Lakshmi LRT

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LAKSHMI RING TRAVELLERS (COIMBATORE) LIMITED

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HAND BOOK

KriArt Designs +91 94425 24402

QD/HB/07/APR 2019

Lakshmi LRT

ONE STOP SOURCE FOR

TOTAL TRAVELLER SOLUTIONS

- INTERNATIONAL PRESENCE
- CUSTOMISED SOLUTIONS
- STATE OF ART R&D
- HIGHEST QUALITY
- TOTAL RANGE

20001721 QM08
20001720 UM

ISO 9001 : 2008
ISO 14001 : 2015

LAKSHMI RING TRAVELLERS

Lakshmi Ring Travellers (Cbe) Ltd (LRT) started its operation In 1974 as a trend setter in the highly sophisticated and accurate sphere of Traveller manufacturing. LRT has multiple units manufacturing ring Travellers in India.

LRT is a part of the well known Lakshmi Machine Works (LMW) group. LMW is one of the largest textile machinery manufacturers in the world manufacturing the complete range of spinning machines. As part of this dynamic group LRT has enormous resources - technology, Expertise and experience at its command.

LRT has a state of the art modern production facility which ensures that the ring travellers are produced in stringent lean tolerances. Raw materials are procured from the best sources in the world. LRT houses state of the art testing facilities for measuring hardness, friction, micro structure analysis and surface finish.

Lakshmi Ring Travellers are manufactured as per the specific requirements of the industry. Today high speed spinning machine require equally high speed Travellers. And LRT, by virtue of their strong R&D and a highly involved commitment to the industry provides products that keep pace with the growth of the industry.

We take this opportunity to thank you for your patronage to our products. We value the experiences you have shared with us.

Our experienced technical staff and application engineers will be pleased to assist you at any time.

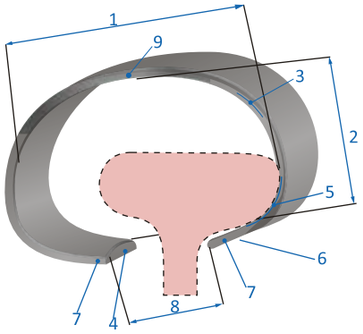
Note : All the information given in this handbook are guidelines based on our experience. The exact recommendations has to be decided at the mill depending on the prevailing conditions. The technical data available is subject to change.

CONTENTS

TYPES OF RING TRAVELLERS

C - SHAPED TRAVELLERS

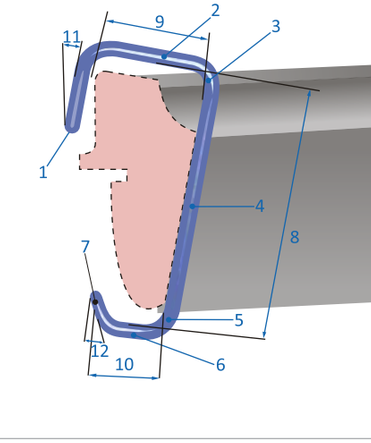
- Used in T-Flange Horizontal Rings.
- For Cotton and Synthetics & Blends.



1. INNER WIDTH
2. HEIGHT OF BOW
3. POSITION OF YARN PATH
4. WIRE SECTION
5. RING CONTACT SURFACE
6. ANGLE OF TOE
7. TOE
8. TOE GAP
9. UPPER PART OF BOW

J - SHAPED TRAVELLERS

- Used in Vertical Rings.
- For Coarser Doubling (Cotton), Acrylics, Woolen and Worsted.



1. NOSE
2. HEAD
3. POSITION OF YARN PATH
4. BACK
5. HEEL
6. FOOT
7. TOE
8. INNER HEIGHT
9. HEAD WIDTH
10. FOOT WIDTH
11. NOSE ANGLE
12. TOE ANGLE

FUNCTION & GENERAL SELECTION OF TRAVELLERS

Functions of a ring traveller

- To provide Twist to the yarn.
- To provide yarn tension (spinning Tension).
- To wind the yarn on the Bobbin.

Selection of Traveller Weight

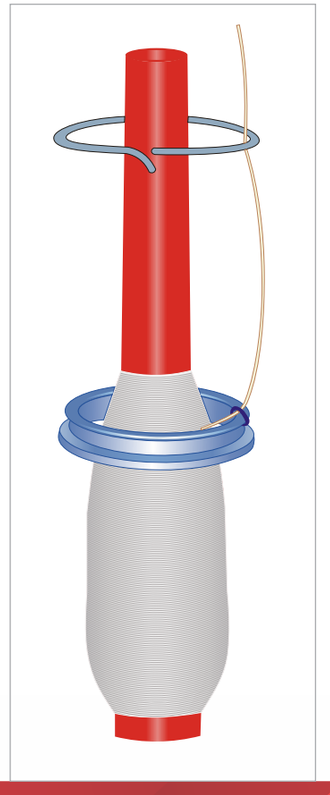
Traveller weight influences the yarn tension which determines the stability of balloon. Staple balloon helps us to reduce the yarn breaks and interns increases the productivity. The parameters influencing the selection of traveller weight are,

- The yarn count.
- Material Processed.
- Spinning Geometry.
- Speed.
- Traveller form.

Selection of the right Traveller

It is determined by

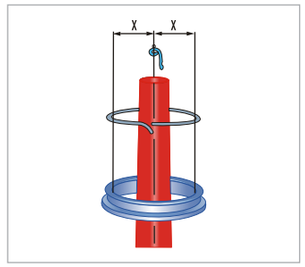
- Yarn Count.
- Ring flange.
- Type of ring.
- Life of ring.
- Material.
- Spindle speed.



PREREQUISITES FOR SMOOTH AND STABLE RUNNING

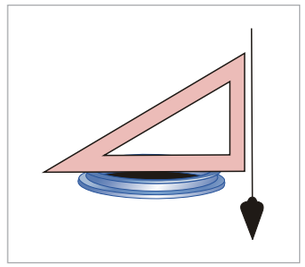
Faultless condition of support and guide of the ring rail as well as a stead & smooth transverse motion.

Concentric position of the ring and spindle as well as anti ballooning ring and yarn guide.



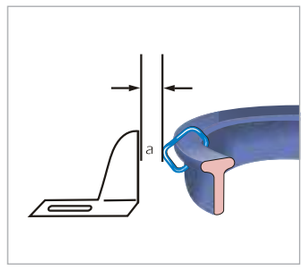
Spindle rotation without vibration and correct concentricity of bobbin tube.

Ring with exact roundness and firm seating in horizontal position.



Correct setting of the Traveller clearer.

Space “a” should be 0.2 to 0.3 mm



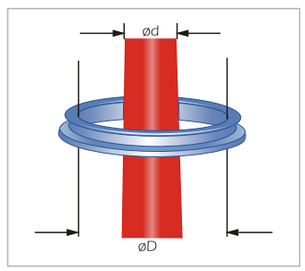
Favourable ratio of Ring diameter to Tube diameter.

Recommended ratio : D : d = 2 : 1

Ring diameter : D

Tube diameter : d

Faultless condition of ring race way.



SPINNING GEOMETRY WITH RESPECT TO RING AND TRAVELLER

Ratio of ring diameter **D**
to tube diameter **d**

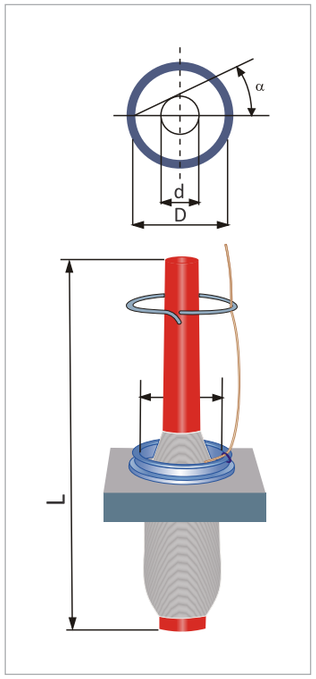
Ideal Ratio 2:1

The ring traveller, together with the yarn as a pull element, is set into motion on the ring by the rotation of the spindle.

If the direction of pull deviates too much from the running direction of the Traveller (alpha less than 30), the tension load will be too high.

The pulling tension can be reduced by adapting the ring or tube diameter (alpha greater th an 30),

during the winding up on the tube (after doffing, resp. At the top of the conical part of the bobbin).



Ratio of tube length to
ring diameter

Ideal Ratio 5:1

The tube length determines (with the yarn guide) the maximum balloon length . This is an important factor for the performance of a ring spinning machine.

The shorter the balloon, higher Traveller speeds can be achieved.

In practical use, the ideal ratio of tube length to ring diameter has been shown to be between 4.5:1 and 5:1.

RECOMMENDED TUBE MEASUREMENTS

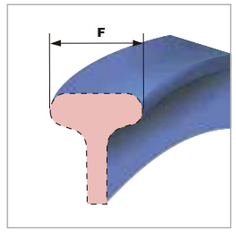
Tube Ø (mm) d					Ring Ø (mm) D	Tube Length (mm) L					
16	17	18	19	20	36	170	175	180	185	190	195
17	18	19	20	21	38	180	185	190	195	200	205
18	19	20	21	22	40	190	195	200	205	210	215
19	20	21	22	23	42	200	205	210	215	220	225
20	21	22	23	24	45	210	215	220	225	230	235
22	23	24	25	26	48	230	235	240	245	250	255
23	24	25	26	27	51	240	245	250	255	260	265

Ideal Range Unfavourable Range

THE PRINCIPAL SHAPES OF FLANGE RINGS

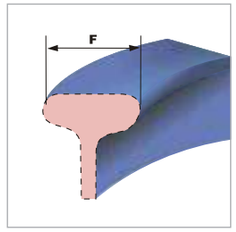
Low Crown / Normal (Symmetrical)

- Reduced crown portion when compared with conventional rings.
- Flange width is equally distributed towards inner & outer side.



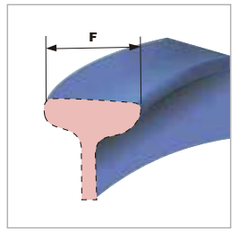
Antiwedge (Assymmetrical)

- Enlarged towards inside to get more area of contact.



CR Antiwedge (Assymmetrical)

- In addition to antiwedge, CR antiwedge will have inclination towards inner side to get extra clearance for yarn.



Flange Width		
Flange ½ = 2.6mm	Flange 1 = 3.2mm	Flange 2 = 4.0mm

RUNNING-IN OF RINGS

Why is it required?

To improve the initial running properties of the ring by smoothening the raceway.

Which is the preferable count & Material ?

40s and Cotton.

What is the procedure to be followed ?

As per the ring manufacturer's recommendation.

Guidelines for Running-in

- End Breaks should be as low as possible.
- Count & Traveller Type should not be changed.
- If the mill is doing running-in with very fine or very coarse counts or synthetics it will take longer time.

Short Running -in

We recommend 4 to 5 changes once every 24 hours. Number of changes will depend on the Ring condition / mill condition.

While increasing the speeds, the Traveller changes to be given in steps of minimum possible speed (200 to 500 rpm) daily.

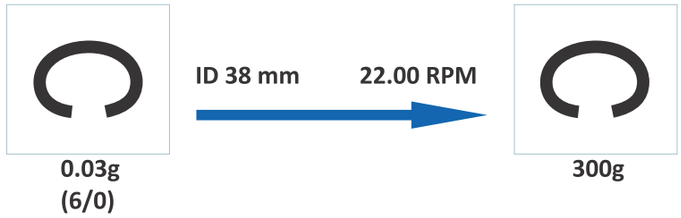
We recommend short running in when :

- We change from one count pattern to another ie, from finer to coarser or coarser to finer counts.
- We change from one Traveller type to another.
- We change from one brand to another.
- We change from one wire section to another.

FACTORS AFFECTING TRAVELLER LIFE

Traveller life is strongly influenced by heat generation

- The ring/ traveller system allows the twisting & winding of the yarn.
- In order to do that there must be a friction between ring and traveller,so that the "braking action" of the traveller will create the yarn tension.
- The heat produced by the braking system goes in two directions: on the ring and on the traveller.
- The mass of the ring is approximately 1000 times the mass of the traveller. Consequently if the ring temperature increase of 1°, the temperature of the traveller increase (theoretically) of 1.000°C.



The braking action is adjusted automatically according to the spindle speed. The centrifugal force makes what we call the "traveller miracle". In fact the Load of the traveller changes from few milligrams up to 300 grams or more (according to the spindle rpm).

Traveller life is strongly influenced by load of the Traveller on the ring

The load of the traveller on the ring :

L = load in mN

m = traveller weight in mg

v = Traveller speed in m/s

r = ring radius in mm (ID/2)

$$\text{Ring load } L = \frac{m^* v^2}{r}$$

Example :

L = 2989 mN = 304 gr

m = 35.5mg(6/0)

v = 40 m/s

r = 38/2 = 19mm

Traveller weight + Speed = Load

Load = Stress on ring

FACTORS AFFECTING TRAVELLER LIFE

Traveller life is strongly influenced by load of the Traveller on the ring

The load on a ring can be compared to the load of a truck. The wear of the tyres of loaded truck is much higher than the wear of the tyres of an un-loaded truck, even if both trucks are running at the same speed.

So rather than speaking about SPEED (m/s),we should speak about Load

Example nr. 1: Ne 8/Spindle Speed 9000/rpm Ring 50mm /Traveller ISO 200 (nr 12) Traveller Speed = 20.9 m/s

Load in mN = 3509

Example nr. 2: Ne60/Spindle Speed 20000/rpm Ring 38 mm/Traveller ISO 22.4 (nr 10/0) Traveller Speed 39.7 m/s

Load in mN = 1866

Traveller life is strongly influenced by specific pressure applied on the ring

We have learned about Load.Now we have to speak about the surface where the load is applied

Specific spacePressure = Load/Surface

The specific Pressure of the Traveller on the ring is very high. The higher is the specific pressure, the higher is the stress on the ring.

SURFACE TREATMENTS

SAPPHIRE PLUS

Special Diffusion Treated Traveller

- Quicker settling time for the traveller.
- Possibilities of going for higher speeds.
- Can be used for running-in.

MAXIMA

Special hardening process for better grain structure

- Excellent heat dissipation.
- Good surface finish helps for better gliding.
- Better wear resistance.

RUBY

Improved surface finish for optimum friction

- Reduced friction values.
- Less burnout helps less wear.
- Smoother surface finish helps for excellent gliding property.

PLATINA

Special process for achieving best micro structure

- Excellent gliding properties.
- Longer life.
- Best wear resistance.
- Consistent performance during the lifetime.

EXPRESS PLUS

Unique surface texture with fine grain size

- Quick settling.
- Better lubrication property.
- Less heat generation.
- Excellent life.

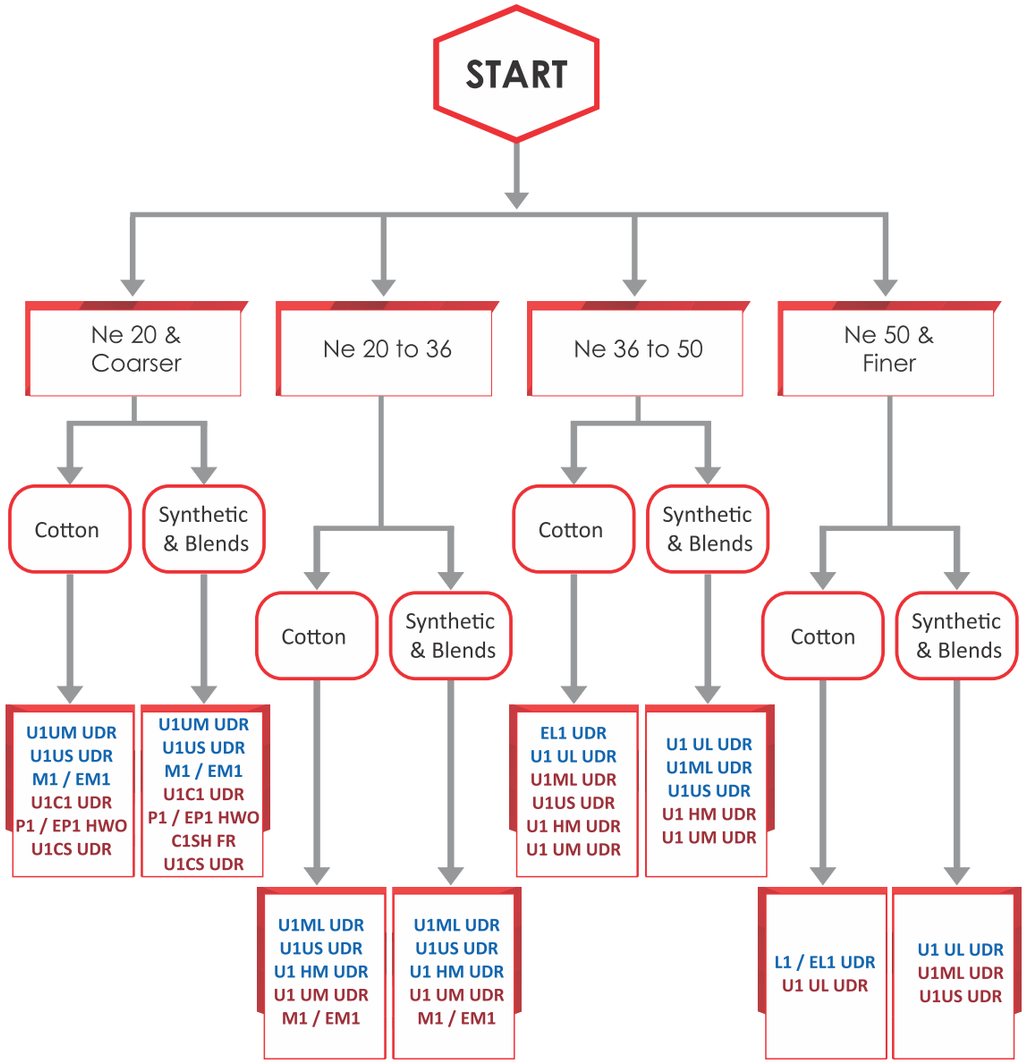
	LOW CROWN / NORMAL RING PROFILE			CR/ANTIWEDGE RING PROFILE
FLANGE 1	U1 CL	Compact Spinning		U1 CL
	U1 EL	Compact Spinning		U1 EL
	U1 FL	Compact Spinning		U1 FL
	U1 LEL	Compact Spinning		U1 LEL
	L1	51s Ne & Finer		EL1
	U1 UL	51s Ne & Finer		U1 UL
	U1 ML	20s - 50s Ne		U1 ML
	U1 UM	20s - 50s Ne		U1 UM
	M1	20s - 50s Ne		EM1
	U1 US	20s - 50s Ne		U1 US
	U1 US	20s - 50s Ne		U1 US
	U1 HM	12s - 50s Ne		U1 HM
	P1	24s Ne & Coarser		EP1
	U1 C1	24s Ne & Coarser		U1 C1
	U1 CS	12s Ne & Coarser		U1 CS
	C1 SH	30s Ne & Coarser		C1 SH
		51s Ne & Finer		EL2
FLANGE 2	U2 UM	20s - 50s Ne		U2 UM
	M2	20s - 50s Ne		EM2
	H2	20s Ne & Coarser		EH2
	P2	20s Ne & Coarser		EP2
	U2 CS	20s Ne & Coarser		U2 CS
	C2	20s Ne & Coarser		C2

UDR (HWO) for Cotton,Synthetic fibres and blends — C2 Traveller are supplied in only flat cross section

HO (DR) for Synthetic fibres and blends — FR for Acrylic and blends (H2, EH2 & C1SH type Travellers are available in FR)

** These are our standard recommendations. For Detailed recommendation please refer page no. 14,15,16 & 17.

TRAVELLER SELECTION GUIDE
NON COMPACT PROCESS, FLANGE 1 RINGS

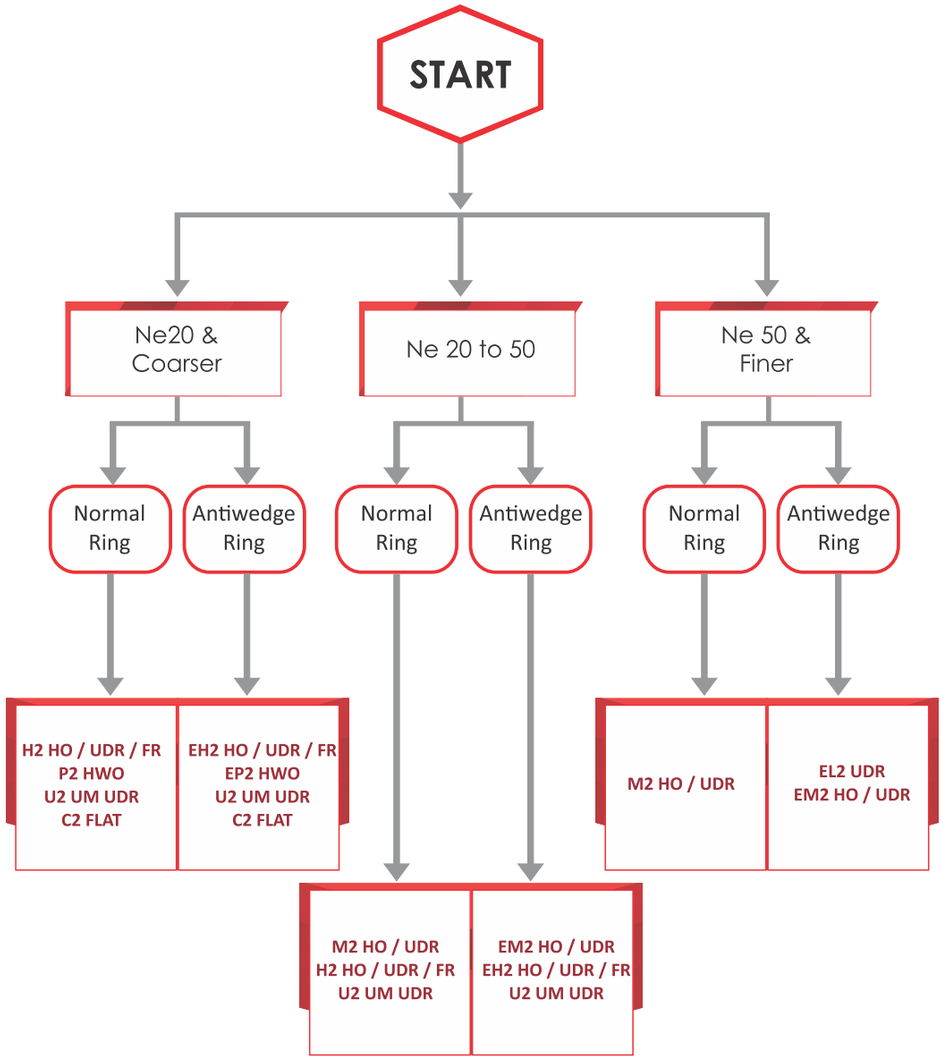


Traveller speed above 40 M/sec.

Traveller speed below 40 M/sec.

Note: P1 / M1 / L1 for Normal rings, EP1 / EM1 / EL1 for Antiwedge rings, U1 / C1 for both Normal and Antiwedge rings

TRAVELLER SELECTION GUIDE
NON COMPACT PROCESS, FLANGE 2 RINGS



UDR (HWO) for Cotton,Synthetic fibres and blends

HO (DR) for Synthetic fibres and blends

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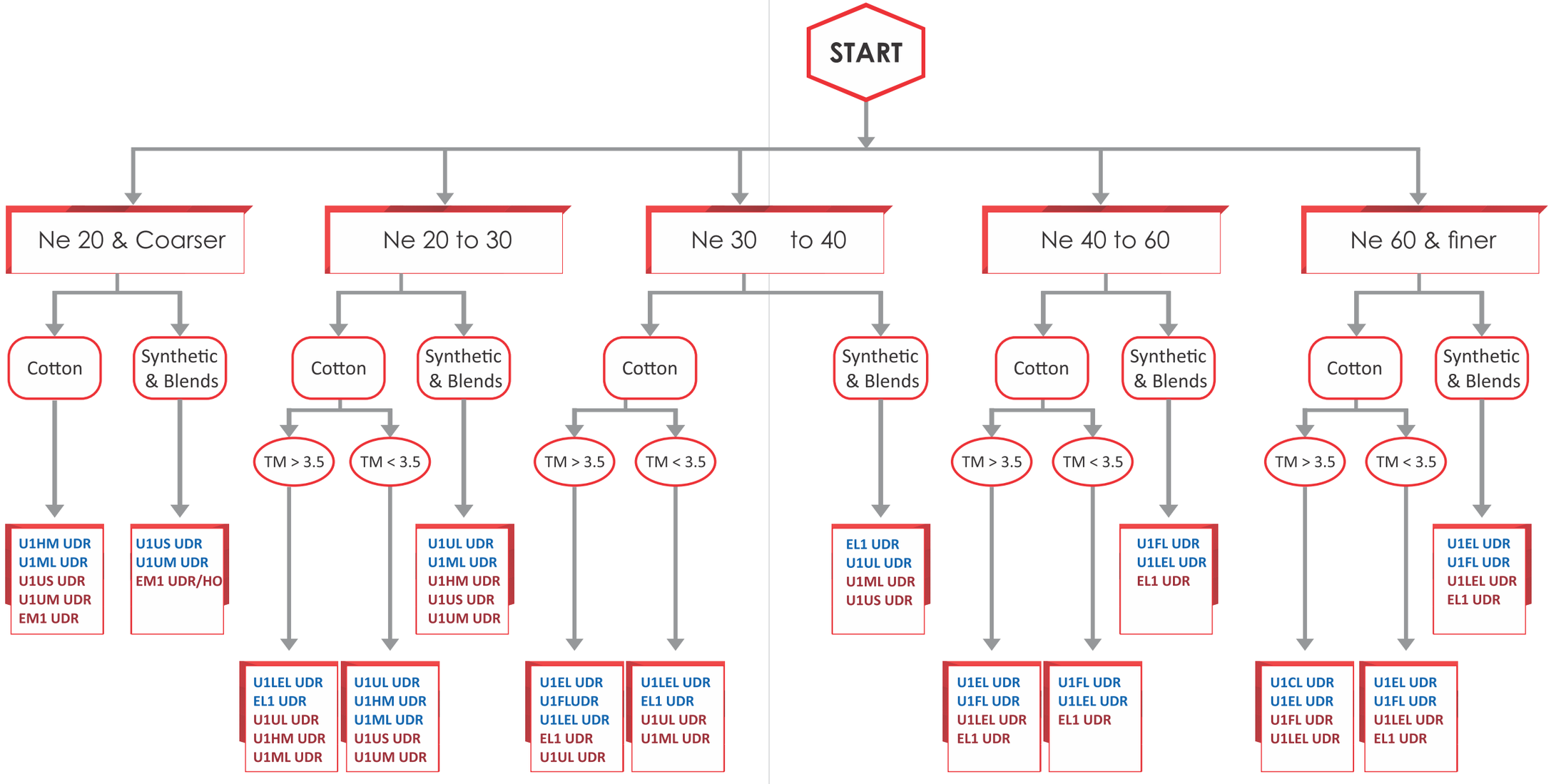
C2 Traveller are supplied in only flat cross section

TRAVELLER SELECTION GUIDE - COMPACT PROCESS



Traveller speed above 40 M/sec.

Traveller speed below 40 M/sec.

Traveller speed above 40 M/sec.

Traveller speed below 40 M/sec.

TROUBLE SHOOTING

PROBLEM	CAUSES	REMEDIES
Poor Ring Traveller Life	• Improper matching • Poor Ring condition	• Correct Traveller Selection • Good Ring Condition
Less Yarn Elongation	• Heavier Ring Travellers	• Lighter Ring Travellers
More Yarn Hairinesss	• Low Bow Height Traveller • Improper Temperature, Air humidity • Lighter Traveller	• High Bow Height Traveller • Correct RH & Temperature • Heavier Travellers
Unable to increase the spindle speed	• Improper Spinning Geometry • Poor Ring/Lappet centering • Spindle tube vibration • Improper selection of travellers	• Proper lift W.R.T count • The ratio between ring diameter 5:1 ring dia to tube length • 2d+5 of tube dia for lappet setting • Correct centering of Ring/lappet • Vibration free spindle/tube • Proper combination of Ring Travellers
Fluff Accumulation	• Improper traveller clearer setting • High Room Temperature • Poor RH% • Poor Housekeeping	• Setting should be 0.2 to 0.3 mm Traveller (operating position) • Optimum Room Temperature • Better RH% • Housekeeping should be proper
Pushed up neps	• Less Yarn clearance • Higher wear- out • Traveller clearer setting	• High clearance Traveller finish/profile • Use best Traveller combination/finish/profile • Clearer setting to be adjusted

MORE YARN BREAKS IN RING SPINNING

End breaks are the main factor in ring spinning, which have direct relationship with productivity and Yarn Quality. Following parameters have to be looked in to control the end breaks.

Spinning Geometry

Spinning Geometry plays a vital role in End Breaks and is directly related to spinning Tension and spinning triangle.

- Perfect spinning Geometry with respect to Material, Count, Speed etc., will help us to achieve the lesser End Breaks.
- Ratio of ring Diameter (**D**) to tube diameter (**d**) should be 2:1
- 5:1 would be an ideal ratio in between Tube length to ring diameter.
- The spinning Triangle should be optimum.

Improper Ring Race Way

- Smoothness of ring race way is a critical factor, which is main limiting factor when you go for higher speeds. Traveller lag will be more when the race way is having pitting marks, rust or damages. End breaks have a direct co-relation on traveller lag. More the traveller lag more the end breaks. Traveller lag is the difference between the spindle speed and traveller speed.
- Smoothening the Ring Race way can be done by doing Short Running in.
- Changing the damaged rings will help to reduce the end breaks.

Spinning performance can be affected by fibre fly, damaged lappet hooks, ABC Rings, plastic tubes etc.

Fibre fly can be arrested by

- Proper house keeping.
- Maintaining lesser short fibre content in back process.
- Frequent cleaning of under winding coil especially in auto doffing.
- Proper doffing practice.
- Plastic separator's bottom position has to be covered by metal to avoid fibre hanging.

MORE YARN BREAKS IN RING SPINNING

Multiple Breaks will occur when

- Traveller is too light.
- Separator is damaged.
- Uncleared Lappet hook Flycatcher.
- Poor House keeping.
- Damaged Lappet hook, Plastic tubes and Anti balloon Rings has to be replaced. It also has to be centered and aligned properly.
- Higher length tubes will touch the yarn at bottom stage, which will create end breaks and Hairiness.

Capability of Ring Frame in achieving the given spindle speed

- Improper combination of ring dia and lift.
- Improper ring traveller combination.
- Perfect combination of ring travellers will improve the working performance.
- For specific issues, our application engineers are always available.
- Gradual Increase in speed.
- New Generation rings, Travellers and spindles can be tried to achieve higher speeds. This will help to achieve lesser Friction which indeed lesser heat dissipation.

Proper selection and Maintenance of Drafting Zone

- Top roller Damages and bottom Improper Suction will create roller lapping.
- Roller lapping will occur because of
    1. Fibre quality
    2. Room climate
    3. Improper clearer rollers
    4. Damaged aprons
- Drafting zone setting has to be optimized based on the length of fibres.
- If amount of draft is too high, it has to be controlled. Necessary roving hank has to be changed.

TRAVELLER FLY

Traveller fly can occur due to the following reasons

1. Reduced flange width of the ring.

2. If Ring Traveller used is too light
   a. Ring Traveller contact area is close to the toe portion of the traveller. Hence traveller fly occurs.
   b. Improper weight to the spinning tension.

3. Ring Traveller contact area is very small (Point Contact). This leads to extreme wear out and finally the traveller breaks and flies.

4. If the setting between Traveller clearer and Traveller is too close, the traveller will hit the clearer & fly.

   Traveller clearer setting should be 0.2 to 0.3 mm between Traveller-to-Traveller Clearer.

5. Cop content is more than recommended.

6. Lesser winding length results in faster movement of ring rails. Hence there is a chance of Traveller fly.

   Increase the winding length with respect to count and spindle speed.

7. If the Center of gravity is higher for the required speed, there is a chance that Traveller has an unstable running. It leads to traveller fly.

   Hence go for a low bow height traveller.

CHOICE OF RIGHT TRAVELLERS

GENERAL RECOMMENDATIONS

SMALLER RING DIAMETER (FOR SAME LIFT)

- Small Balloon - Use Lighter Travellers.
- When the ring Diameter is less, Balloon Diameter will be small. This leads to more yarn tension, hence use lighter Travellers.

LARGER RING DIAMETER (FOR SAME LIFT)

- Larger Balloon - Use Heavier Travellers.
- When the ring Diameter is high, Balloon diameter will be more. This leads to less yarn tension and Balloon touches the separator, hence use heavier Travellers.

SHORT TUBE LENGTH (FOR SAME RING DIA)

- Short Balloon Length - Use Lighter Travellers.
- When the tube length is short, the yarn tension will be more, hence use lighter Travellers.

LONG TUBE LENGTH (FOR SAME RING DIA)

- Longer Balloon Length - Use Heavier Travellers.
- When the tube length is long, the yarn tension will be less, hence use Heavier Travellers.

FOR BETTER FIBRE LUBRICATION (COTTON)

- Use Heavier Travellers.
- When the yarn contact area and ring contact area in Travellers is closer, Fibre Lubrication is better especially in cotton , hence use heavier Travellers.

FOR HIGHER SPINDLE SPEEDS

- Use Lighter Travellers.
- For Higher Speeds Lighter Travellers give lesser yarn tension.
- Low Bow Height Travellers 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 NEW RINGS

- Use Lighter Travellers.
- To avoid end breakages by reducing the yarn tension, use lighter Travellers.

FOR OLDER RINGS

- Use Heavier Travellers.
- To avoid Bigger Balloon, use Heavier Travellers.

FOR LESSER YARN HAIRINESS

- Use Heavier Travellers.
- Heavier Travellers will help to avoid fibres coming out to the yarn surface.

FOR BETTER YARN ELONGATION

- Use Lighter Travellers.
- When using Lighter Travellers, yarn stretch will be less. It helps for better yarn elongation.

FOR RUNNING - IN

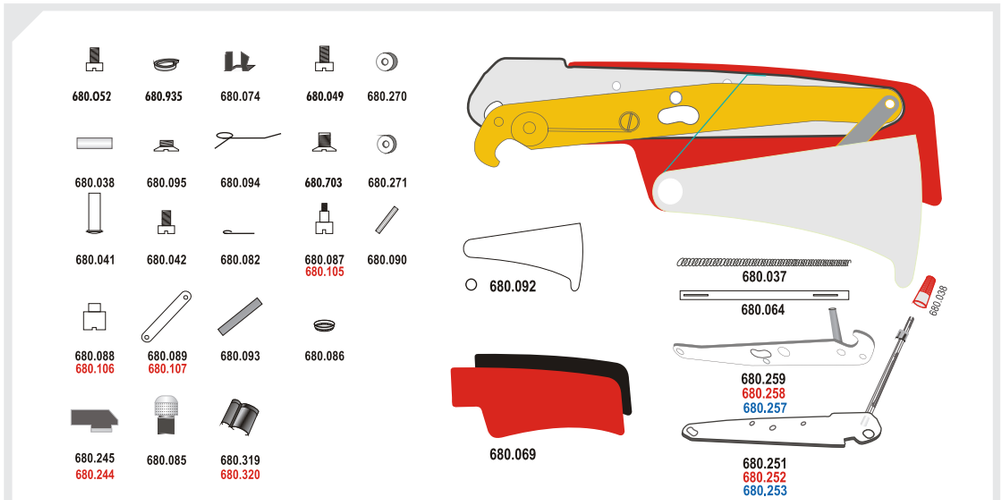
- Use Only Non-coated Travellers.
- During Running - in the end Breakage should be kept to a minimum.

LRT QUICKFIX

LRT QUICKFIX is a versatile Ring Traveller inserting tool.It is very light weight and easy to use.

LRT Quickfix Advantage

- Quicker & easier insertion of Traveller.
- No Traveller deformation.
- Reduced danger of damage to Ring surface.
- Lower ends down rate.
- Reduced idling time for machines.
- Complete elimination of Traveller losses.



Part numbers in Red indicates equivalent parts for C72
Part numbers in Blue indicates parts for C73
Other parts are common for C71, C72, & C73

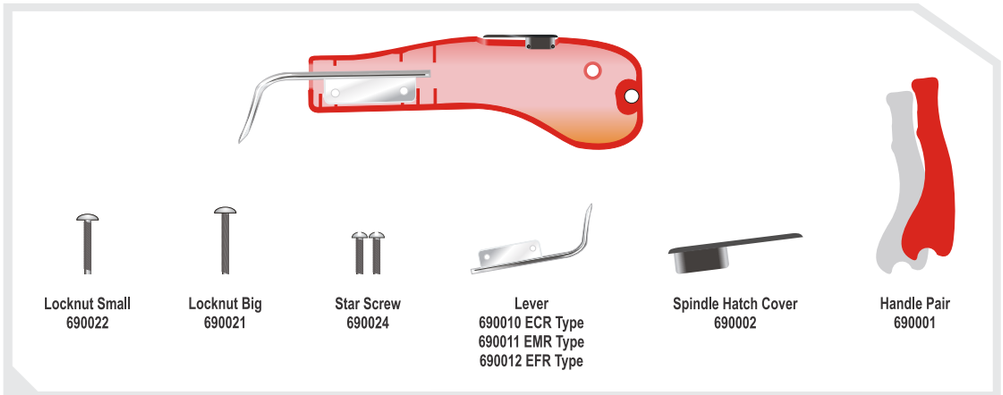
LRT QUICKFIX schedule of types

RANGE	TYPES	RING FLANGE	FOR TRAVELLER TYPE
20/0 - 8	C7	ONE	L1, M1, P1, EL1, EM1, EP1, U1
10/0 - 26	C7	TWO	M2, H2, P2, U2, EL2, EH2, EP2
9/0 - 18/0	C7	HALF	U1 CL UDR & U1/2 TYPES*

*Only U1 CL UDR in one Flange can be used in C73

LRT EXTRACT

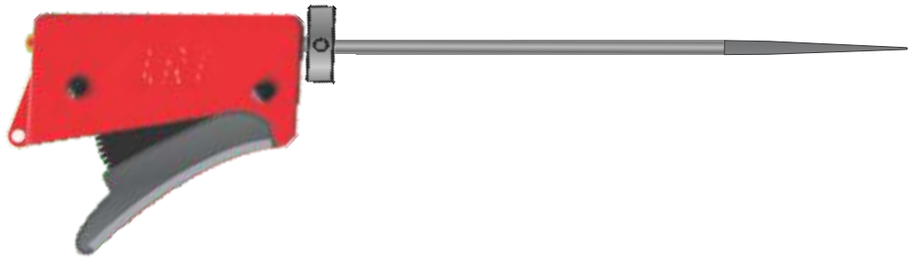
- 100% Collection of Travellers without spilling on the floor.
- No damage to the Ring surface.
- Quick removal of Travellers.
- No strain for fingers.



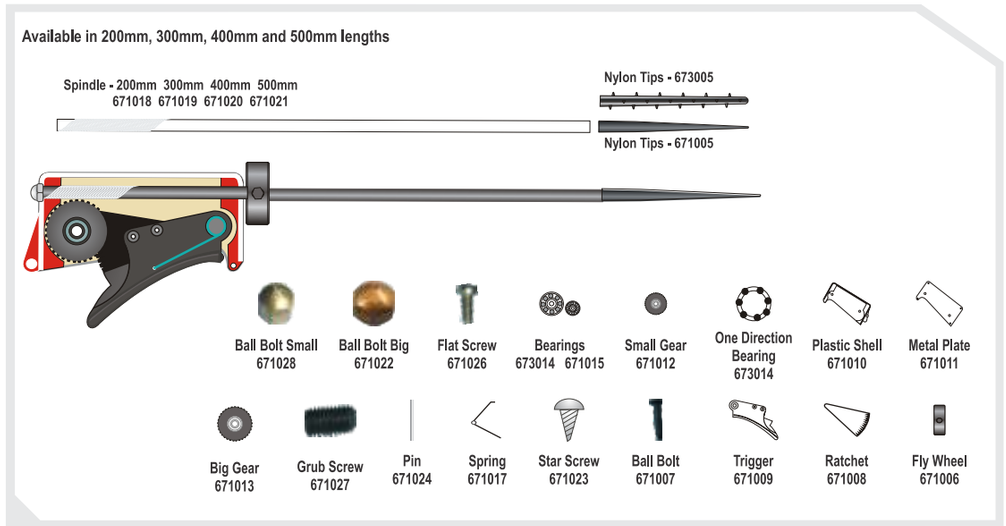
LRT EXTRACT TYPES

MODEL	CODE	APPLICATION RANGE
ECR	690100	No. 1 - 10
EMR	690101	No.1/0 - 10/0
EFR	690102	No. 10/0 - Finer

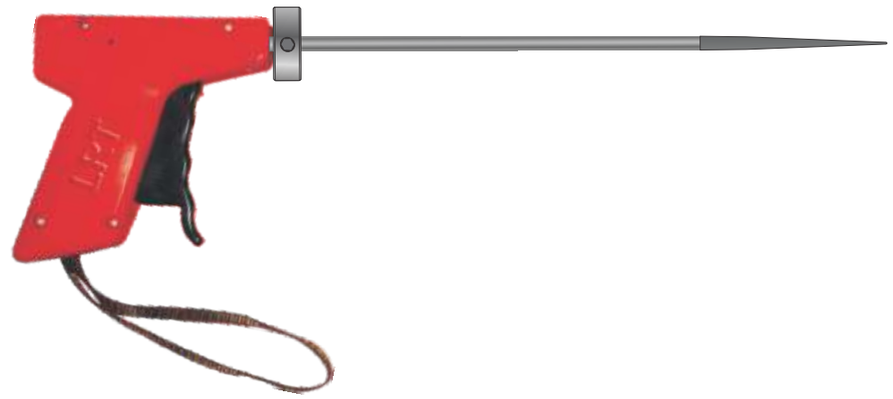
FLUFF REMOVER - FR 1



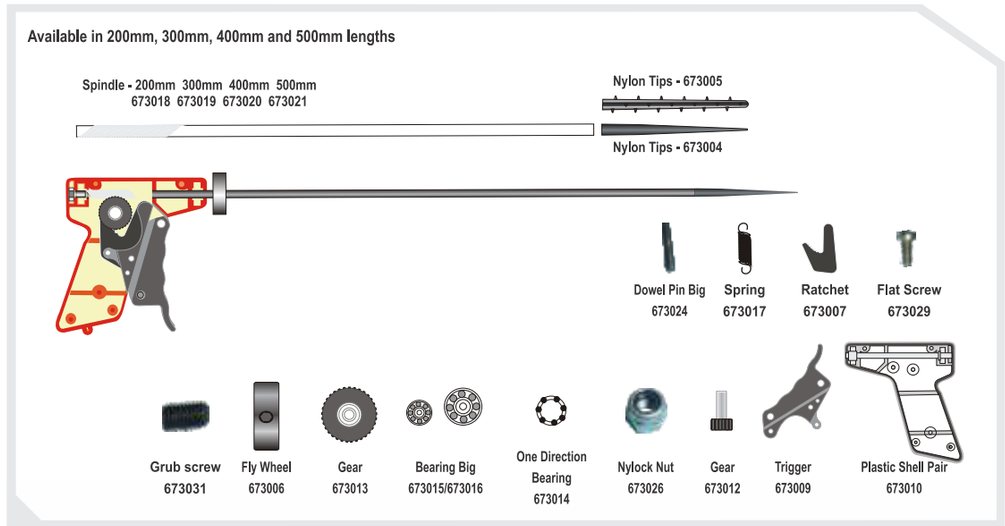
- Light Weight.
- Ergonomically designed handle for easy handling.
- Increased RPM.
- Serrations in the plastic tip for better Fluff removal.
- Dynamically balanced.
- Made of wear resistant materials for longer life.



FLUFF REMOVER - FR 2



- Light Weight.
- Ergonomically designed handle for easy handling.
- Serrations in the plastic tip for better Fluff removal.
- Dynamically balanced.
- Made of wear resistant materials for longer life.

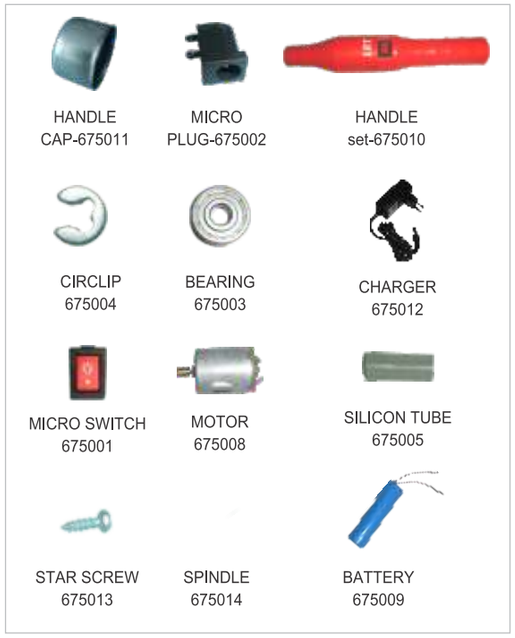


LRT ELECTROCLEAN - EC1

Available in 150mm & 300mm Spindle lengths

ADVANTAGES OF LRT ELECTRO CLEAN

- Light weight and handy - user friendly and well accepted by the end users.
- Increased RPM - Time saving.
- Dynamically balanced and direct drive from motor- no frequent break down.
- No gears and springs - free from maintenance and noise.
- Economical and made of wear resistance material for longer life.
- Enhanced battery life.
- Long usage after each charge.



LRT STROBOSCOPE

KEY FEATURES

- Super portable - battery-powered,pocket sized.
- Extremely Rugged.
- No Protruding parts and hence no chance of damage to them.
- Lightweight (only 300 grams).
- Easy to handle.
- Brighter than any comparable hand held inspection lighting.
- Recharges completely in 4 hours.
- Up to 50,000 flashes/min.

APPLICATIONS

LRT Stroboscope can be used in Textile Industry for

- Analyzing Ring and traveller combination.
- Inspecting the Traveller tilting, Traveller loading and Balloon formation.
- Observing Hairiness on running packages.
- Finding out belt slippage which causes twist variation.
- Analyzing the twist variation in Doubling and twisting machines.
- Observing the weft insertion in weaving machines.
- Measuring the speed of Motor, shafts, gears & pulleys.
- Visual inspection of moving and rotating parts.

SPECIFICATION

Size: (147.24 X 89.0 X 25.0) mm Power: 6 Watts MA, 0.6 Amps Max

SPINNING WITH FLANGE TRAVELLERS

Relationship of yarn count to Traveller number

Yarn Count			Traveller Number			
			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	10-14		
100	5.9	169	22/0-18/0	9-12.5		
120	4.9	203	26/0-22/0	7.1-9		

TWISTING / DOUBLING WITH FLANGE TRAVELLERS

Relationship of ply yarn count to Traveller number

Single Yarn Count			2 - Ply		3 - Ply		4 - Ply	
Ne	TEX	Nm	Traveller No.	Traveller Wt.	Traveller No.	Traveller Wt.	Traveller No.	Traveller Wt.
5	118.0	8.5	26-30	425-475				
7	84.3	11.9	22-26	375-400	28-30	450-475		
10	59.0	16.9	18-22	315-355	24-28	400-450	28-30	450-475
12	49.2	20.3	16-18	280-315	22-24	375-400	26-28	425-450
16	36.9	27.1	15-17	265-300	18-20	315-355	20-22	355-375
18	32.8	30.5	14-16	250-280	17-19	300-335	19-22	335-375
20	29.5	33.9	12-14	200-250	15-16	265-280	18-20	315-355
24	24.6	40.6	10-12	160-200	13-14	224-250	16-18	280-315
30	19.7	50.8	8-10	125-160	10-12	160-200	13-15	224-265
36	16.4	60.9	6-8	100-125	8-9	125-140	11-12	180-200
40	14.8	67.7	4-6	90-100	7-8	112-125	10-11	160-180
50	11.8	84.7	1-3	63-71	5-6	95-100	9-10	140-160
60	9.8	101.6	1/0-1	56-63	3-5	80-95	8-9	125-140
70	8.4	118.5	2/0-1/0	50-56	1-3	63-80	7-8	112-125
80	7.4	135.4	3/0-2/0	45-50	1/0-2	56-71	4-6	90-100
90	6.6	152.4	6/0-4/0	31.5-40	2/0-1/0	50-56	2-4	71-90
105	5.6	117.8	7/0-5/0	28-38.5	4/0-3	40-45	1-3	63-80

TRAVELLER WEIGHT COMPARISON TABLE*

Traveller weight per 1000 Travellers in gram

Traveller No.	Lakshmi/ Bracker	Kanai	R&F	Traveller No.	Lakshmi/ Bracker	Kanai	R&F
28/0	6.3	6.7	5	**4**	90	89	85
26/0	7.1	8.1	6	**5**	95	95	95
24/0	8	9.5	7.1	**6**	100	109	106
22/0	9	10.9	8	**7**	112	122	112
20/0	10	12.3	9	**8**	125	136	125
19/0	11.2	13.0	10	**9**	140	154	140
18/0	12.5	13.7	11.2	**10**	160	175	160
17/0	13.2	14.5	11.8	**11**	180	204	180
16/0	14	15.4	13.2	**12**	200	224	200
15/0	15	16.6	14	**13**	224	244	224
14/0	16	18.3	15	**14**	250	264	236
13/0	17	20.0	16	**15**	265	283	250
12/0	18	21.6	18	**16**	280	280	265
11/0	20	23.4	19	**17**	300	311	280
10/0	22.4	24.8	20	**18**	315	324	300
9/0	23.6	26.8	22.4	**19**	335	335	315
8/0	25	28.5	23.6	**20**	355	355	325
7/0	28	30.2	26.5	**21**		364	335
6/0	31.5	32.2	30	**22**	375	378	355
5/0	35.5	35.1	31.5	**23**		391	375
4/0	40	39.3	35.5	**24**	400	404	385
3/0	45	42.2	40	**25**		400	
2/0	50	48.3	45	**26**	425	431	415
1/0	56	54.6	50	**27**		444	425
1	63	62.2	60	**28**	450	457	450
2	71	74	71	**29**		472	460
3	80	81	80	**30**	475	485	475

* Subject to change based on Manufacturer Recommendation

NUMBERING SYSTEMS FOR YARN

Yarn count comparision chart (rounded figures)

ENGLISH COUNT (Ne)	WOOLEN (Ne)	METRIC COUNT (Nm)	TEX	DENIER
6	20	10	98	885
7	23	12	84	759
8	26	14	74	664
9	30	15	66	590
10	33	17	59	531
11	36	19	54	483
12	39	20	49	443
13	43	22	45	408
14	46	24	42	379
17	56	29	35	312
18	59	30	33	295
19	62	32	31	279
20	66	34	30	266
24	79	41	25	221
26	85	44	23	204
28	92	47	21	190
30	98	51	20	177
36	118	61	16	148
40	131	68	15	133
48	157	82	12	111
50	164	85	12	106
55	180	93	11	97
60	197	102	10	89
65	213	110	9	82
70	230	119	8	76
80	262	135	7	66
90		152	7	59
100		169	6	53
110		186	5	48
120		203	5	44
150		254	4	35
180		305	3	30

NUMBERING SYSTEMS FOR YARN- CONVERSION FORMULA

DIRECT SYSTEM

Mass per Unit Length

i.e. No. of mass units in length of the yarn

Denier : - No. of gram units in 9000 meter of yarn

Tex : No. of gram units in 1000 meter of yarn.

INDIRECT SYSTEM

Length per Unit Mass

i.e. No. of length units in unit mass

Ne : No. of 840 yards in 1 lb yarn

Nm : No. of 1000 mts. In 1 kg yarn.

CONVERSION FORMULA

Desired	Abbreviation	Den	Tex	Dtex	Nm	Ne_L	Ne_w	Ne_k
Given Tex	Tex	9 tex	10 tex	—	$\frac{1000}{tex}$	$\frac{1654}{tex}$	$\frac{1938}{tex}$	$\frac{886}{tex}$
Decitex	Dtex	0.9 dtex	0.1 dtex	—	$\frac{10000}{dtex}$	$\frac{16540}{dtex}$	$\frac{19380}{dtex}$	$\frac{8860}{dtex}$
Den	Den	—	0.111 den	0.111 den	$\frac{9000}{den}$	$\frac{14882}{den}$	$\frac{17440}{den}$	$\frac{7972}{den}$
Metric No.	Nm	$\frac{9000}{Nm}$	$\frac{1000}{Nm}$	$\frac{10000}{Nm}$	—	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	—
Engl. Linen No.	Ne_L	$\frac{14882}{Ne_L}$	$\frac{1654}{Ne_L}$	16540	0.605 Ne_L	—	1,172 Ne_L	1,5 Ne_L
Engl. Woolen No.	Ne_w	$\frac{7440}{Ne_w}$	$\frac{1938}{Ne_w}$	$\frac{19380}{Ne_w}$	0.516 Ne_w	0.853 Ne_w	—	0.457 Ne_w

$Ne_B = \frac{840 \text{ yds}}{\text{pound}}$ $Ne_L = \frac{300 \text{ yds}}{\text{pound}}$ $Ne_W = \frac{256 \text{ yds (woolen)}}{\text{pound}}$ $Ne_K = \frac{560 \text{ yds (worsted)}}{\text{pound}}$

TRAVELLER SPEEDS/PERFORMANCE CALCULATIONS

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

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

Ring - ∅		9000 9500 10000	10500 11000 11500	12000 12500 13000	13500 14000 14500	15000 15500 16000	16500 17000 17500	18000 18500 19000	19500 20000 20500	21000 21500 22000	22500 23000 23500	24000 24500 25000
mm	inch	Spindle Speed (rpm)										
70	2 3/4	33 34 36	38 40 42									
67	2 5/8	31 33 35	36 38 40	42 43 45								
63	2 1/2	29 31 33	34 36 38	39 41 42								
60	2 2/8	28 29 31	33 34 36	37 39 42	42 44 45							
57	2 1/4	25 27 28	30 31 32	34 35 37	38 40 41							
54	2 1/8	25 26 28	29 31 32	34 35 36	38 39 41	42 43 45						
51	2	24 25 26	28 29 30	32 33 34	36 37 38	40 41 42						
48	1 1/8	22 24 25	26 27 29	30 31 32	34 35 36	37 39 40	41 42 44					
45	1 3/4	21 22 23	24 26 27	28 29 30	31 33 34	35 36 37	39 40 41	42 43 44				
42	1 5/8	20 21 22	23 24 25	26 27 28	29 30 32	33 34 35	36 37 38	39 40 41	43 44 45			
40	1 9/15	19 20 21	22 23 24	25 26 27	28 29 30	31 32 33	34 35 36	37 38 39	41 42 43			
38	1 1/2		21 22 23	24 25 26	27 28 29	30 31 32	33 34 35	36 37 38	39 40 40	41 42 43	45 46 47	48 49 50
36	1 27/64			23 24 25	25 26 27	28 29 30	31 32 33	34 35 36	37 38 39	40 41 41	42 43 44	45 46 47
		9000 9500 10000	10500 11000 11500	12000 12500 13000	13500 14000 14500	15000 15500 16000	16500 17000 17500	18000 18500 19000	19500 20000 20500	21000 21500 22000	22500 23000 23500	24000 24500 25000

Delivery :

$L = \frac{n}{T/m}$

Production

$P = \frac{L \times tex \times 60 \times \eta}{1000}$

$P = \frac{n \times tex \times 60 \times \eta}{T/m \times 1000}$

L = Delivery in m/min

P = Production in g/h per spindle

n = Spindle speed in rpm

T/m = Twists per metre

η = Efficiency

GENERAL CALCULATIONS *

Blow Room

Cleaning efficiency % in Blow room

$$\frac{\text{\% trash in cotton - \% trash in lap}}{\text{\% trash in cotton}} \times 100$$

Draw Frame

Production per delivery per 8 hours shift

$$0.625 \times \text{front roller speed in mpm} \times \frac{\text{Machine Efficiency (\%)}}{100}$$

Simplex

Production per spindle per 8 hours in kgs

$$\frac{\text{7.2 x Spindle speed x Machine Efficiency (\%)}}{\text{TPI x Roving Hank x 100000}}$$

Spinning

Production per spindle per 8 hours in gms

$$\frac{\text{7.2 x Spindle speed x Machine Efficiency (\%)}}{\text{TPI x Count x 100}}$$

Ring Doubling

Production per spindle per 8 hours in gms

$$\frac{\text{7.2 x Spindle Speed x Machine Efficiency (\%)}}{\text{TPI x Resultant Count x 100}}$$

$$\text{Resultant Count} = \frac{\text{Single yarn count}}{\text{No. of Ply}}$$

Two for one Twister

Production per spindle per 8 hours in gms

$$\frac{\text{7.2 x Spindle Speed x 2 x Machine Efficiency}}{\text{TPI x Resultant Count x 100}}$$

COP CONTENT CALCULATION

1. a. Yarn content per cop in Ring Spinning for given spindle lift and Ring Diameter.

   $3.25 \times L \times D^2$ grams

   L = Lift in Inches

   D = Ring Diameter in inches

   b. The yarn content for man made fibres and blended yarns are roughly 8% more than those for cotton yarns for comparable spindle lifts & ring diameters.

2. Silver content per can in Draw frames:

$$\frac{1.5 \times \text{can height} \times \text{can diameter}^2}{1000}$$ Can Measurements in inches

3. Roving content in Kgs = $\frac{3 \times L \times D^2}{1000}$

L = Lift in inches D = Full Bobbin Diameter in inches

Standards to be maintained in mills

Illumination levels required in LUX

Department	Good	Average	Poor
Blow room, Humidification plants and packing	50	40	<25
Preparatory	70	50	<40
Spinning, Doubling and TFO	100	75	<60
Post Spinning and Inspection Room	150	100	<60

Relative Humidity and Temperature for Different Departments**

(Cotton Spinning)

Department	R.H. %	°C	°F
Mixing	60-50	27-35	80-95
Blow room Carding Preparatory	50-55	27-35	80-95
Ring Frame	50-60	27-35	80-95
Winding	60-65	27-32	80-90

** About 5% higher RH% than that for cotton spinning is to be maintained while spinning blended yarns.

C - Centigrade F - Fahrenheit

* Source - Sitra norms 2004

TRAVELLER SELECTION FOR COTTON

Count NE	Traveller Number	FLANGE 1		FLANGE 2	
		Normal	CR/ AW	Normal	CR/ AW
8	10 - 14	U1 CS/P1/U1 UM/U1 US	U1 CS/EP1/U1 UM/U1 US	*C2/H2/P2	*C2/EH2/EP2
12	6 - 9	U1 C1/P1/U1 HM/U1 UM/U1 US	U1 C1/EP1/U1 HM/U1 UM/U1 US	*C2/H2/P2	*C2/EH2/EP2
18	2 - 6	U1 C1/P1/U1 HM/U1 UM/U1 US	U1 C1/EP1/U1 HM/U1 UM/U1 US	*C2/H2/P2	*C2/EH2/EP2
20	2/0 - 3	M1/P1/U1 UM/U1 C1/U1 US/U1 HM	EM1/EP1/U1 UM/U1 C1/U1 US/U1 HM	H2/P2/U2 UM	EH2/EP2/U2 UM
24	3/0 - 2	M1/P1/U1 UM/U1 C1/U1 US/U1 HM	EM1/EP1/U1 UM/U1 C1/U1 US/U1 HM	M2/H2/U2 UM	EM2/EH2/U2 UM
30	5/0 - 1/0	M1/U1 UM/U1 ML/U1 US/U1 HM	EM1/U1 UM/U1 ML/U1 US/U1 HM	M2/U2 UM	EM2/U2 UM
34	6/0 - 2/0	M1/U1 UM/U1 ML/U1 US/U1 HM	EM1/U1 UM/U1 ML/U1 US/U1 HM	M2	EM2/EL2
40	9/0 - 5/0	M1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL/EL1	M2	EM2/EL2
45	11/0 - 8/0	M1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL/EL1	–	–
55	13/0 - 9/0	M1/U1 UM/U1 ML/U1 US/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 UL/EL1	–	–
60	14/0 -10/0	L1/U1 UL	EL1/U1 UL	–	–
70	16/0 - 12/0	L1/U1 UL	EL1/U1 UL	–	–
80	18/0 - 14/0	L1/U1 UL	EL1/U1 UL	–	–
90	20/0 - 16/0	L1/U1 UL	EL1/U1 UL	–	–
100	22/0 - 18/0	L1/U1 UL	EL1/U1 UL	–	–
120	26/0 - 22/0	L1/U1 UL	EL1/U1 UL	–	–

TRAVELLER SELECTION FOR SYNTHETICS

Count NE	Traveller Number	FLANGE 1		FLANGE 2	
		Normal	CR/ AW	Normal	CR/ AW
8	12 - 16	U1 CS/P1/U1 UM/U1 US	U1 CS/EP1/U1 UM/U1 US	*C2/H2/P2	*C2/EH2/EP2
12	8 - 11	U1 C1/EP1/U1 HM/U1 UM/U1 US	U1 C1/EP1/U1 HM/U1 UM/U1 US	*C2/H2/P2	*C2/EH2/EP2
18	5 - 8	M1/P1/U1 UM/U1 C1/U1 US/U1 HM	EM1/EP/U1 UM/U1 C1/U1 US/U1 HM	*C2/H2/P2	*C2/EH2/EP2
20	4 - 7	M1/P1/U1 UM/U1 C1/U1 US/U1 HM	EM1/EP1/U1 UM/U1 C1/U1 US/U1 HM	H2/P2/U2 UM	EH2/EP2/U2 UM
24	1 - 4	M1/P1/U1 UM/U1 C1/U1 US/U1 HM	EM1/EP1/U1 UM/U1 C1/U1 US/U1 HM	M2/H2/U2 UM	EM2/EH2/U2 UM
30	2/0 - 2	M1/U1 UM/U1 ML/U1 C1/U1 US/U1 HM	EM1/U1 UM/U1 ML/U1 C1/U1 US/U1 HM	M2/U2 UM	EM2/U2 UM
34	3/0 - 1	M1/U1 UM/U1 ML/U1 US/U1 HM	EM1/U1 UM/U1 ML/U1 US/U1 HM	M2	EM2
40	7/0 - 3/0	M1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	M2	EM2
45	9/0 - 6/0	M1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	M2	EM2
55	11/0 - 7/0	M1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	EM1/U1 UM/U1 ML/U1 US/U1 HM/U1 UL	–	–
60	12/0 - 8/0	M1/U1 UM/U1 ML/U1 UL	EL1/U1 UM/U1 ML/U1 UL	–	–
70	14/0 - 10/0	L1/U1 UL/U1 ML	EL1/U1 UL/U1 ML/U1 UL	–	–
80	16/0 - 12/0	L1/U1 UL	EL1/U1 UL	–	–

*HO(DR) for Synthetic fibres and blends. *UDR(HWO) for Cotton, Synthetic and blends

*C2 Traveller are supplied in only flat cross section

You may select the Traveller number/ type as per your mill conditions. For assistance, please contact LRT

NOTE : Guidelines for Traveller selection are specified based on our experience

J-SHAPED VERTICAL RING TRAVELLER

Vertical Travellers are being used to spin acrylics, worsted, woollen, and heavy doubling on vertical rings.

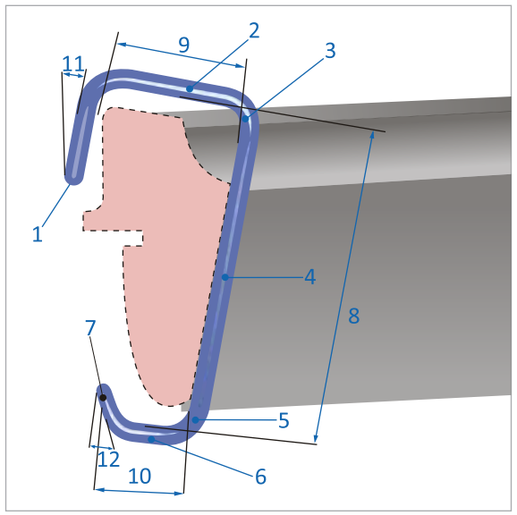
Presently two types of vertical rings are available.

1. Conical Rings
2. Vertical Rings

Based on the ring profile and ring height the traveller will be selected.

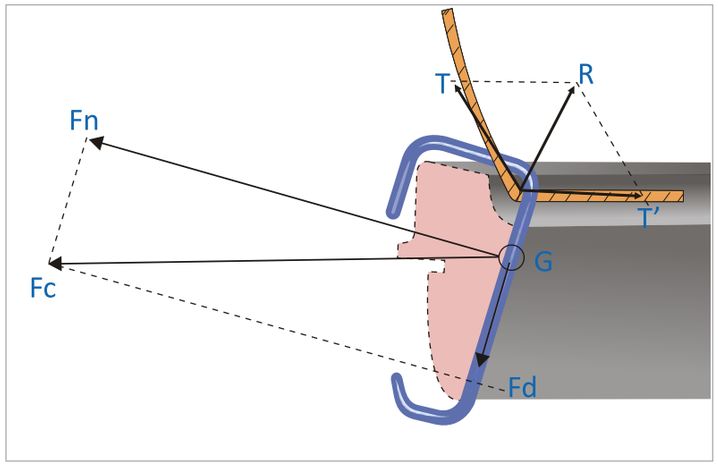
LRT is supplying Ring Travellers for the ring heights of 9.1 mm and 11.1mm

PARTS OF J-SHAPED RINGS & TRAVELLERS



1. NOSE
2. HEAD
3. POSITION OF YARN PATH
4. BACK
5. HEEL
6. FOOT
7. TOE
8. INNER HEIGHT
9. HEAD WIDTH
10. FOOT WIDTH
11. NOSE ANGLE
12. TOE ANGLE

FORCES ON RINGS J-SHAPED TRAVELLER



G - Traveller center of gravity
TT - Yarn Tension
R - Resultant of the Yarn Tension
Fc - Centrifugal force acting on the traveller (Resultant of Fn + Fd)
Fn - Normal Force, which presses the Traveller against the raceway
Fd - Reacting Force, which pulls the traveller downwards

TRAVELLER CONTACT AND ITS IMPACT ON TRAVELLER WEAR OUT

Worn-out Position	Traveller Weight	Suggestions
Wear in head and back	Correct	
Wear only on head	Traveller too heavy	Use Light Traveller
Wear only on toe	Traveller too light	Use Heavier Traveller

J-SHAPED TRAVELLER FOR CONICAL RINGS

Ring Height in mm (inch)	Type		Traveller Back	Recommended Ring raceway	Application Range
9.1 (23/64")	J 9.1 Standard		Straight	Convex	Fine and Medium Worsted Yarns
	J 9.1 CST		Straight	Convex	Especially for fine Worsted Yarns
11.1 (7/16")	J 11.1 Standard		Straight	Convex	Fine and Medium Worsted Yarns
	J 11.1 B		Convex	Straight	Coarse Worsted Yarns
	J 11.1 CST		Straight	Convex	Fine and Medium Worsted Yarns
	J 11.1 CST B		Convex	Straight	Fine and Medium Worsted Yarns
	J 11.1 KST		Straight	Convex	Coarse Worsted Yarns
17.4 (11/16")	J 17.4		Convex	Straight	Coarse Worsted and Semi-worsted Yarns

HZ TYPE TRAVELLER FOR VERTICAL RINGS

Ring Height in mm (inch)	Type		Application Range
10.3 (13/32")	HZ 10.3 RST		Sewing threads worsted yarns and man-made fibres
16.7 (21/32")	HZ 16.7 CST BS		Woollen yarns

All J Shaped / HZ Type Travellers are only in round cross section

WEIGHT CHART OF J-SHAPED RING TRAVELLERS

ISO No.	Lakshmi / Bracker	R + F	Carter	Kanai
16	560	560	-	300
17	450	450	450	270
18	355	355	355	240
19	250	250	250	210
20	180	180	170	180
21	160	150	140	150
22	125	132	125	135
23	112	112	118	120
24	90	90	95	105
25	71	75	75	90
26	63	60	63	75
27	50	50	50	68
28	40	40	40	61
29	31.5	33.5	33	54
30	28	30	28	47
31	25	26.5	25	40
32	23.6	23.6		36
33	22.4	22.4		32
34	21.2	21.2		28
35	20	20		24
36	18	18		20

TRAVELLER RECOMMENDATION J-SHAPED TRAVELLERS

Nm	Ne (worsted)	Traveller Wt.	Lakshmi No.
14	28	355	18
16	32	250	19
18	36	180	20
20	40	160	21
22	44	125	22
26	52	112	23
32	63	90	24
36	71	71	25
40	79	63	26
48	95	50	27
56	111	40	28
60	119	31.5	29
64	127	28	30
72	143	25	31

Traveller Weight for 1000 pcs

NOTES

NOTES

SPINNING QUALITY - WORLD WIDE