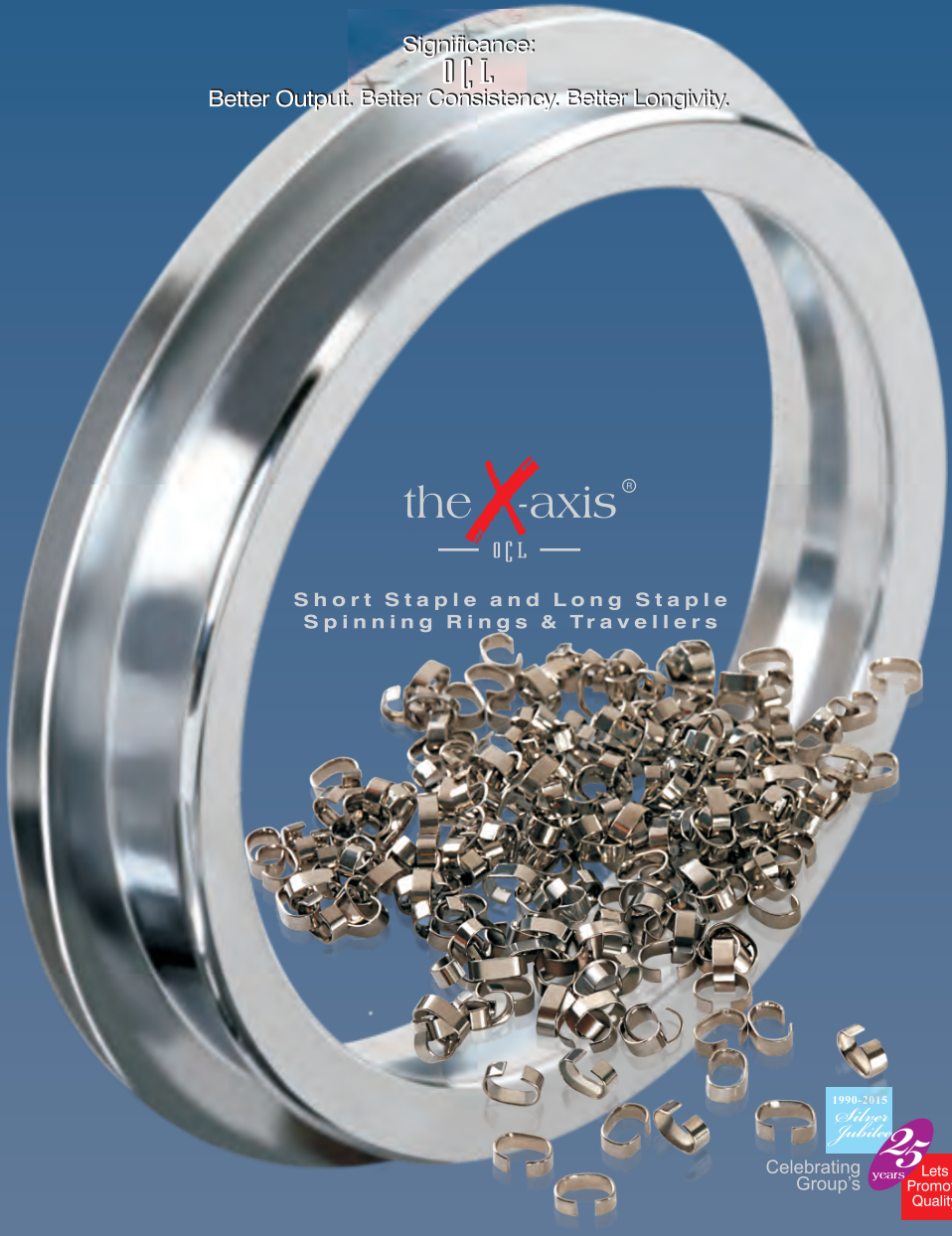
Youngest & Safest

Rings and Ring Travellers. Tried and Tested and used satisfactorily for 60 to 300 count yarn for international clothing.

Significance:
OCL
Better Output. Better Consistency. Better Longivity.



1990-2015 Silver Jubilee
Celebrating Group's 25 years
Lets Promote Quality

Youngest & Safest

Better Output Better Consistency Better Longevity

Contents:

Significance of Rings & Travellers in Ring Spinning

Role of the spinning Rings is known since the inception of Yarn Spinning by Rings. In the process of commercialisation and competition many a times the ring's individual contribution is overlooked.

Our in-house studies indicate that, Rings has its direct effect on Spinning Output, Consistency and longevity of not only spinning, but affects weaving, knitting, dying and finishing.

Significance of Spinning Rings is indirectly providing a perfectly engineered path, for traveller in providing twist to the yarn and then winding the yarn. Its direct significance can be seen in perfect Cop building. As the drafted fiber strand passes through different physical phenomenon here, which reflects in formation of the final Yarn. It is here that the quality of ring compensates the Torsional Force on fiber strand without influencing the twisting, winding and spinning tension, that contributes in producing international class Yarn and globally accepted perfect Cop after Cop after Cop.

The challenge of quality is not only in bettering output but to bring consistency in this bettered output i.e. producing quality without (significant) variation throughout its operational life.

At X-axis we are working together to provide this Consistency in producing Yarn, on which spinners can rely and feel satisfied, producing good quality Yarn.

Its molecular structure of processed steel outruns in quality and length of life that helps to optimise the spinning machine efficiency. Thus, it gives longevity to Spinning, Weaving, Knitting, Dying and Finishing.

These suggest that the quality and selection of Spinning Rings should be judged only in the light of its Output, Consistency and Longevity.

Youngest & Safest

Rings & Travellers

In Spinning Better Profitability is when Better Productivity, that is ...

Know more of The X-axis

the X-axis®

Better
Output
Better
Consistency
Better
Longevity

the X-axis®

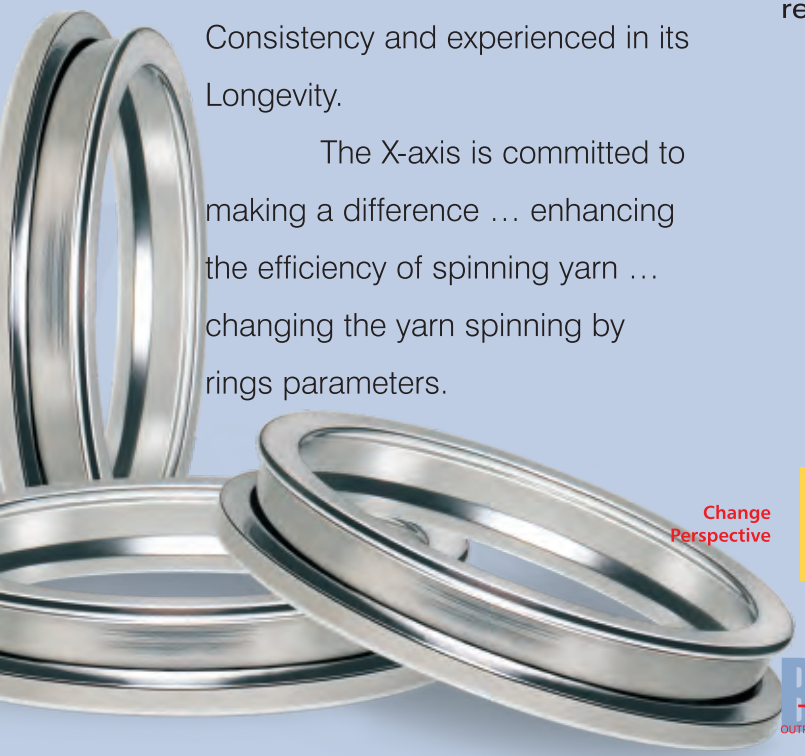
OCL

Summary

The X-axis rings are manufactured by employing precision engineering and latest technologies, with the focussed objective of Output, Consistency and Longevity in mind. This is measured in its Output and Consistency and experienced in its Longevity.

The X-axis is committed to making a difference … enhancing the efficiency of spinning yarn … changing the yarn spinning by rings parameters.

Chapters:



Change Perspective

To better the productivity and quality of yarn, it is necessary for quality spinners to change their perspective of selecting spinning rings and travellers.

Better OCL
OUTPUT CONSISTENCY LONGEVITY

Youngest
& Safest

more value

Flanged

Rings

the X-axis®

OCL

Flanged Rings
Finishes and Types

the X-axis®
OCL
Better
OCL
OUTPUT CONSISTENCY LONGEVITY

XL-R

XL-C

"Xtensa"
Universal Spinning Rings

NEW XGEN RINGS

New generation Spinning Rings for new generation of spinning machines. The X-axis rings are beneficial for optimising productivity and quality of any Yarn.

It reduces Yarn Hairiness and End Breakages. Helps to produce better quality Yarn.

More Production. Better Quality. Longer Efficient Working Life.

Types of Rings

Adapter Fitting -	Spring Fitting -
Inside Ring Dia x Fitting Dia (mm)	Inside Ring Dia x Fitting Dia (mm)
36 x 47, 38 x 47, 38 x 51,	36 x 45, 38 x 45, 40 x 47,
40 x 47, 40 x 51,	42 x 49, 45 x 52, 40 x 50.8,
42 x 51, 42 x 54, 45 x 54.	42 x 50.8, 45 x 50.8, 45 x 54.

Youngest & Safest

The X-axis - Flanged Ring

Get more Value Rings

Get more:

Output
Consistency
Longevity

Types of Rings
XL-R

Option of Bright Finish and Black Finish

Adapter Fitting - Inside Ring Dia x Fitting Dia in mm -
36x47, 38x47, 38x51, 40x47, 40x51, 42x51, 42x54, 45x54.

Spring Fitting - Inside Ring Dia x Fitting Dia in mm -
36x45, 38x45, 40x47, 42x49, 45x52, 40x50.8, 42x50.8, 45x50.8, 45x54.

XL-R
Bright

XL-R

Bright and Black

Economical.
Ideal for
20^{s} to 40^{s}

The X-axis
most economical
regular finish rings.

Preferred for
coarser yarn spinning.

Used for economical
and rugged fabrics
for relative applications.

XL-R
Black

Youngest
& Safest

Get more Value
Rings

the X-axis®

Get more:

Output
Consistency
Longevity

Get more Value

XL-C

XL-C

The X-axis - Flanged Rings
Specially Coated Rings

the X-axis®

VALUE OTHER XL-C

Output

Today's' Spinners demand Output, that outruns in quantity and quality. An output that is measured by reduction in imperfections and visible in net gains, in value of the Yarn.

VALUE OTHER XL-C

Consistency

Outperforms even while operating at high speed and reduces imperfections drastically. It helps to build even Cop with smooth, strong and even yarn, Cop after Cop.

VALUE OTHER XL-C

Longevity

Outlives with its efficient performance and helps in producing continuous, quality Yarn with least end breakage. There by increasing efficiency of Spinning, Weaving, Knitting, Dying and Finishing Machine

Types of Rings XL-C

Adapter Fitting - Inside Ring Dia x Fitting Dia in mm -
36x47, 38x47, 38x51, 40x47, 40x51, 42x51, 42x54, 45x54.

Spring Fitting - Inside Ring Dia x Fitting Dia in mm -
36x45, 38x45, 40x47, 42x49, 45x52, 40x50.8, 42x50.8, 45x50.8, 45x54.

BETTER VALUE

The X-axis - Flanged Rings
Finishes and Types

One Ring
for all counts
of man-made
or natural
Capable to spin
@ 25,000 rpm.

the X factor *Good Price. Better Productivity. Best Profitability.*

"Xtensa"
Universal Spinning Rings

The X-axis - Flanged
Specially Super Coated Rings

the X-axis®

Universal Spinning Rings

Xtensa is preferred for any single flanged ring for comfortable running of traveller for the highest possible speed. If you can run it then it is engineered to operate at even 25,000 rpm. However, it has satisfied all spinners who have tried and operated at the highest speed practised in recent times i.e. of 23,500 rpm.

In the trials conducted at various mill-floors at different places, Xtensa has performed withstanding all the forces.

For Finer Counts Ne 45^s and above with preferred ring dia 36 and 38 mm, at 22,000 rpm (+) under normal spinning conditions.

For Coarser counts i.e. Below Ne 25^s with preferred ring dia 40 mm, achieved spindle speed seldom higher as 18,500 rpm.

Youngest & Safest

The X-axis - Flanged Rings

Finishes and Types

Better OCL
OUTPUT CONSISTENCY LONGEVITY

Tested at many spinning units and spinners found impressive results. The technology and being youngest is perfectly blended.

introducing sleek

NEW XGEN RINGS

the X-axis®

The youngest of The X-axis range of Rings. The most advanced 'Xgen' Rings.

Spin Super fine or coarse, it gives the best end results. It performs to utmost Output, Consistency and Longevity. It seconds, to none and performs better than most in the open market.

It is manufactured with the latest technology and has the most advanced finish and outer surface to withstand toughest wear and tear.

Celebrating Group's 25th year

Youngest
& Safest

The X-axis - XGEN Rings
Rings of the Future

Better
DCL
OUTPUT CONSISTENCY LONGEVITY

- It is Extremely Fine Tuned. Designed for both Cotton as well Synthetics.

- Specific Coating Composition leads to Long Life Wear Resistance.

- Basic Raw Material & Process is in such a controlled way to meet out Excellent Constant Parameters within Range.

- Fully Tested & Practical Trial taken in reputed Spinning Units.

Celebrating Group's 25th year Silver Jubilee Year
Lets Promote Quality

Youngest and latest best in productivity and profitability. Safe and secured investment.

introducing sleek NEW XGEN RINGS

GAIN DUE TO LONG LIFE IN XGEN RING

Ring	Xgen	Other
Gain in Life	Up to 80% more life than others	5 - 6 Years
Gain in Production	No loss in life time	Production Loss due to Speed & Quality in after 3 Years & again after 8 years in second change
Gain in ROR	Only one time, 50% lesser than others	Two or Three time in 14 years
Gain in Speed	2 - 3 % higher speed can be achieved in life time	Speed will run slow & after 4 years as wear out starts (2 - 5 % lesser speed to achieve quality)
Gain in Hairiness & IPI	Always least & Remains Constant full life span	Will deteriorate after 3 years & vary frequently
Gain in Traveller Change	Traveller Life & number will be same up to full life and 3 - 5 % gain in traveller consumption	Heavier Traveller after 3 years & life will lesser
Gain in Power Consumption	Less Power due to Less Wear Out of Ring & Traveller. 30 % of total time, will run one number lighter traveller compare to others	Higher power after 3 years due to wear out of Ring & heavy traveller used

Special Sizes Rings

The X-axis specialises in manufacturing wide range of Special Size Rings.

Custom made as per requiremnet to suit the Spinners' need.

Special the X-axis®

The youngest and safest,
The X-axis range of Rings.
The most advanced and
wide range of Rings to suit
all spinning needs.

Special Range:

Vertical Ring
Multigroove Ring
Ring Dia upto 150 mm

Celebrating Group's 25th year Silver Jubilee Year
Lets Promote Quality

Youngest
& Safest

more value

XL-RS

The X-axis, XL-RS travellers has been specially 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.

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

XL-CS

The X-axis, XL-CS travellers has a special coating and is applied with a special process. It lowers friction values in the yarn passage and prevents fibre damages.

XL-CS offers optimum resistance to corrosion.

XENDOW

The X-axis Xendow Travellers offers lowest fricition value reducing Yarn breakages. Special coating gives longer life than regular travellers in conventional spinning and compact spinning. Available in RS and CS finish.

XGEN

The X-axis Xgen Travellers have fine and uniform micro-structure, practically no friction surface treatment. Improved wear resistance, offers excellent longest life and Best Quality.

Available in RS and CS finish.

the X-axis®

Flanged

the X-axis®

Better OCL OUTPUT CONSISTENCY LONGEVITY

Finishes and Types

XL-RS

XL-CS

XENDOW RS

XENDOW CS

NEW XGEN CS

NEW XGEN RS

Ring Travellers

Youngest & Safest

The X-axis - Flanged Ring Travellers

An option of
Win Win situation
and that also
FREE*

* For 1st time users.
For details contact our sales office.
Terms and Conditions apply.

XL-RS

the X-axis®

Better OCL
OUTPUT CONSISTENCY LONGEVITY

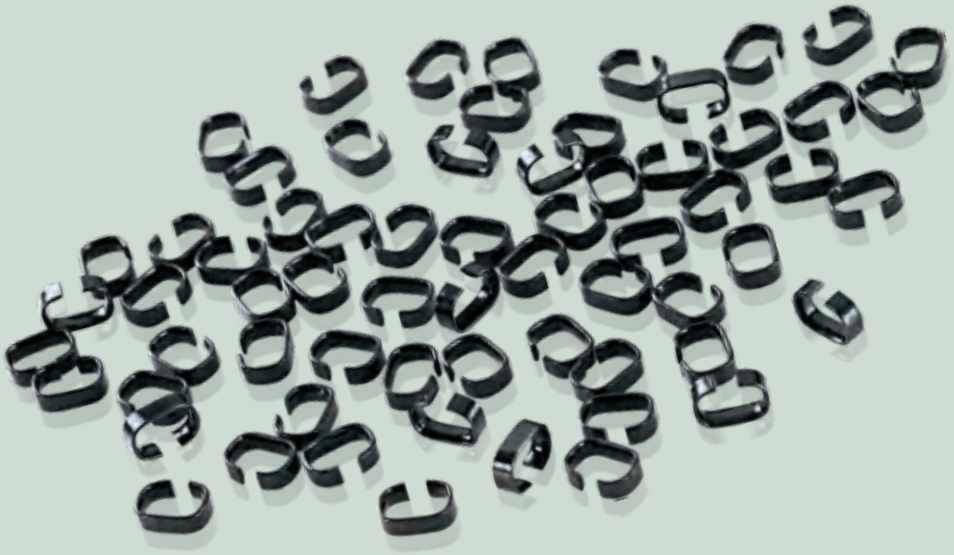
Travellers

XL-CS

- **Better Output**
  Reduced Yarn Breakages
- **Better Consistency**
  Operates Optimum Speed
- **Better Longevity**
  Long Life

Youngest & Safest

The X-axis - Flanged Ring Travellers



the X-axis®

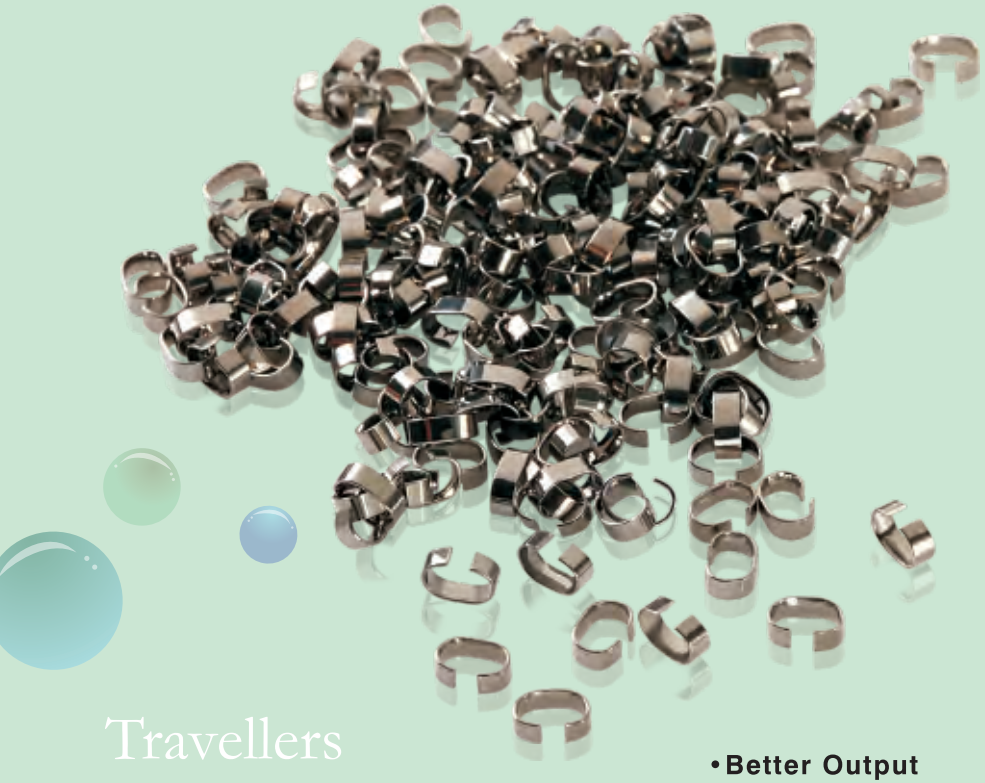
An option of
Win Win situation
and that also
FREE*

* For details check with our agent
or contact our sales office.
Terms and Conditions apply

XENDOW RS

the X-axis®

Better OCL
OUTPUT CONSISTENCY LONGEVITY



Travellers

XENDOW CS

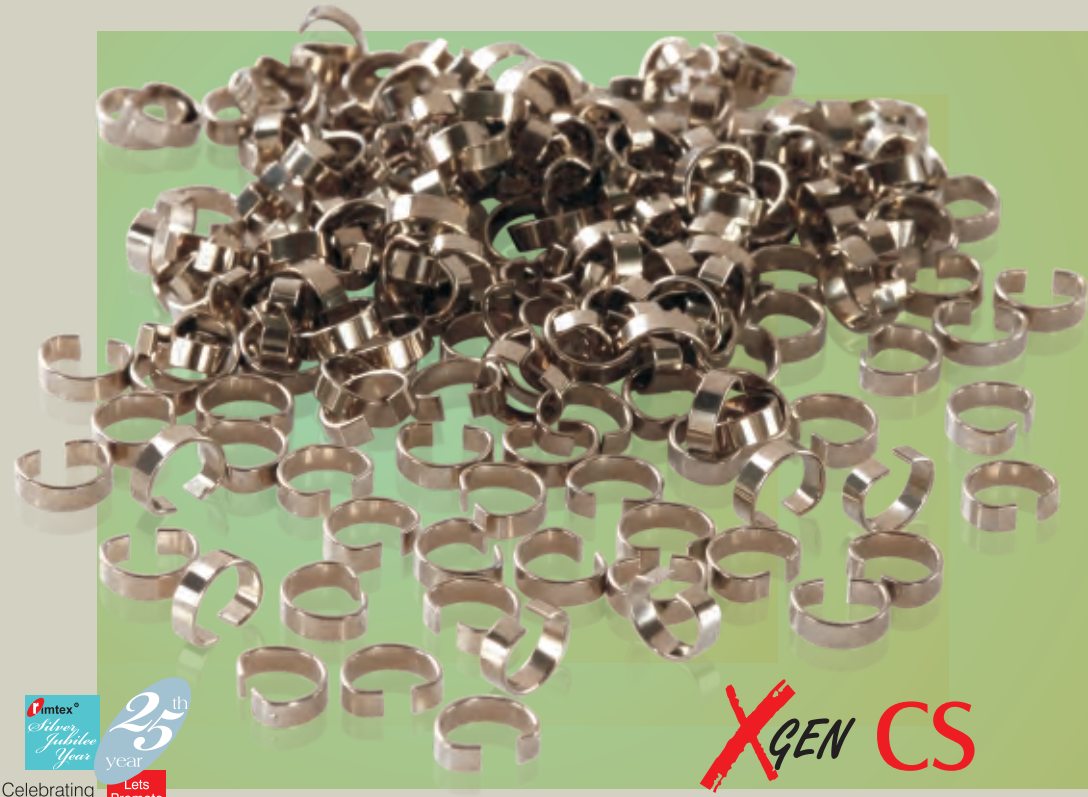
- **Better Output**
  Reduced Yarn Breakages
- **Better Consistency**
  Operates Optimum Speed
- **Better Longevity**
  Long Life

Young and Versatile

introducing sleek NEW XGEN TRAVELLERS

The youngest of The X-axis range of Travellers. It offers largest number of Travellers suited for any type and on any make of machine in the world.

Xgen Travellers is the most advanced. Spins, Super fine or the coarse. It give the best end results. It performs to utmost Output, Consistency and Longevity. It seconds to none and performs much better than many in the open market.



XGEN CS

Celebrating Group's 25th year Silver Jubilee Year

Lets Promote Quality

Better Output.
Better Consistency.
Better Longevity.
Short Staple and
Long Staple Spinning.

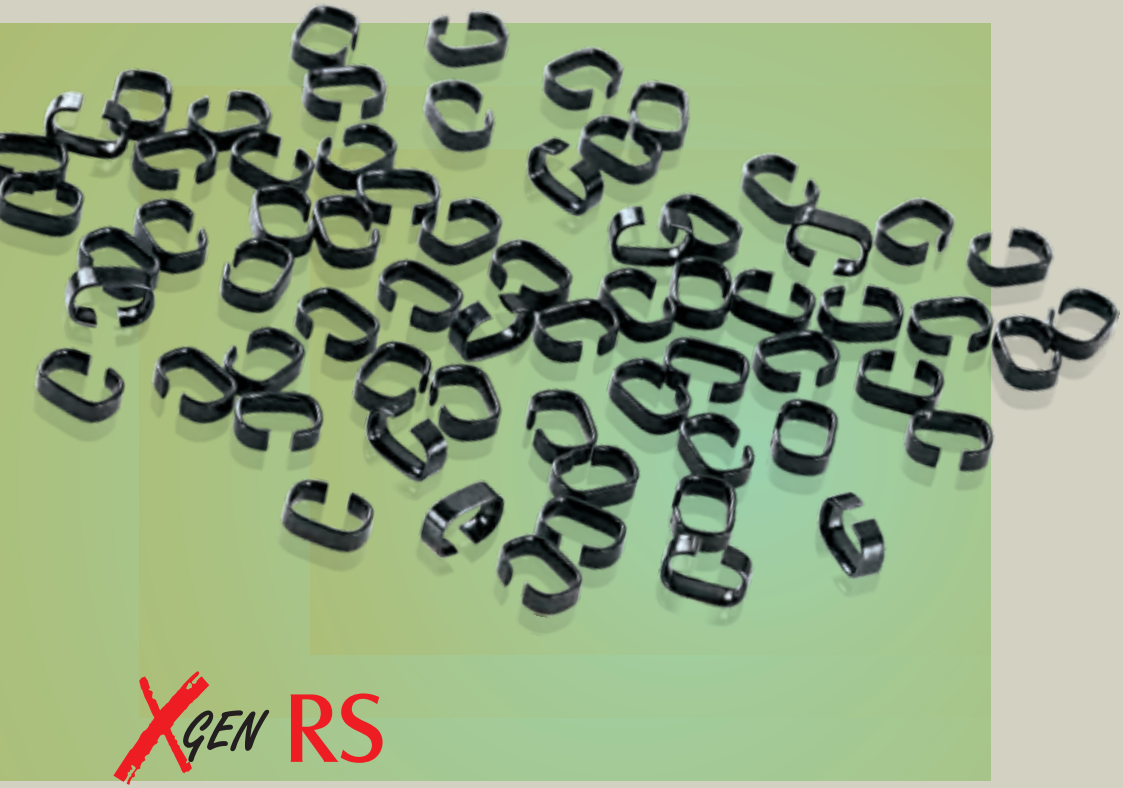
the X-axis®

Better
OCL
OUTPUT CONSISTENCY LONGEVITY

It is manufactured with the latest technology and has the most advanced finish and metallurgy to withstand toughest wear and tear.

Tested at many spinning units and spinners found impressive results.

The technology and being youngest is perfectly blended.



XGEN RS

Youngest & Safest

Tested at many spinning units and spinners found impressive results. The technology and being youngest is perfectly blended.

The X-axis - XGEN Travellers

Travellers of the Future

Better DCL
OUTPUT CONSISTENCY LONGEVITY

XGEN

THE NEW FINISH TRAVELLER

- It is extremely fine tuned designed & treated to get both better life & excellent quality.
- Specific coating composition leads to long life wear resistance on high speed.
- Basic raw material & process is in such a controlled way to meet out excellent constant parameters for long life.
- Fully tested & practical trilled in reputed spinning units.
- Challenge to 25% better life with better speed, ipi, hairiness value.

PRESENT TRAVELLER	NEW TRAVELLER	NEW TRAVELLER FEATURES
XENDOW-RS	Xgen-RS	Special hardening process for better grain structure & frictionless surface treatment for better Thermal transfer. Having better heat dissipation, low RA value, Smooth gliding leads to lesser end breakage even at high speed with long life.
XENDOW-CS	Xgen-CS	Manufactured with unique process for better & uniform Microstructure. Improved wear resistance, lesser heat generation, smooth coating generates minimum friction provides excellent life at highest speed.

Celebrating Group's 25th year Lets Promote Quality

NEW XGEN TRAVELLERS

PERFORMANCE

the X-axis®

• TRAVELLER SEARCH ENDED WITH XGEN

X-axis introduces series with new finish in traveller to solve the all query beyond from existing travellers. The x-axis Xgen series travellers give life more than standard expectation with reduced hairiness, end breakages, start up breakages with eliminate fly & loading issue.

Particulars	Performance in Xgen series traveller
Traveller life	25% higher
Traveller speed	2 -5 % higher speed with same life
Breakages	Lesser than 5%
U%, ipi & harriness	Excellent & lesser harriness by 2 to 3%
Traveller consumption	25% lesser
Machine down time production gain	25% lesser down time due to lesser number of traveller change. Due to slow running at traveller change so if Lesser the number of changes, higher the production.
Wastage of traveller	Lesser as number of changes reduced by 25%
Work load	Lesser hands engagement due to lesser changes requirement

Gain in terms of Life Xgen

Particulars	Others	Xgen
Ring dia	38 mm	38 mm
Traveller life	7	10
Breakages	3.50%	3.40%
Avg speed	18500	18500
Count	40	40
TPI	25	25
Changes in 10000 sp./months .	42.86	30.00
Traveller saving	0.00	12.86
Gain in percent / month	0.00	30.00
Down time20 min / change	857.14	600.00
Machine down time saving	0.00	257.14

Gain in terms of Speed Productivity

Particulars	Others	Xgen
Ring dia	38 mm	38MM
Traveller life	7	7
Breakages	3.50%	3.40%
Avg speed	18500	19000
Count	40	40
TPI	25	25
Production /sp./shift	0.133	0.137
Per month	11.99	12.31
Gain in / month/spindle	0.00	0.32
Gain in kg/ 10000 sp	0.00	3240.00
Per day production gain	0.00	108.00

The X-axis - Conical Rings

Finishes and Types

Threaded Rings for Wool, Acrylic,
Worsted and Semi-worsted

The Conical Rings are mainly used for Acrylic, Wool, Worsted and Semi-worsted materials. Standard Conical Rings are available in different Ring heights like, 9.1 mm, 11.1 mm and 17.4 mm with various lubricating systems.

The Ring can have several pairs of lubrication points like 2x2, 3x3 and 4x4 depending on the ring size and count spun.

The Conical Ring gives excellent Ring and Traveller contact area and allows the Traveller to move freely up and down



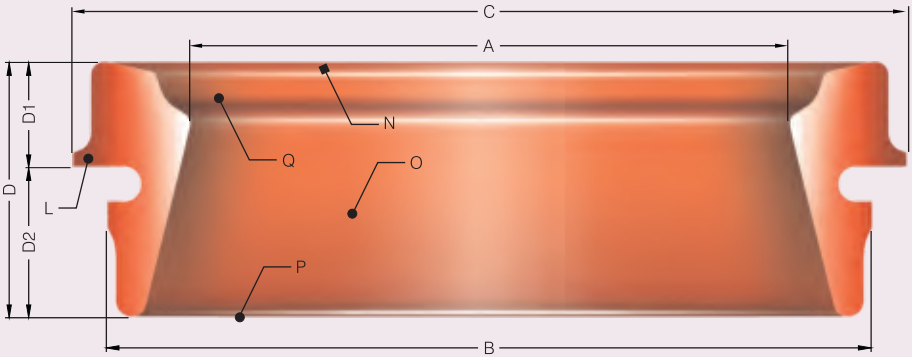

XL-N

XL-N XLR Bright
XL-N XLC

the X-axis®

Better
OCL
OUTPUT CONSISTENCY LONGEVITY

Designation of Conical Ring Parts



A	Inner Diameter
B	Fitting Diameter
C	Shoulder Diameter (Largest Diameter)
D	Ring Height
D1	Height Above Ring Rail
D2	Height Below Ring Rail
L	Shoulder
N	Upper Raceway
O	Inner Raceway
P	Lower Raceway
Q	Yarn Recess

Standard Sizes

Inner Diameter "A" in mm	42	45	48	50	52	55	57	60
Fitting Diameter "B" in mm	49	52	55	57	59	62	64	67
Ring Height "D" in mm	9.1	11.1	17.4	For All Above Sizes				

Conical Ring Travellers

Traveller Shapes

Shapes of standard J Traveller

Preferred Operating Position of Traveller

Correct Position.:

While running, the traveller normally contacts the inner conical ring track and the upper ring track and consequently produces the main wear in these areas.

Traveller too Light

The Traveller is pulled upwards and thus gets into contact with the lower and the inner ring track. Its lower contact area willl subsequently wear heavily. The consequences are shorter lifetimes of the traveller and more yarn breakages.

Traveller too heavy

Too heavy wear at the upper contact area of the ring. The life time of the travellers become shorter and the rate of yarn break rises.

J Travellers of Steel

J Travellers of Steel

Available in finish: XL-CS, XL-RS, Xendow RS, Xendow CS, Xgen RS, Xgen CS.

J Travellers of steel

Traveller Designiations

The designation of X-axis J Travellers are based on international standards.

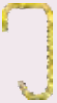
J 9.1 r Standard No. 28 / ISO No. 40 XLCS
J 11.1 r Standard No. 24 / ISO No. 90 XLRS

Explanation

Traveller Shape	Ring Height	Wire Profile	Traveller Type	Material	Traveller No.	ISO No.	Traveller Finish
J	9.1	r	Standard	Steel	28	40	XL-CS
J	11.1	r	Standard	Steel	24	90	XL-RS

Wire Profiles

J Traveller of Steel for J 9.1 and J 11.1 Rings.

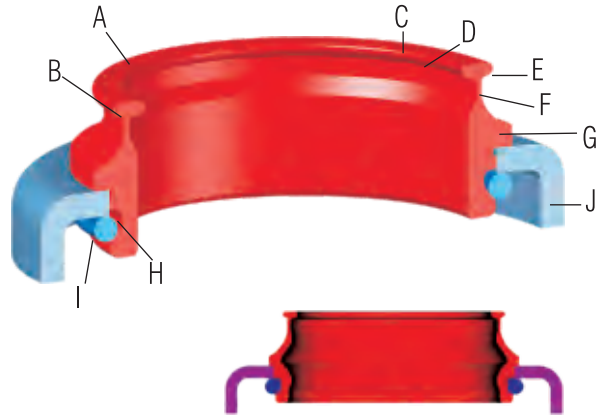
Ring Height		Traveller Designation	Numbering System	Traveller Number Range		Illustration of	
Designation	mm			J No.	ISO NO. (Gram/ 1000 piece)	Wire Profile	Traveller
J 9.1	9.1 mm	J 9.1 r	J	20 to 32	23.6 to 180	•	
J 11.1	11.1 mm	J 11.1 r	J	18 to 29	33.5 to 335	•	

Technical Details Related to Spinning

Designation of Ring Parts

Non-Reversible Flange Rings

A = TRAVELLER PATH
B = FLANGE
C = FLANGE TOP
D = INSIDE FLANGE
E = OUTSIDE FLANGE
F = WEB
G = SHOULDER
H = CIRCLIP GROOVE
I = CIRCLIP
J = RING RAIL



Ring Shapes

Aluminum Holder with Circlip Fitting

Circlip Fitting

Aluminum Aapter Fitting

Press Fitting

Ring Fitting Methods

Aluminum Holder with Circlip Fitting

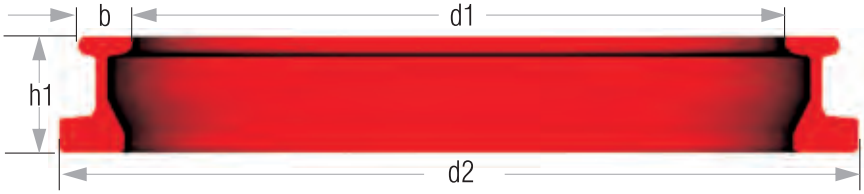
Aluminum Adapter Fitting

Circlip Fitting

Conical Nut Fitting

Press Fit

Aluminum Adapter Fitting



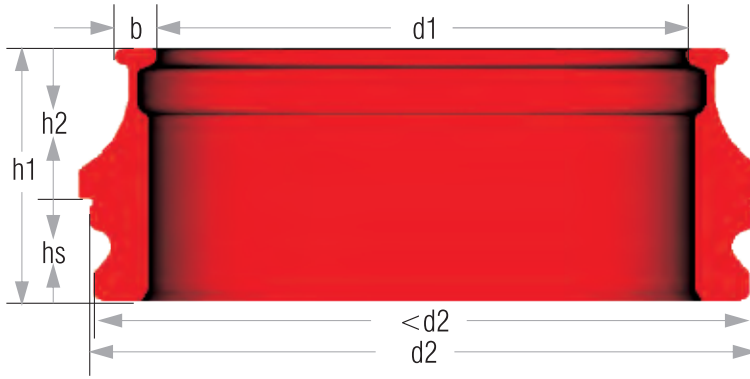
b = flange width
Flange 1 = 3.2mm
Flange 2 = 4.0 mm

d1 = inside ring diameter
d2 = fitting diameter
h1 = ring height

d1mm	Flange 1 d2mm	Flange 2 d2mm	Deviation limits of fiting ø for d2 in mm
36	47	–	–
38	47	–	–
38	51	–	–
40	47	–	0.0
40	51	–	-0.2
42	51	–	–
42	54	–	–
45	54	54	–

Rings with other sizes manufactured on request

Ring Fitting Methods



b = flange width

Flange 1 = 3.2mm

Flange 2 = 4.0 mm

d1 = inside ring diameter

d2 = fitting diameter

h1 = ring height

h2 = ring height above ring rail

hs = fitting height

d1mm	Flange 1 d2mm	Flange 2 d2mm	Deviation limits of fiting ø for d2 in mm
36	45	–	–
38	45	–	–
40	47	–	–
42	49	–	0.0
45	52	–	-0.2
40	50.8	–	–
42	50.8	–	–
45	50.8	50.8	–
45	54	54	–

Rings with other sizes manufactured on request

Ring Traveller Profile

FLANGE 1


U1 EL udr


U1 CL udr


E1 LL udr


U1 XEL udr


EL1 udr


U1 ML udr


U1 UL udr

FLANGE 1


U1 UM udr


U1 C1 udr


C1 H udr


EP1 udr


U1 MM udr


EM1 udr


U1 US udr

FLANGE 2


U2 UM dr


EM2 dr


EP2 dr


C2 H dr


EH2 dr


C2 F

the X-axis®
OCL

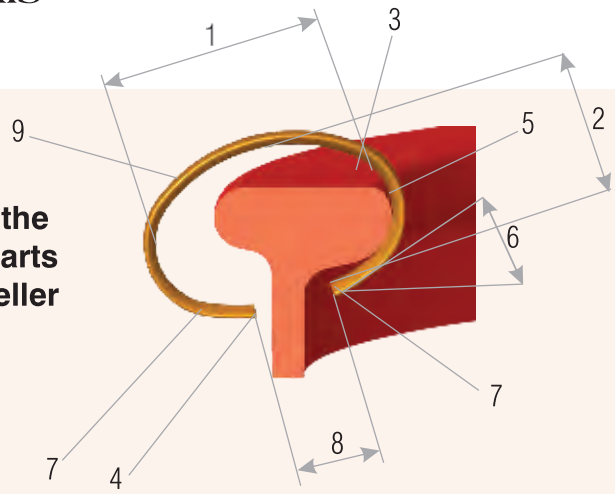
Recommendation for The X-axis Travellers

Fiber	C - Type Horizontal Traveller							J - Type Vertical Traveller	
	For Cotton - Carded / Combed			For Compact	For Synthetic & Blends			For Worsted (Conical Ring)	
Yarn Count Range	Coarse Ne 5 to 20	Medium Ne 20 to 40	Fine Ne 40 to 60	Super Fine & Compact	Coarse Ne up to 20 & SLUB	Medium Ne 20 to 40	Fine Ne 40 to 60	For 9.1mm Ring Height	For 11.1 mm Ring Height
Flange - 1	C1 H udr U1 UM udr U1 MS udr	C1 H udr U1 ML udr U1 UL udr U1 MM udr U1 UM udr	U1 CL udr U1 ML udr U1 UL udr U1 MM udr	U1 EL udr U1 CL udr E1 LL udr U1 XEL udr EL1 udr	EP1 udr U1 UM udr EM1 udr U1 MS udr C1 W udr	C1 H udr U1 UL udr U1 US udr U1 MS udr	U1 C1 udr U1 UM udr U1 ML udr U1 UL udr U1 MM udr	J 9.1 r (20 to 32)	J 11.1 r (18 to 29)
Flange - 2	EP2 dr C2H dr EH2 dr	U2 UM dr EM2 dr C2H dr	NA	NA	EP2 dr C2 H dr EH2 dr C2 F	U2 UM dr EM2 dr EP2 dr	NA	NA	NA

Remarks

1. Above recommendation is for your easy guidelines & better selection point of view based on running count range & product basis, viewing the market acceptability & technical parameters of traveller profile.
2. We have all the no. of above profile in the count range defined & most versatile profiles complete range for any count.
3. Besides above profiles, we have also some special developed profile as U½ UL udr, EM1 dr, C1 HF udr, C1 H1 dr, C1 HD udr, C2 rf, H2 dr & C2 Z dr etc on Market demands.
4. The X-axis having largest range of profiles along with availability of numbers & all travellers are ready on stock available.

Designation of the Ring Traveller parts C - shaped traveller

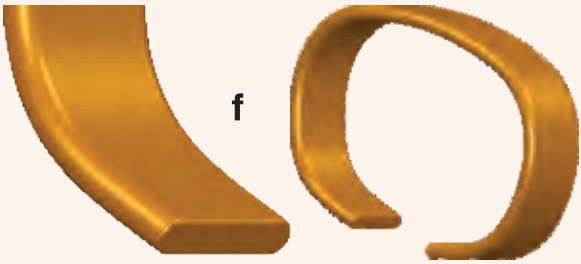


1. Inner Traveller Width
2. Height of bow
3. Yarn passage
4. Wire section
5. Traveller - ring contact surface
6. Angle of toe
7. Toe
8. Toe Gap
9. Upper part of traveller bow

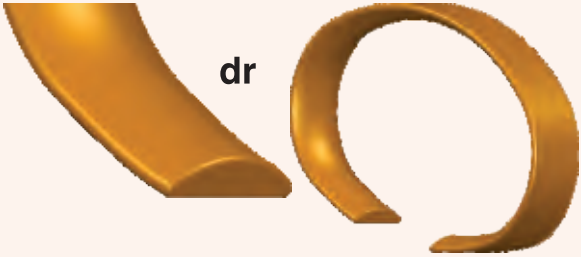
Wire Cross Sections

The wire section does influence the yarn quality, the running behaviour, the performance and the life time of the travellers. The right choice of the wire section is an important factor for optimum results.

Only for cotton : improves the traveller lubrication

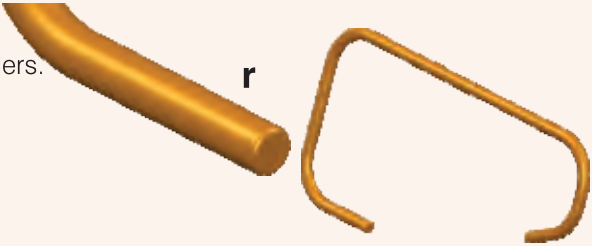


Synthetics and blends : prevents fibre damage
Fine cotton yarns : reduces production (push-back) neps.



For cotton and blends : Through an enlarged contact surface on the ring raceway, highest performances are possible.

Main application for J and HZ travellers.



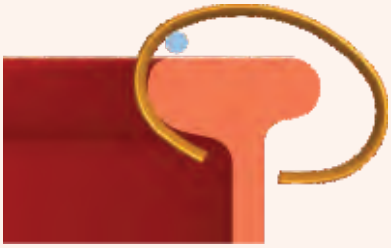
Travellers: **udr, dr, f, r** profile

Yarn clearance

The yarn clearance must be adapted to the yarn count, yarn twist (volume) as well as to the fibers processed.
The yarn clearance does also influence the fibre lubrication.

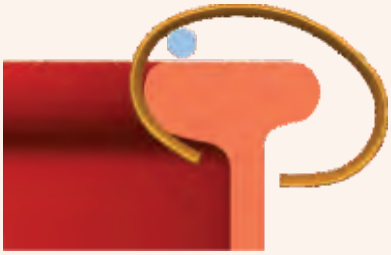
Reduced yarn clearance ---- good lubrication
Large yarn clearance -------- reduced lubrication.

- low bowed traveller
- reduced yarn clearance
- low center of gravity
  for fine cotton yarns
  for compact yarns



* Optimum fibre lubrication

- low to medium bowed traveller
- small to medium yarn clearance
  for fine to medium fine cotton yarns



*Normal fibre lubrication

- high bowed traveller
- large yarn clearance
  for medium to coarse cotton yarn,
  also suitable for blends and synthetics

* Reduced fibre lubrication

Yarn clearance

The Influence of Yarn clearance on Traveller Lubrication

The required yarn clearance in the traveller must be selected according to the yarn count and to the fibres processed. It is determined by the traveller shape and the inclination of the traveller. Effects of the yarn clearance on the yarn quality and the running behaviour of the traveller:

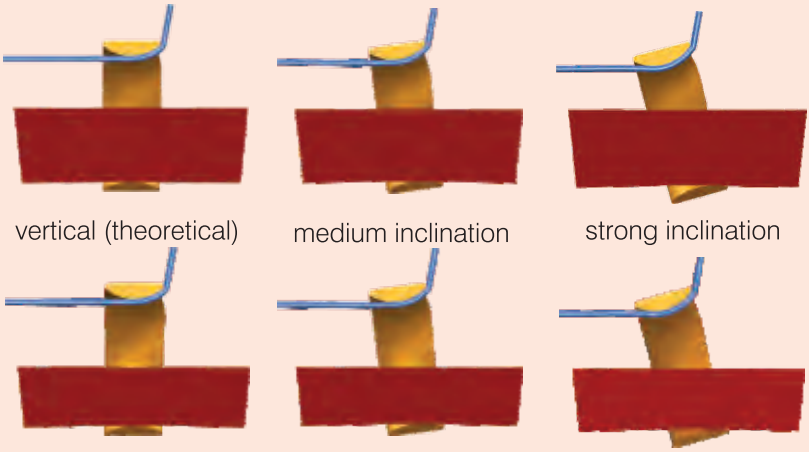
Yarn clearance	Small, low	Large, high
Yarn count	Fine	Coarse
Fibre	Cotton	Synthetics, blends
Influence of lubrication film	Good traveller lubrication	Reduced traveller lubrication
Influence of yarn quality	Danger of “push-back” neps and melting points (on synthetics)	Excellent yarn quality No such problem

The inclination of the traveller is primarily influenced by the spinning geometry and the spinning tension. The stronger the inclination of the traveller, the more the yarn clearance is reduced and the better the traveller lubrication.

The influence of traveller shape and inclinations.

Low bowed traveller

Position



vertical (theoretical) | medium inclination | strong inclination

High bowed traveller

TRAVELLER SPEEDS CALCULATION

In m/s. (Rounded Figures), ring diameter 36 - 70 mm

Formula: $\frac{\text{Ring diameter (mm) x } \pi \text{ x n(rpm)}}{1000\text{x}60}$ = m/s (feet / min ≅ m/s x 200)

Ring Dia in - mm. / Spindle Speed (rpm) - inch	70 2 3/4	67 2 5/8	63 2 1/2	60 2 3/8	57 2 1/4	54 2 1/8	51 2	48 1 7/8	45 1 3/4	42 1 5/8	40 1 9/16	38 1 1/2	36 1 27/64
9000	33	32	30	28	27	25	24	23	21	20	19		
9500	35	33	31	30	28	27	25	24	22	21	20		
10000	37	35	33	31	30	28	27	25	24	22	21		
10500	38	37	35	33	31	30	28	26	25	23	22	21	
11000	40	39	36	35	33	31	29	28	26	24	23	22	
11500	42	40	38	36	34	33	31	29	27	25	24	23	
12000		42	40	38	36	34	32	30	28	26	25	24	23
12500		44	41	39	37	35	33	31	29	27	26	25	24
13000		46	43	41	39	37	35	33	31	29	27	26	25
13500				42	40	38	36	34	32	30	28	27	25
14000				44	42	40	37	35	33	31	29	28	26
14500				46	43	41	39	36	34	32	30	29	27
15000						42	40	38	35	33	31	30	28
15500						44	41	39	37	34	32	31	29
16000						45	43	40	38	35	34	32	30
16500								41	39	36	35	33	31
17000								43	40	37	36	34	32
17500								44	41	38	37	35	33
18000									42	40	38	36	34
18500									44	41	39	37	35
19000									45	42	40	38	36
19500										43	41	39	37
20000										44	42	40	38
20500										45	43	41	39
21000												42	40
21500												43	41
22000												44	41
22500												45	42
23000												46	43
23500												47	44
24000												48	45
24500												49	46
25000												50	47

NUMBERING SYSTEMS FOR YARNS AND TWISTS

YARN COUNT COMPARISON CHART (ROUNDED FIGURES)

TEX	NM	Ne_B	Ne_K	Ne_W	Ne_L	Den
100.0	10.0	6.0	8.9	19.4	16.5	900
84.0	12.0	7.0	10.6	23.3	19.8	750
72.0	14.0	8.3	12.4	27.1	23.2	643
64.0	16.0	9.5	14.2	31.0	26.5	563
60.0	17.0	10.0	15.0	33.0	28.0	529
56.0	18.0	10.6	16.0	35.0	29.8	500
50.0	20.0	12.0	17.7	39.0	33.0	450
46.0	22.0	13.0	19.5	43.0	36.4	409
42.0	24.0	14.0	21.1	47.0	40.0	375
36.0	28.0	16.5	24.8	54.0	46.0	321
34.0	30.0	18.0	26.6	58.0	50.0	300
32.0	32.0	19.0	28.4	62.0	53.0	281
30.0	34.0	20.0	30.1	66.0	56.0	265
25.0	40.0	24.0	35.4	78.0	66.0	225
23.0	44.0	26.0	39.0	85.0	73.0	205
21.0	48.0	28.0	42.5	93.0	79.0	188
20.0	50.0	30.0	44.3	97.0	83.0	180
17.0	60.0	36.0	53.2	116.0	99.0	150
14.0	70.0	40.0	62.0	136.0	116.0	129
12.5	80.0	48.0	71.0	155.0	132.0	113
12.0	85.0	50.0	75.3	---	140.5	108
10.0	100.0	60.0	88.6	---	165.4	90
8.3	120.0	70.0	104.5	---	195.1	75
7.4	135.0	80.0	119.6	---	223.2	67
6.6	150.0	90.0	---	—	—	60
5.8	170.0	100.0	---	---	---	52
5.5	180.0	105.0	---	---	---	50
5.0	200.0	120.0	---	---	---	45
4.0	250.0	150.0	---	---	---	36
3.3	300.0	180.0	—	—	—	30

Numbering Systems for Yarns and twists
Conversion formulas

Given \ Desired	Abbre-viation	den	tex	dtex	Nm	Ne_B	Ne_L	Ne_W	Ne_K
Tex	tex	9tex	---	10tex	$\frac{1000}{\text{tex}}$	$\frac{590}{\text{tex}}$	$\frac{1654}{\text{tex}}$	$\frac{1938}{\text{tex}}$	$\frac{886}{\text{tex}}$
Decitex	dtex	0.9tex	0.1dtex	---	$\frac{10000}{\text{dtex}}$	$\frac{5900}{\text{dtex}}$	$\frac{16540}{\text{dtex}}$	$\frac{19380}{\text{dtex}}$	$\frac{8860}{\text{dtex}}$
Den	den	---	0.111den	1.111den	$\frac{9000}{\text{den}}$	$\frac{5315}{\text{den}}$	$\frac{14882}{\text{den}}$	$\frac{17440}{\text{den}}$	$\frac{7972}{\text{den}}$
Metric no	Nm	$\frac{9000}{\text{Nm}}$	$\frac{1000}{\text{Nm}}$	$\frac{10000}{\text{Nm}}$	---	0.590 Nm	1.654 Nm	1.938 Nm	0.886 Nm
Engl. Cotton no	Ne_B	$\frac{5315}{Ne_B}$	$\frac{590}{Ne_B}$	$\frac{5900}{Ne_B}$	1.693 Ne_B	----	2.80 Ne_B	3.28 Ne_B	1.5Ne_B
Engl Linen no.	Ne_L	$\frac{14882}{Ne_L}$	$\frac{1654}{Ne_L}$	$\frac{16540}{Ne_L}$	0.605 Ne_L	0.357 Ne_L	—	1.172 Ne_L	0.536 Ne_L
Engl. Woolen. No	Ne_W	$\frac{17440}{Ne_W}$	$\frac{1938}{Ne_W}$	$\frac{19380}{Ne_W}$	0.516 Ne_W	0.305 Ne_W	0.853 Ne_W	----	0.457 Ne_W
Engl. Comb. No	Ne_K	$\frac{7972}{Ne_K}$	$\frac{886}{Ne_K}$	$\frac{8860}{Ne_K}$	1.129 Ne_K	0.667 Ne_K	1.867 Ne_K	2.188 Ne_K	----

Mass count $= \frac{\text{Weight}}{\text{Length}}$ tex $= \frac{g}{Km}$

den $= \frac{g}{9000m}$

Length count $=$ **$\frac{\text{Length}}{\text{Weight}}$**

Twist

with Ne T/" $= \propto e \bullet \sqrt{Ne}$

with Nm T/m $= \propto m \bullet \sqrt{Nm}$

with tex T/m $= \frac{\propto tex}{\sqrt{tex}}$

weft twist ~ warp x 0.9
knit twist ~ warp x 0.8

Twist multiplier

with Ne $\propto e$ $= \frac{T"}{\sqrt{Ne}}$

with Nm $\propto m$ $= \frac{T/m}{\sqrt{Nm}}$

with tex $\propto tex$ $= T/m \bullet \sqrt{tex}$

Nm $= \frac{m}{g}$

$Ne_B = \frac{840 \text{ yds}}{\text{pound}}$

$Ne_L = \frac{300 \text{ yds}}{\text{pound}}$

$Ne_W = \frac{256 \text{ yds}}{\text{pound}}$ (woolen)

$Ne_K = \frac{560 \text{ yds}}{\text{pound}}$ (woolen)

Relationship of yarn count to Traveller number

Traveller Number

Yarn Count			Cotton		Synthetics & Blends	
Ne	TEX	NM	Traveller No.	Traveller Wt.	Traveller No.	Traveller Wt.
8	73.8	14	10-14	160-250	12-16	200-280
12	49.2	20	6-9	100-140	8-11	125-180
18	32.8	30	2-6	71-100	5-8	95-125
20	29.5	34	2/0-3	50-80	4-7	90-112
24	24.6	41	3/0-2	45-71	1-4	63-90
30	19.7	51	5/0-1/0	35.5-56	2/0-2	50-71
34	17.4	58	6/0-2/0	31.5-50	3/0-1	45-63
40	14.8	68	9/0-5/0	23.6-35.5	7/0-3/0	28-45
45	13.1	76	11/0-8/0	20-25	9/0-6/0	23.6-31.5
55	10.7	93	13/0-9/0	17-23.6	11/0-7/0	20-28
60	9.8	102	14/0-10/0	16-22.4	12/0-8/0	18-25
70	8.4	119	16/0-12/0	14-18	14/0-10/0	16-22.4
80	7.4	135	18/0-14/0	12.5-16	16/0-12/0	14-18
90	6.6	152	20/0-16/0	10-14		
100	5.9	169	22/0-18/0	9-12.5		
120	4.9	203	26/0-22/0	7.1-9		

The X-axis - Flanged Ring Travellers

Traveller No	X-axis	Lakshmi /Bracker	R+F	AB Carter India	Kanai
30/0			4.0		
29/0			4.5		
28/0	6.3	6.3	5.0	6.3	6.7
27/0			5.6		7.3
26/0	7.1	7.1	6.0	7.1	8.1
25/0			6.3		8.9
24/0	8.0	8.0	7.1	8.0	9.5
23/0			7.5		10.4
22/0	9.0	9.0	8.0	9.0	10.9
21/0			8.5		11.6
20/0	10.0	10.0	9.0	10.0	12.3
19/0	11.2	11.2	10.0	11.2	13.0
18/0	12.5	12.5	11.2	12.5	13.7
17/0	(13.2)	(13.2)	11.8	(13.2)	14.5
16/0	14.0	14.0	13.2	14.0	15.4
15/0	(15)	(15)	14.0	(15)	16.6
14/0	16.0	16.0	15.0	16.0	18.3
13/0	(17)	(17)	16.0	(17)	20.0
12/0	18.0	18.0	18.0	18.0	21.6
11/0	20.0	20.0	19.0	20.0	23.4
10/0	22.4	22.4	20.0	22.4	25.0
9/0	(23.6)	(23.6)	22.4	(23.6)	26.8
8/0	25.0	25.0	23.6	25.0	28.5
7/0	28.0	28.0	26.5	28.0	30.2
6/0	31.5	31.5	30.0	31.5	32.2
5/0	35.5	35.5	31.5	35.5	35.1
4/0	40.0	40.0	35.5	40.0	38.3
3/0	45.0	45.0	40.0	45.0	42.2
2/0	50.0	50.0	45.0	50.0	48.3
1/0	56.0	56.0	50.0	56.0	54.6

Weight Chart
'C'-Type

the X-axis®

Better
OCL
OUTPUT CONSISTENCY LONGEVITY

Traveller No	X-axis	Lakshmi / Bracker	R+F	AB Carter India	Kanai
1	63.0	63.0	60.0	63.0	62.2
2	71.0	71.0	71.0	71.0	73.6
3	80.0	80.0	80.0	80.0	81.0
4	90.0	90.0	85.0	90.0	87.7
5	(95)	(95)	95.0	(95)	95.3
6	100.0	100.0	106.0	100.0	108.8
7	112.0	112.0	112.0	112.0	121.8
8	125.0	125.0	125.0	125.0	135.9
9	140.0	140.0	140.0	140.0	154.4
10	160.0	160.0	160.0	160.0	174.8
11	180.0	180.0	180.0	180.0	199.0
12	200.0	200.0	200.0	200.0	219.8
13	224.0	224.0	224.0	224.0	237.8
14	250.0	250.0	236.0	250.0	258.7
15	(265)	(265)	250.0	(265)	277.1
16	280.0	280.0	265.0	280.0	298.0
17	(300)	(300)	280.0	(300)	
18	315.0	315.0	300.0	315.0	
19	(335)	(335)	315.0	(335)	
20	355.0	355.0	325.0	355.0	
22	(375)	(375)	355.0	(375)	
24	400.0	400.0	385.0	400.0	
26	(425)	(425)	415.0	(425)	
28	450.0	450.0	450.0	450.0	
30	(475)	(475)	475.0	(475)	

Details other than of The X-axis is as available / informed in the general catalogues or from the open market.

The X-axis - Conical Ring Travellers

Traveller No	X-axis	R+F	Bracker LRT	Kanai (SBA)
6.0	3000.0	3000.0	3150.0	
7.0	2650.0	2650.0	2800.0	
8.0	2360.0	2360.0	2500.0	
9.0	2120.0	2120.0	2240.0	950.0
10.0	1800.0	1800.0	1800.0	850.0
11.0	1600.0	1600.0	1600.0	650.0
11.5	1400.0	1400.0		
12.0	1320.0	1320.0	1250.0	580.0
12.5	1180.0	1180.0		545.0
13.0	1060.0	1060.0	1000.0	510.0
13.5	950.0	950.0		475.0
14.0	850.0	850.0	900.0	440.0
14.5	800.0	800.0		405.0
15.0	710.0	710.0	710.0	370.0
15.5	630.0	630.0		335.0
16.0	560.0	560.0	560.0	300.0
16.5	500.0	500.0	500.0	285.0
17.0	450.0	450.0	450.0	270.0
17.5	400.0	400.0	400.0	255.0
18.0	355.0	355.0	355.0	240.0
18.5	300.0	300.0	280.0	225.0
19.0	250.0	250.0	250.0	210.0
19.5	224.0	224.0	224.0	195.0
20.0	180.0	180.0	180.0	180.0
20.5	160.0	160.0	(170)	165.0
21.0	150.0	150.0	160.0	150.0
21.5	140.0	140.0	140.0	143.0
22.0	132.0	132.0	125.0	135.0
22.5	118.0	118.0	(118)	128.0

Weight Chart
'J'-Type

the X-axis®

Better
OCL
OUTPUT CONSISTENCY LONGEVITY

Traveller No	X-axis	R+F	Bracker LRT	Kanai (SBA)
23.0	112.0	112.0	112.0	120.0
23.5	100.0	100.0	100.0	113.0
24.0	90.0	90.0	90.0	105.0
24.5	85.0	85.0	80.0	97.5
25.0	75.0	75.0	71.0	90.0
25.5	67.0	67.0	(67)	82.5
26.0	60.0	60.0	63.0	75.0
26.5	53.0	53.0	56.0	71.5
27.0	50.0	50.0	50.0	68.0
27.5	45.0	45.0	45.0	64.5
28.0	40.0	40.0	40.0	61.0
28.5	35.5	35.5	35.5	57.5
29.0	33.5	33.5	31.5	54.0
29.5	31.5	31.5	(30)	50.5
30.0	30.0	30.0	28.0	47.0
30.5	28.0	28.0		43.5
31.0	26.5	26.5	25.0	40.0
31.5	25.0	25.0		38.2
32.0	23.6	23.6	23.6	36.0
33.0	22.4	22.4	22.4	32.0
34.0	21.2	21.2	21.2	28.0
35.0	20.0	20.0	20.0	24.0
36.0	18.0	18.0	18.0	20.0
37.0	16.0	16.0	16.0	18.0
38.0	15.0	15.0	14.0	16.0
39.0	13.2	13.2	12.5	
40.0	11.8	11.8	11.2	

Details other than of The X-axis is as available / informed in the general catalogues or from the open market.

The X-axis - Ring Travellers

Directly Reduces:
Traveller wastage. Eliminates risk of damaging Ring or Traveller while inserting.

Indirectly Increases:
Productivity.
Working convenience.

Easy to use.
A demo of travellers easily inserted on ring.

Inserting Tools

TRAVELLER INSERTING TOOL

TRAVELLER BEING INSERTED
BY AN INSERTING TOOL

Safest and user friendly way
of inserting travellers.

TRAVELLERS
MAGAZINE BOX

Brief information about the function and contribution of Ring and Traveller in Yarn Spinning:

In Ring Spinning the drafted fibre strand passes through different physical phenomenon during formation of Yarn. At this stage of manufacturing, Ring and Traveller contributes highest percentage of their physical and chemical properties to produce a good quality Yarn. Apart from Ring and Traveller, Spinning Tube, Spindles, Lappet Hook and ABC Ring also plays critical role for producing world class yarn.

During Spinning process the Ring Traveller perform three main task while it is running on the profiled surface of the Ring.

a) To provide Twist to the yarn
b) To wind the yarn on the bobbin
c) To provide yarn tension (Spinning tension)

The operation of twisting and winding carried out by Traveller must be performed without any unwanted Tension on the Yarn through out the process of Cop Building. Torsional force on the fibre strand is a function of the Delivery of Ring Frame to the Spindle Speed. Any variation of this ratio is compensated by the Traveller without influence on its Twisting, Winding and Tension.

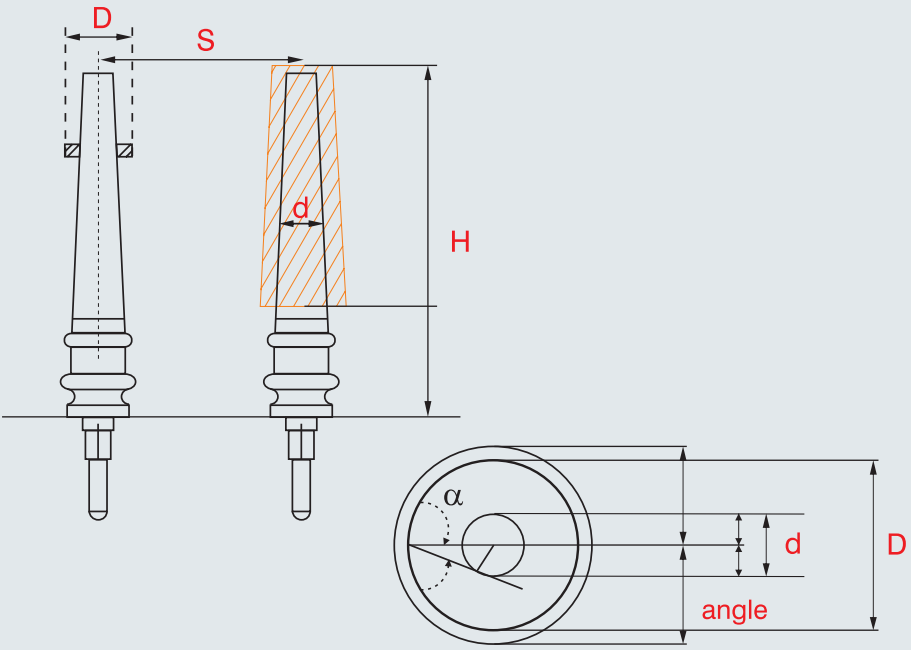
As Profiled surface of Steel Ring faces the extra ordinary pressure (Upto 35N/Sq.mm) exerted by traveller at speed of about 45 Mt/Sec., a considerable amount of heat app. 300°C is generated due to frictional force between the surface of Ring and Traveller.

Low mass of the Traveller does not permit dissipation of the generated heat in short time available. As a result the operating speed of the Traveller is limited to about 45 Mts/Sec.

Surface characteristics of Ring i.e. Surface Roughness, Metallurgy etc. are the dependant variables of the amount of heat generated due to friction between Ring and Traveller.

Withstanding capacity against the strain and heat generated limits the performance of Ring Spinning. Also the spinning tension is directly proportional to the co-efficient of friction between Ring and Traveller and inversely proportional to the Ring Diameter.

Interesting relation Ring, ANBC Ring, Lappet Hook and Spindle:



S= Spindle Gauge.

D= Inside diameter of Ring.

d= Average diameter. of the bobbin.

H=Length of the bobbin.

To run the Ring Frame with low end breakage rate and to produce a good quality yarn, Balloon Control Ring, Lappet Hook and the Ring must be concentric and all of the above faculties of spinning must be concentric with respect to the Spindle. A few relations and ideal values of all the above mentioned variable parameters are mentioned below to provide a guide line for better output and consistency in quality of Yarn as well as optimum performance and longevity of the machine.

While selecting Ring Diameter, the spindle gauge has to be taken into consideration. Ring Diameter should be 25 mm smaller than the spindle gauge up to Ring Diameter of 85 mm. Above 90 mm Ring Diameter, it should be 30 mm smaller than the Spindle Gauge.

Recommended ratio: D=S-25 mm.
'd:D in spinning 0.48-0.5 or the angle of yarn pull $\alpha = 29^{\circ} - 30^{\circ}$.
'd:D in Twisting 0.44 - 0.5 or α will be $27^{\circ} - 30^{\circ}$.

If this ratio is too small a high traveller strain occurs resulting premature life of traveller followed by high end breakage rate. If this value is too high, Balloon will collapse, intermittently resulting high end breakage rate.

Length of the bobbin H should be 5 x D. If the bobbin or the spindle is too long, Yarn will touch the tip of the Bobbin and will create yarn breakage and more hairiness.

Youngest
& Safest

Points to be considered for selection of a Ring

1. Counts to be processed.

2. Spindle Speed of Ring Frame.

1) Counts to be processed: Yarn count to be processed is an important factor for selecting the diameter of the Ring. As yarn Diameter is inversely proportional to the count of the yarn, the coarser yarn have bigger diameter than the finer Yarn. Keeping all other parameters like Lift of the spindle, Ring Traveller count unchanged, if anybody wants to produce Yarn of 20s in 38 mm, 40 mm and 45 mm Ring, the cop content will vary as the dia. of ring varies. So for Coarser Yarn one should go for bigger dia. ring to get the required cop content. If the Ring Diameter is smaller, then the winding efficiency will go down drastically because of more number of Cop change. Depending on the range of count one should select the Diameter of the Ring. Flange of the Ring is also dependant on the count of the yarn. Ring flange determines the width of the traveller and provides the space to run the yarn through traveller. So depending on the count, flange and diameter of the Ring is to be selected.

2) Spindle Speed of the Ring Frame: As the spindle speed increases the traveller speed also increases .The traveller speed ranges from 30 mt/sec to 40 mt/sec. Traveller linear speed is directly proportional to the diameter of the Ring and the Spindle Speed. So higher the spindle speed, ring diameter should also be smaller proportionately, to maintain the Traveller speed within the maximum possible range of 45 mt/sec. Spindle speed is also influenced by the profile of Ring. Different profile has got their own limitation for optimizing the spindle speed. Amongst all, Antiwedge Profile suits the best spindle speed in the Spinning industry.

3) Geometry of Ring Frame: Geometry of Ring Frame considers Balloon Length, Bobbin Dia, Lift of the Bobbin and Total Length of the Bobbin, as the main variables of the Spinning Geometry. All these parameters are directly related with the Spinning Tension and winding tension. Through out the process of cop building, Spinning Tension is related with the Ratio of Ring dia. and Tube dia.(D/d). If in the ring frame geometry, the Balloon length is bigger and bobbin lift is more, one has to go for Bigger Diameter Ring with combination of heavier Traveller to compensate the spinning tension and subsequently reduce the end breakages. So Spinning Geometry as a whole, plays a vital role for selecting the specifications of a Ring.

4) Length of the Bobbin and Bobbin Diameter: Bobbin length is directly related with the Balloon height .At a certain speed higher the Balloon height the spinning tension will be more. At a certain Balloon height the tension varies with the ring diameter. There is mathematical relation between Balloon height, Ring Diameter and the generated spinning tension from which one can optimize the Ring Diameter, Bobbin Length and Speed of the machine. Regarding this relation we will discuss elaborately in the subsequent chapter. Following Table is Guide Line to select the optimum Ring Dia. as well as Tube Diameter and its Length.

Ring Dia 'D' in mm	Tube Dia 'd' in mm				Tube Length 'L' in mm			
36	17	18	19	20	170	180	190	200
38	18	19	20	21	180	190	200	210
39	19	20	21	22	190	200	210	220
40	20	21	22	23	200	210	220	230
42	21	22	23	24	210	220	230	240
45	22	23	24	25	220	230	240	250
48	23	24	25	26	230	240	250	260
51	24	25	26	27	240	250	260	270
54	25	26	27	28	250	260	270	280

= Most Favourable condition = Unfavourable condition

Optimum possible Spindle Speed in Ring Frame: To achieve the optimum possible Spindle Speed in a particular type of Ring Frame one has to consider interdependence of some of the variable parameters in ring frame like Traveller profile and number, Yarn Count , Ring, Lift, ABC, Lappet, Geometry of Spinning Frame, Tube and Thread guide etc. Unless and until we know the relation between above parameters we can not calculate the maximum achievable spindle speed.

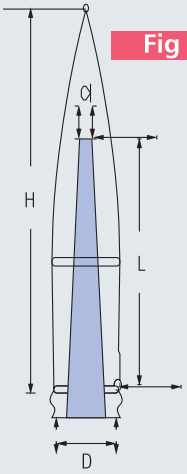


Fig 1

Geometry of Spinning Frame: Many experts speaks of the Geometry of spinning Frame mentioning only the Tube, while others mention the lift and only few take total height of the balloon into consideration. Let us show one simple geometry of ring frame at the doffing, where we can easily identify the size of the Maximum Balloon with “H”, the lift with “L”, the tube diameter “d” and the Ring Diameter with “D”.Fig.1.

The values influencing the Yarn Tension are Count, Air Resistance, The Ring/Tube Ratio (D/d) and the total height of the balloon. We are not considering the Coriolis Force as it does not effect the yarn tension . The yarn tension is not influenced by the lift and the Tube height. The variation of Traveller weight influences the diameter of the Balloon. As for example, if we consider a predetermined value of Balloon Diameter in percentage of the Ring Diameter and the Balloon height, the Traveller to be used will be determined by the predetermined value of Balloon diameter which actually influences the Yarn Tension.

Points to be considered for selection of a Ring

If we consider two different Spinning Geometry (Fig.2) into consideration working with following parameters:

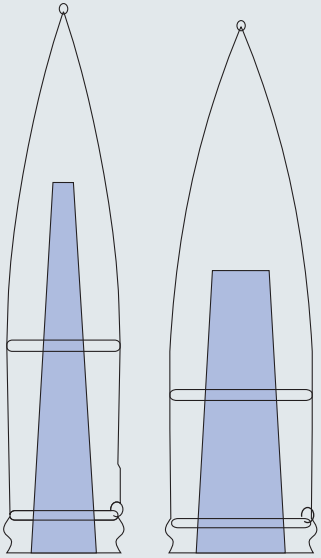


Fig 2

Tube diameter is different.

Tube height is different.

Lift is different.

Count is same for both types.

Spindle speed is same for the both.

Balloon Height is same for both geometry.

Traveller is same for both configuration.

As the balloon height is same and the traveller used is also same so for both configuration the Yarn tension value will be same.

Now if we consider two different configuration with Same lift as in fig.2

Different Balloon Height.

Tube dia same. Count and Spindle Speed is same. So if we use different Traveller the Yarn tension will be different. To keep the tension constant for a particular configuration we have to change the Ratio of Ring / Tube (D / d).

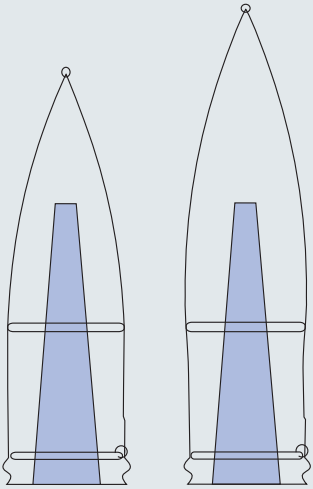
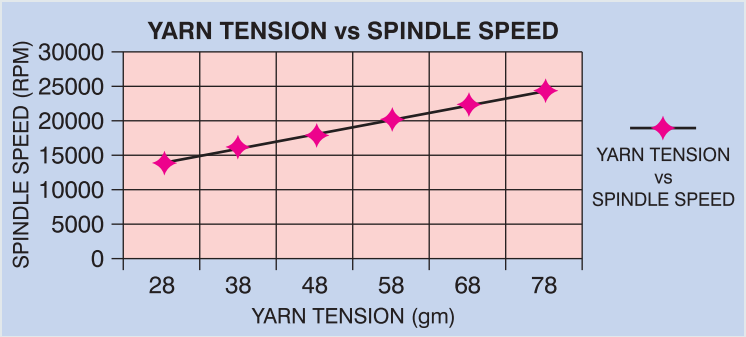


Fig 3

Now we will try to find out a combination of Ring and Traveller so that it will permit the higher spindle speed at lower thread tension. Graph No.1 illustrates the trend of yarn tension(Gm) with change of Spindle Speed(RPM).



Graph 1

Points to be considered for selection of a Ring

From Diagram no.1 it is clear that the tension is directly proportional to the spindle Speed.

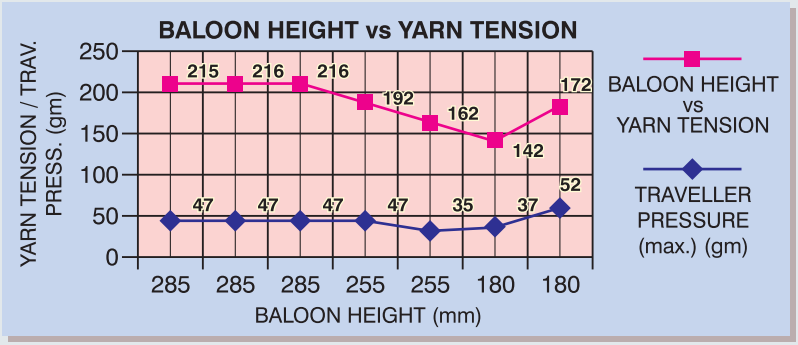
As it is not possible to increase the Spindle Speed with the same yarn without compromising the Breakage. Therefore the spinning geometry and the Ring & Traveller combination should allow the yarn to run at higher speed at Constant Tension. So it is necessary to make a machine with short Balloon and Ring of Small diameter. In this way one would succeed in obtaining the same peripheral speed of the Traveller, same yarn tension and a strong reduction of centrifugal force exerted by the Traveller on Ring surface. In the following table we have shown how different geometry, Ring Dia. Traveller Number.affects the spinning tension as well as the force exerted by the Traveller on the Ring .

Ring Frame Types	1	2	3	4	5	6	7
Balloon Height in mm	285	285	285	255	225	180	180
Lift in mm	230	170	200	200	170	150	150
Count	40	40	40	40	40	40	40
Spindle Speed	15400	15400	15400	15400	15400	20000	25000
Ring Diameter in mm	40	40	40	40	40	38	38
Tube Diameter in mm	22	22	22	22	22	17	17
Traveller	4/0	4/0	4/0	5/0	7/0	11/0	13/0
Maximum Tension in Gr.	47	47	47	47	35	37	52
Minimum Tension in Gr.	32	33	33	29	24	25	36
Maximum Traveller Force in Gr.	215	216	216	192	162	142	172

From the below mentioned graph it is clear that minimum tension value is with Balloon height of 180 mm and ring dia of 38 mm. So one can achieve the speed of 20,000 RPM and above by using the combination of 38 mm ring dia and lower balloon length. For Higher speed two things are to be taken into consideration.

a) Power consumption at higher speed. Because power consumption increases as per the square of the speed.

b) Number of doffs when smaller Ring Dia. and smaller lift. This will affect the winding efficiency by increasing the number of bobbin change as well as the frequency of doffs per shift lowering the Ring frame efficiency.



So considering this two points, one has to optimize their Ring Diameter and Lift of the bobbin to get the maximum benefit from a particular type of Ring Frame. The above chart is a guideline only. One can optimize the spindle speed considering all the variables of his available spinning Geometry.

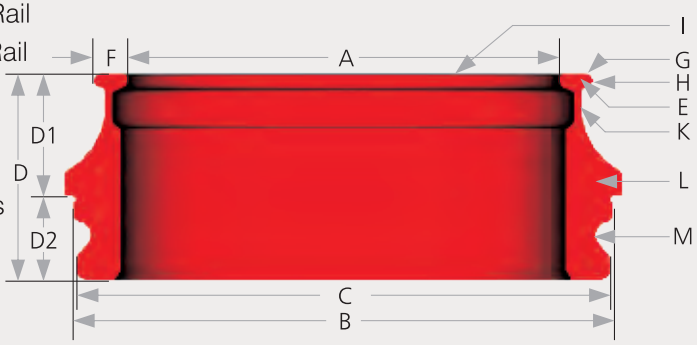
Points to be considered for selection of a Ring

Description of different parts of a Ring:

Following figure describes the different parts of a Spinning Ring. The fitting system varies according to the different make and models of Ring Frame. There are different fitting system like Screw Fitting, Cir-clip fitting, Press fitting etc.

A : Inner Diameter
B : Fitting Diameter
C : Shoulder Diameter
D : Ring Height
D1 : Height above Ring Rail
D2 : Height below Ring Rail
E : Flange
F : Flange Width
G : Flange Crown
H : Outer Flange Radius
I : Race way of Ring
K : Web
L : Shoulder
M : Slot for Circlip

Cross section of a Ring



Effect of surface characteristics on Ring performance: Surface characteristics of Ring affects the behavior of Running Traveller. Traveller runs at a speed of 30-40 Mts/Sec on the profiled surface of the Ring. Two main factors affect the quality of Speed and smooth running of Traveller:

a) Coefficient of friction between Traveller surface and the Ring surface.
b) Metallurgical configuration of Both Ring and Traveller to dissipate the generated heat at fastest possible time.

Higher Friction and higher amount of heat limits the speed of the Traveller and thus Spindle Speed.

Frictional force is dependant on the Traveller weight also. As the Traveller weight increases the frictional resistance also increases. Because of lower Ra Value, the Frictional resistance is less and the amount of heat generated is also less.

Metallurgical properties and molecular structure of the coating material in The X-Axis Rings, increases the rate of heat dissipation, which improves the life of Ring as well as of Traveller.

The frictional force can be calculated from the following equation:

$$R = \mu \times N$$

Where

R : Traveller Friction in mN.

μ : Coefficient of Friction.

N : Normal Force.

Normal Force can be calculated from the formula

$$MV^2 / R$$

Where

M : Weight of Traveller.

V : Velocity of Traveller.

R : Radius of Ring.

The force exerted by the traveller on Ring surface can be obtained by deducting the Winding Tension from the centrifugal force on the Traveller.

Points to be considered for selection of a Ring

Surface Hardness of Ring:

Apart from Surface Roughness, Surface hardness of ring plays very important role for achieving optimum performance of Ring and Traveller. Degree of hardness also depends on the Process of Hardening ,Chemical structure of Coating Material. The hardness of Ring Traveller is kept at least 200 HV less than the Ring.

Dynamics of Traveller on Ring: While running on the Ring surface at high speed the Traveller faces number of forces from different direction. The design and Shape of Ring & Ring Traveller helps to run the Traveller at a dynamically balanced condition over the fine profile of the Ring. Following forces are acts on a running Traveller:

a) Centrifugal Forces.
b) Weight of Traveller.
c) Ballooning Tension.
d) Winding Tension.

Rings

After compilation of all those forces it is found that a couple is formed around the centre of gravity of the Traveller which tries to tilt it on the ring Profile. If all those forces can be optimized and the Centre of gravity of the traveller can be kept as low as possible (by using Low Bow Traveller) the best dynamic equilibrium of Traveller can be achieved ,resulting higher spindle speed and lower end breaks. Traveller changes its position during its circular movement on the Ring surface. Apart from the Rotational movement it faces following motions

a) Tilting Motion
b) Pitching Motion
c) Radial Motion

If the profile of Ring and the profile of the Traveller is perfectly matched the above three motion will be balanced and minimized resulting smooth movement of traveller.

The X-axis rings surface coating is a like a shield that fights the force exerted by the Traveller on ring when moving at a very high speed and protects the ring flange surface from any unwanted deformation for a long time.

Points to be considered for selection of a Ring

For higher Spindle Speed

a) Use lighter Traveller - For higher speed lighter Traveller gives less yarn tension.

b) Use low bow height Traveller with adequate yarn clearance - The center of gravity should be as low as possible for stable running of Traveller. For this use low bow height Travellers.

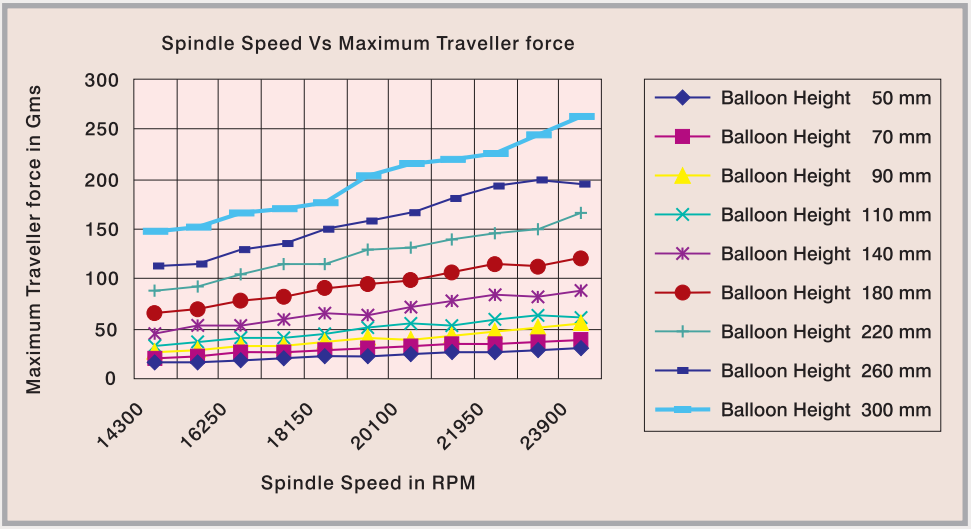
For lesser yarn Hairiness

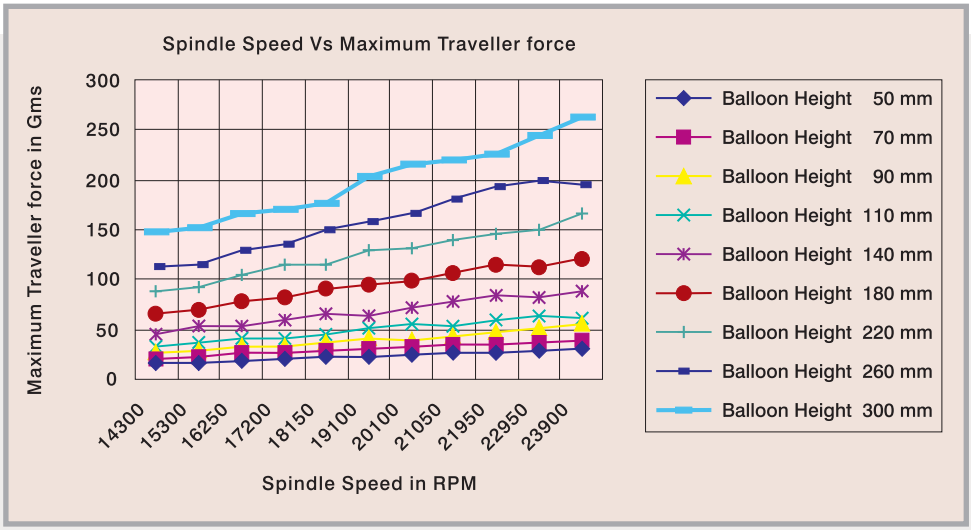
a) Use heavier Traveller - Heavier Traveller helps to avoid fibres coming out to the yarn surface.

For better yarn Elongation

a) Use lighter Traveller - When using lighter Traveller, yarn stretch will be less. It helps for better yarn Elongation.

Graph 3





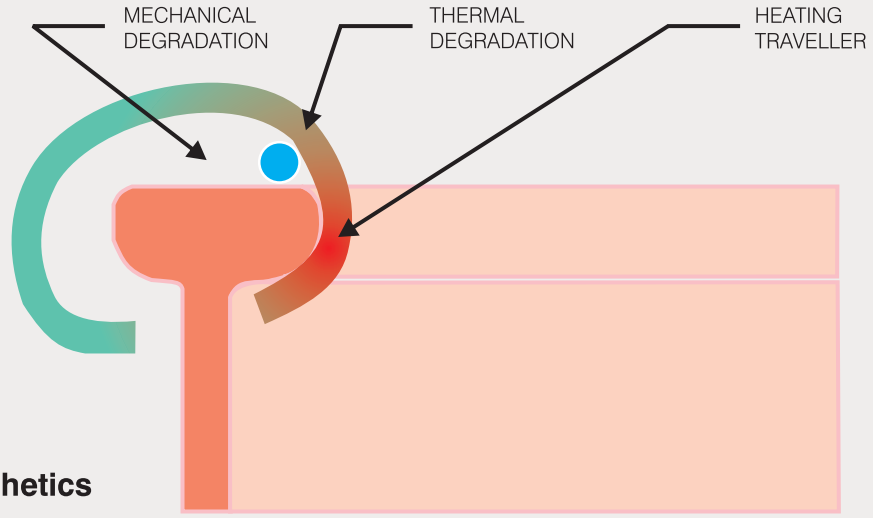
Graph 4

In the Graph No.3 we have calculated and shown the Maximum Force exerted by the Traveller at different Balloon Height and at different Spindle Speed. In Graph No.4 the trend of Balloon Tension against different Spindle Speed is plotted for different Balloon height. Here we have considered the Ring Diameter as 40 mm. From The graph No.3 it is clear that with normal Balloon height of 260 mm at Spindle Speed of 17,200 rpm (Traveller Speed of 36 mt/sec) the maximum Traveller force is 136 gms where as at the speed of 23,900 rpm and lesser balloon height the maximum force exerted by Traveller is only 88 gms. though the Traveller Speed is about 50 mts/sec. In Graph No.4 the rate of increase of Balloon Tension with the Spindle Speed is least at Balloon Height of 140 mm. But at this Balloon height the Bobbin content of the ring frame will be very less which will affect the winding efficiency as well as the doffing frequency will also be increased considerably. Hence the best trend in at Balloon height of 180 mm. So it is possible to run the Ring Frame at the speed more than 20,000 rpm but in that case one has to select the lower Ring Diameter with lower Balloon Height.

Thermal degradation of Ring.

While running at a speed of 30-40 mt/Sec on the ring surface Traveller produces enormous amount of heat which is dissipated into atmosphere through Ring and Traveller. If the contact area between Ring and the Traveller is not sufficient and the Ring Surface Roughness Value (Ra) is high, the heat generated cannot be dissipated at the required rate causing burnt out of Traveller or Thermal degradation of the Traveller. In following figures the area of thermal degradation is shown clearly.

Ring & Traveller Combination



Synthetics

Synthetics are particularly susceptible to mechanical and thermal degradation. Consequently, low-arc travellers can not be used in majority of the applications.

To facilitate the traveller in forming the (lubricated) right traveller path, we suggest short running-in, in the following manner.

Sr. No.	Traveller Change	Traveller Changing frequency	Spindle Speed	Remarks
1	1st Change	After 1hr(before first doff)	75% of Target speed	Start with 75% of target speed run up to next change.
2	2nd Change	After 4 operating hrs	80% of Target speed	Start with 75% & increase up to 80% gradually & run 80% up to next change
3	3rd Change	After 8 operating hrs	85% of Target speed	Start with 80% & increase up to 85% gradually & run 85% up to next change
4	4th Change	After 24 operating hrs	88% of Target speed	Start with 80% & increase up to 88% gradually & run 88% up to next change
5	5th Change	After 48 operating hrs	90% of Target speed	Start with 80% & increase up to 90% gradually & run 90% up to next change
6	6th Change	After 72operating hrs	92% of Target speed	Start with 80% & increase up to 92% gradually & run 92% up to next change
7	7th Change	After 96 operating hrs	94% of Target speed	Start with 85% & increase up to 94% gradually & run 94% up to next change
8	8th Change	After 120 operating hrs	96% of Target speed	Start with 85% & increase up to 96% gradually & run 96% up to next change
9	9th Change	Normal Life	98% of Target speed	Start with 85% & increase up to 98% gradually & run 98% up to next change
10	After this you may run normally & get life, speed as usual by checking traveller Burning & breakages.			

1. Start the running in with 2 no. traveller heaviour than usual and continue the same up to second change and then Normal no of Traveller should be used.
2. The above running in process is a guideline only, you may go for slight changes & adopt nearby process as per practices, product & parameters.
3. It should be taken care in running in to avoid idle spindles & centering of rings & spindle should perfect.

The above Running in Process is a general guideline only. Mill can change as per their system.

Traveller trial should conduct with short running in.

1: First change should take after 24 hrs with one no. heaver & speed should be 90%
2: Second change with normal no. traveller & run for 72 hrs with full speed.
3: Third change run as per normal & take full life up to wear out.
4: Fourth change will give you desired results.

Continue running will give further improvement change by change.

Common Faults produced

Problems

Poor yarn quality

More Hairiness

Less yarn Elongation

Pushed up Neps

Unable to increase the spindle speed

More end Breaks

by Ring & Traveller and their possible remedies. 1

Causes	Remedies
• Improper matching • Worn-out Rings • Improper position of lappet	• Correct traveller type & No. • Good Ring condition • 2d + 5mm of tube dia for lappet setting
• Inconsistent RH • Less clearance of traveller • Lighter traveller	• Correct RH • High bow height traveller • Heavier traveller
• Heavier Traveller	• Use lighter traveller
• Less yarn clearance	• Use higher clearance traveller
• Improper lift • Improper ring & tube dia	• Proper lift w.r.t count • 2:1 ring dia & tube dia 1:5 ring dia to tube length
• Improper lappet height • Poor ring & lappet centring • Spindle / Tube vibration • Ring Diameter is not matched properly with Tube length, Tube Dia and Spinning geometry.	• 2d+5mm of tube dia for lappet setting • Correct ring & lappet centring • Vibration free spindle & tube • Check the combination. With the help of our guide line chart, get the correct combination of Ring, Tube and Spinning geometry.
• Wrong selection of traveller - type, profile & number • Uneven Spinning Tension	• Select correct type and number w.r.t. count, material, ring dia, Spindle speed, yarn strength and life of ring. • Rings, ABC Ring and Lappet should be re-centred.

Common Faults produced

Problems
Poor traveller life
Fluff accumulation
Traveller is flying off frequently.
Higher end Breaks during Doffing.

by Ring & Traveller and their possible remedies.

2

Causes	Remedies
• Improper matching • Poor ring condition	• Correct selection of traveller • Good ring condition
• Improper traveller clearer setting • Poor house keeping • Higher room temperature • Poor R.H %	• Setting should be 0.2 to 0.3 mm (clearer to traveller at operating condition) • Good House keeping • Optimum room temperature • Better RH % (50 to 55)
• Improper selection of Traveller type and number according to the profile of the Ring. • Due to wrong selection of Traveller the yarn is facing high friction with ABC Ring and separator.	• Check the shape of the traveller and try to go for a Traveller having Lower Bow Height. • Change the Traveller weight or change the profile of the traveller.
• Yarn is coming out from traveller. • Traveller got Jammed.	• Change the traveller Profile and Shape. • Check the condition of Ring Surface. Change the Traveller Type.
• Ring Diameter is not matched properly with Tube length, Tube Dia and Spinning geometry.	• Check the combination. With the help of our guide line chart, get the correct combination of Ring, Tube and Spinning geometry.

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To better the productivity and quality of yarn, it is necessary for quality spinners to change their perspective of selecting spinning rings and travellers.

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