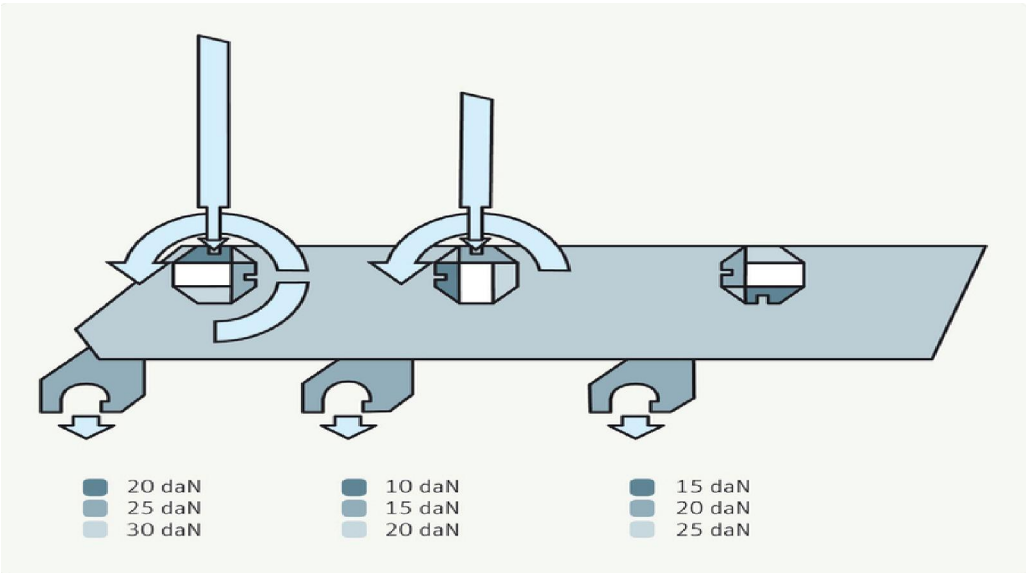

1
a
b
c
d
e

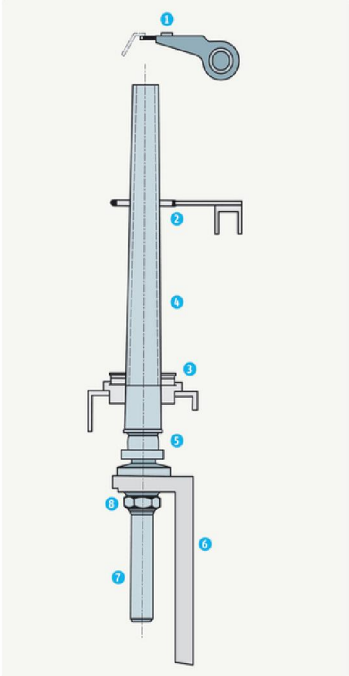


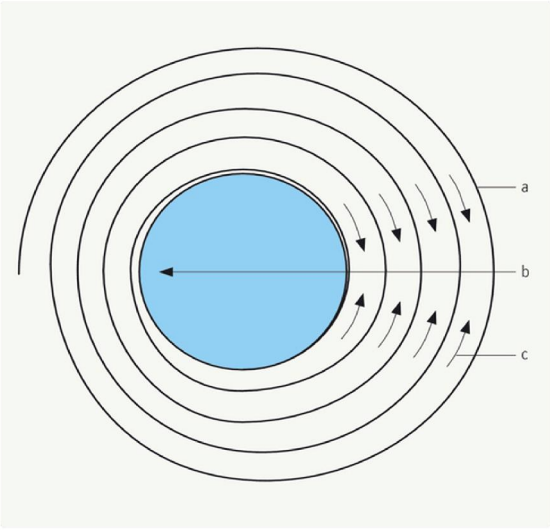

Break draft
Rubber-coated top rolls
Main draft
X
X
Fluted metal bottom rolls
Twist triangle
Long apron
Yarn
(a)
Break draft
Main draft
X
X
Short apron
Twist triangle
Yarn or roving
(b)


Back Rollers
Apron
Apron
Front Rollers
Roller Drafting System
Drafting Zone
t_b
t_f
(y)
Time (t)
Apron Drafting System
Drafting Zone
t_b
t_f
(y)
Time (t)

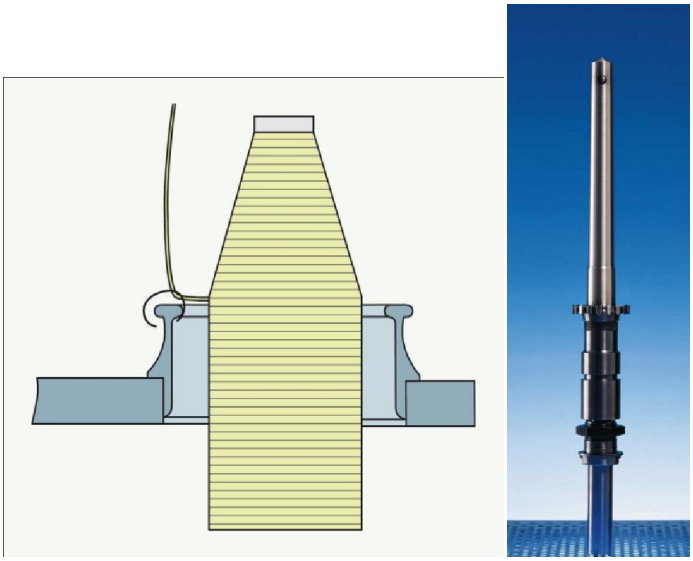

1
2
3
4
5
6

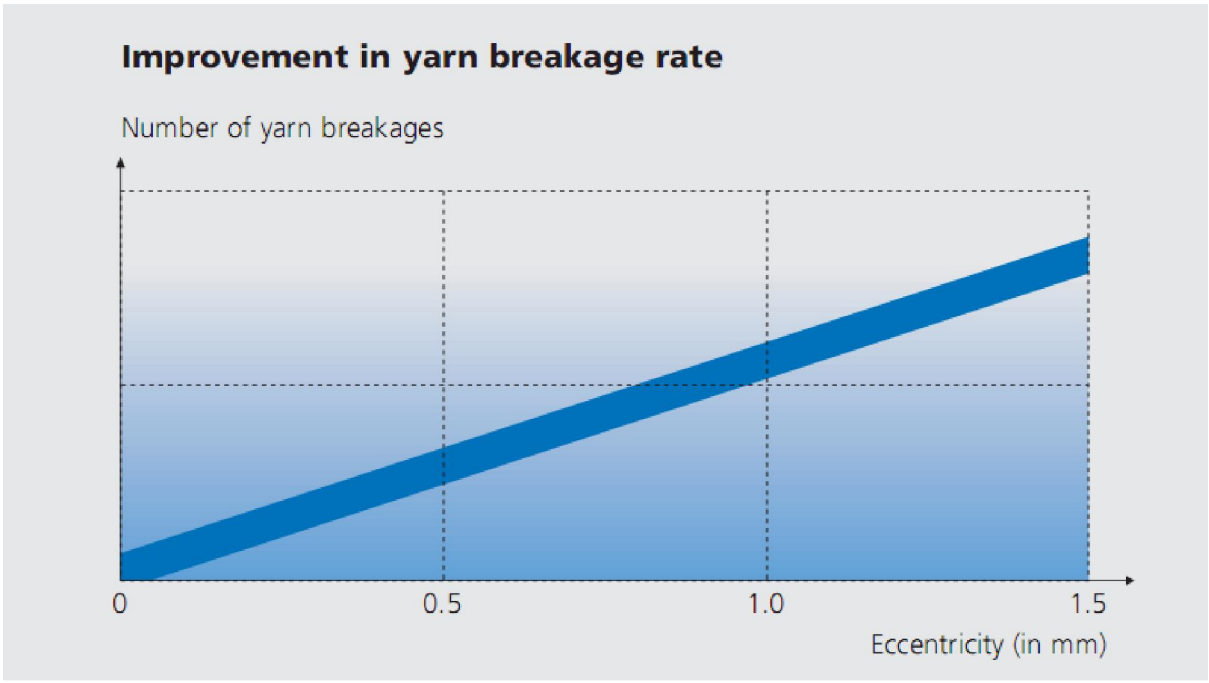

20 daN
25 daN
30 daN
10 daN
15 daN
20 daN
15 daN
20 daN
25 daN

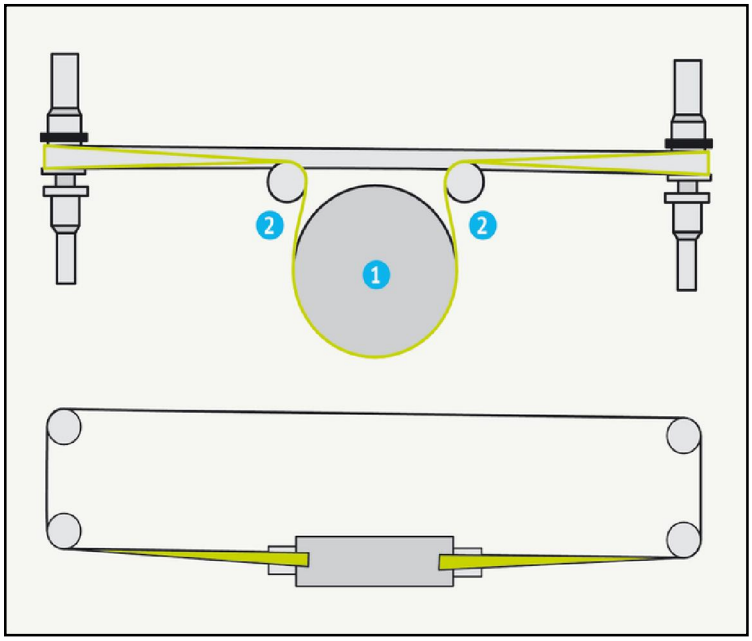


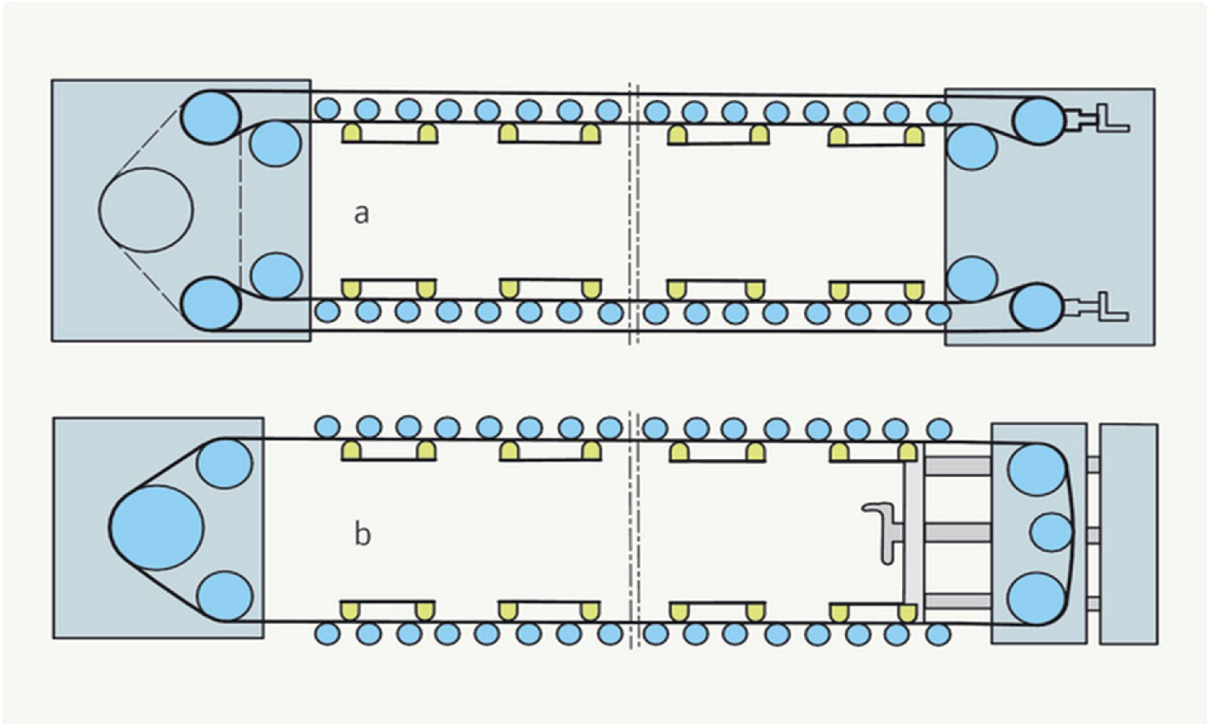


بعد از هر ۱۰۰۰۰ تا ۲۰۰۰۰ ساعت بایستی روغن تعویض شود.

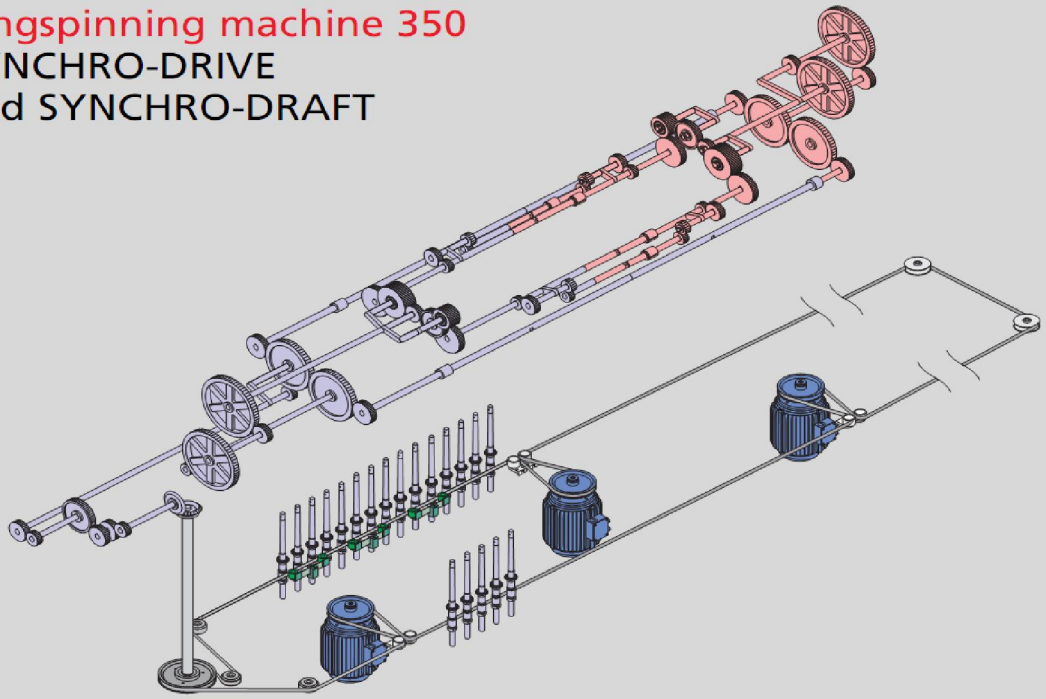


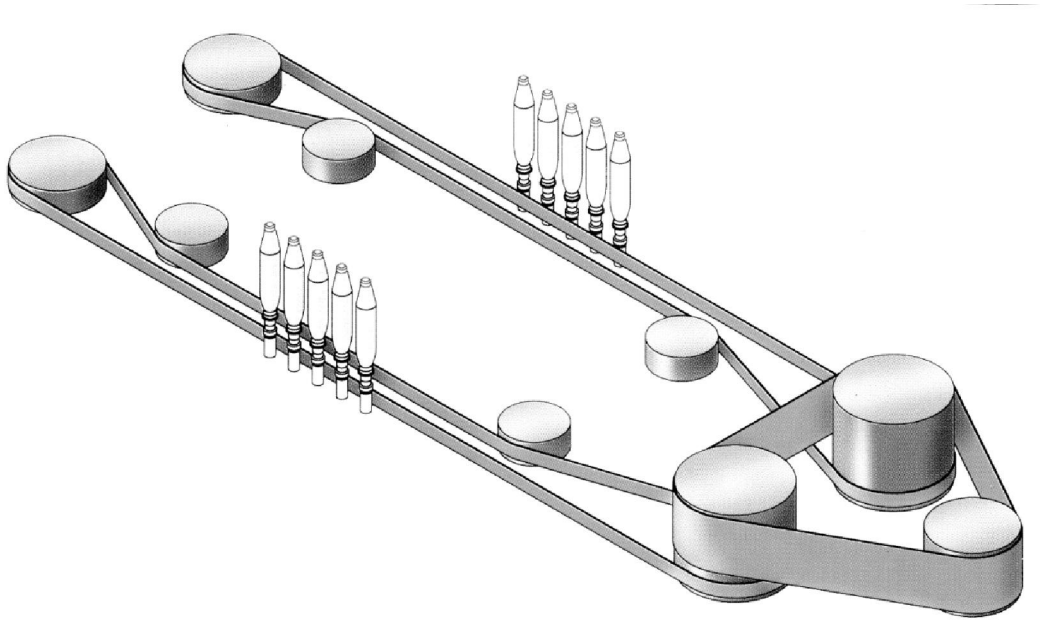

Improvement in yarn breakage rate
Number of yarn breakages
0
0.5
1.0
1.5
Eccentricity (in mm)


2
1
2


a
b

Ringspinning machine 350
SYNCHRO-DRIVE
and SYNCHRO-DRAFT





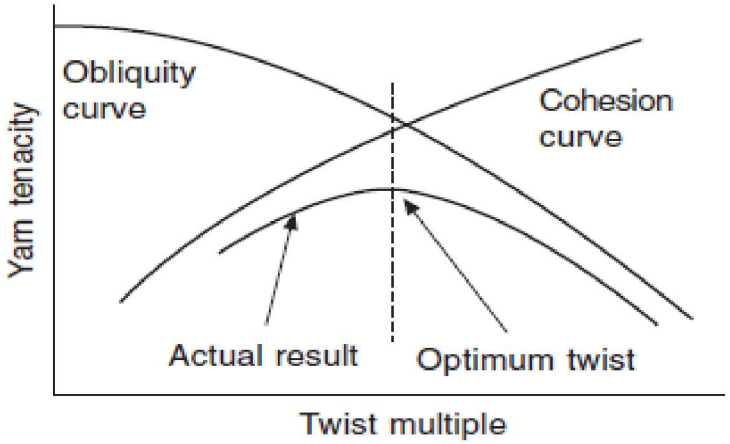


Fig. 3.2 Effect of twist on yarn strength

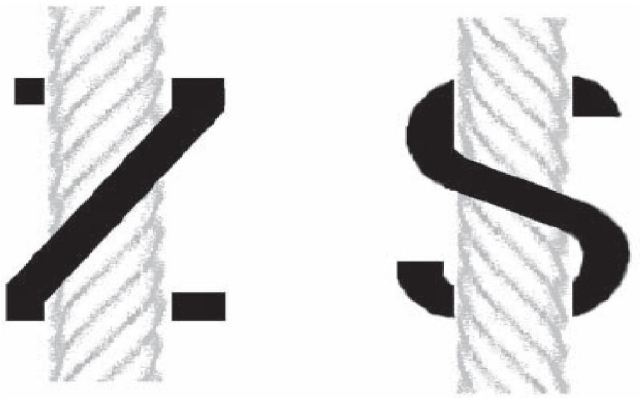
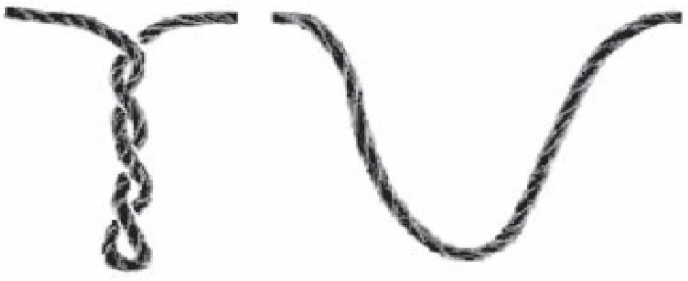


Fig. 3.1 Twist direction

Table 3.1 Typical twist multiples

System	Length	Use	N_e cotton count	N_m metric count	N_w worsted count
Cotton	Short	Warp	4.0–5.0	120–150	–
		Filling	3.2–3.8	110–115	–
		Hosiery	–	–	–
Cotton	Long	Warp	3.4–3.8	100–115	–
		Filling	2.5–3.0	75–90	–
		Hosiery	2.2–2.6	65–80	–
Wool	Long	Warp	–	65–75	1.8–2.0
		Filling	–	55–65	1.5–1.8
		Hosiery	–	45–55	1.4–1.5



(a) Twist lively (b) Non-twist lively

Fig. 3.4 Twist liveliness

Collection of formulae

a) $T/m = \dfrac{\text{spindle revolutions (1/min)}}{\text{delivery speed (m/min)}} = \dfrac{nspi}{L}$

b) $T/m = \dfrac{\alpha tex}{\sqrt{tex}}$ $T/m = \alpha m \times \sqrt{Nm}$

$T/" = \alpha e \times \sqrt{Ne_c}$

Conversion formulae

$T/m = \dfrac{\alpha m}{\sqrt{\frac{tex}{1000}}}$ $T/m = T/" \times 39{,}4$

$T/" = T/m \times 0{,}0254$

$\alpha tex = T/m \times \sqrt{tex}$ $\alpha tex = \alpha m \times 31{,}6$ $\alpha tex = \alpha e \times 958$

$\alpha m = \dfrac{T/m}{\sqrt{Nm}}$ $\alpha m = T/m \times \sqrt{\frac{tex}{1000}}$ $\alpha m = \dfrac{\alpha tex}{31{,}6}$ $\alpha m = \alpha e \times 30{,}3$

$\alpha e = \dfrac{T/"}{\sqrt{Ne_c}}$ $\alpha e = \alpha m \times 0{,}033$ $\alpha e = \alpha tex \times 0{,}00104$

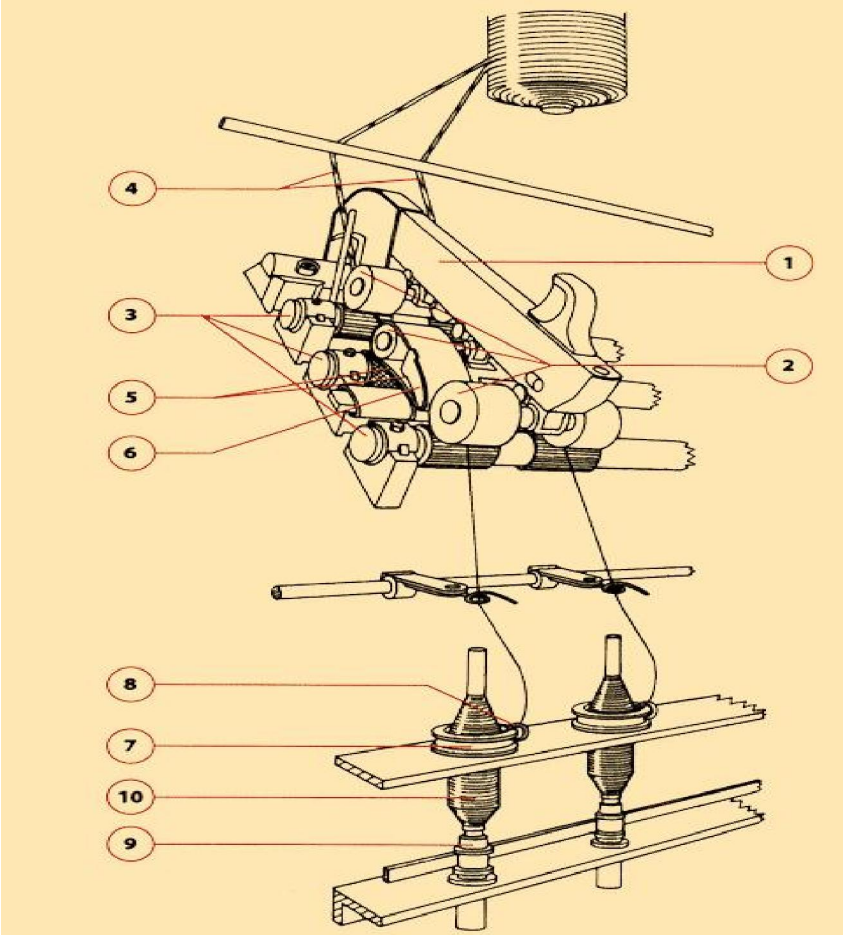


Fig. 1

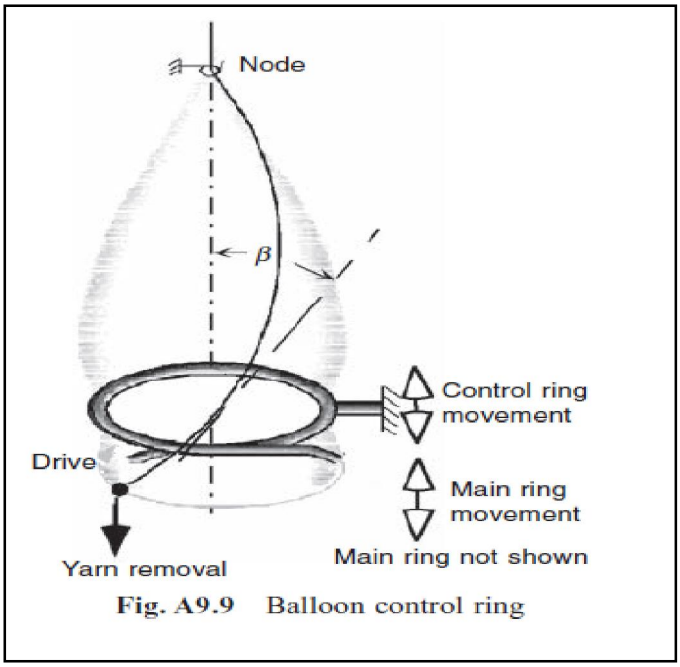
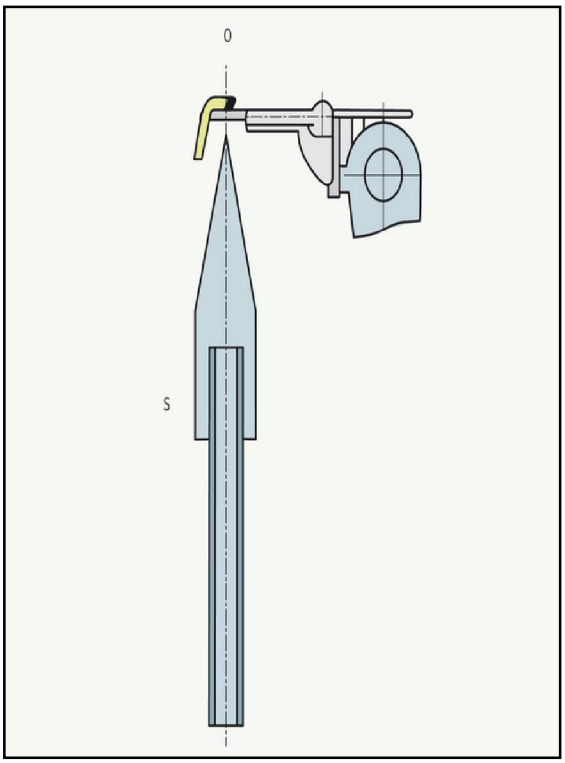
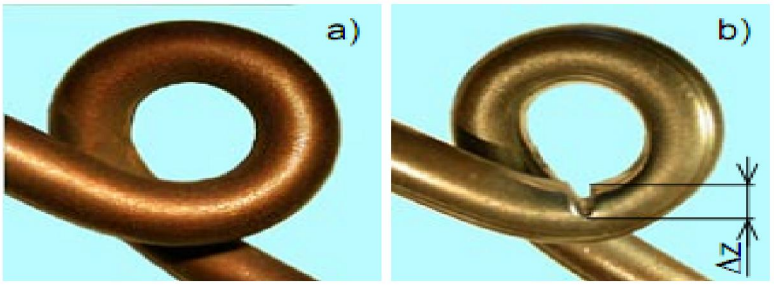
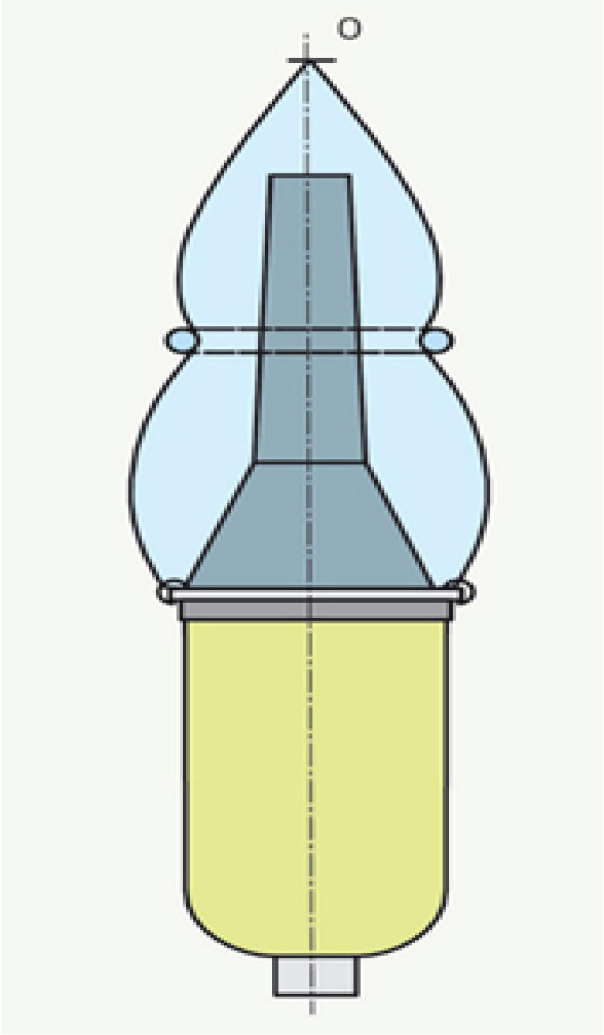
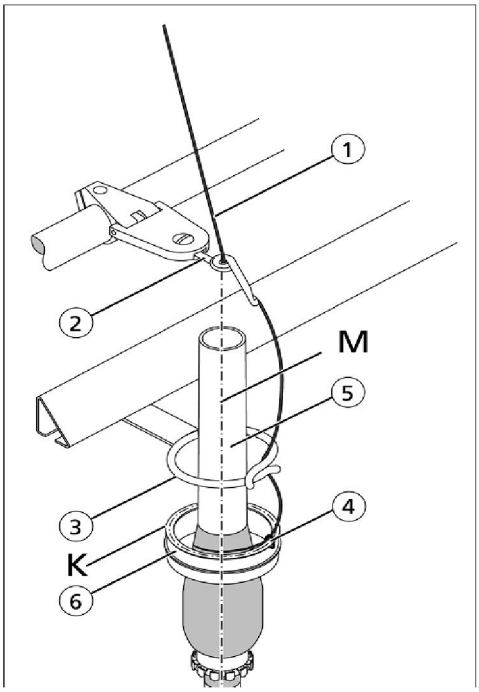


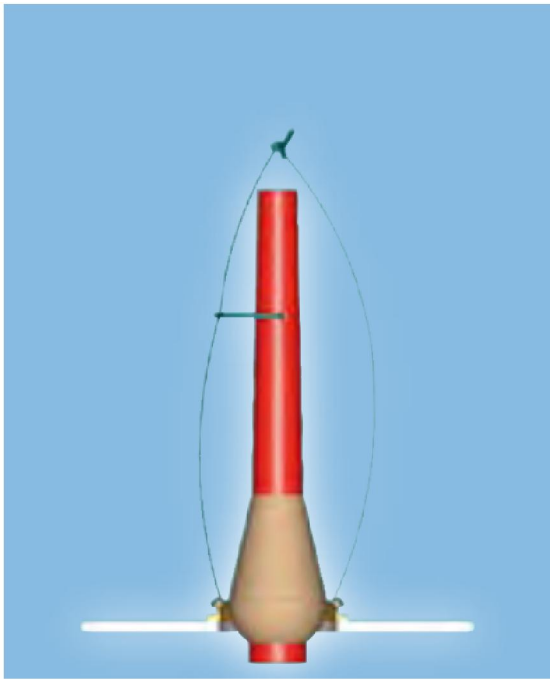
Fig. A9.9 Balloon control ring

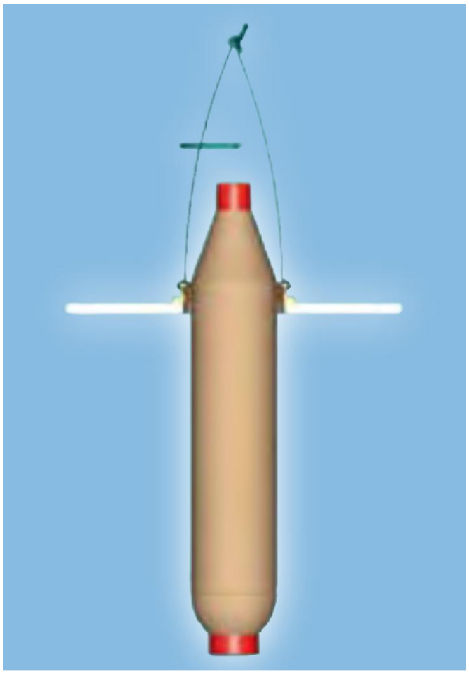

0
S

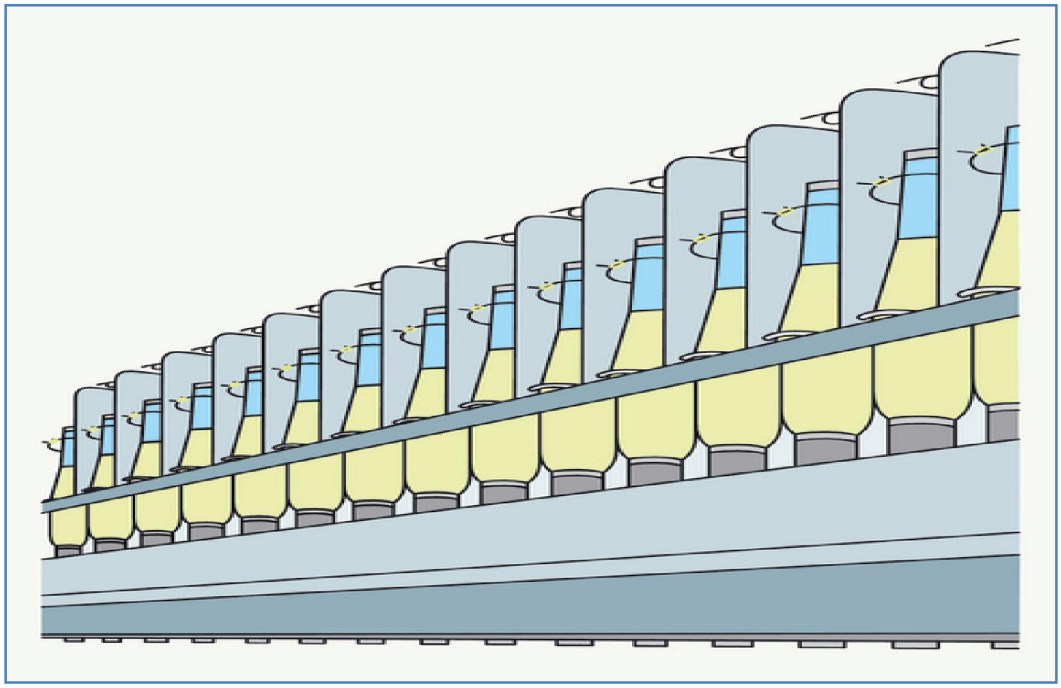

a)
b)
ΔZ

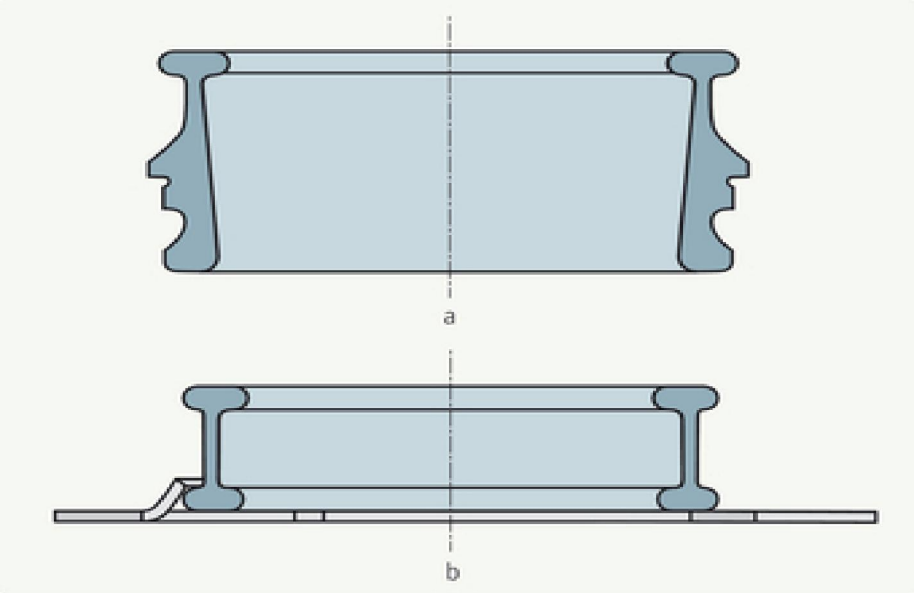

O

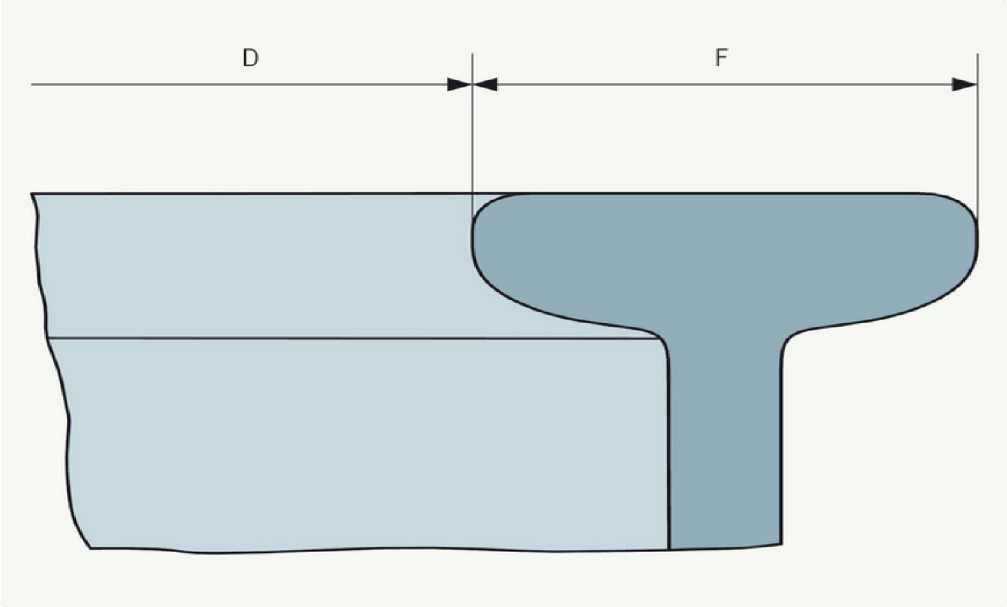

1
2
M
5
3
4
K
6

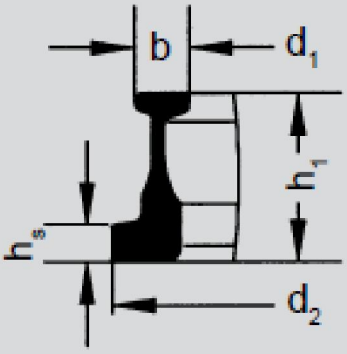




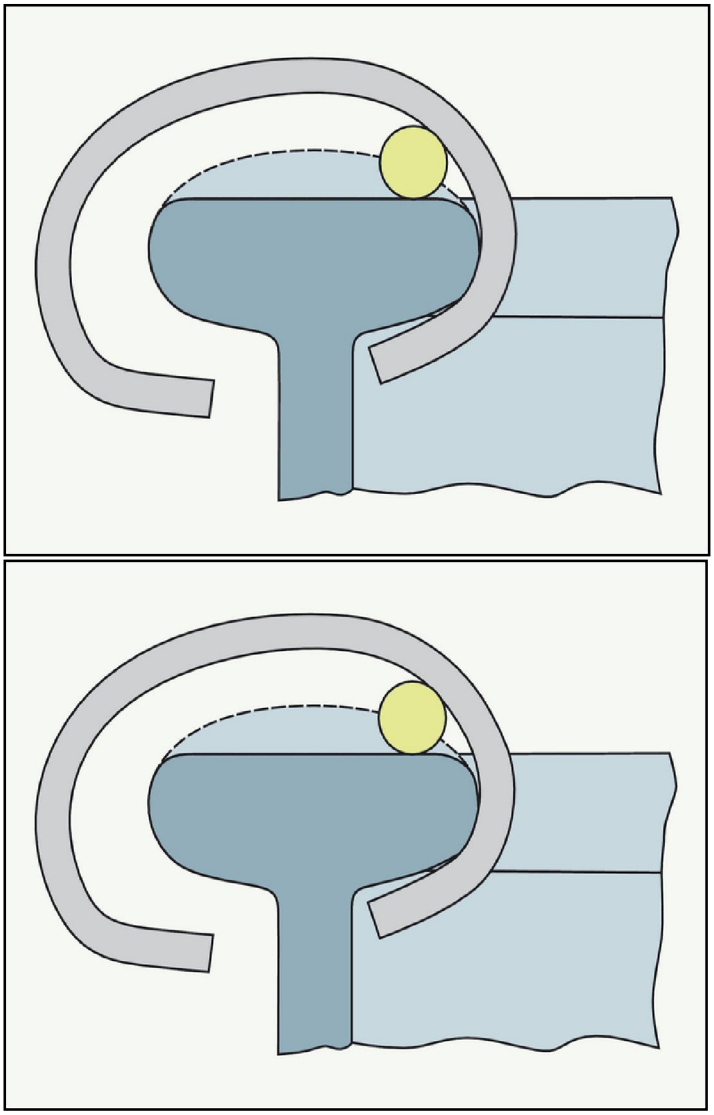


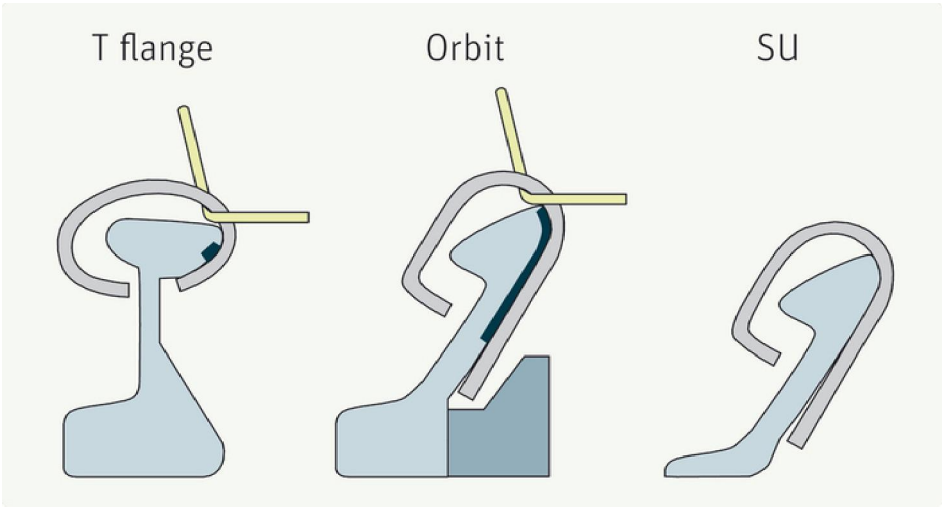

a
b

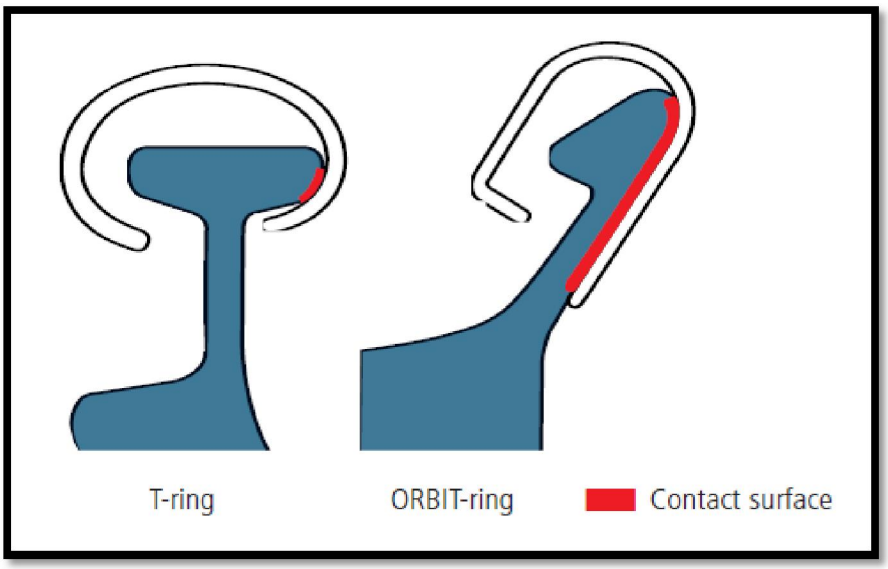

D
F

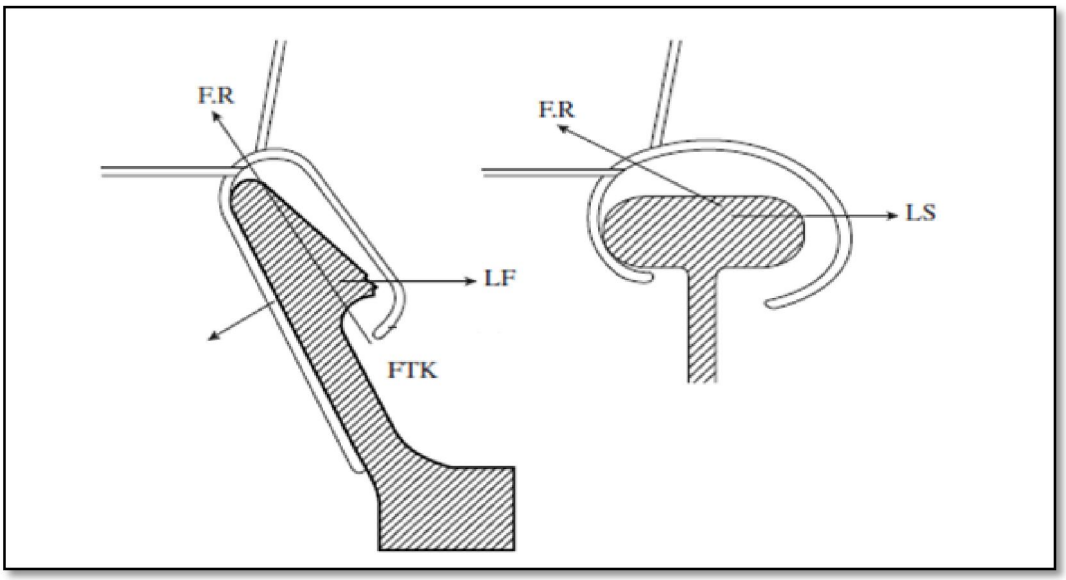


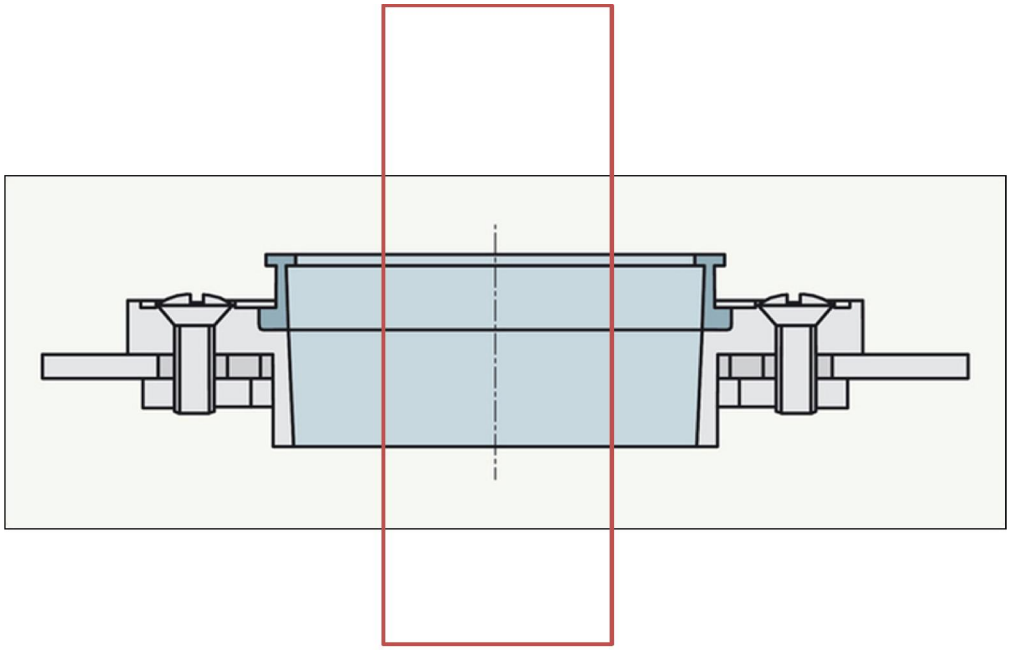
single flange ring to be fixed with small clamping plates

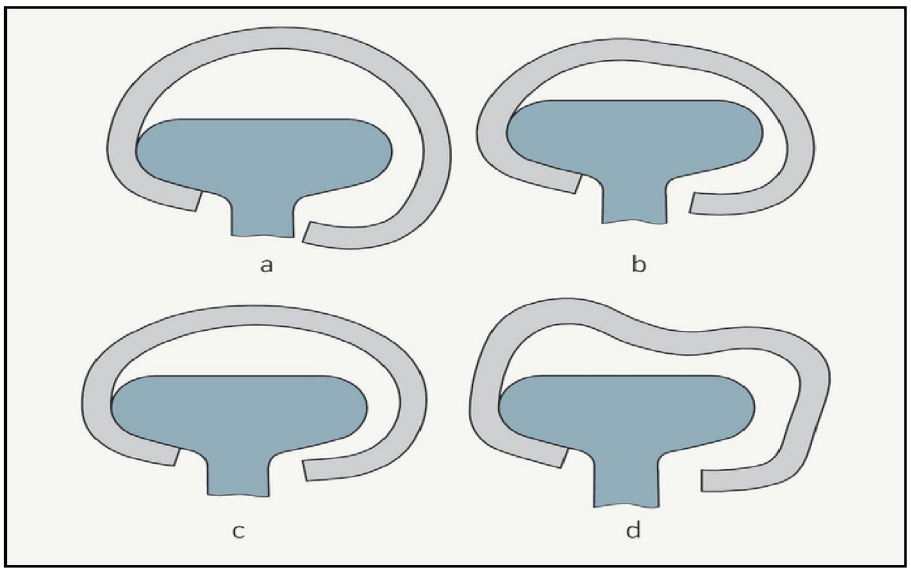


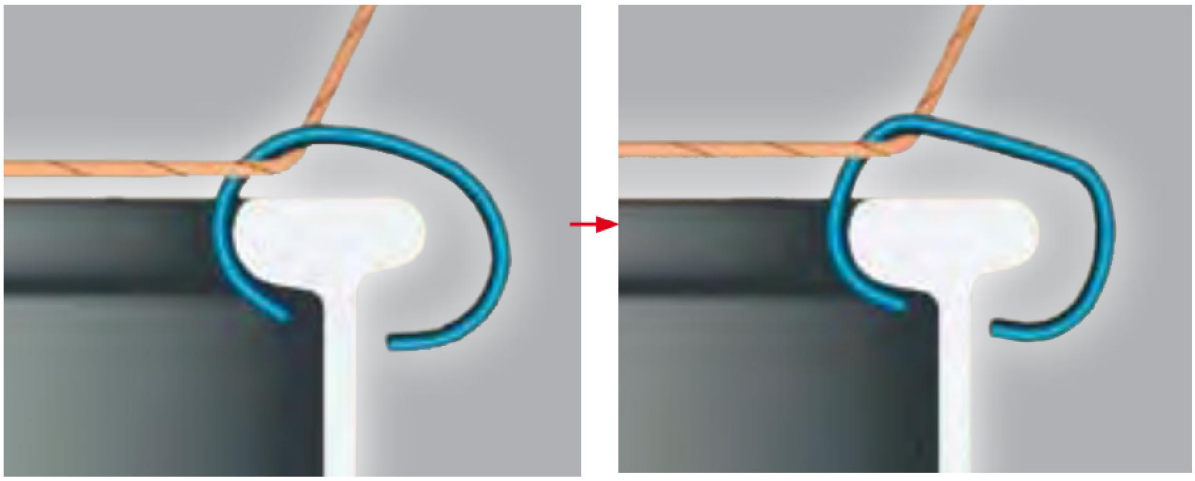

T flange
Orbit
SU

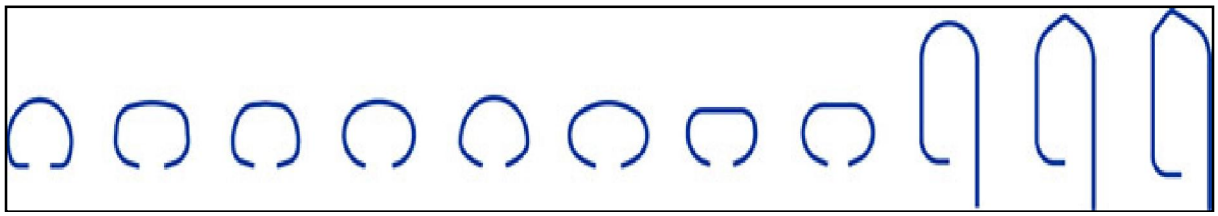

T-ring
ORBIT-ring
Contact surface

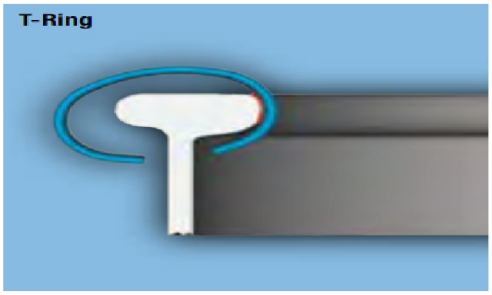

F.R
LF
FTK
F.R
LS




a
b
c
d







The SU ring/traveller system is suitable for the processing of synthetics (PAC, VC, PES) and their blends in the medium to coarse yarn count range. In some cases the conical, lubricated rings can be replaced by the SU ring/traveller system.

The design features of the SU system are:

- Large contact area between ring and traveller reduces the specific pressure.
- Optimum heat dissipation traveller to ring

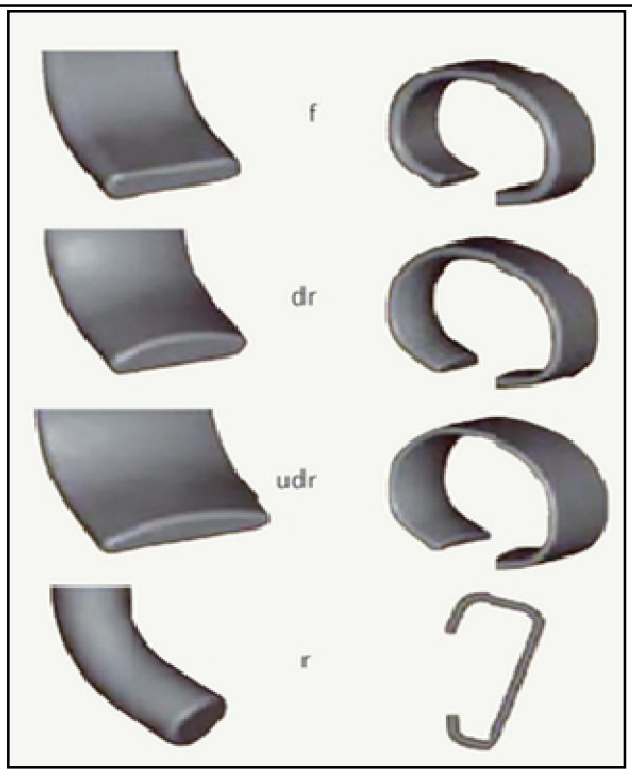
The SU ring/traveller system provides following advantages:

- No lubrication required (as against conical rings; not suitable for wool and wool blends)
- Better and more even yarn quality
- Consistent yarn tension
- No thermal fibre damages
- Increased life cycle of travellers and rings
- Higher spindle speeds
- Lower yarn breakage rate
- No yarn stain

J	 Standard -Type-
J	 Type -A-  Type -B-  Type -BB-  Type -CSB-

Round (R), Half Round (DR), Half Round - Wide (DRW), Flat (F), Half Flat (HF) & Wide Oval (WO).

R **DR** **DRW** **F** **HF** **WO**



SAPHIR

Diffusion treatment

Bräcker SAPHIR has been especially developed for high performances. The enrichment components are present throughout the entire traveller section and do generate their effect even when the surface is affected.

SAPHIR can be used for the ring running-in, normal operation and covers the entire fibre and yarn count range.

STARLET

Electrolytic surface treatment (special nickel plating)

A nickel coating is applied with a special process.

Low friction values in the yarn passage prevent fibre damages.

Optimum resistance to corrosion.

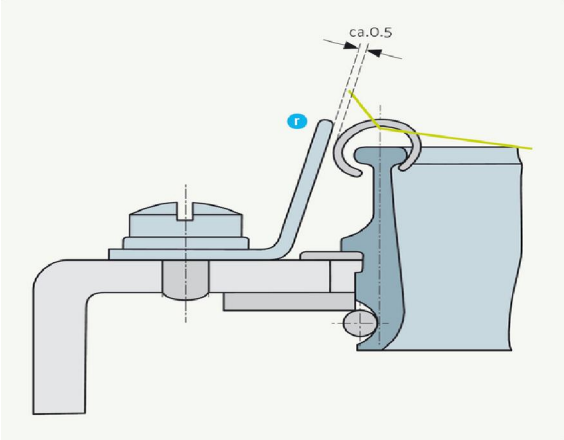
PYRIT

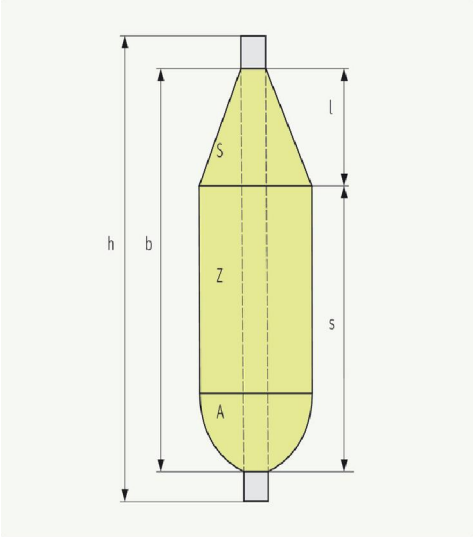
PYRIT treated travellers have a enriched steel structure through additional components.

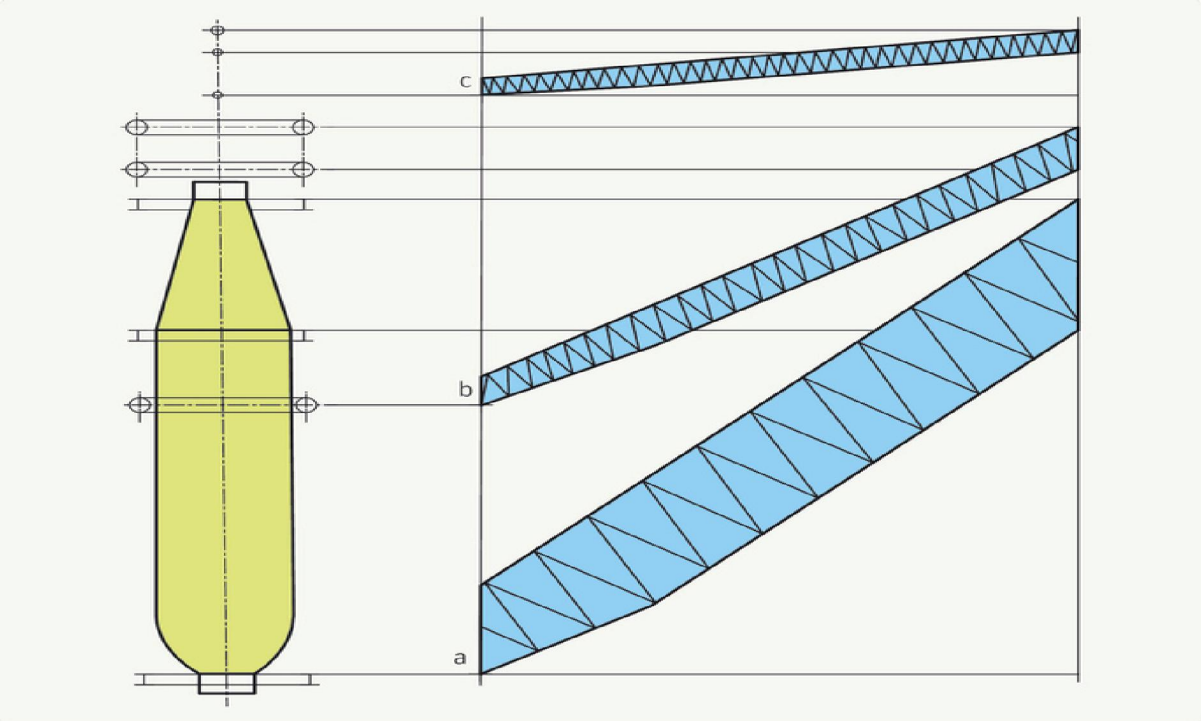
The wear resistance is considerably increased This improves the running behaviour and guarantees a more consistent yarn quality.

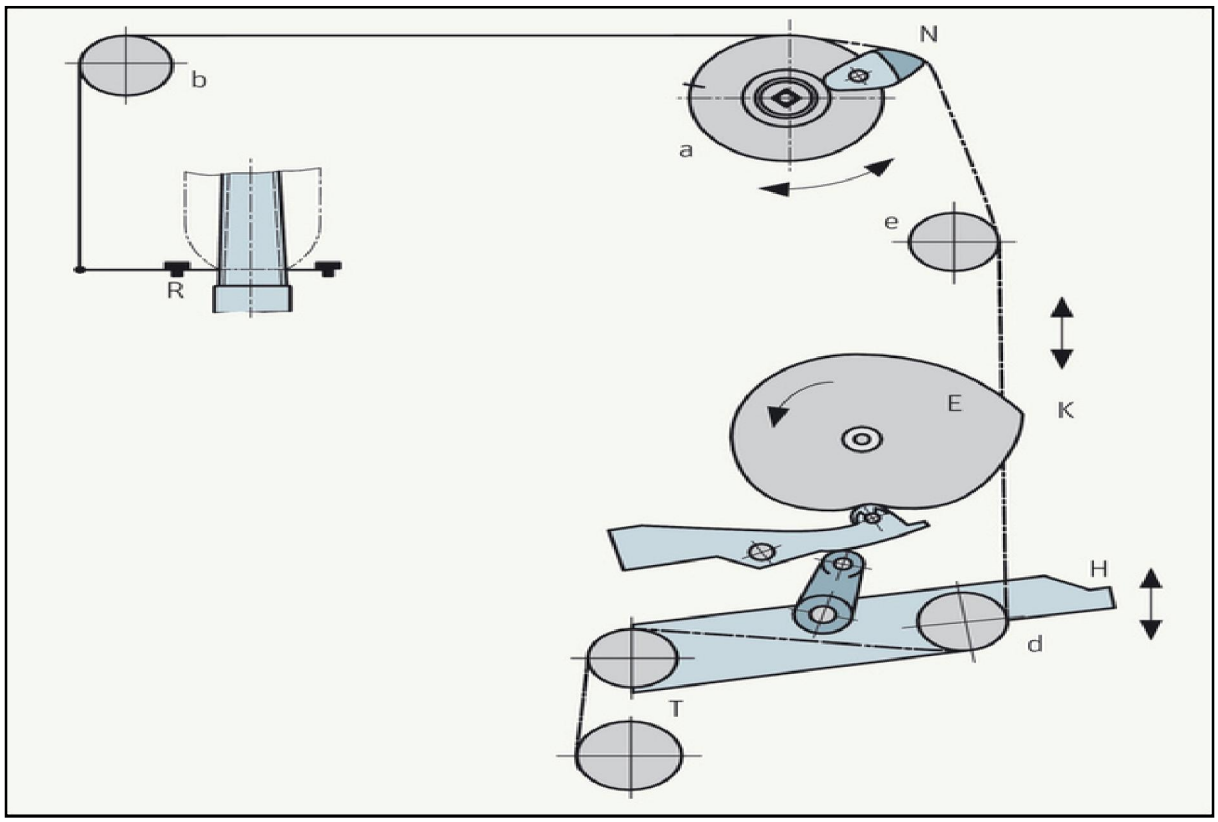
At high speeds the traveller service life can be increased by more than 100% compared to travellers with conventional finish.

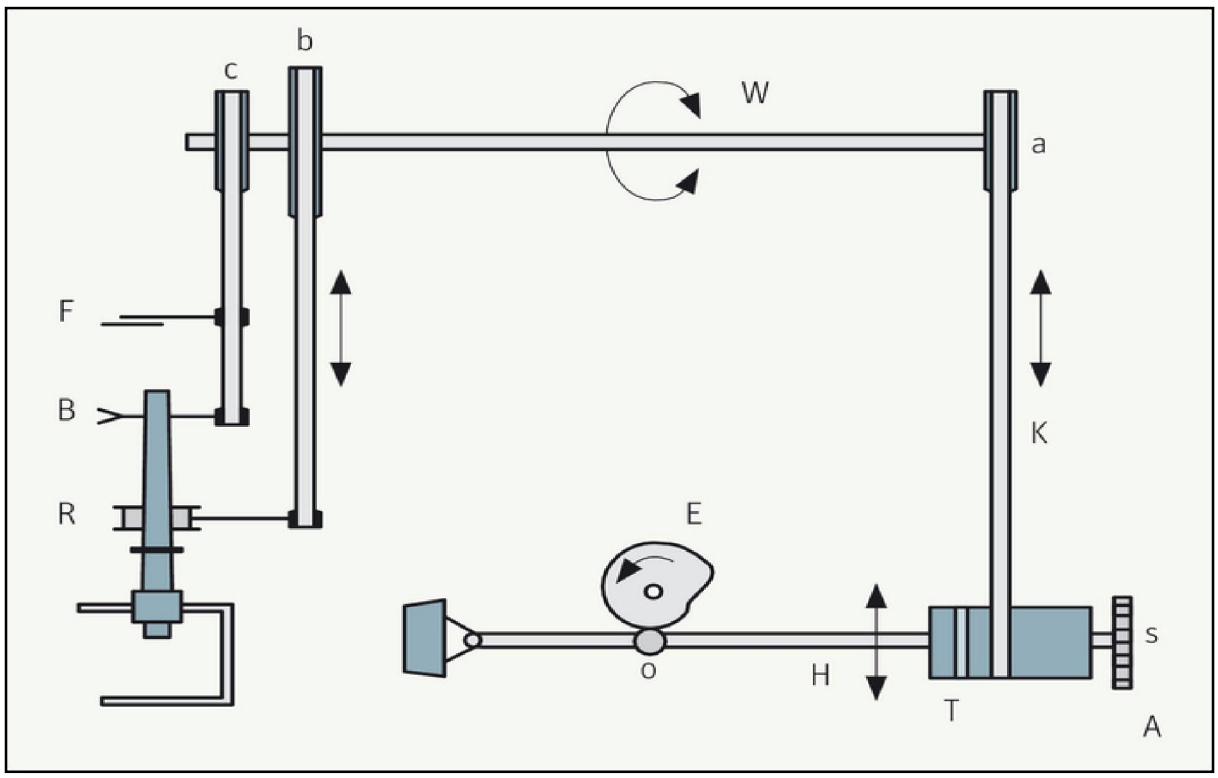
Tex	Nm	Ne	T flange				Orbit		SU			
									PES		PAC and CV	
			Traveller No		ISO		ISO		ISO			
100	10	6	14	18	250	315					250	315
72	14	8	11	14	180	250			250	315	200	280
59	17	10	9	11	140	180			224	280	140	200
50	20	12	6	9	100	140	90	125	200	250	100	160
42	24	14	3	7	80	112	80	112	160	250	90	140
36	27	16	1	4	63	90	71	100	125	200	80	112
30	34	20	2/0	2	50	71	63	90	80	160	63	80
25	40	24	4/0	1	40	63	45	71	80	140	50	71
20	50	30	5/0	2/0	35.5	50	31.5	50	63	112	31.5	63
17	60	36	6/0	3/0	31.5	45	28	40	56	80	31.5	50
15	68	40	7/0	4/0	28	40	25	40	56	71	31.5	45
12	85	50	8/0	6/0	25	35.5	20	31.5	50	63	31.5	40
10	100	60	10/0	7/0	22.4	28	18	25	40	50		
8.5	120	70	11/0	10/0	20	22.4	16	22.4				
7.4	135	80	14/0	11/0	16	20	14	20				
6.6	150	90	16/0	12/0	14	18	14	18				
5.6	180	105	18/0	14/0	12.5	16	12.5	16				
5.3	190	112	19/0	16/0	11.2	14						
4.5	220	132	22/0	19/0	9	11.2						

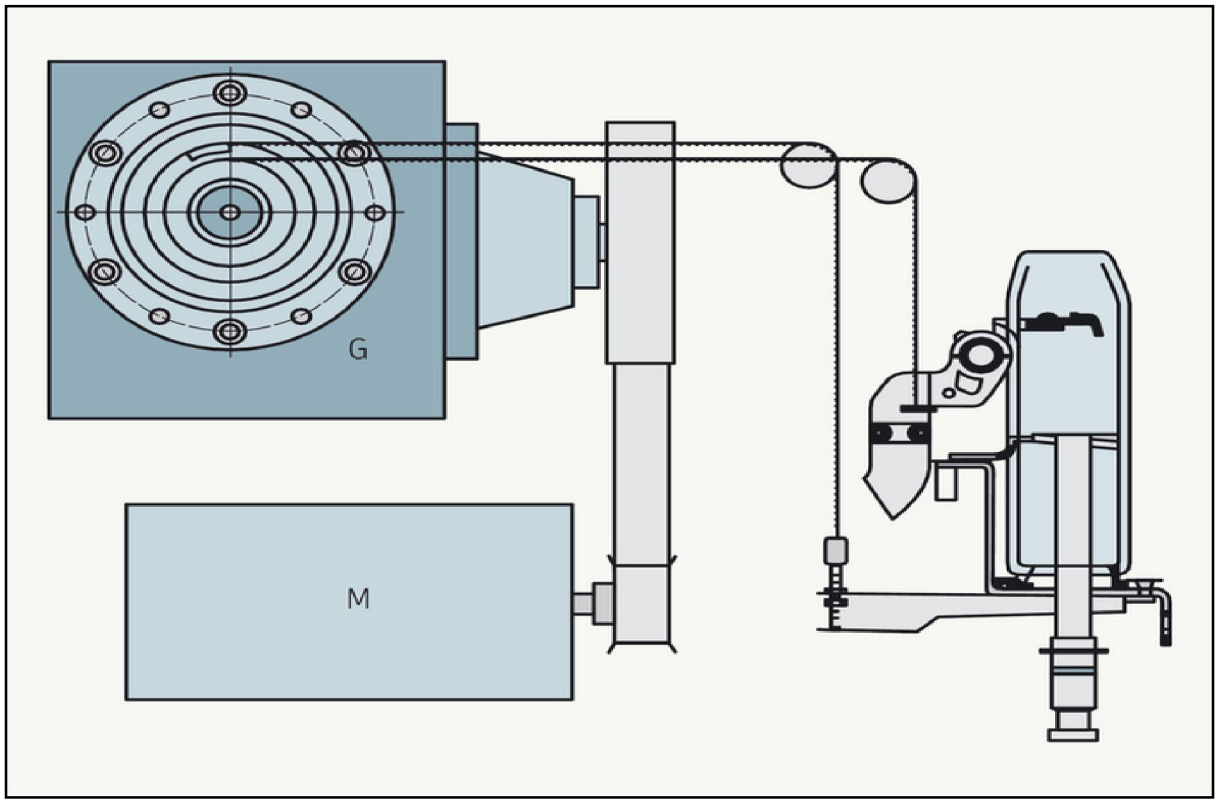


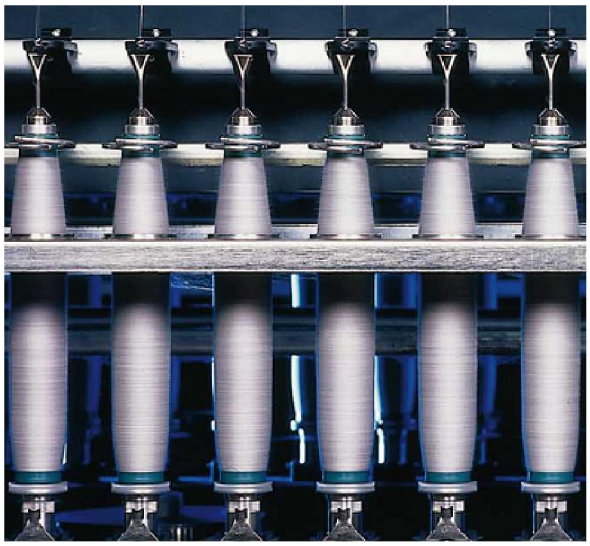

h
b
l
S
Z
s
A

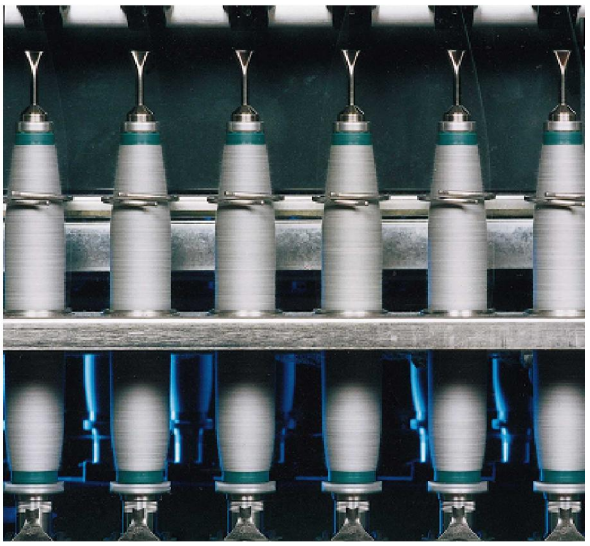

c
b
a

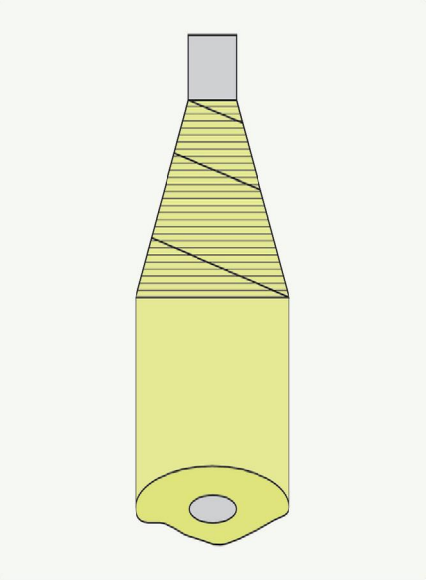

b
R
N
a
e
E
K
H
d
T

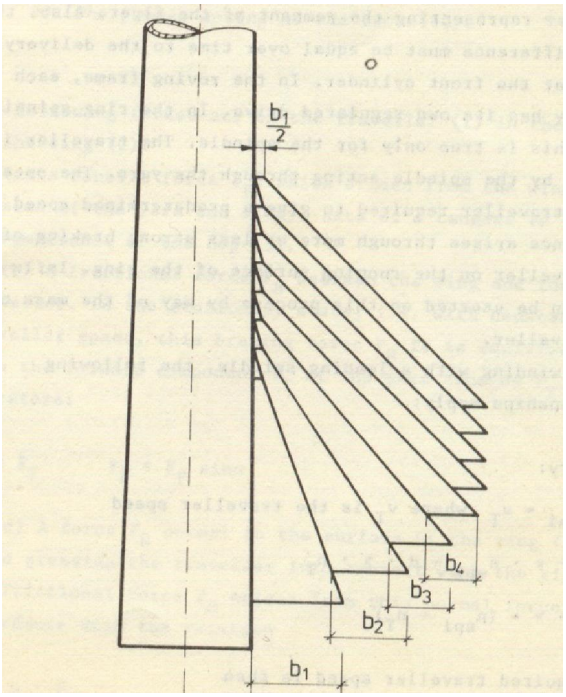

b
c
W
a
F
B
R
K
E
o
H
T
s
A

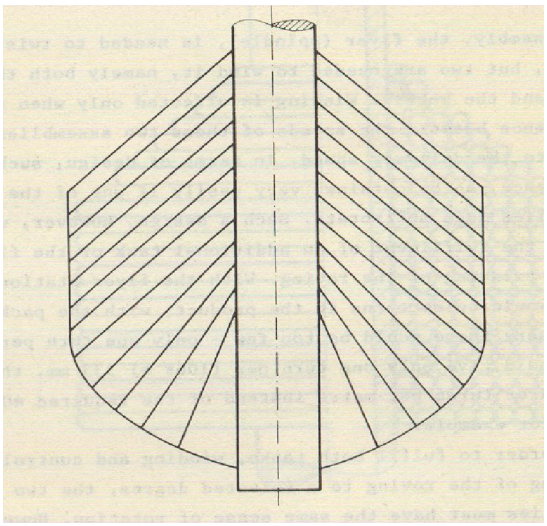

G
M

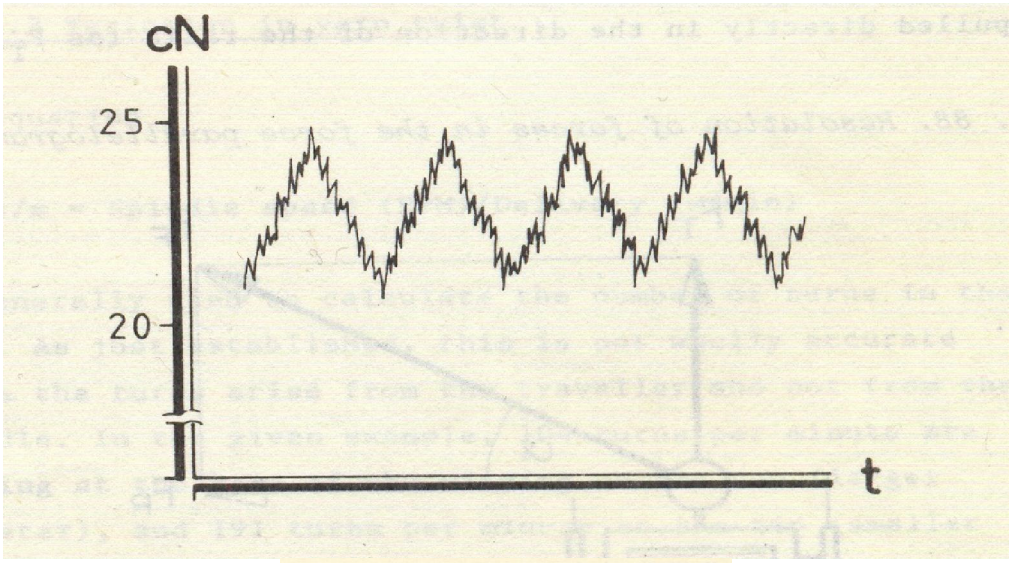


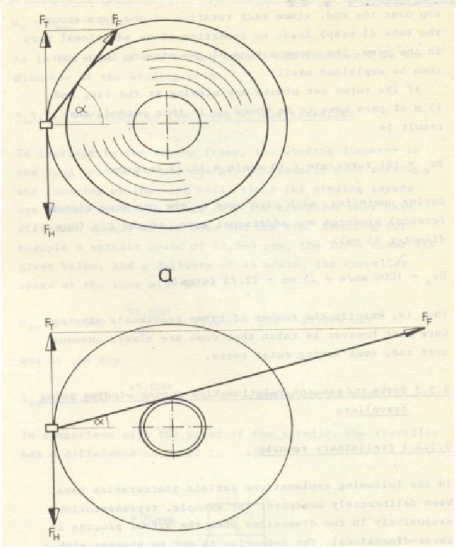




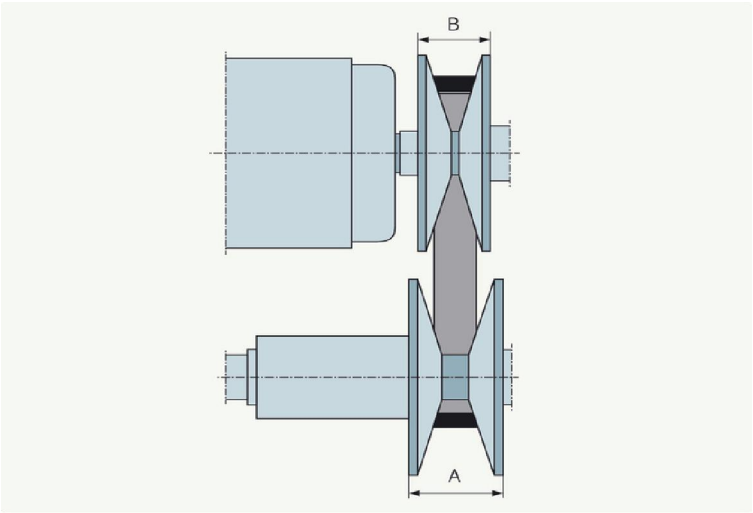

b1/2
b4
b3
b2
b1

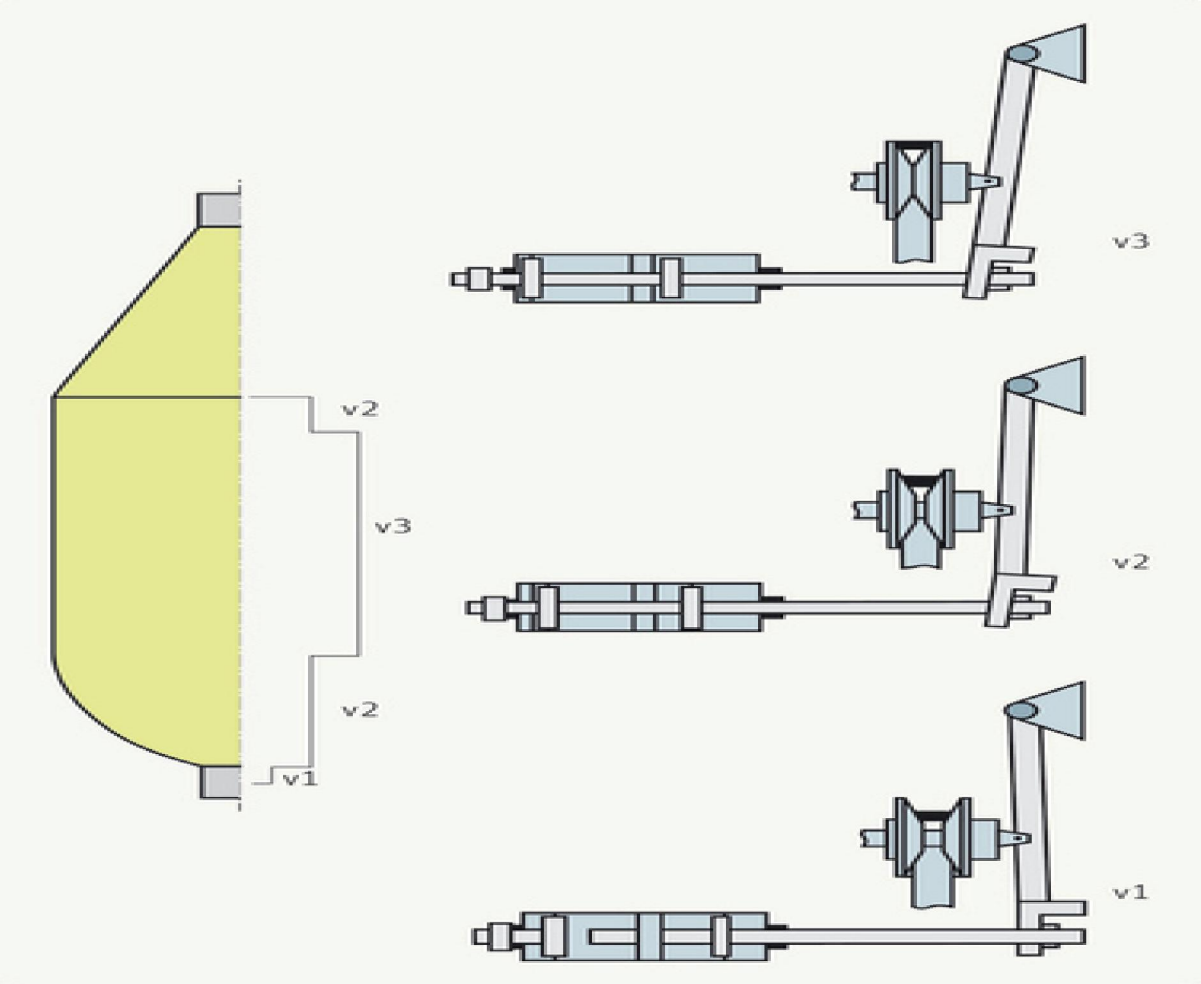


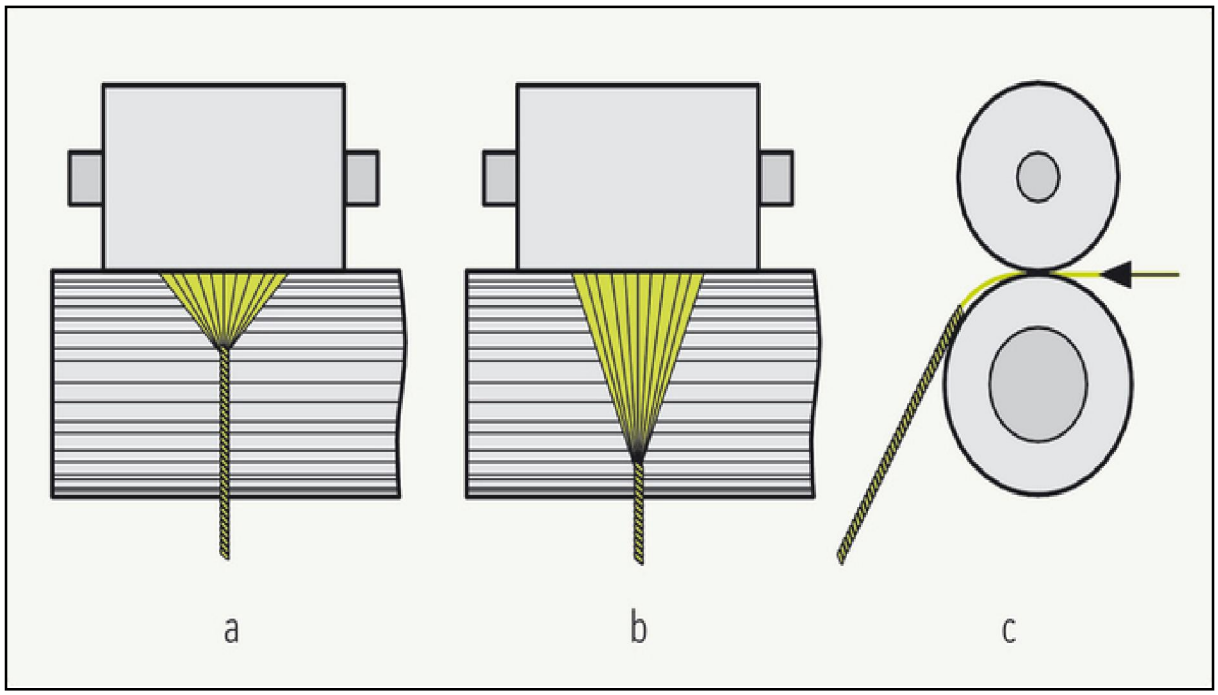


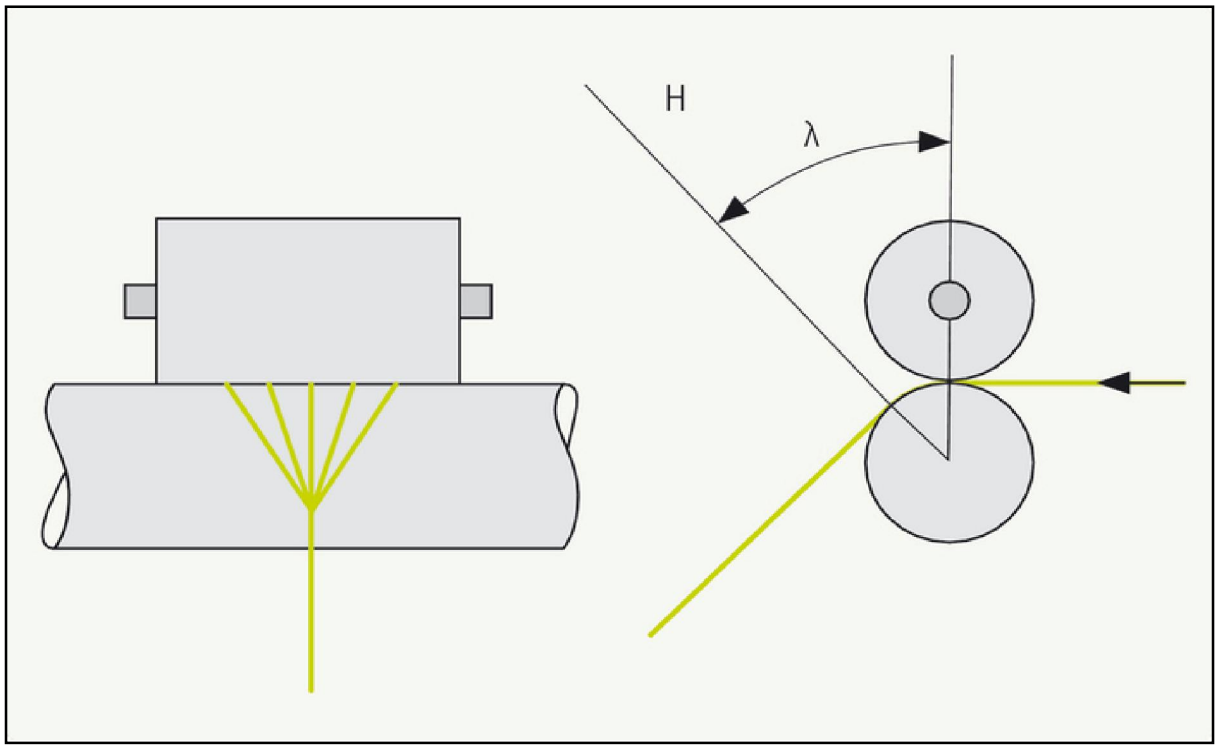


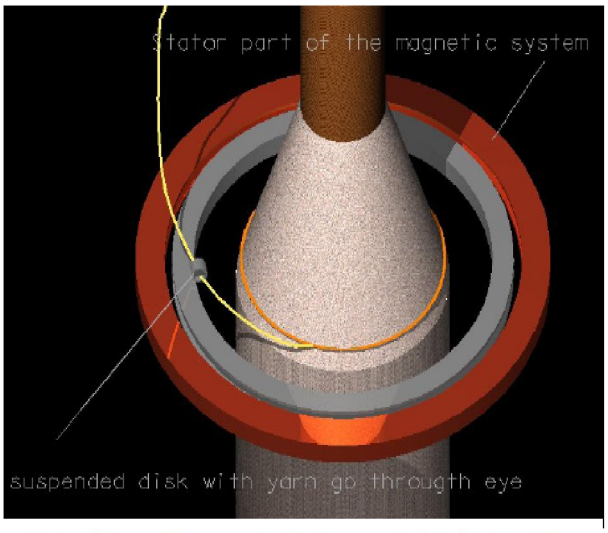
a


B
A

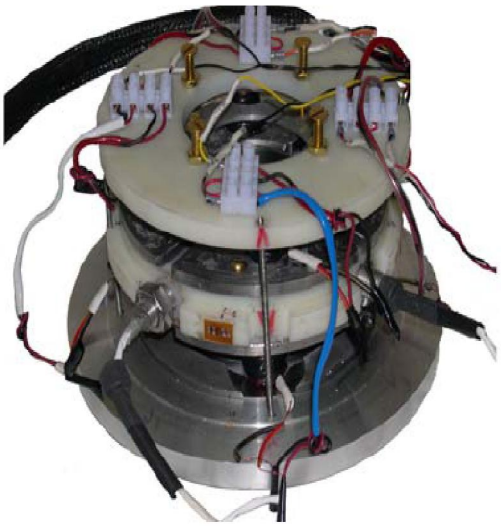

v2
v3
v2
v1
v3
v2
v1


a
b
c

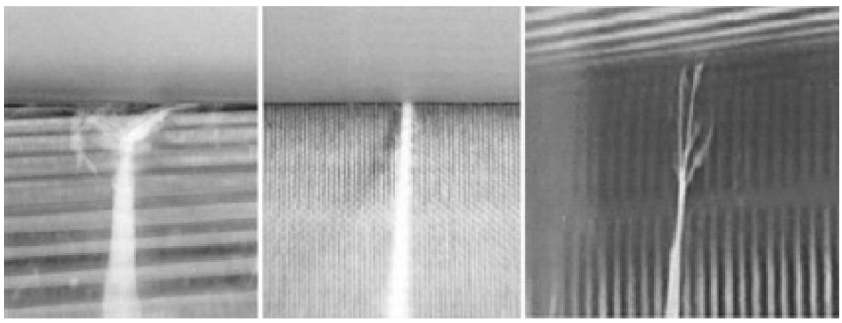

H
λ

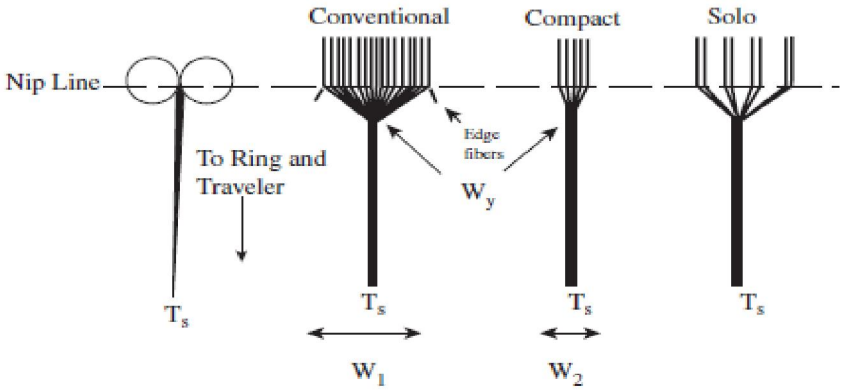


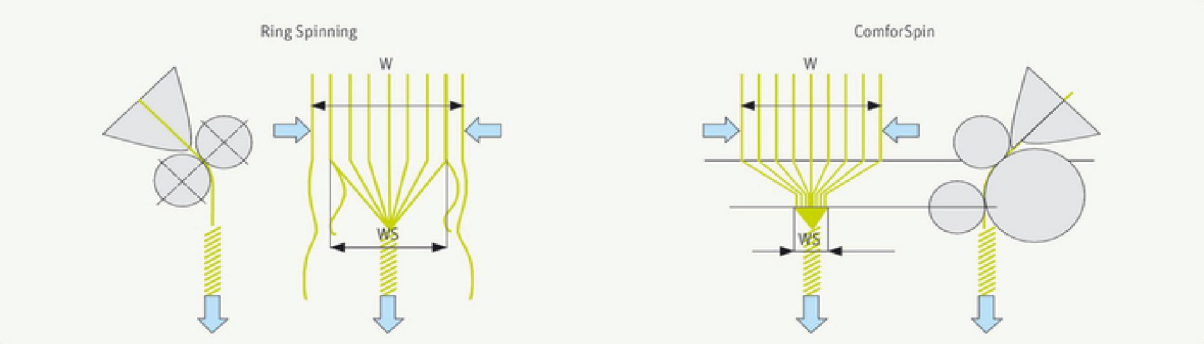
Close View of Magnetically Suspended Spinning Ring



Control System Prototype





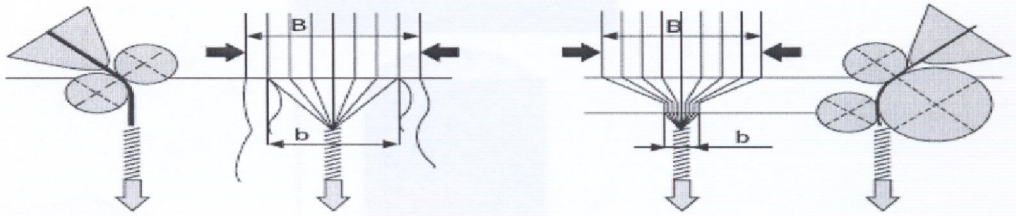


ComforSpin® machine – principle

Operating principle

Ring spinning

ComforSpin®



$B_{ring} = B_{COM4}$

8.8 Compact spinning (Maschinenfabrik Rieter AG).[27]

A B

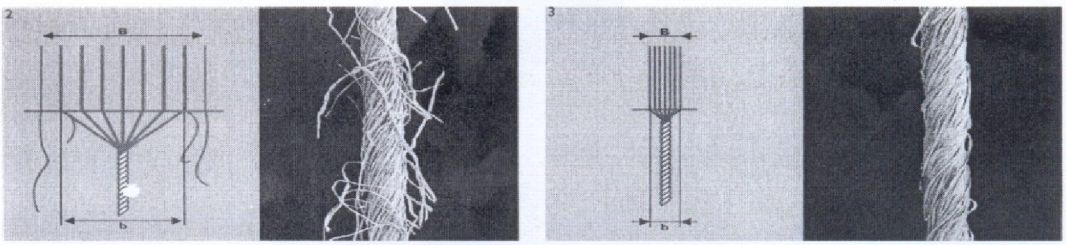
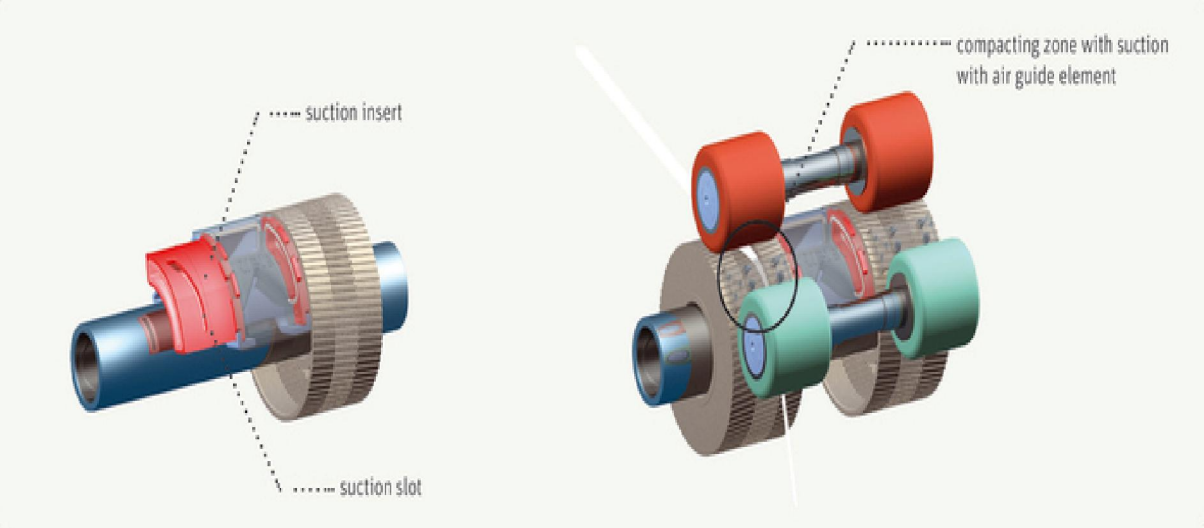
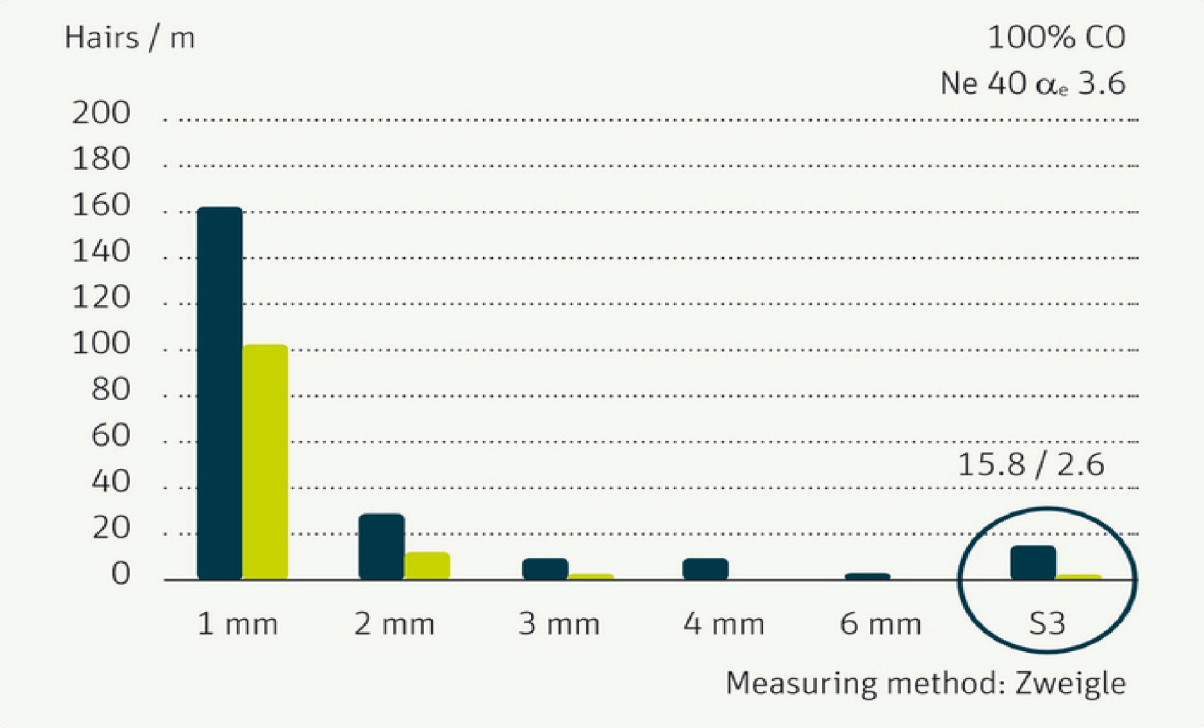
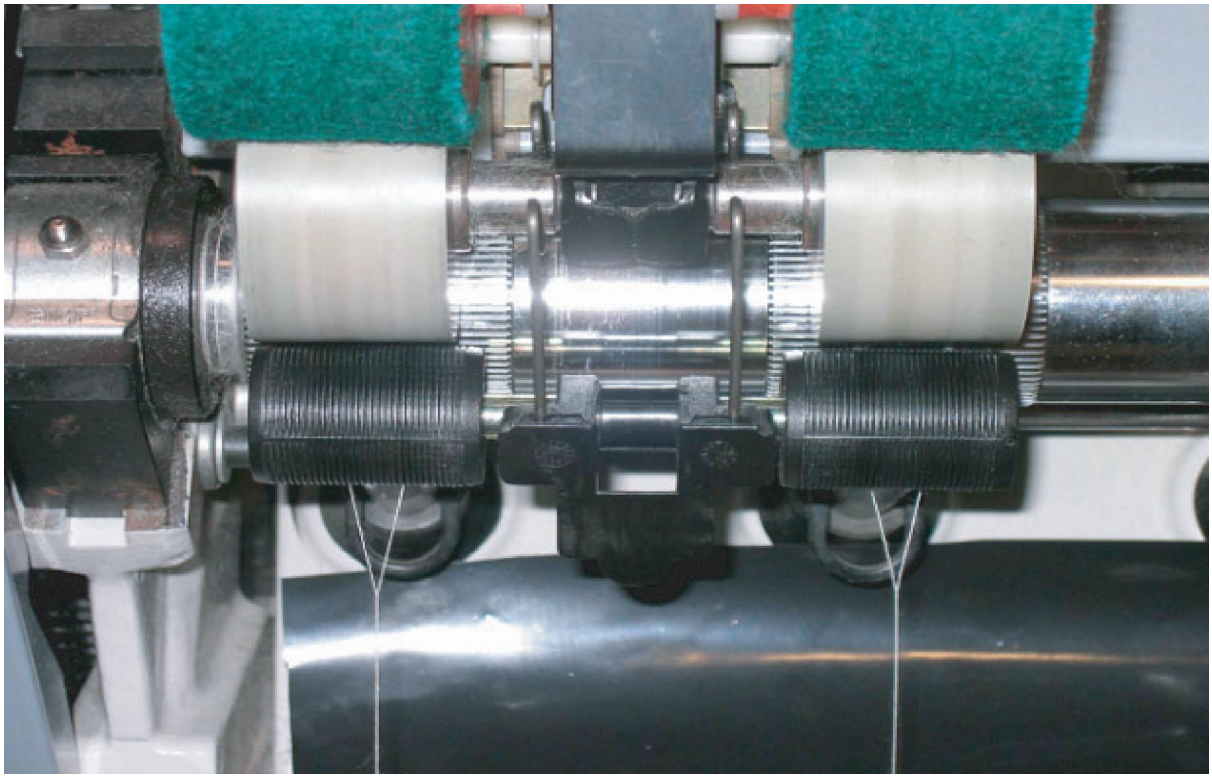
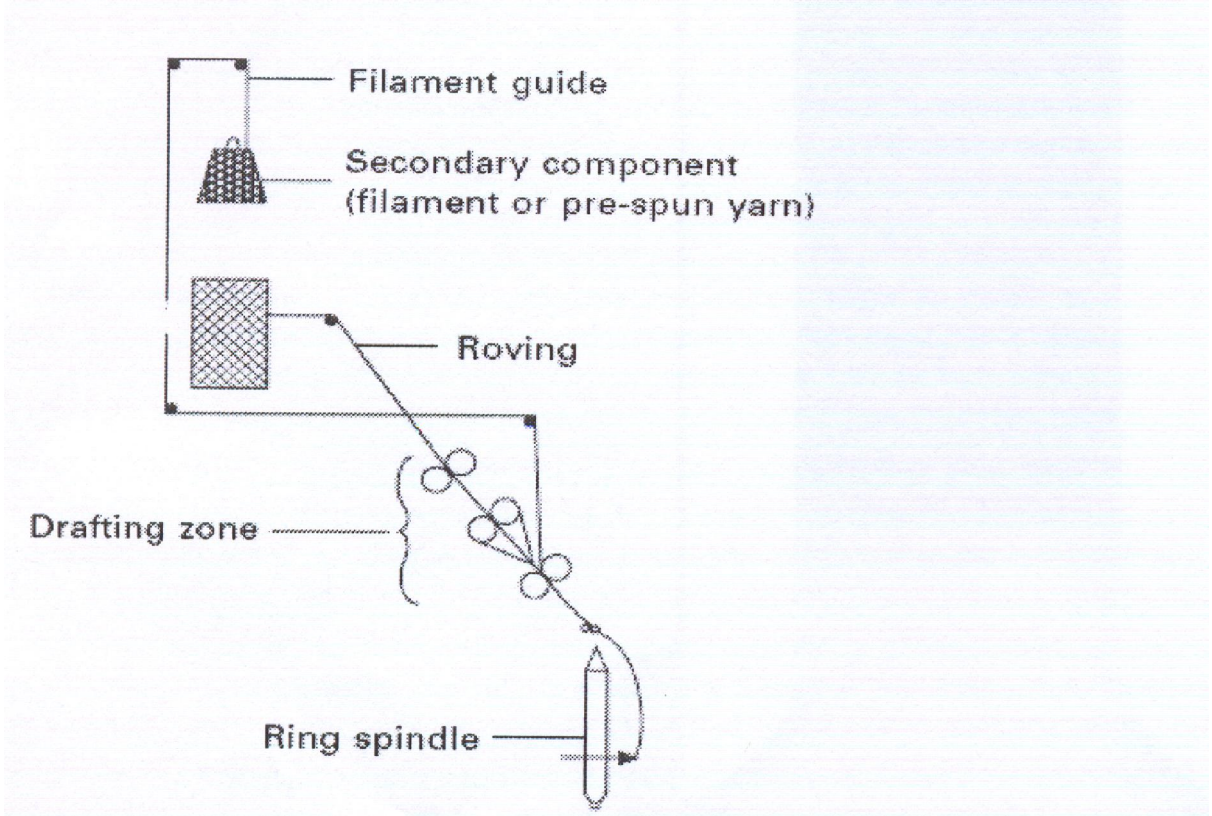


Fig. 48 Comparison between a normal ring-spun yarn (A) and a yarn produced (B) with the condensation technique


suction insert
suction slot
compacting zone with suction
with air guide element


Hairs / m
100% CO
Ne 40 α_e 3.6
200
180
160
140
120
100
80
60
40
20
0
15.8 / 2.6
1 mm
2 mm
3 mm
4 mm
6 mm
S3
Measuring method: Zweigle
Ring yarn
Com4®





8.9 Bicomponent spinning (source: IWS Wool Profiles).[28]