



Reiners + Fürst
Rings and Travellers

**360° PER-
FORMANCE
MADE IN
GERMANY.**



Reiners + Fürst
Rings and Travellers

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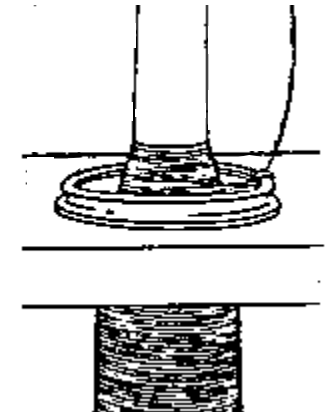
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– since over 75 years.

Spinning Technology
Recommendations
chapter 1



Rings and Travellers for Cotton
Spinning
chapter 2 – 3

Rings and Travellers for Worsted
Spinning
chapter 4 – 7



From Mönchengladbach into the world.

Rings and travellers to optimize your spinning process.



360° R+F Performance

The Reiners + Fürst brand stands for rings and travellers manufactured in high-end quality made in Germany. Our tradition as a family-owned business in its 3rd generation is to always focus on safeguarding the ring spinning process.

All over the world our customers achieve excellent results with our products and service. It is our personal goal to constantly meet your highest expectations!

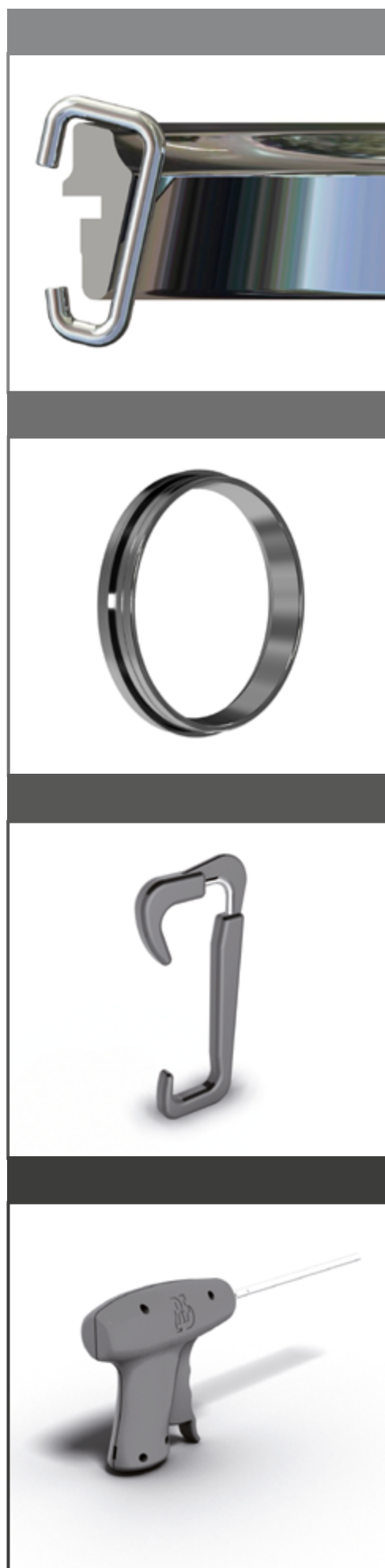
A handwritten signature in blue ink that reads "B. Reiners".

Dipl.-Kfm. Benjamin Reiners
President of Reiners + Fürst



Content

1.	Spinning Technology Recommendations	11
1.1	Prerequisites for Optimum Spinning Results	11 – 14
1.2	Recommendations for Special Applications	15 – 16
1.3	Ring and Traveller Impact on the Yarn Quality	17 – 18
1.4	Impact on Yarn Breaks	18 – 19
1.5	Performance Capabilities of the Ring – Traveller System	19
1.6	General	20 – 25
2.	Flange Rings	27
2.1	Ring Qualities	27 – 28
2.2	Speed Recommendations on Turbo Rings	28 – 29
2.3	Comparison of Turbo Rings	29
2.4	Ring Shapes	30
2.5	Ring types	31
2.6	Profile Selection for coated Rings	32
2.7	Running-In of the Rings	32
3.	Flange Travellers	33
3.1	Surface Treatments of Ring Travellers	33 – 35
3.2	Traveller Designation	36 – 37
3.3	Comparative Chart of Traveller Weights	38
3.4	Wire Profiles	39
3.5	Recommendations for Traveller Type	40 – 41
3.6	Manufacturing Range of Flange Travellers	42 – 44
3.7	Traveller Speeds	45
3.8	Traveller Number Recommendations	46 – 47
3.9	Traveller Cleaner Settings	48 – 49
3.10	Magazined Ring Travellers and Traveller Insertion Devices	50 – 53
4.	J-Rings	55
4.1	Ring Materials	55 – 56
4.2	Ring Diameter, Ring Heights and Lubrication Systems	56 – 58
4.3	Lubricants	59



5.	J-Travellers	61
5.1	J-Steel Travellers	61
5.2	Traveller Shapes	62
5.3	Table Comparing Weights and Numbers of J-Steel Travellers	63
5.4	Production Range of Steel J-Travellers for J 9.1-, J 11.1- and J 17.4-Rings	64 – 65
5.5	J-Travellers of Nylon	66
5.6	Application Recommendations	67 – 68
5.7	Tools for Fitting and Removing J-Travellers	69
6.	HZ-Rings	71
6.1	Ringmaterials	71
6.2	Profile Shapes, Ring Diameters, Ring Heights and Lubrication Systems	72 – 74
6.3	Lubricants	75
6.4	Oil Recommendations	76
7.	HZ-Travellers	77
7.1	HZ Steel Travellers	77
7.2	Table comparing Weights and Numbers of HZ Steel Travellers	78
7.3	Production Range of HZ Steel Travellers	79
7.4	Nylon Ring Travellers for HZ Rings	80
7.5	Production Range of Nylon Travellers	81 – 87
7.6	Application recommendations	88 – 93
7.7	Tools for Fitting and Removing HZ Travellers	94
8.	Fluff Collectors	95
8.1	Fluff collectors SPIN CLEANER SC 1	95 – 96
8.2	Survey on spare parts	97

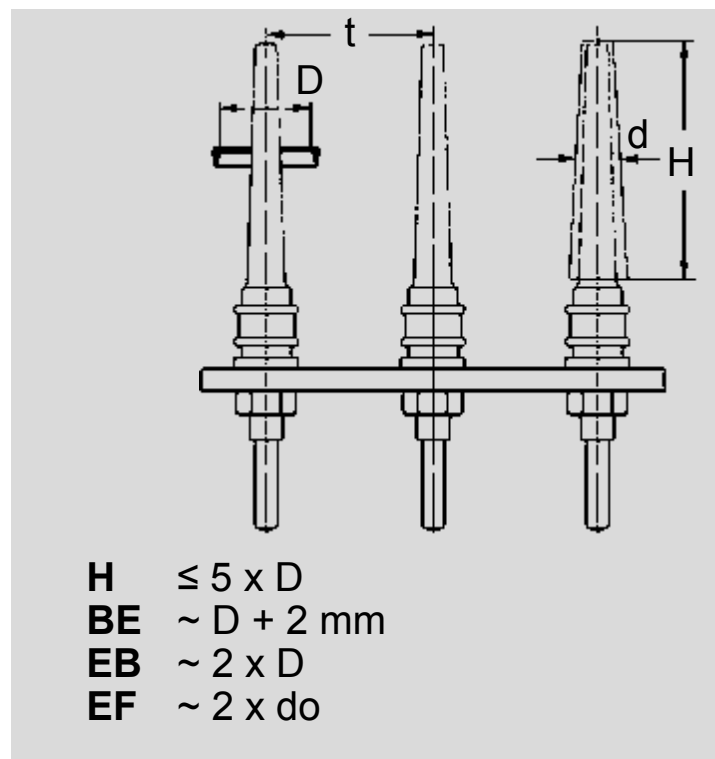
1. Spinning Technology Recommendations

1.1 Prerequisites for Optimum Spinning Results

The performance of ring spinning and twisting machines is among other factors determined by the performance of rings and travellers. Thanks to intensive research and recent developments in the ring-traveller segment, this ability to withstand strain could be considerably increased. It is a known fact that traveller wear does not only depend on the material chosen, but that rather complex tribological factors do play their part as well. Moreover, the heat generated between ring and traveller must be dissipated so rapidly that local temperature increases to temperatures exceeding 300 degrees in the friction areas of the traveller are prevented.

To keep the stress on the ring-traveller system to an absolute minimum, the following must be ensured:

- The rings are perfectly centered with regard to the spindles;
- The yarn guide eyelet is well centered with regard to the spindles;
- The balloon control rings are perfectly centered with regard to the spindles;
- The spindle bearing is in good condition, preventing spindle vibrations;
- The ratio between bobbin diameter, bobbin length and spindle gauge and ring diameter are correct;
- Balloon control rings exist and their diameter matches the ring;
- Suitable, correctly adjusted traveller cleaners keep the flange traveller free of fibre fly;
- The climate in the room (temperature and relative humidity) is favourable for the yarn being processed;
- The room air is virtually dust free and there is little fibre fly that could have a negative impact on traveller performance;
- The ring rail is aligned in perfect horizontal direction to the spindle.



Symbols:

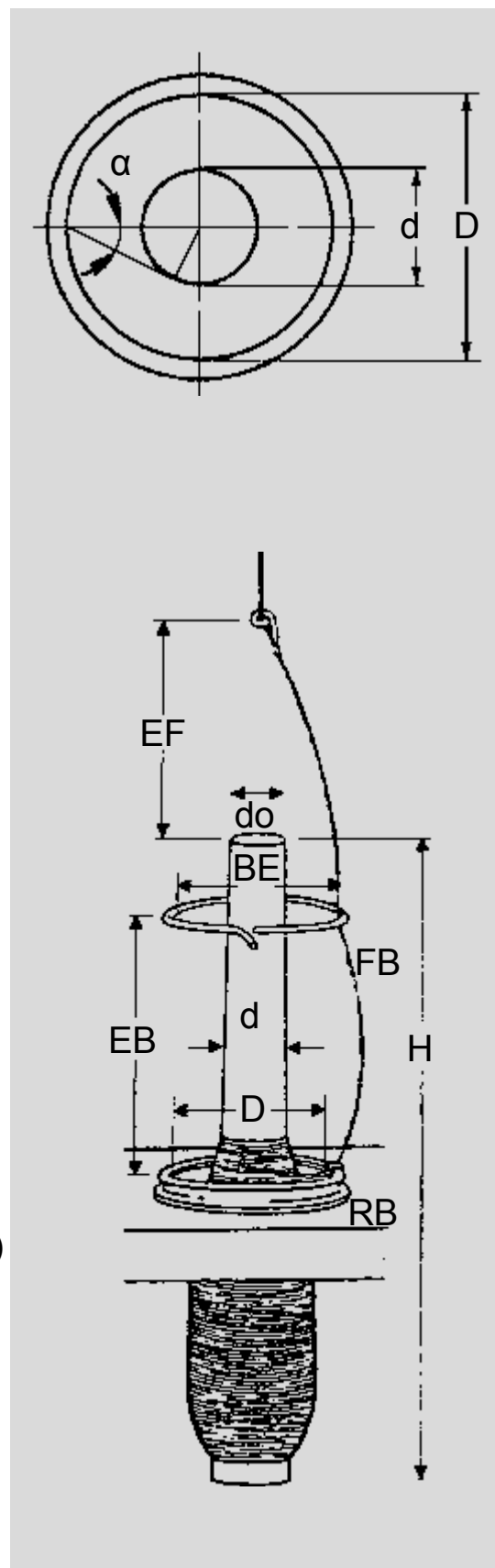
t = spindle gauge
D = inside ring \varnothing
d = mean bobbin \varnothing
d_o = top bobbin \varnothing
H = bobbin length
BE = balloon control ring
EB = setting distance ring/
balloon control ring
FB = yarn balloon
RB = ring rail
EF = setting distance top of bobbin/
yarn-guide eyelet (measures in mm)

Recommended ratio values:

D = $t - 25 \text{ mm}$

d:D in spinning:

0,48 - 0,5 bzw. $\alpha 29^\circ - 30^\circ$
(not less than 0.44 or $\alpha 26^\circ$)



Spinning Geometry:

To achieve good spinning results, the geometrical ratios described below must be complied with as precisely as possible:

d:D: if the value of $d:D$ is too small, this leads to extreme traveller strain. Traveller wear and end breakages will increase as a result.

If the value of $d:D$ is too large, it will result in a low productivity, however, this does not have an adverse effect on the spinning conditions

H: If the bobbin or spindle selected is too long (e.g. $H = 5, 5 \times D$), the yarn balloon will touch the tip of the bobbin. Besides frequent end breakages and inferior yarn quality is registered.

D and t: When choosing the ring \varnothing (D) the spindle gauge (t) must be taken into account.

In comparison to the spindle gauge, the maximum ring diameter must be no more than 25 mm smaller than the gauge.

This ensures that traveller and yarn balloon have the same flexibility. The insertion of the traveller, the elimination of end breakage and cop changes are less problematic.

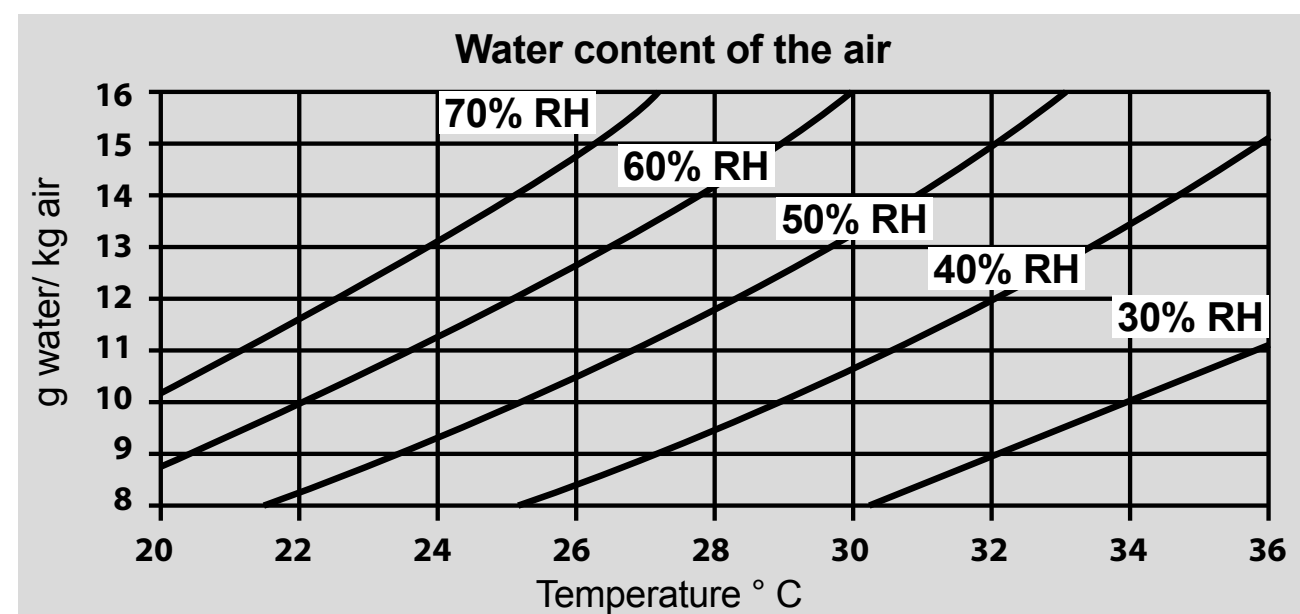
BE: The balloon control ring should be 2–3 mm larger than the ring diameter. If the balloon control ring is too large, it will not provide any relief for the yarn balloon.

Climatic Conditions:

Perfect climatic conditions (humidity, temperature) are a prerequisite for good spinning results along with clean ambient air. To prevent the adverse impact of contamination, air conditioners should be designed for at least 30 recirculations of air per hour. General recommendations for relative humidity can be found in the table below:

Material	Temperature [Degrees Celsius]	Rel. Humidity [%]
Short Staple Spinning	28 – 32	38 – 45
Long Staple Spinning	23 – 28	60 – 65

The absolute air water contents are more important for the operating conditions of the mill than the relative humidity. At a short staple mill, the air should have a water content of approx. 11-12 g / Kg air, at a long staple mill approx. 13 – 14 g / Kg air. The figure below indicates the relative humidity required to attain this value for each existing temperature.



Basis: Air pressure 1013 mbar

General Information on the Spinning Climate:

If cotton has a tendency to stick or lap, a drier spinning climate should be chosen.

If chemical fibres tend to attract static charges, a more humid spinning climate is recommended.

Warm dry climates have a positive effect on the drawing proces. Low temperatures can lead to disturbances in the drawing process.

Clean air is particularly important for good operational conditions and a minimum amount of imperfections. If the air contains a lot of dust and fibres, this results in frequent end breakages and yarn deficiencies, especially if fine yarns are being processed (air recirculation frequency of the air conditioner).

Air contaminated with mineral dust, which develops for instance as a result of construction work, can have an aggressive impact on spinning rings and ring travellers and cause very fast wear and tear.

Water used to humidify the air must be sodium-free; failure to comply will result in accelerated corrosion of rings and travellers.

1.2 Recommendations for Special Applications

Compact Yarns

Compact yarns are types of yarn with minimal hairiness. The friction conditions are problematic when processing these yarns, since the fibres required for lubrication simply are not provided. Consequently, when spinning compact yarns, special conditions must be complied with.

For compact yarns Fl. 1, R+F recommends the K 2 Profile (please also refer to Chapter 2.5), which was developed specifically for this application.

Due to the lack of fibre lubrication, the ring – traveller friction is higher when spinning compact yarns than it is with conventional yarns. For this reason, lighter-weight travellers (1–2 numbers lighter) are used for compact yarn spinning applications. To bring the few available lubrication fibres closer to the contact zone between ring andtraveller, the use of lower and narrower travellers is recommended as well.

Compared to conventional ring spinning, climate conditions should be drier and warmer for compact spinning.

Core Yarns

The Spinning of core yarns is frequently problematic, in particular if the application involves spinning hard core yarns. In this case, the ratio between sheet fibres and core is minimal and the risk of damaging the sheet is particularly high. This is not quite as critical for the processing of soft core yarns because the ratio between sheet fibres and core fibres is higher.

Given that hard core yarns are frequently processed without a balloon control ring, much heavier travellers have to be used than those used with conventional yarns (up to 3 numbers heavier). The appropriate traveller number must be established in tests. We principally recommend the use of the Normal Profile for the processing of core yarns. The travellers should have a yarn passage that is as smooth as possible, especially with hard core yarns. Consequently, we recommend the use of rf profile wires, which have a round cross section in the yarn passage area.

1 Fancy Yarns

Due to their specification, fancy yarns have very large mass fluctuations, which are distributed across different yarn lengths. Consequently, the selection of the traveller weight is always a compromise. Principally, the selection of the traveller weight is based on the medium yarn number. In many cases, a much heavier traveller weight than recommended must be selected to prevent excessive bulging of the yarn balloon in the thick places. The deciding factor is the length of the thick place. If thick places are of the same length as the yarn balloon or longer, the traveller weight must be based on the yarn number that applies to the thick place in order to control the balloon.

Compared to normal yarns the RPM of the spindle have to be reduced to prevent end breaks in the thin areas. The optimum spinning parameters must be established through tests.

Depending on the intensity of the yarn effects, normal travellers may be used. If the effects are intense, substantially larger travellers will have to be used. Traveller recommendation for coarse effect yarns:

Synthetics and Blends

Synthetic fibres all have a wide variety of characteristics. Consequently, the recommendations of the fibre manufacturer should always be complied with when processing these fibres.

Synthetic fibres are frequently friction sensitive. To prevent the appearance of melting points in these fibres, higher traveller types should always be used. This prevents contact between yarn and ring crown. If the fibres are very sensitive, balloon control rings should not be used. In these cases, substantially higher traveller weights than those recommended for normal fibres should always be selected.

Most dyed fibres and fibres with a dull finish contain very aggressive substances. Given that fibres also create the lubricating film between ring and traveller, these substances do have an abrasive effect on traveller and ring, so that the traveller life will be shortened in many cases. Moreover, the RPM of the spindle should be reduced.

For the selection of travellers for various applications, please refer to the table on page 40.

1.3 Ring and Traveller Impact on the Yarn Quality

In the ring spinning process, yarn quality is affected by many factors, and the ring, as well as the traveller, have an impact. However, ring and traveller cannot improve the quality of a fibre strand coming from the drawing system. The correct selection of ring and traveller can have a positive impact on the spinning results, in particular in terms of yarn hairiness.

Hairiness:

Ring and traveller do have an effect in particular on yarn hairiness. The wear condition and the centering of the ring play a primary role. A worn ring surface always results in increased yarn hairiness results.

The centering of the ring is also of critical importance for minimal yarn hairiness, and its importance increases with increasing spindle speed. Also, the smaller the ring diameter, the more important is centering. Even at an excentricity of 0.3 mm, the theoretical traveller speed fluctuates considerably. This makes the traveller buzz and thus yarn hairiness increases.

The correct selection of the traveller weight is also important for good yarn hairiness results. If the traveller weight is too low, the balloon may bulge a lot, which results in increased friction on the balloon control ring and thus leads to increased yarn hairiness. If the spinning rings are worn, the ring-traveller friction is reduced as a result of the damaged ring surface. In this case, heavier traveller rates can temporarily remedy the problem. Nonetheless, the rings should always be replaced as soon as possible if this is the case.

Choosing the right shape of traveller and wire profile will yield optimum yarn hairiness results.

Neps:

Neps are extremely short mass fluctuations that usually stem from the spinning preparation process. In some cases, push - up neps, which may develop on the traveller, can also lead to an increased number of neps. The cause may be an unsuitable traveller or a heavily worn traveller. In this case, a suitable traveller shape or shorter traveller replacement intervals can improve the situation. If the number of neps is increased significantly and is caused by push - up neps, the CV value may be increased as well.

Yarn Irregularity (CV%):

This measurement is used to describe mass fluctuation in the yarn. Ring and traveller have very little impact on mass fluctuations. However, if the number of neps is high this may indeed also lead to elevated CV values.

Thin and Thick Places:

These imperfections describe mass fluctuations pertaining to centimetres in the yarn, which are only minimally impacted by ring and traveller.

Yarn Strength and Extension

Besides the yarn parameters (twist) and raw materials, yarn extension hinges on the yarn tension during the spinning process and thus also the spindle speed. The yarn strength is influenced in particular by the orientation of the fibres in the yarn body. This is influenced primarily by the drawing unit and the spinning triangle.

1.4 Impact on Yarn Breaks

Breaks during Spinning

A minimal number of end breakages is of critical importance for optimum machine efficiency.

End breaks occur if the spinning triangle cannot resist the occurring yarn tension. Consequently, yarns with a low irregularity always present less breaks than yarns with a high irregularity.

The traveller weight should always be selected in such a manner that the yarn tension is so minimal that end breakages are rare on the one hand and that there are no problems as a result of an excessively large (bulging) balloon on the other hand.

Breaks during Doffing:

A low doffer end breakage rate hinges on the perfect installation of the reserve winding (bottom winding).

In doffer operations we differentiate between unthreading the yarn and actual yarn breaks.

Unthreading the Yarn during Doffing:

The fact that the yarn has been unthreaded is usually clearly indicated by the fact that the residual yarn is curling around the yarn guide (pigtail). This happens because the yarn, after having been unthreaded is twisted until it breaks as a result of excessive twist. The best remedy to solve this problem is to optimize the steps of the doffing process.

Generally it is recommended to:

- Start up the spindles immediately after the ring rail starts moving down
- Start the drawing unit later than the spindles

Moreover, selecting the proper traveller can also reduce the frequency of yarn unthreading

Yarn Breaks during Doffing:

In this case, there is usually not found any residual yarn hanging around the yarn guide (pigtail).

In some cases, the traveller may be blocked during the start procedure. In this case, the outside traveller foot gets stuck on the exterior of the ring. In this case, the yarn tension increases and the yarn breaks. One way to remedy this is to brake the spindles quicker when stopping the machine (this causes the thread to be looser during the start-up). A second solution is choosing a proper traveller.

Stabilizing the thread balloon as quickly is also highly crucial for low doffing end breakage rates.

1.5 The Performance Capabilities of the Ring – Traveller System

During its lifecycle of approx. 14 days, the traveller covers a distance that exceeds the circumference of the earth at speeds of up to 150 Km/h (42 m/s). Thanks to their extremely long traveller lifecycle, CeraDur travellers can actually cover a distance equivalent to that between the earth and the moon (365.000 km).

The centrifugal force, which equals a weight of up to 500 grammes, presses the traveller to the ring flange. This system receives its lubrication solely from the lubricant film consisting of crushed fibres from the spinning material.

The spinning ring withstands this stress over a lifecycle of several years.

Ring-Ø		Spindle Speed															in 1000 R.P.M.										Ring-Ø						
		11,5	12,0	12,5	13,0	13,5	14,0	14,5	15,0	15,5	16,0	16,5	17,0	17,5	18,0		18,5	19,0	19,5	20,0	20,5	21,0	21,5	22,0	22,5	23,0	23,5	24,0	24,5	25,0			
mm	inches approx.	Traveller Speed															in m/s										mm	inches approx.					
36	1 7/16	21,7	22,6	23,6	24,5	25,5	26,4	27,3	28,3	29,2	30,2	31,1	32,0	33,0	33,9		34,9	35,8	36,8	37,7	38,6	39,6	40,5	41,5	42,4	43,4	44,3	45,2	46,2	47,1	36	1 7/16	
38	1 1/2	22,9	23,9	24,9	25,9	26,9	27,9	28,9	29,9	30,8	31,8	32,8	33,8	34,8	35,8		36,8	37,8	38,8	39,8	40,8	41,8	42,8	43,8	44,8	45,8	46,8	47,8	48,8	49,7	38	1 1/2	
40	1 9/16	24,1	25,1	26,2	27,2	28,3	29,3	30,4	31,4	32,5	33,5	34,6	35,6	36,7	37,7		38,8	39,8	40,8	41,9	42,9	44,0	45,0	46,1	47,1	48,2	49,2	50,3	51,3	52,4	40	1 9/16	
42	1 5/8	25,3	26,4	27,5	28,6	29,7	30,8	31,9	33,0	34,1	35,2	36,3	37,4	38,5	39,6		40,7	41,8	42,9	44,0	45,1	46,2	47,3	48,4	49,5	50,6	51,7	52,8	53,9	55,0	42	1 5/8	
45	1 3/4	27,1	28,3	29,5	30,6	31,8	33,0	34,2	35,3	36,5	37,7	38,9	40,1	41,2	42,4		43,6	44,8	46,0	47,1	48,3	49,5	50,7	51,8	53,0	54,2	55,4	56,6	57,7	58,9	45	1 3/4	
48	1 7/8	28,9	30,2	31,4	32,7	33,9	35,2	36,4	37,7	39,0	40,2	41,5	42,7	44,0	45,2		46,5	47,8	49,0	50,3	51,5	52,8	54,0	55,3	56,6	57,8	59,1	22,0	23,1	24,2	42	1 5/8	
50	2	30,1	31,4	32,7	34,0	35,3	36,7	38,0	39,3	40,6	41,9	43,2	44,5	45,8	47,1		48,4	49,7	51,1	52,4	53,7	16,5	17,7	18,9	20,0	21,2	22,4	23,6	24,7	25,9	45	1 3/4	
52	2 1/16	31,3	32,7	34,0	35,4	36,8	38,1	39,5	40,8	42,2	43,6	44,9	46,3	47,7	49,0		50,4	51,7	53,1	15,1	16,3	17,6	18,9	20,1	21,4	22,6	23,9	25,1	26,4	27,6	48	1 7/8	
55	2 1/8	33,1	34,6	36,0	37,4	38,9	40,3	41,8	43,2	44,6	46,1	47,5	49,0	50,4	51,8		53,3			15,7	17,0	18,3	19,7	20,9	22,3	23,5	24,9	26,2	27,5	28,8	50	2	
57	2 1/4	34,3	35,8	37,3	38,8	40,3	41,8	43,3	44,8	46,3	47,8	49,3	50,7	52,2					16,3	17,7	19,1	20,4	21,8	23,1	24,5	25,9	27,2	28,6	30,0	52	2 1/16		
60	2 3/8	36,1	37,7	39,3	40,8	42,4	44,0	45,6	47,1	48,7	50,3	51,8							17,3	18,7	20,2	21,6	23,0	24,5	25,9	27,4	28,8	30,2	31,7	55	2 1/8		
63	2 1/2	37,9	39,6	41,2	42,9	44,5	46,2	47,8	49,5	51,1								16,4	17,9	19,4	20,9	22,4	23,9	25,4	26,9	28,4	29,8	31,3	32,8	57	2 1/4		
65	2 9/16	39,1	40,8	42,5	44,2	46,0	47,7	49,4										15,7	17,3	18,9	20,4	22,0	23,6	25,1	26,7	28,3	29,8	31,4	33,0	34,6	60	2 3/8	
70	2 3/4	42,2	44,0	45,8	47,7	49,5											14,8	16,5	18,1	19,8	21,4	23,1	24,7	26,4	28,0	29,7	31,3	33,0	34,6	36,3	63	2 1/2	
75	3	45,2	47,1	49,1											13,6		15,3	17,0	18,7	20,4	22,1	23,8	25,5	27,2	28,9	30,6	32,3	34,0	35,7	37,4	65	2 9/16	
80	3 1/8	48,2												12,8	14,7		16,5	18,3	20,2	22,0	23,8	25,7	27,5	29,3	31,2	33,0	34,8	36,7	38,5	40,3	70	2 3/4	
75	3												11,8	13,7	15,7		17,7	19,6	21,6	23,6	25,5	27,5	29,5	31,4	33,4	35,3	37,3	39,3	41,2	43,2	75	3	
80	3 1/8												11,7	12,6	14,7	16,8		18,9	20,9	23,0	25,1	27,2	29,3	31,4	33,5	35,6	37,7	39,8	41,9	44,0	46,1	80	3 1/8
90	3 1/2										12,3	13,2	14,1	16,5	18,9		21,2	23,6	25,9	28,3	30,6	33,0	35,3	37,7	40,1	42,4	44,8	47,1	49,5	51,8	90	3 1/2	
100	4									12,6	13,6	14,7	15,7	18,3	20,9		23,6	26,2	28,8	31,4	34,0	36,7	39,3	41,9	44,5	47,1	49,7	52,4			100	4	
115	4 1/2								13,2	14,5	15,7	16,9	18,1	21,1	24,1		27,1	30,1	33,1	36,1	39,1	42,2	45,2	48,2	51,2	54,2	57,2				115	4 1/2	
120	4 3/4							12,6	13,8	15,1	16,3	17,6	18,9	22,0	25,1		28,3	31,4	34,5	37,7	40,8	44,0	47,1	50,3	53,4	56,6					120	4 3/4	
140	5 1/2						13,2	14,7	16,1	17,6	19,1	20,5	22,0	25,7	29,3		33,0	36,7	40,3	44,0	47,7	51,3	55,0	58,7							140	5 1/2	
160	6 1/4					13,4	15,1	16,8	18,4	20,1	21,8	23,1	25,1	29,3	33,5		37,7	41,9	46,1	50,3	54,5	58,7	62,8								160	6 1/4	
180	7 1/8				13,2	15,1	17,0	18,9	20,7	22,6	24,5	26,4	28,3	33,0	37,7		42,4	47,1	51,8	56,6	61,3	66,0							180	7 1/8			
200	7 1/8			12,6	14,7	16,8	18,9	20,9	23,0	25,1	27,2	29,3	31,4	36,7	41,9		47,1	52,4	57,6	62,8									200	7 1/8			
225	8 7/8		11,8	14,1	16,5	18,9	20,9	23,6	25,9	28,3	30,6	33,0	35,3	41,2	47,1		53,0	58,9	64,8										225	8 7/8			
250	9 7/8	10,5	13,1	15,7	18,3	20,9	23,6	26,2	28,8	31,4	34,0	36,7	39,3	45,8	52,4		58,9	65,5										250	9 7/8				
275	10 7/8	11,5	14,4	17,3	20,2	23,0	25,9	28,8	31,7	34,6	37,4	40,3	43,2	50,4	57,6													275	10 7/8				
300	11 7/8	12,6	15,7	18,9	22,0	25,1	28,3	31,4	34,6	37,7	40,8	44,0	47,1	55,0														300	11 7/8				
350	14	14,7	18,3	22,2	25,7	29,3	33,0	36,7	40,3	44,0	47,7	51,3	55,0															350	14				
		0,8	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,5	4,0		4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0	9,5	10,0	10,5	11,0			
		Spindle Speed															in 1000 R.P.M.																

Traveller Speed:

$$V_L = \frac{\text{ring-}\varnothing \times \text{nspi} \times \pi}{60 \times 1000}$$

V_L = traveller speed in m/s
nspi = spindle revolutions/min



Ne _c	Nm	tex	dtex
6,0	10,0	100,0	1000,0
7,0	12,0	84,0	840,0
8,3	14,0	72,0	720,0
9,5	16,0	64,0	640,0
10,0	17,0	60,0	600,0
10,6	18,0	56,0	560,0
12,0	20,0	50,0	500,0
13,0	22,0	46,0	460,0
14,0	24,0	42,0	420,0
16,5	28,0	36,0	360,0
18,0	30,0	34,0	340,0
19,0	32,0	32,0	320,0
20,0	34,0	30,0	300,0
24,0	40,0	25,0	250,0
26,0	44,0	23,0	230,0
28,0	48,0	21,0	210,0
30,0	50,0	20,0	200,0
36,0	60,0	17,0	170,0
40,0	70,0	14,0	140,0
48,0	80,0	12,5	125,0
50,0	85,0	12,0	120,0
60,0	100,0	10,0	100,0
70,0	120,0	8,3	83,0
100,0	170,0	5,8	58,0
105,0	180,0	5,5	55,0
120,0	200,0	5,0	50,0

Denier	dtex	Denier	dtex
1,0	1,1	150	167
1,2	1,3	180	200
1,3	1,4	200	220
1,4	1,6	300	330
1,5	1,7	400	440
1,7	1,9	500	550
2,0	2,2	600	660
2,2	2,4	700	780
2,3	2,6	800	890
2,5	2,8	840	940
2,7	3,0	950	1000
3,0	3,3	1000	1100
3,2	3,6	1050	1160
3,5	3,9	1100	1220
3,7	4,2	1260	1400
4,0	4,4	1300	1450
5	5,6	1500	1670
6	6,7	1650	1840
8	8,9	2000	2200
10	11	3000	3300
12	13	4000	4400
15	17	5000	5600
20	22	6000	6700
30	33	7000	7800
40	44	8000	9000
50	56	9000	10000
60	67	10000	11000
70	78	12500	14000
80	90	15000	17000
90	100	20000	22000
100	110	30000	33000
120	133	50000	56000

Terms Designating the Fineness of Yarn Counts
Conversion Formulae

Fineness Known	Fineness Wanted				
	tex	dtex	den	Nm	Ne _c (cotton)
tex	tex	tex x 10	tex x 9	$\frac{1000}{tex}$	$\frac{590}{tex}$
dtex	dtex x 0,1	dtex	dtex x 0,9	$\frac{10000}{dtex}$	$\frac{5900}{dtex}$
den	den x 0,11	den x 1,11	den	$\frac{9000}{den}$	$\frac{5315}{den}$
Nm	$\frac{1000}{Nm}$	$\frac{10000}{Nm}$	$\frac{9000}{Nm}$	Nm	Nm x 0,59
Ne _c	$\frac{590}{Ne_c}$	$\frac{5900}{Ne_c}$	$\frac{5315}{Ne_c}$	Ne _c x 1,693	Ne _c
Ne _k	$\frac{886}{Ne_k}$	$\frac{8860}{Ne_k}$	$\frac{7672}{Ne_k}$	Ne _k x 1,129	Ne _k x 0,667
Ne _w	$\frac{1940}{Ne_w}$	$\frac{19400}{Ne_w}$	$\frac{17440}{Ne_w}$	Ne _w x 0,516	Ne _w x 0,305
Ne _L	$\frac{1653}{Ne_L}$	$\frac{16530}{Ne_L}$	$\frac{14880}{Ne_L}$	Ne _L x 0,605	Ne _L x 0,357

Yarn Twist

The twist of a yarn is mainly determined by its final use. Furthermore, each kind of yarn has specific twist values of its own depending on fibre quality, fibre structure, fibre fineness, and fibre length.

In practice, the twist factor is calculated according to the formula established by Koechlin: $T/m = \alpha m \times \sqrt{Nm}$.

Explanation of terms

T = twist
 α = twist coefficient

Collection of formulae

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

b) $T/m = \frac{\alpha tex}{\sqrt{tex}}$ $T/m = \alpha m \times \sqrt{Nm}$
 $T/'' = \alpha e \times \sqrt{Ne_c}$

Conversion formulae

$T/m = \frac{\alpha m}{\sqrt{\frac{tex}{1000}}}$ $T/m = T/'' \times 39,4$

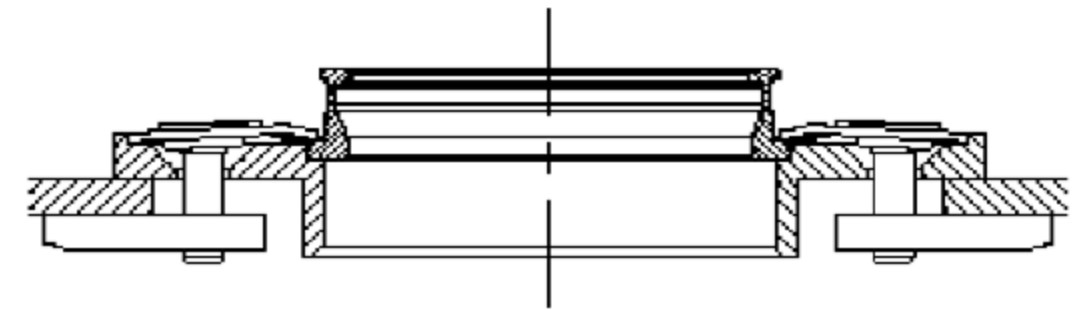
$T/'' = T/m \times 0,0254$

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

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

$\alpha e = \frac{T/''}{\sqrt{Ne_c}}$ $\alpha e = \alpha m \times 0,033$ $\alpha e = \alpha tex \times 0,00104$

2. Flange Rings



2.1 Ring Qualities

For the wide variety of different spinning conditions and spinning targets R+F offers different ring qualities.

The selection of the appropriate ring quality depends on the features of the processed fibres, the technological application as well as on the targeted spindle speeds and achievable service life.

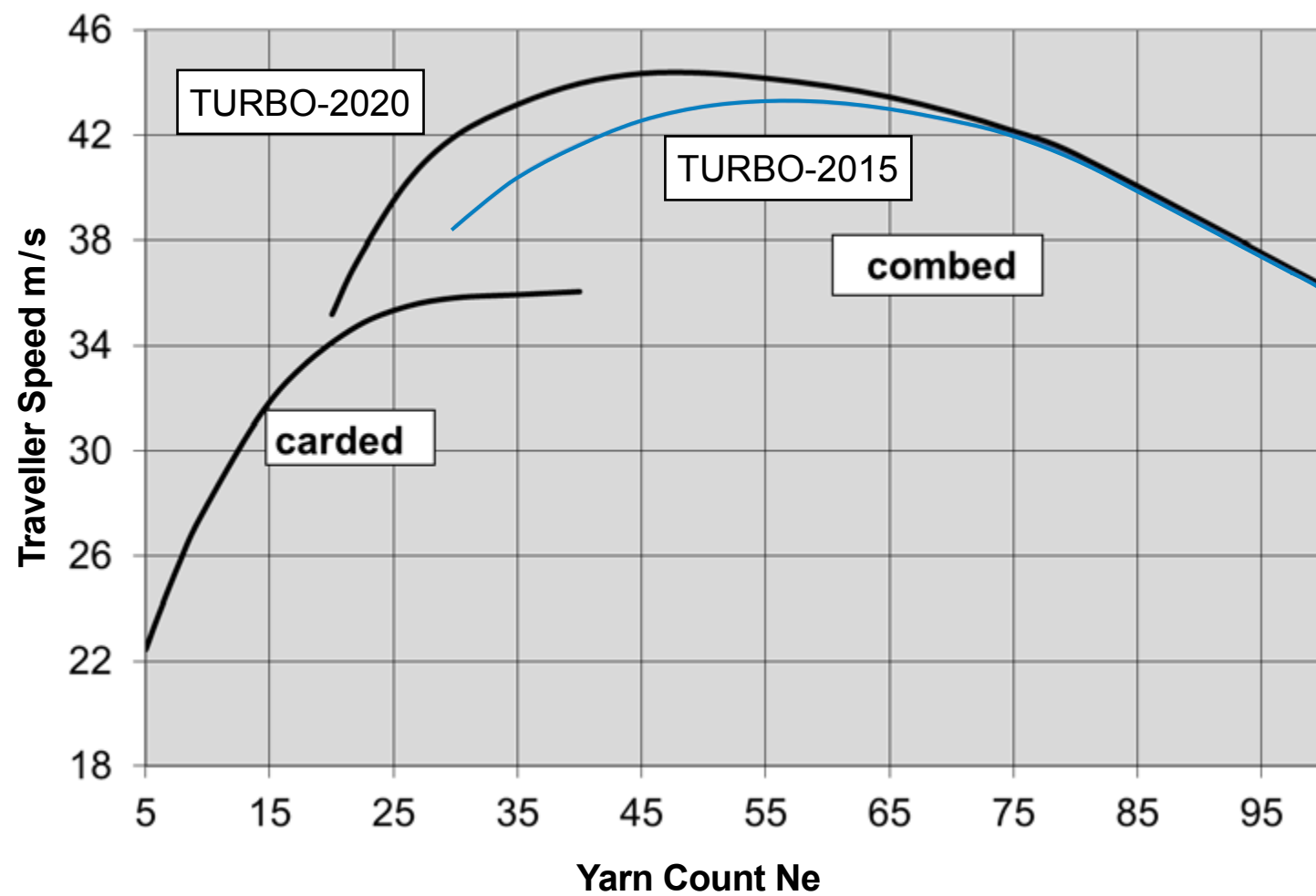
While uncoated Champion rings yield good spinning results under moderate spinning conditions, the use of coated rings like CeraDur and Turbo is recommended for higher stress conditions.

- **Champion** – the winner among the basic rings. Its strength is an excellent wear-out behaviour among non-coated rings. The selected raw material with its well-balanced texture after hardening offers the optimal base for building-up of the lubrication film on the traveller track. Champion rings are successfully used as an economical solution on standard applications when the traveller speeds do not exceed 36 m/sec.
- **CeraDur** – the high-tech layer with hardness values of 2,000 HV is the perfect base for all kinds of travellers. In combination with R+F CeraDur travellers longest service lifetimes are achievable. This combination is a perfect solution for spinners who are focused on extra-long production lots. Production losses due to machine stops for traveller changes are negligible.
- **Turbo** – the top seller is more than simply a chrome-plated ring. Turbo rings are produced based on manufacturing technologies exclusively developed by R+F. The rings undergo continuous development and improvements to always supply optimum solutions to our customers.

The unique surface structure along with extreme high manufacturing accuracy ensure very stable performance of the Turbo rings including highest machine efficiencies even when on common flange rings it is already necessary to reduce the spindle speeds.

On top customers benefit from very consistent and excellent quality parameters of the produced yarns – even under more and more critical spinning conditions. Along with the prolonged service-life of Turbo rings customers receive a product with an excellent price-performance ratio.

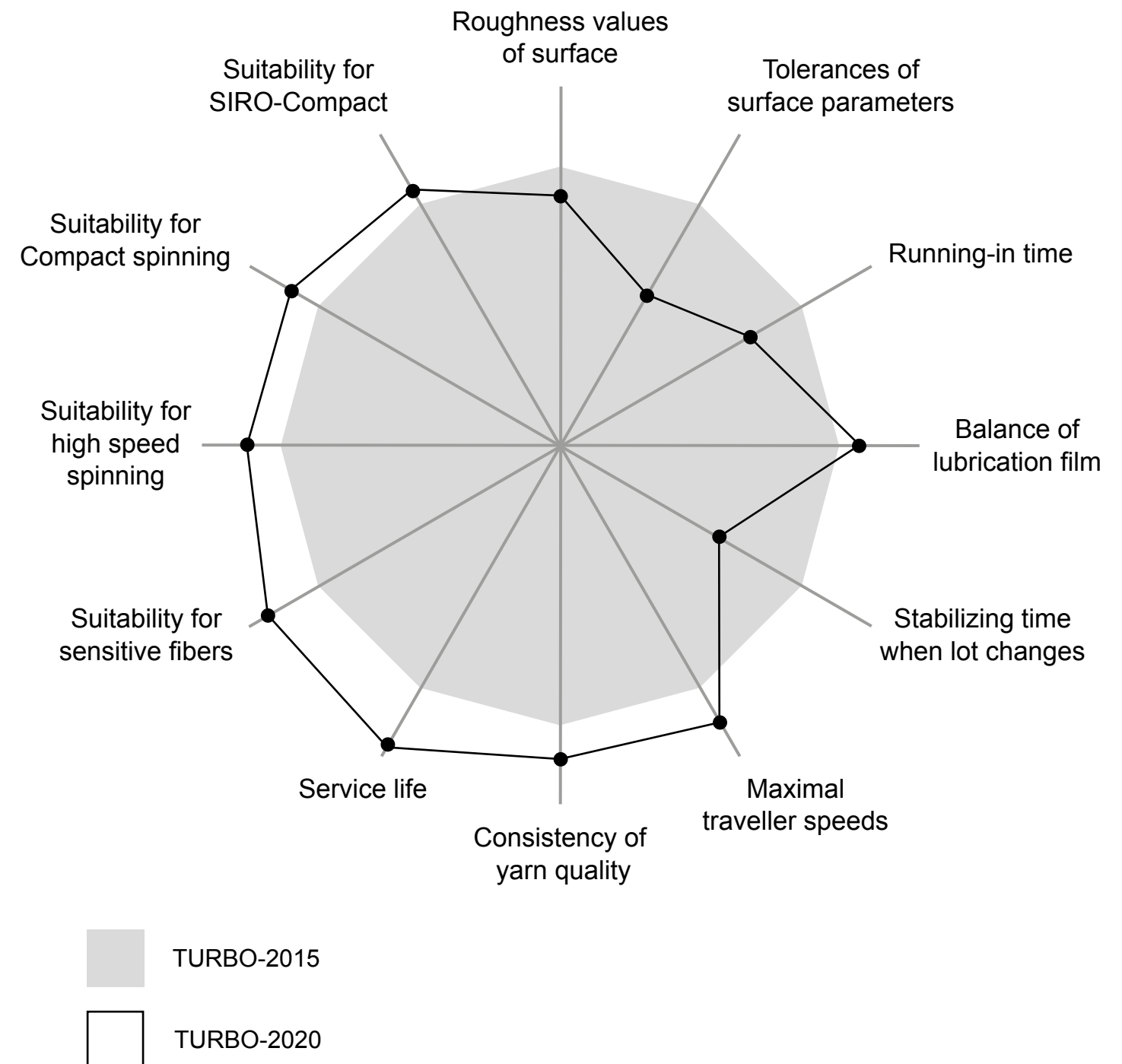
2.2 Speed Recommendations on Turbo Rings



For spinning conditions on or below the recommended characteristics for Turbo Rings as on page 28 are yielded benefits as follows:

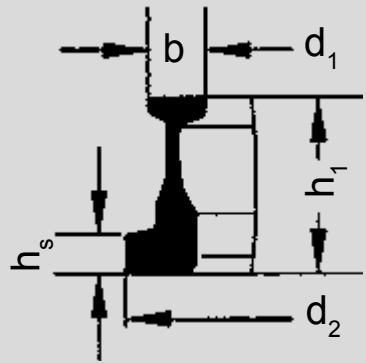
- Best possible yarn quality parameters with very high consistency
- Highest possible machine efficiencies
- Positive effect on energy consumption
- Longest service life

2.3 Comparison of Turbo Rings



2.4 Ring Shapes

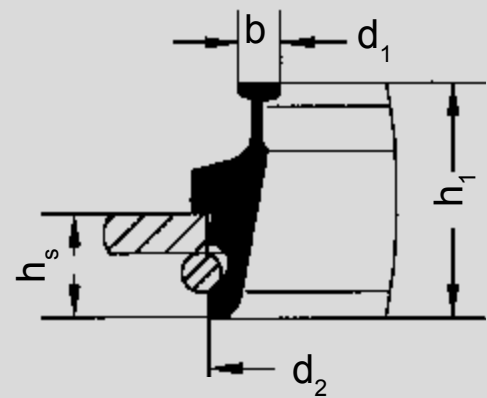
2.4.1 Form BEF



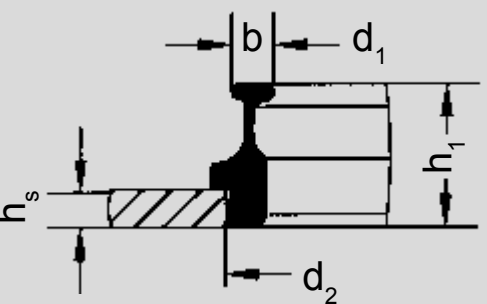
single flange ring to be fixed with small clamping plates



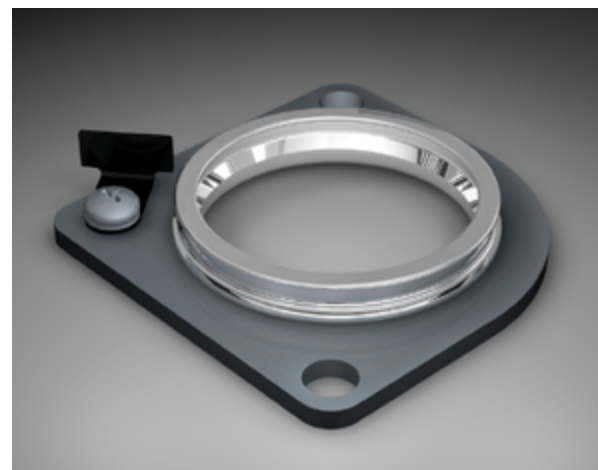
2.4.2 Form A



non-reversible ring with circlip groove.
 h_1 and h_s at customer's option



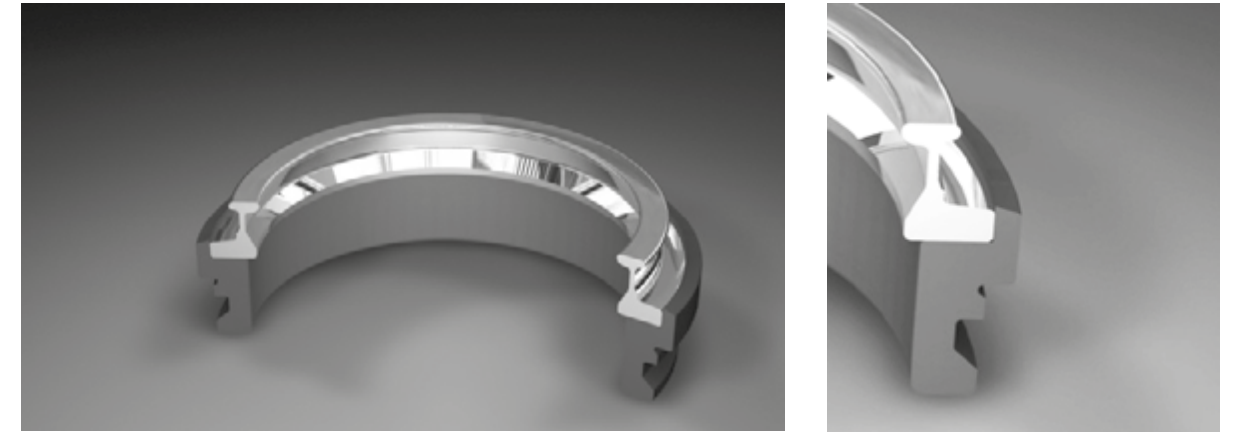
non-reversible ring with centering plate



2.5 Ring types

2.5.1 Varius A for system-centreable spindles

High-performance ring pressed into aluminium adapter for fixing with circlip



2.5.2 Varius P type for systems with centreable ring

a) High-performance ring for pressing into aluminium adapter



b) High performance ring pressed into R+F centering plate



2.6 Profile Selection for coated Rings

R+F offers different ring profiles for a variety of applications.

Flange Size	Diameter*	Profile	Application	Advantage
Fl.½ = 2,6mm	36 – 40	K 2	No restriction	For super-fine yarn (Ne100) and finer
Fl.1 = 3,2mm	36 – 48	K 2	No restriction	Best for high speed, compact yarn & Man-made fibers
		Elliptic**	Conventional spinning of cotton and cotton blends	Reducing the hairiness values
		Normal	No restriction	Hard-Core and very sensitive synthetic yarn
Fl.2 = 4,1mm	45 – 60	Normal	No restriction	

* other diameters upon request
** traveller speed up to 40 m/sec

2.7 Running-In of the Rings

Thanks to the state-of-the-art production technologies used to manufacture R+F spinning rings, the precision as well as the surface quality of the rings has been improved remarkably. Consequently, the running-in times for rings have been considerably reduced. Smoothing of the rings is no longer necessary, all that is required is the development of an even fibre lubrication film on the running surface of the ring traveller, which calls for a brief running-in period. All R+F ring shipments are accompanied by the applicable running-in recommendations.

General Recommendations for the Running-In of Rings:

A well run-in surface can significantly increase the ring lifecycle and ensure minimal end breakage rates in combination with high traveller lifetime.

- Avoid changing traveller shapes, yarn quality and yarn numbers.
- It is no longer necessary to clean the spinning rings prior to running in. Do not use a solvent to clean the rings prior to start-up.
- If you are changing travellers, do this at the beginning of the last cops third if possible.
- consistent room temperatures and humidity levels have a very positive impact on the running-in process.
- If the machine is equipped with an fancy yarn device, this device should not be used while running-in the rings. The thread tension discrepancies caused by the variation in yarn mass prevent the development of an even fibre lubrication film.
- During the running-in of rings, core yarns should not be spun, if at all possible.

3. Flange Travellers



Flange Ring with Ring Traveller in Operating Position:

3.1 Surface Treatments of Ring Travellers

The operating behaviour of ring travellers is mainly determined by the formation of a film of lubricating fibres and therefore by the sliding properties between spinning ring and ring traveller. Besides the fact that the bow shape of the travellers should match exactly the ring and the yarn quality, an additional surface treatment is of great importance too.

With an optimum choice the requested good operating results and traveller service lives can be achieved. The following variants for the various cases of application are available.

BlackSpeed

BlackSpeed ring travellers are recommended for use on standard-quality rings, e.g. the R+F Champion ring. A special thermo-chemical process creates a brilliant black oxide layer on the BlackSpeed traveller. This results in excellent adhesion of the film of lubricating fibres and improved protection against wear. The black oxide layer also greatly improves the heat dissipation of the traveller and provides significantly higher corrosion resistance. The oxide layer is highly resistant to the harmful effects of aggressive fibre substances, brightening agents, lubricants and unfavourable influences of the room climate. The BlackSpeed ring traveller is highly durable and resilient.

Avus

The Avus ring traveller is made from a special, high-alloy – and therefore extremely resilient – base material. In its manufacture R+F uses a process that has been tailored specifically to this base material to enrich it with wear-reducing components. The resulting smooth surface of the traveller enables the extremely rapid build-up of a broad and optimal contact surface with the ring. This feature guarantees excellent heat dissipation.



3 pation. Very good adhesion of the built-up lubrication film is also achieved. The wear-resistant components of the traveller material counteract the natural wear of the material, enabling very long service lives for Avus ring travellers. The Avus traveller offers benefits, particularly in the spinning of yarns of cotton and cotton-like fibre materials that give few or almost no fibres to the build-up of a fibre lubricating film. The Avus ring traveller provides particularly good results at high and very high spinning speeds as well as with compact yarns and high-twisted, fine and super-fine yarns.

SuperSpeed

R+F SuperSpeed ring travellers are provided with a specially developed additional coating. This layer has ultra-low friction values, thus guaranteeing an optimally gentle yarn passage with the result that the resistance of the yarn passage in relation to a given wire profile remains constant and therefore ensures a constant yarn quality. The special coating is also wear-resistant and enables longer service lives at higher speeds compared to uncoated ring travellers. The R+F SuperSpeed ring traveller is a true all-rounder with consistently high yarn quality, high productivity and long traveller service lives.

Vector

The Vector ring traveller is provided with a special coating with deposits, which guarantees emergency running properties even under extreme conditions. If the build-up of the lubricating film is briefly disturbed by external influences, the ring is supplied by this coating with the required lubricant. This not only prevents yarn breaks, but also protects the ring surface from damage. Because of the low friction values of the Vector coating, significantly longer ring traveller service lives are achieved under normal spinning conditions. The Vector ring traveller is suitable for the processing of all materials. No matter whether it is used for materials that are difficult to process or to achieve longer service lives, the Vector ring traveller can be used successfully – depending on application – with medium coarse (Ne 20) to fine yarns (to Ne 60).

DiaDur®

The high-quality coating of DiaDur is characterised by a unique wear-resistant surface with outstanding gliding abilities. The premium coating prevents an early wear of the traveller particularly when spinning aggressive fibres. The frictional coefficients remain constantly low and guarantee consistent yarn quality values for long lifetimes as well as a sustainable protection of the ring surface.

Even in case of high spindle speeds the spinning process takes place with low yarn break rates. This results in considerable increases of efficiency for ring spinning machines especially in combination with long lifetimes of the DiaDur ring travellers.

CeraDur®

The CeraDur-coated R+F ring traveller enables an extremely long service life. R+F developed the CeraDur ring and CeraDur ring traveller together with partner companies and institutes that specialise in research into material wear. The joint aim was to achieve an extremely low-wearing surface, optimised for the system ring and ring traveller. The characteristics of the traveller are significantly improved by the diffusion process of the CeraDur coating and enable the achievement of a ring traveller surface hardness of over 1100 HV and extremely low friction values. Given the relevant spinning conditions, this combination of CeraDur ring and CeraDur traveller provides outstanding benefits in spinning mills. Under practical conditions traveller service lives of up to 20 weeks can be achieved. CeraDur ring travellers can also be used on turbo rings providing a good film of lubrication is supplied. The CeraDur ring traveller is used in the range of medium-coarse (Ne 20) to fine yarns (to Ne 80).

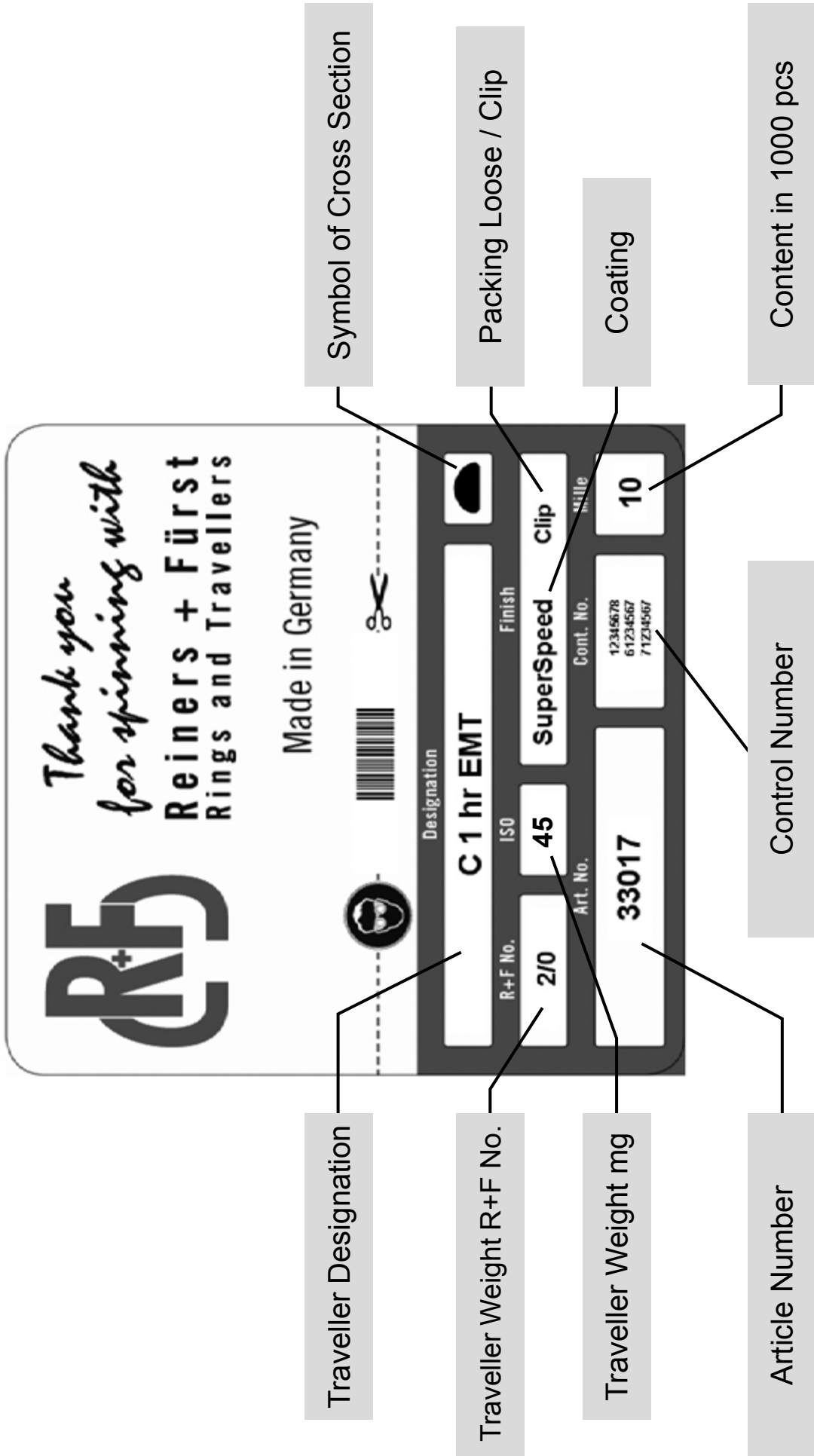
3.2 Traveller Designations

The label on the traveller box gives all important traveller data. In addition to information about traveller design, box load and the R+F article number, the lot-specific control numbers can also be found here.

Flange number and profile	C 1 for Normal und K2 Profile.
Wire profile	hr for half round
Traveller shape	EMT
Traveller number	2/0 for R+F Number 2/0
ISO 45	weight 45 mg
Surface treatment	SuperSpeed
Format	or clip magazine travellers
Article Number	33017
Control Number	up to 3 numbers listed underneath each other
Content	in 1000 pieces

Example: 33017 C 1 hr EMT No. 2/0 ISO 45 SuperSpeed CLIP/magazined

The original R+F label is attached, such that the traveller box is secured against unintentional opening.

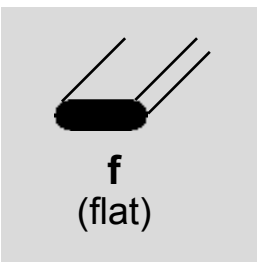
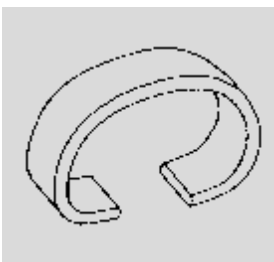


3.3 Comparative Chart of Traveller Weights


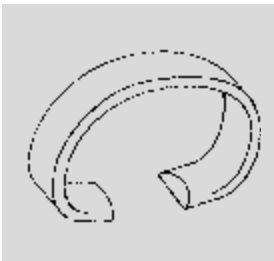
Travel. No.	R+F ISO-No.	Bräcker ISO-No.	Carter ISO-No.	Kanai* ISO-No.	Travel. No.	R+F ISO-No.	Bräcker ISO-No.	Carter ISO-No.	Kanai* ISO-No.
30/0	4,0				1	60	63	63	62,2
29/0	4,5				2	71	71	71	73,6
28/0	5,0	6,3	6,3	6,7	3	80	80	80	81,0
27/0	5,6			7,3	4	85	90	90	87,7
26/0	6,0	7,1	7,1	8,1	5	95	95	95	95,3
25/0	6,3			8,9	6	106	100	100	108,8
24/0	7,1	8,0	8,0	9,5	7	112	112	112	121,8
23/0	7,5			10,4	8	125	125	125	135,9
22/0	8,0	9,0	9,0	10,9	9	140	140	140	154,4
21/0	8,5			11,6	10	160	160	160	174,8
20/0	9,0	10,0	10,0	12,3	11	180	180	180	199,0
19/0	10,0	11,2	11,2	13,0	12	200	200	200	219,8
18/0	11,2	12,5	12,5	13,7	13	224	224	224	237,8
17/0	11,8	13,2	13,2	14,5	14	236	250	250	258,7
16/0	13,2	14,0	14,0	15,4	15	250	265	265	277,1
15/0	14,0	15,0	15,0	16,6	16	265	280	280	298,0
14/0	15,0	16,0	16,0	18,3	17	280	300	300	
13/0	16,0	17,0	17,0	20,0	18	300	315	315	
12/0	18,0	18,0	18,0	21,6	19	315	335	335	
11/0	19,0	20,0	20,0	23,4	20	325	355	355	
10/0	20,0	22,4	22,4	25,0	21				
9/0	22,4	23,6	23,6	26,8	22	355	375	375	
8/0	23,6	25,0	25,0	28,5	23				
7/0	26,5	28,0	28,0	30,2	24	385	400	400	
6/0	30,0	31,5	31,5	32,2	25				
5/0	31,5	35,5	35,5	35,1	26	415	425	425	
4/0	35,5	40	40	38,3	27				
3/0	40	45	45	42,2	28	450	450	450	
2/0	45	50	50	48,3	29				
1/0	50	56	56	54,6	30	475	475		

* Weight series of the most important types (ISO No. = traveller weight in mg)

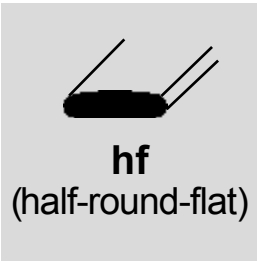
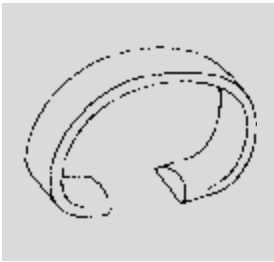
3.4 Wire Profiles



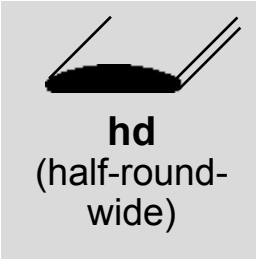
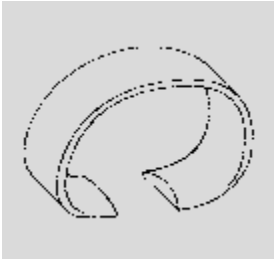
f
(flat)



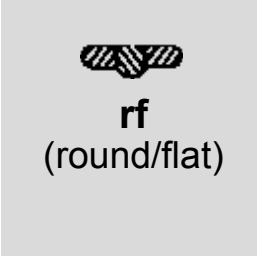
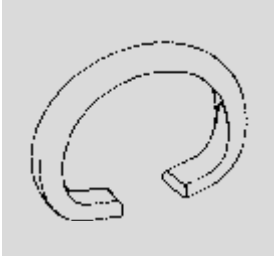
hr
(half-round)



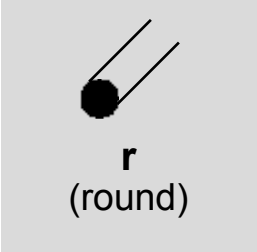

hf
(half-round-flat)



hd
(half-round-wide)



rf
(round/flat)



r
(round)

Wire profile preferred for yarns of cotton and rayon staple, if the hairiness is supposed to be as low as possible. Suited for average spindle speeds only.

Suited for higher performance with cotton, synthetics and blended yarns. Wire profile preferred for tricot twists.

Suited for highest performance with fine combed cotton yarns. Hairiness and end breakage values remain low.

Suited for high performance. Especially recommended for fine yarn numbers made from cotton, viscose, synthetics and blends for good hairiness and lifetime results. Ideal for weaving yarns.

Wire profile preferred for core yarns as well as acrylics or synthetics. The yarn passage is made of round wire whereas the traveller foot at the ring contacting area has a flat-round wire profile being more strainable.

Suited for certain delicate synthetic yarns or for long staple fibres in the coarser titre range. The achievable spindle speeds are significantly lower compared to other wire profiles.

3.5 Recommendations for Traveller Type

Traveller recommendations for fibre materials and ring profiles

Normal Profile												X	X	X	X
EL-Profile					X	X	X		X	X	X				X
K2-Profile			X*	X	X	X	X	X	X	X	X	X	X	X	X
Application	Ne	Nm	EL ½ hd*	EL 1 hf	EL 1 hd EM	EL 1 hd W	EL 1 hr W	EL 1 hd TW	EL 1 f HW	EL 1 hr HW	HEL 1 hr EMT	C 1 hd CS	C 1 hd CL	C 1 hd CM	C 1 hd W
Carded cotton	< 16	< 27					X			X					
	> 16	> 27			X					X					X
Combed cotton weaving	< 24	< 40					X		X						X
	> 24	> 40	X	X		X			X						X
Combed cotton knitting	< 30	< 50			X				X						X
	> 30	> 50	X		X				X						X
Compact yarn	< 30	< 50												X	X
	> 30	> 50	X	X				X				X	X	X	X
SIRO yarn	< 30	< 50					X								X
	> 30	> 50				X									X
SIRO Compact	< 30	< 50					X	X						X	X
	> 30	> 50				X		X						X	X
Cotton blended yarns	< 30	< 50					X				X				
	> 30	> 50			X						X				
Melange yarn	< 30	< 50													
	> 30	> 50													
100% PES	< 30	< 50									X				
	> 30	> 50									X				
100% Viscose	< 30	< 50							X		X				
	> 30	> 50						X							X
PES / Viscose	< 30	< 50													
	> 30	> 50													
100% Acryl	< 30	< 50								X					
	> 30	> 50								X					
Fancy (Slub) yarn	< 16	< 27								X					
	> 16	> 27								X					
Hard core yarn	< 16	< 27													
	> 16	> 27													
Soft core yarn	< 16	< 27								X					
	> 16	> 27								X					
























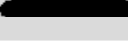
X Possible profile application

* For ½ Flange Rings









Normal Profile			X	X	X	X	X	X	X	X	X	X	X	X	X
EL-Profile					X										
K2-Profile			X	X	X	X	X	X	X	X					
Application	Ne	Nm	C 1 hd TW	C 1 hr TW	C 1 hf KM	C 1 hd EMT	C 1 hr EMT	C 1 hr MT	C 1 rf MT	C 1 hr MTW	C 2 f	C 2 hr T	C 2 hr MT	C 2 rf MT	C 2 hr MTW
Carded cotton	< 16	< 27			X	X	X	X		X	X		X		X
	> 16	> 27		X	X	X						X			
Combed cotton weaving	< 24	< 40		X	X		X			X			X		
	> 24	> 40	X		X	X						X			
Combed cotton knitting	< 30	< 50		X	X		X			X			X		
	> 30	> 50	X		X	X	X					X			
Compact yarn	< 30	< 50										X			
	> 30	> 50										X			
SIRO yarn	< 30	< 50		X								X			
	> 30	> 50	X	X											
SIRO Compact	< 30	< 50		X											
	> 30	> 50													
Cotton blended yarns	< 30	< 50		X	X	X	X								
	> 30	> 50	X		X	X	X					X			
Melange yarn	< 30	< 50						X					X		
	> 30	> 50				X							X		
100% PES	< 30	< 50					X	X					X		
	> 30	> 50					X					X			
100% Viscose	< 30	< 50		X			X				X		X		
	> 30	> 50	X		X	X	X					X			
PES / Viscose	< 30	< 50					X	X					X		
	> 30	> 50			X										
100% Acryl	< 30	< 50					X	X	X				X	X	
	> 30	> 50					X	X	X				X	X	
Fancy (Slub) yarn	< 16	< 27						X		X			X		X
	> 16	> 27						X				X	X		
Hard core yarn	< 16	< 27							X					X	
	> 16	> 27							X					X	
Soft core yarn	< 16	< 27							X						
	> 16	> 27							X						

3.6 Manufacturing Range of Flange Travellers




















Manufacturing Range of EL 1 Travellers

Ring No.	Flange Width	Traveller Designation	Traveller-		R+F Number	ISO No. (mg/piece)
			Shape	Cross Sec		
1	2,6mm	EL ½ hd			22/0 – 4/0	8 – 35,5
	3,2mm	EL 1 hf T			20/0 – 7/0	9 – 26,5
		EL 1 f			7/0 – 4/0 19/0KN* – 8/0KN*	26,5 – 35,5 11,7 – 25,9
		EL 1 hf			17/0 – 1/0	11,8 – 50
		EL 1 hd TWW			19/0 – 3/0	11,2 – 40
		EL 1 hd TW			18/0 – 1/0	11,2 – 50
		EL 1 hr TW			10/0 – 3	20 – 80
		EL 1 hd EM			15/0 – 4	14 – 85
		EL 1 hd W			5/0 – 6	31,5 – 106
		EL 1 hr W			9/0 – 8	22,4 – 125
		EL 1 f HW			10/0 – 6	20 – 106
		EL 1 hd HW			12/0 – 3	16 – 80
		EL 1 hr HW			10/0 – 12	20 – 200
		HEL 1 hd EMT			4/0 – 1	35,5 – 60
		HEL 1 hr EMT			7/0 – 9	26,5 – 140












Manufacturing Range of C 1 Travellers

Ring No.	Flange Width	Traveller Designation	Traveller-		R+F Number	ISO No. (mg/piece)
			Shape	Cross Sec		
1	3,2mm	C 1 hd CS			20/0 – 7/0	9 – 26,5
		C 1 hd CL			15/0 – 4/0	14 – 35,5
		C 1 hd CM			13/0 – 3/0	16 – 40
		C 1 hd W			10/0 – 3	20 – 80

Manufacturing Range of C 1 Travellers

Ring No.	Flange Width	Traveller Designation	Traveller-		R+F Number	ISO No. (mg/piece)
			Shape	Cross Sec		
1	3,2mm	C 1 f			3/0 – 4	40 – 85
		C 1 hd TW			10/0 – 7	20 – 112
		C 1 hr TW			12/0 – 10	18 – 160
		C 1 hf KM			11/0KN* – 9KN*	23,4 – 154,4
		C 1 hd KM			12/0KN* – 12KN*	21,6 – 219,8
		C 1 hd EMT			8/0 – 13	23,6 – 224
		C 1 hr EMT			7/0 – 8	26,5 – 125
		C 1 hd MT			8/0 – 13	23,6 – 224
		C 1 hr MT			9/0 – 14	22,4 – 236
		C 1 rf MT			7/0 – 9	26,5 – 140
		C 1 hd KS			10/0KN* – 11KN*	26,5 – 140
		C 1 hr MTW			1 – 24	50 – 385

Manufacturing Range of C 2 Travellers

Ring No.	Flange Width	Traveller Designation	Traveller-		R+F Number	ISO No. (mg/piece)
			Shape	Cross Sec		
2	4,0/ 4,1mm	C 2 f			2 – 34	71 – 730
		C 2 r			16 – 38	265 – 575
		C 2 hd T			2/0 – 6	45 – 106
		C 2 hr T			4/0 – 15	35,5 – 250
		C 2 hr MT			8/0 – 32	23,6 – 500
		C 2 rf MT			1/0 – 24	50 – 358
		C 2 hr MTW			2 – 14	71 – 236

* A Different numbering. For weight, see comparison table Traveller weights in the Kanai column

3.8 Traveller Number Recommendations:

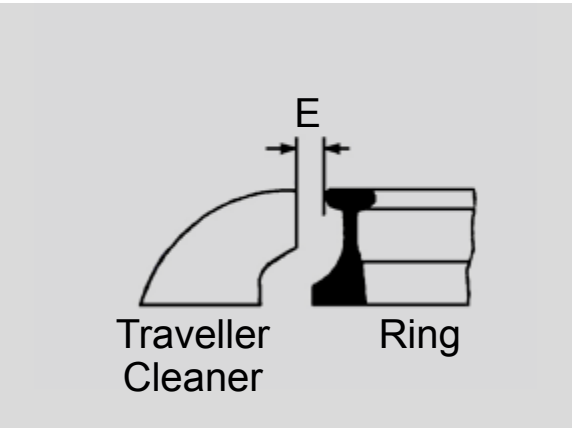
The indicated traveller number recommendadtions refer to modern spinning machines working at high speeds. These are reference values that are based on experiences of numerous textile manufacturers. However, in detail, the traveller numbers can vary significantly depending on the spinning conditions. In particular in the following cases, substantial deviations will have to be expected:

- When processing compact yarns, 1–2 traveller number lighter travellers have to be used due to the reduced lubrication
- When processing volatile yarns without a ballon control ring (e.g. core yarns) traveller numbers will have to be increased 2–3 numbers in some cases
- For the processing of fine yarns on large rings in old spinning machines, significantly heavier travellers are frequently used (up to 3 numbers heavier and more)
- Flatwiretravellers (e.g. El 1 f) are often applied 1 – 2 numbers lighter due to different friction conditions with this wire type.
- If the rings are worn, travellers with weights that are up to 3 numbers heavier have to be used to stabilize the yarn balloon.
- Principal rule: the higher the speed, the lighter the traveller and vice versa

Ne	Nm	tex	R+F Nr.	ISO (mg)
5	8	118	16 – 20	265 – 325
6	10	100	14 – 18	236 – 300
7	12	85	12 – 15	200 – 250
8	14	72	11 – 13	180 – 224
10	17	59	8 – 10	125 – 160
12	20	50	6 – 7	106 – 112
14	24	42	4 – 5	85 – 95
16	27	36	2 – 3	71 – 80
18	30	34	1 – 2	60 – 71
20	34	30	1/0 – 1	50 – 60
24	40	25	2/0 – 1/0	45 – 50
26	44	23	3/0 – 2/0	40 – 45
28	48	21	4/0 – 3/0	35,5 – 40
30	50	20	4/0 – 3/0	35,5 – 40
32	54	18	5/0 – 4/0	31,5 – 35,5
36	60	17	6/0 – 5/0	30 – 31,5
40	68	15	7/0 – 6/0	26,5 – 30
48	80	13	8/0 – 7/0	23,6 – 26,5
50	85	12	9/0 – 8/0	22,4 – 23,6
54	90	11	9/0 – 8/0	22,4 – 23,6
60	100	10	10/0 – 9/0	20 – 22,4
70	120	8,3	12/0 – 11/0	18 – 19
80	135	7,4	15/0 – 13/0	14 – 16
90	150	6,7	17/0 – 15/0	11,8 – 14
100	170	6,0	18/0 – 16/0	11,2 – 13,2
105	180	5,6	19/0 – 17/0	10 – 11,8
112	190	5,3	20/0 – 18/0	9 – 11,2
130	220	4,6	21/0 – 19/0	8,5 – 10

3.9 Traveller Cleaner Settings:

Short staple mills generally use traveller cleaners to keep the traveller free of fibre accumulations. Failure to use a cleaner or cleaners that are not set up tight enough may result in traveller blockage due to fibre clogs, or its performance may be severely negatively affected. This leads to elevated end breakage rates and a decline in yarn quality.



In the following tables recommended adjusting dimensions are stated in mm.

Traveller Cleaner Settings of Flange 1 Travellers

Traveller Type	Traveller Number				Traveller Type	Traveller Number			
	20/0 – 5/0	4/0 – 3	4 – 7	8 – 16		20/0 – 5/0	4/0 – 3	4 – 7	8 – 16
EL ½ hd	1,3	1,4	-	-	C 1 hd CS	1,5	-	-	-
EL 1 hf T	1,5	1,9	-	-	C 1 hd CL	1,5	1,6	-	-
EL 1 f		1,9	2,0	2,6	C 1 hd CM	1,7	2,2	-	-
EL 1 hf		1,8	1,9	-	C 1 hd W	1,7	2,0	-	-
EL 1 hd TWW	1,5	1,6	-	-	C 1 hd TW	1,7	1,9	-	-
EL 1 hd TW	1,7	2,2	-	-	C 1 hr TW		2,0	2,2	2,6
EL 1 hd EM	1,7	2,0	-	-	C 1 hf KM	1,7	2,3	2,5	-
EL 1 hr W	1,7	2,2	2,4	-	C 1 hd KM				2,6
EL 1 hd W		2,0	2,2	-	C 1 hd EMT	1,6	1,8	2,0	2,1
EL 1 f HW	1,7	2,1	2,3	2,8	C 1 hr EMT			2,1	2,2
EL 1 hd HW		2,2	2,4	2,9	C 1 hd MT	1,7	2,0	2,2	2,4
EL 1 hr HW		2,0	2,4	2,9	C 1 hr MT			2,3	2,6
HEL 1 hd EMT	1,5	1,7	-	-	C 1 hd KS	1,6	2,2	2,5	2,6
HEL 1 hr EMT			2,0	2,2	C 1 hr MTW	-	3,2	3,5	3,7
C 1 f	1,6	2,0	2,2	2,6	C 1 rf MT	2,3	2,7	2,9	3,1
C 1 f T	1,6	2,0	2,1	2,2					

Setting of Traveller Cleaners for Flange 2 Travellers

Traveller Type	Traveller Number				
	8/0 – 5/0	4/0 – 3	4 – 7	8 – 16	16 – 30
C 2 hd T	2,0	2,1	2,2	2,8	3,2
C 2 hr T					
C 2 hr MT	2,0	2,3	2,4	2,8	3,0
C 2 hf MT					
C 2 rf MT	2,5	2,7	2,8	3,1	3,5
C 2 hr MTW	-	2,5	2,6	2,9	3,4

Traveller Type	Traveller Number					
	8/0 – 4/0	4/0 – 3	4 – 7	8 – 10	11 – 16	17 – 30
C 2 f	-	1,9	2,5	2,6	2,9	3,2
C 2 r	-	2,6	2,8	3,4	4,1	4,3



3.10 Magazined Ring Travellers and Traveller Insertion Devices:

Benefits of the use of clip magazine ring travellers:

- Reduced machine downtimes during traveller replacement
- As a result, higher machine efficiency
- Reduced traveller loss during traveller replacement
- Less staff needed for traveller replacements
- Easy handling

Traveller Insertion Devices

LW 12-20 SIMPLEX with an additional appliance for the exact adjustment of the traveller width, especially designed for the lighter traveller number range; tables pages 51 – 53
small ring diameters, narrow spindle gauges and if Ringdata systems are installed

LW 13-2 especially designed for the heavier traveller number range tables page 51 – 53

LW 13-20 with additional appliance for the exact adjustment of the traveller width, suitable for all magazined traveller types and numbers (except travellers with "rf" or "rhr" wire profile) tables page 51 – 53

LW 13-3 especially for travellers with "rf" and "rhr" wire profiles table page 52

Tools for setting and removing travellers

Traveller remover for flange 1	LA Fl. 1	(Article No. 60153)
Traveller remover for flange 2	LA Fl. 2	(Article No. 60152)
Traveller hooks for flange 1	LH	(Article No. 70768)

Magazine Stems for Elliptical Travellers Flange 1

Ring Traveller Designation	Nos. of Magazined Travellers for the Insertion Devices		Designation of Magazine Stem
	LW 12 – 20 No. R+F	LW 13 – 2/ 13 – 20 No. R+F	
EL 1 hf T	20/0 – 1/0		T 38
EL 1 f	20/0 – 1/0	14/0 – 1/0	E 39 (E 40)
"	1 – 4	1 – 4	E 41 (E 42)
EL 1 hf	20/0 – 1	15/0 – 1	E 40 (E 41)
EL 1 hd	16/0 – 11/0	16/0 – 11/0	E 40 (E 41)
"	10/0 – 3	10/0 – 3	E 41 (E 42)
EL 1 hd TWW	16/0 – 6/0	16/0 – 6/0	T 38 (T 39)
EL 1 hd TW	12/0 – 1/0	12/0 – 1/0	E 41 (E 42)
EL 1 hd W	14/0 – 1/0	14/0 – 1/0	E 42 (E 43)
EL 1 hr W	9/0 – 1/0 (-8)	8/0 – 1/0 (-8)	E 42 (E 43)
"	1 – 8	1 – 8	E 44 (E 45)
EL 1 hd EM	12/0 – 3	12/0 – 1	E 42 (E 43)
EL 1 f HW	12/0 – 1/0 (-7)	12/0 – 1/0 (-7)	EH 42 (EH 43)
"	1 – 7	1 – 7 (-16)	EH 44 (EH 45)
"		8 – 16	EH 45
EL 1 hd HW	13/0 – 1/0 (-4)	13/0 – 1/0 (-4)	EH 42 (EH 43)
"	1 – 4	1 – 4	EH 44 (EH 45)
EL 1 hr HW	12/0 – 1/0 (-7)	12/0 – 1/0 (-7)	EH 42 (EH 43)
"	1 – 7	1 – 7 (-17)	EH 44 (EH 45)
"		8 – 17	EH 45
HEL 1 hd EMT	8/0 – 2	8/0 – 2	E 41 (E 42)
HEL 1 hr EMT	12/0 – 4 (-8)	12/0 – 8	E 41 (E 42)



Magazine Stems for C-shaped Travellers Flange 1

Ring Traveller Designation	Nos. of Magazined Travellers for the Insertion Devices		Designation of Magazine Stem
	LW 12 – 20 No. R+F	LW 13 – 2 / 13 – 20 No. R+F	
C 1 f		8/0 – 1/0	40
"		1 – 7(-10)	42 (43)
"		8 – 14	43 (45)
C 1 f T	18/0 – 1/0	18/0 – 1/0	T 40 (T 42)
"	1 – 4	1 – 6	T 42
C 1 hd CS	20/0 – 7/0	20/0 – 7/0	E 39
C 1 hd CL	15/0 – 4/0	15/0 – 4/0	T 38 (T 39)
C 1 hd CM	13/0 – 3/0	13/0 – 3/0	E 41 (E 42)
C 1 hd W	10/0 – 3	10/0 – 3	E 42 (E 43)
C 1 hd TW	14/0 – 2	14/0 – 2	TW 42 (TW 43)
C 1 hr TW	18/0 – 7	15/0 – 7 (-12)	TW 42 (TW 43)
C 1 hr EM	14/0 – 3	14/0 – 3	E 42 (E 43)
C 1 hd KM	16/0KN – 1/0KN	14/0KN – 1/0KN	E 42 (E 43)
"	1KN – 8KN	1KN – 10KN	E 45
C 1 hf KM	12/0KN – 1/0KN	12/0KN – 1/0KN	E 42 (E 43)
"	1KN – 4KN	1KN – 4KN	E 45
C 1 hd KS	16/0KN – 1/0KN	16/0KN – 1/0KN	EMT 41
"	1KN – 8KN	1KN – 10KN	EMT 42
C 1 hd EMT	18/0 – 7	14/0 – 10	EMT 41 (EMT 42)
C 1 hr EMT	13/0 – 7	13/0 – 8	EMT 41 (EMT 42)
C 1 hd MT	5/0 – 7	5/0 – 10	MT 43 (MT 44)
C 1 hr MT	11/0 – 7	11/0 – 11 (-14)	MT 43 (MT 44)
"		12 – 14	MT 44 (MT 45)
C 1 hr MTW		1 – 22	MT 54

Magazine Stems for the Traveller Insertion Device LW 13 – 3
or travellers with "rf" and "rhr" wire profiles

Ring Traveller Designation	Nos. of Magazined Travellers for the Insertion Devices		Designation of Magazine Stem
	LW 13 – 3	R+F No.	
EL 1 rf HWW	3/0 – 8		EH 48 (EH 49)
C 1 rf MT	7/0 – 10		MT 43 (MT 44)
C 2 rhr TM	9/0 – 7		T 50 (T 51)
C 2 rf MT	7/0 – 12		MT 50 (MT 51)

Magazine Stems for EL and C-shaped Travellers Flange 2

Ring Traveller Designation	Nos. of Magazined Travellers for the Insertion Devices		Designation of Magazine Stem
	LW 12 – 20 R+F-No.	LW 13 – 2 / 13 – 20 R+F-No.	
C 2 f	–	5/0 – 3	50 (51)
"	–	4 – 10	54 (56)
"	–	11 – 20	56 (58)
"	–	21 – 32	60
C 2 r	–	1 – 7	52 (51)
"	–	8 – 10	54 (56)
"	–	11 – 20	60
C 2 hd T	9/0 – 7	9/0 – 7	T 50 (T 51)
"	–	8 – 10	T 54
C 2 hr T	10/0 – 7	10/0 – 7	T 50 (T 51)
"	–	8 – 24	T 54
C 2 hr MT	–	9/0 – 7	MT 50 (MT 49)
"	–	8 – 32	MT 50 (MT 51)
C 2 hf MT	–	3 – 14	MT 50 (MT 51)
C 2 hr MTW	–	1/0 – 30	MT 54

4. J-Rings

4.1 Ring Materials

Steel J-Rings

Steel J-rings are made from selected high quality steel that is highly wear resistant as a result of special heat treatment. Special surface treatments provide optimum smoothness and evenness in the traveller contact areas, which results in short running-in times. Oil lubricated J-rings in all practical designs are manufactured primarily for worsted yarn mills. They guarantee the industry best performance and perfect yarn quality.

Conical J-rings can be optimally used for the differing applications in worsted yarn mills. They are manufactured

- in several ring heights (9.1 mm or 11.1 mm or 17.4 mm for effect yarns)
- in all standard diameters
- with the required fastening means.

Steel rings are equipped with several wick loops and lubricating points in the upper ring track which provide the traveller contact area with lubricants. The number of lubricating points is determined by the ring diameter or the amount of oil required for an optimum ring lubrication.

Sinter Steel J-Rings

Due to the higher sensitivity of sinter steel rings and the maintenance required by the sinter material, J-rings made from sinter steel are used rarely nowadays. Sinter rings do have advantages if

- the quality standards in terms of evenness and cleanliness of the yarn are very high or
- in combination with nylon travellers.

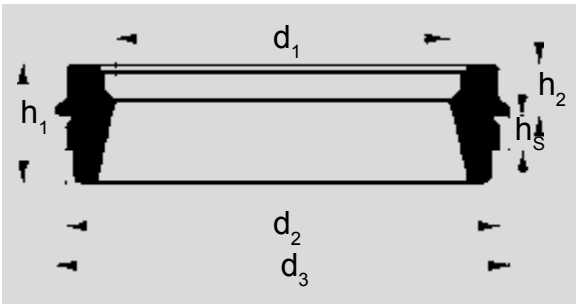
To prevent damages to the sinter steel ring as a result of too much stress, usage restrictions have to be complied with when using heavy steel traveller numbers.

Heaviest steel traveller number to be used:

Designation	R+F No.	Iso No.
J 9,1	R+F Nr. 24	ISO 90
J 11,1	R+F Nr. 22	ISO 132
J 17,4	R+F Nr. 18	ISO 355

Sinter steel rings require continuous maintenance to produce optimum operating results in the long term. Cleaning and re-soaking with the recommended special oil is required at regular intervals.

4.2 Ring Diameter, Ring Heights and Lubrication Systems



- d₁: inside ring Ø
- d₂: fitting Ø
- d₃: outside ring Ø (shoulder Ø)
- h₁: ring height
- h₂: ring height above ring rail
- h_s: fitting height

All sizes in millimeters

Inside Ring Ø d ₁	Ring Heights h ₁			Deviation limits (Tolerances of fitting Ø) for d ₂
	9,1mm	11,1mm	17,4	
Fitting-Ø d ₂				in mm
42	49	-	-	0 - 0,2
45	52	52	-	
48	55	55	-	
50	57	57	-	
52	59	59	-	
55	62	62	-	
57	64	64	-	
60	67	67	71	0 - 0,25
65	-	72	76	
70	-	77	81	
75	-	82	86	
80	-	87	91	
90	-	97	101	
100	-	107	111	
110	-	117	121	0 - 0,32
115	-	-	126	
120	-	-	131	
127	-	-	138	
140	-	-	151	0 - 0,40
160	-	-	171	
180	-	-	191	0 - 0,55

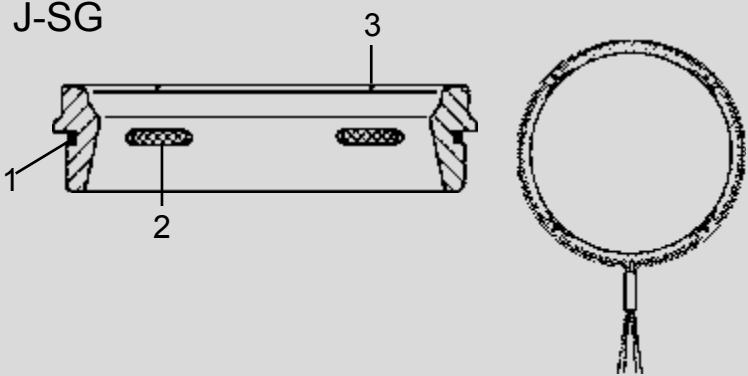
Ring diameters d₁, d₂ and **ring heights** h₁ generally according to standards. Rings with diameters that are not mentioned in the table may be manufactured on request.

Fitting diameter d₂: Bigger fitting diameters d₂ than those indicated in the table may be chosen to conform with the lubricating system, ring fixing method, centerability and exchangeability. Other deviation limits for d₂ on request. These deviation limits do not apply to any ovality system.

Lubricating Systems:

J Rings of steel are provided with lubricating areas in the inner ring track and additionally with lubricating wicks in the upper running surface.

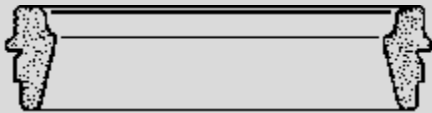
J-SG



J-SG is the preferred lubricating system for the ring heights 9.1 and 11.1 mm: the lubricating wick (1) is located in the outer groove and is guided several times through the holes as a wick loop (2) to the inner ring track. The additional wick points (3) supply the upper running surface.

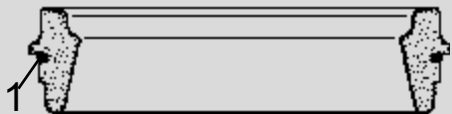
J Rings of sintered steel are soaked with a special oil on their delivery. They have to be re-lubricated or re-soaked in regular intervals

J-Si



Ring of sintered steel without lubricating wick

J-Si-SR

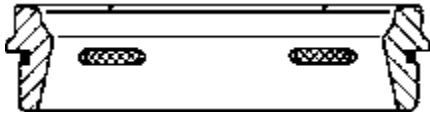


Ring of sintered steel with lubricating wick (1) in an external groove

4.3 Lubricants:
Steel J-Rings

Lubricating Systems

J-SG



wick loops

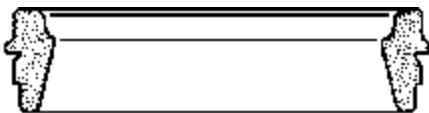
Ring Heights	ISO Viscosity Grades*			
	Oils for <u>Steel</u> Travellers		Oils for <u>Nylon</u> Travellers	
Designations and sizes	synth. oils	mineral oils	synth. oils	mineral oils
J 9,1 (9,1 mm)	ISO VG 32	ISO VG 32 (perhaps. 46)	ISO VG 32 (perhaps. 46)	ISO VG 32 (perhaps. 46)
J 11,1 (11,1 mm)				
J 17,4 (17,4 mm)	ISO VG 32	ISO VG 32 (perhaps. 46)	ISO VG 32 (perhaps 46)	ISO VG 46
J 17,7 (17,7 mm)				

* Deviations are possible under practical conditions

Sinter Steel J-Rings

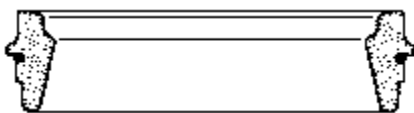
Lubricating Systems

J-Si



without wick lubrication

J-Si-SR



with wick lubrication

Ring Height	ISO Viscosity Grade *			
	Oils for <u>Steel</u> Travellers		Oils for <u>Nylon</u> Travellers	
Designations and sizes	synth. oils	mineral oils	synth. oils	mineral oils
J 9,1 (9,1 mm)	ISO VG 15 (perhaps. 22)	ISO VG 32	ISO VG 22 (perhaps. 32)	ISO VG 32 (perhaps. 46)
J 11,1 (11,1 mm)				
J 17,4 (17,4 mm)	ISO VG 15 (perhaps. 22)	ISO VG 32 (perhaps. 46)	ISO VG 32 (perhaps. 46)	ISO VG 46 (perhaps. 68)

* Deviations are possible under practical conditions

Page 76 provides information on the oil recommendations of a variety of manufacturers

5. J Travellers

5.1 J-Steel Travellers

Surface Treatment:

The J-travellers of different shapes are produced in the surface treatment "SuperPolish"

Examples:

23400	J 9,1 r steel SuperPolish lose	No. 26	ISO-No. 60
23152	J 11.1 r steel SuperPolish lose	No. 24	ISO-No. 90
23254	J 11.1 r type B steel SuperPolish lose	No. 24	ISO-No. 90
227222	J 11.1 r type B steel SuperPolish Clip magazined	No. 22	ISO-No. 132

Explanation:

The designations recommended in the relevant standard were used for steel J-travellers. An additional type identifier is added to the designation, e.g.:

Traveller Shape	Ring Height	Wire Profile	Traveller Type	Material	Traveller-		Traveller Treatment
					No.	ISO-No.	
J	9,1	r		steel	26	60	loose
J	11,1	r		steel	24	90	loose
J	11,1	r	B	steel	24	90	loose
J	11,1	r	B	steel	22	132	Clip magazined

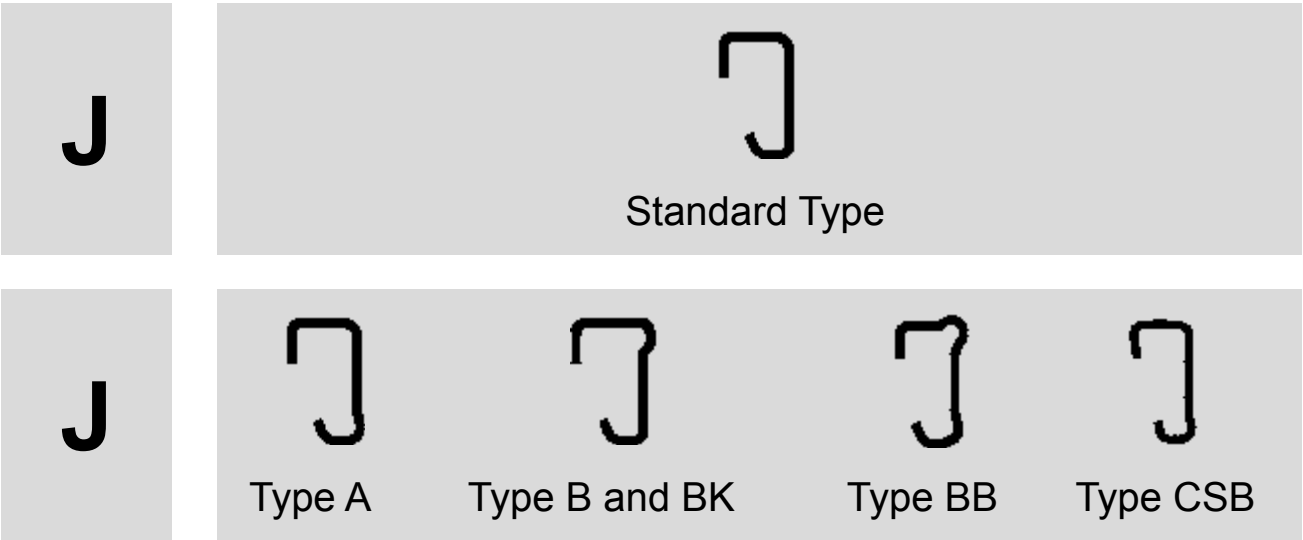
Wire Profiles:

 r (round)

 hr (half-round)

5.2 Traveller Shapes

If the shape of a traveller differs from the standard type, the following supplementary designations are possible:



Operating Position of the Traveller

Correct position (Fig. 1a)

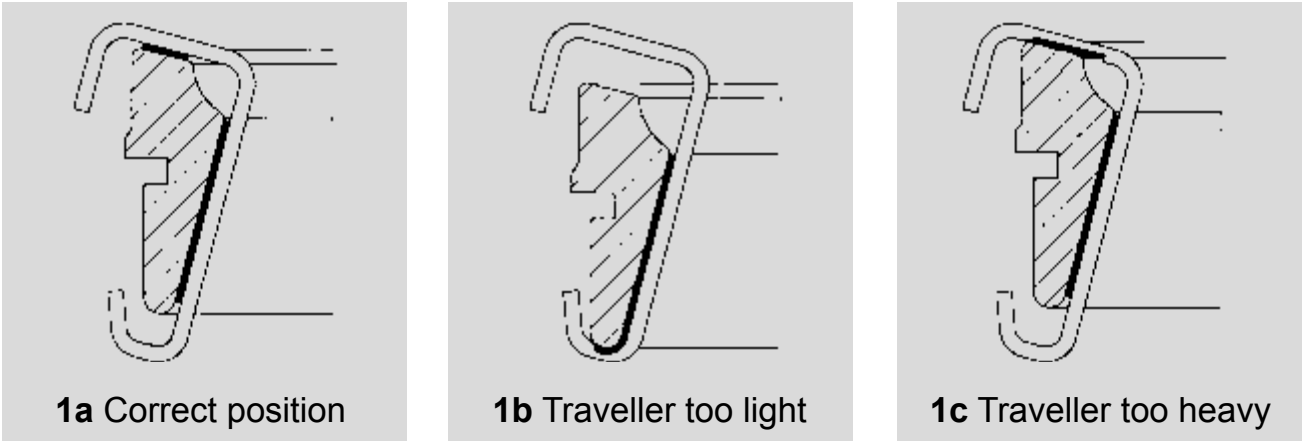
While running, the traveller normally contacts the inner conical ring track and the upper ring track and consequently produces the main wear in these areas.

Travellers too light (Fig. 1b)

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

Travellers too heavy (Fig. 1c)

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



5.3 Table Comparing Weights and Numbers of J Steel Travellers

Traveller No.	R+F ISO No.	Bräcker ISO No.	Kanai ISO No. (Type SBA)	Carter J 11.1 No.	Travel-ler No.	R+F ISO No.	Bräcker ISO No.	Kanai ISO No. (Type SBA)	Carter J 11.1 No.
10	1800	1800	850		24,5	85	80	97,5	22
11	1600	1600	650	10	25	75	71	90	23
11,5	1400				25,5	67	67	82,5	23 1/2
12	1320	1250	580	11	26	60	63	75	24
12,5	1180		545		26,5	53	56	71,5	24 1/4
13	1060	1000	510	12	27	50	50	68	24 1/2
13,5	950		475		27,5	45	45	64,5	25
14	850	900	440	13	28	40	40	61	25 1/2
14,5	800		405		28,5	35,5	35,5	57,5	26
15	710	710	370	14	29	33,5	31,5	54	
15,5	630		335		29,5	31,5	30	50,5	
16	560	560	300	15	30	30	28	47	27
16,5	500	500	285		30,5	28		43,5	
17	450	450	270	16	31	26,5	25	40	28
17,5	400	400	255		31,5	25		38,2	
18	355	355	240	17	32	23,6	22,4	36	
18,5	300	280	225	17 3/4	32,5			34	
19	250	250	210	18	33	22,4		32	29
19,5	224	224	195	18 1/2	33,5			30	
20	180	180	180	19	34	21,2	20	28	
20,5	160	170	165	19 1/4	34,5			26	
21	150	160	150	19 1/2	35	20		24	30
21,5	140	140	143	19 3/4	35,5			22	
22	132	125	135	20	36	18	18	20	
22,5	118	118	128	20 1/4	37	16	16	18	31
23	112	112	120	20 1/2	38	15	14	16	
23,5	100	100	113	21	39	13,2	12,5		
24	90	90	105	21 1/2	40	11,8	11,2		

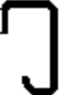




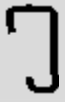


(ISO No. = traveller weight in mg)



5.4 Production Range of Steel J-Travellers for J 9.1 and J 11.1 Rings

Ring Height		Traveller Designation	System (weights see page 63) Numbering
Designation	mm		
J 9,1	9,1 mm	J 9,1 r *	J
		J 9,1 r B	J
		J 9,1 r BK	J
J 11,1	11,1 mm	J 11,1 hr *	J
		J 11,1 r *	J
		J 11,1 r A	J
		J 11,1 r CSB	J
		J 11,1 r B	J
		J 11,1 r BB	J

* Standard Type

Traveller Number Range		Wire Profile	Picture of	
J-No.	ISO-No. (mg/piece)		Traveller shape	
18 – 40	11,8 – 355	●		
23 – 33	22,4 – 112	●	Standard-Type	
34 – 40	11,8 – 21,2	●		
12 – 13	1060 – 1320			
14 – 40	11,8 – 850	●	Standard-Type	
20 – 30	30 – 180	●		
20,5 – 35	20 – 160	●	Type CSB	
17 – 31	26,5 – 450	●		
16 – 28	40 – 560	●	Type B	
			Type BB	



5.5 J Travellers of Nylon

J 9,1			J 11,1			J 17,4			Colour Scale	Steel Trav. (comparable numbers)	
Nylon ISO-No.	Super Nylon ISO-No.	Super Nylon 3 ISO-No.	Nylon ISO-No.	Super Nylon ISO-No.	Super Nylon 3 ISO-No.	Nylon ISO-No.	Super Nylon ISO-No.	Super Nylon3 ISO-No.		J-No.	ISO-No.
40			40						green	24	90
45	45		45	45					black	23 1/2	100
50	50	50	50	50	50				red	23	112
55	55	55	55	55	55				pink	22 1/2	118
60	60	60	60	60	60				dark blue	22	132
70	70	70	70	70	70				dark violet	21 1/2	140
80	80	80	80	80	80	80			brown	21	150
90	90	90	90	90	90	90	90		blue	20	180
100	100	100	100	100	100	100	100	100	yellow	19 1/2	224
112	112	112	112	112	112	112	112	112	orange	19	250
125	125	125	125	125	125	125	125	125	dark red	18 1/2	300
140	140	140	140	140	140	140	140	140	turquoise	18	355
160	160	160	160	160	160	160	160	160	dark brown	17 1/2	400
	180	180	180	180	180	180	180	180	violet	17	450
		200	200	200	200	200	200	200	green	16 1/2	500
			225	225	225	225	225	225	orange	16	560
			250	250	250	250	250	250	red	15 1/2	630
			280	280	280	280	280	280	dark blue	15	710
			320	320	320	320	320	320	brown	14 1/2	800
			360	360	360	360	360	360	blue	14	850
			400	400	400	400	400	400	yellow	13	1060
			450	450	450	450	450	450	orange	12 1/2	1180
			510	510	510	510	510	510	dark red	12	1320
			580	580	580	580	580	580	dark brown	11 1/2	1400
			660	660	660	660	660	660	green	11	1600
			740	740	740	740	740	740	dark blue	10	1800
			830	830	830	830	830	830	dark violet	9	2120
				940		940	940	940	brown	8	2360
					1060	1060	1060	1060	blue	7	2650
						1200	1200	1200	orange	6	3000
						1340	1340	1340	dark red	-	-
						1500	1500	1500	dark brown	-	-
						1700	1700	1700	green	-	-
						1900	1900	1900	orange	-	-
						2150	2150	2150	red	-	-
						2400	2400	2400	violet	-	-
						2700	2700	2700	dark blue	-	-
						3050	3050	3050	yellow	-	-
						3450	3450	3450	brown	-	-
							3850	3850	dark violet	-	-
								4350	green	-	-

J Travellers of Nylon are made in a large number range. Besides the quality Nylon, there are available the glassfibre reinforced qualities SuperNylon and SuperNylon 3. Nylon travellers can be used for certain yarn qualities of about Nm 28 and coarser. They require less lubrication, whereas they may allow to run at higher spindle speeds compared to steel travellers.

Nro. 125 – 580



J 11.1 Nylon / SuperNylon

No. 280 – 3050



J 11.1 Nylon / SuperNylon

For placing and removing heavy nylon traveller numbers, one of the tools offered on page 69 may be used.

5.6 Application Recommendations

Ring Heights and J-Travellers recommended for Worsted Spinning

Steel J-Rings

Yarn Quality	Yarn Counts		Ring Heights Recommended and			
			Steel Travellers		SuperNylon	
	Nm	tex	J 9,1	J 11,1	J 9,1	J 11,1
wool 100%	12 – 18	56 – 84	-	x	x	x
	18 – 28	36 – 56	o	x	o	o
	28 – 48	21 – 36	o	x	-	-
	48 – 64	16 – 21	x	o	-	-
	finer 64	finer 16	x	o	-	-
wool/synthetics	12 – 18	56 – 84	-	x	x	x
	18 – 28	36 – 56	o	x	o	o
	28 – 48	25 – 36	o	x	-	-
	48 – 60	17 – 25	x	o	-	-
Polyester 100% Acrylic 100%	20 – 28	36 – 50	o	x	o	o
	28 – 40	25 – 36	o	x	-	-
	44 – 50	20 – 30	x	x	-	-
	finer 50	finer 20	x	o	-	-

x = preferred traveller
o = may be used
- = not possible



Numbers of J Travellers for Spinning

Worsted, Semi-Worsted and Fancy Yarns						SIRO- SPUN -Technology				
Nm	tex	Ne _k	Ne _w	Steel Travel. No. (J No.)	SUPER- NYLON Traveller No. (mg)	Nm	tex	Ne _k	Steel Travel. No. (J No.)	SUPER- NYLON Traveller No. (mg)
0,4	2500		0,8		3050 – 3850					
0,6	1650		1,2		2400 – 3050					
0,8	1250		1,6	6	1900 – 2400					
1	1000	0,9	2	7	1340 – 1700					
1,2	840	1,1	2,3	8	1060 – 1340					
1,4	710	1,2	2,7	9	940 – 1060					
1,7	590	1,5	3,3	10	830 – 940					
2	500	1,8	3,9	11	740 – 830					
2,5	400	2,2	4,8	11/12	660 – 740					
3	330	2,7	5,8	12/13	580 – 660					
4	250	3,5	7,8	13/14	450 – 510					
6	165	5,3	11,6	14/15	320 – 360					
8	125	7	15,5	15/16	250 – 280					
10	100	9	19,4	16/17	160 – 180	20/2	50/2	18/2	17/18	160/180
12	84	10	23,3	17/18	160	24/2	42/2	21/2	18/19	140/160
14	71	12	27	17/18	140*	28/2	36/2	25/2	18/19	125/140
16	63	14	31	18–19	125*	32/2	31/2	28/2	19/20	112/125
18	56	16	35	18–19	112*	36/2	28/2	32/2	19/20	100/112
20	50	18	39	19–20	100*	40/2	25/2	35/2	20/21	90/100
24	42	21	47	20–21	90*	48/2	21/2	42/2	21/22	70/80
28	36	25	54	20–22	90*	52/2	19/2	46/2	21/22	60/70
32	31	28	62	21–24	80*	64/2	16/2	56/2	22–24	50/60
36	28	32		22–25	* use exclusively Super Nylon quality	72/2	14,5/2	62/2	22–25	45/50
40	25	35		23–26		80/2	12,5/2	70/2	23–26	40/45
44	22,5	39		24–27						
50	20	44		25–28						
56	18	50		26–29						
60	16,5	54		27–30						
70	14,5	62		29–32						
85	12	76		30–33						
100	10	90		32–34						
120	8,5	105		34–36						

Traveller number: The values indicated are known from practice. Different operating conditions (machine type, ring condition, ring lubrication, traveller type, yarn quality, T/m, yarn tension, amount of fibre fly, spindle speed and traveller speed, ambient climate, etc.) may imply the use of slightly differing traveller numbers.

5.7 Tools for Fitting and Removing J Travellers

Insertion Device TRAVELLER PIXER LW 26-2
(for fitting steel travellers on magazines)

Ring		Traveller Designation	TRAVELLER PIXER LW 26-2			Article No.
Designa- tion	Height mm		Stem Designation	Steel Travellers		
				R+F-No.	ISO-No.	
J 9,1	9,1	J 9,1 r	J 9,1	20 – 30	30 – 180	60700
		J 9,1 r A				
		J 9,1 r B				
J 11,1	11,1	J 11,1 r	J 11,1	19 – 30	30 – 250	60709
		J 11,1 r A				
		J 11,1 r CSB	J 11,1 CSB	26 – 30,5	28 – 63	60710
		J 11,1 r B	J 11,1	19 – 30	30 – 250	60709
		J 11,1 r BB				

Traveller Pliers and Removing Tools
(for fitting and removing travellers)

Ring		Traveller Designation	Traveller Pliers (LZ) Removing Tools (LA)	Article No.
Designa- tion	Height mm			
			<u>LZ with remover for steel travellers</u>	
J 9,1	9,1	J 9,1 Steel	LZ/A - J 9,1 S	60160
J 11,1	11,1	J 11,1 Steel	LZ/A - J 11,1 S	60119
J 17,4	17,4	J 17,4 Steel	LZ/A - J 17,4 S	60120
			<u>LZ with remover for nylon travellers</u>	
J 11,1	11,1	J 11,1 Nylon	LZ/A - J 11,1 N	60120
J 17,4	17,4	J 17,4 Nylon	LZ/A - J 17,4 N	60114



6. HZ Rings

6.1 Ring Materials

Steel HZ-Rings are made from select high quality steel that is highly wear resistant as a result of special heat treatment. Special surface treatments give these rings optimum smoothness and evenness in the traveller contact areas, which results in short running-in times. R+F steel rings are suitable for use with steel travellers as well as nylon travellers without weight restrictions.

Sinter Steel HZ-Rings

While running, the traveller contact areas provides the optimum oil quantity on an as-needed basis. This yields highest traveller, spindle and delivery speeds. Preferred uses:

- if quality standards in terms of evenness and cleanliness of the yarn are very high
- in processes involving synthetic filament yarns, tyre cord yarns, glass yarns, sewing threads
- in combination with nylon travellers

To prevent damages to the sinter steel ring as a result of too much stress, usage restrictions have to be complied with when using heavy steel traveller numbers.


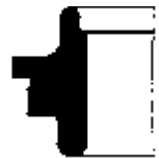

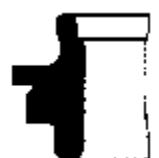

Heaviest permitted steel traveller number:

Designation	R+F No.	Iso No.
HZ 9,5	R+F No. 24	ISO 90
HZ 10,3	R+F No. 23	ISO 112
HZ 11,1	R+F No. 22	ISO 132
HZ 16,7	R+F No. 18	ISO 355









If heavier travellers are required, only nylon travellers may be used. For ring heights HZ 25.4 and HZ 38.1 only nylon travellers should be used. Express type steel travellers are preferably used for ring heights HZ 9.5, HZ 10.3 and HZ 11.1 in draw twisting applications. Sinter steel rings require continuous maintenance to produce optimum operating results in the long term. Cleaning and re-soaking with the recommended special oil is required at regular intervals (see Oil Recommendations).

Should you need any detailed information in this regard, please request our technical information sheet.

6.2 Profile Shapes, Ring Diameters, Ring Heights and Lubrication Systems

	HZ	standard profile for steel travellers
	HZ-B	standard profile with increased yarn clearance for steel travellers
	HZ-BS	special profile for nylon travellers (may also be used for steel travellers)
	HZ-B-BS	special profile for nylon travellers (may also be used for steel travellers)
	HZ-BS-K	special profile for nylon travellers (may also be used for steel travellers)

Ring Diameters, Ring Heights

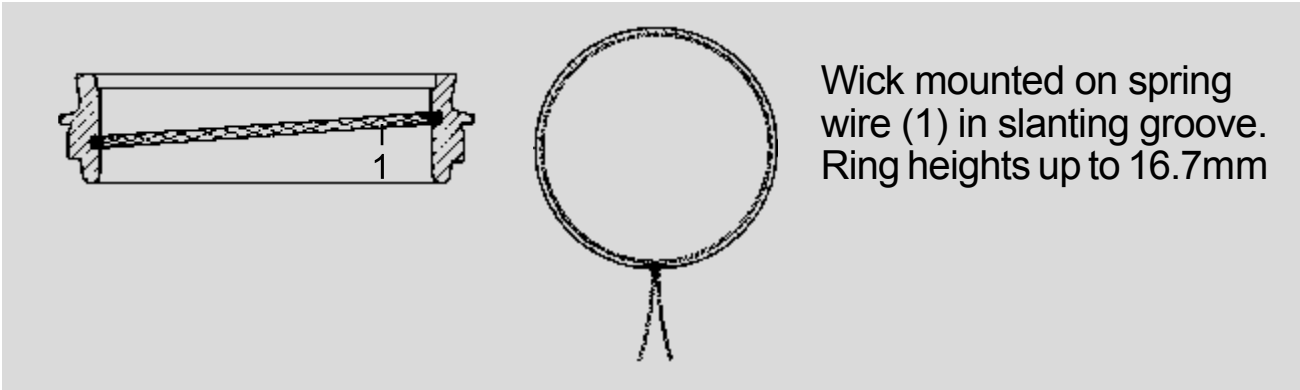
		Ring diameters (mm) d ₁ : inside ring Ø d ₂ : fitting Ø d ₃ : outside ring Ø (shoulder Ø)	Ring heights (mm) h ₁ : ring height h ₂ : ring height above ring rail h _s : fitting height					
Inside Ring Ø d ₁	Designations of Ring Heights							Deviation limits (tolerances of fitting Ø) for d ₂ in mm
	HZ 6,3	HZ 9,5	HZ 10,3	HZ 11,1	HZ 16,7	HZ 25,4	HZ 38,1	
	Ring heights h ₁ in mm							
								
	6,3	9,5	10,3	11,1	16,7	25,4	38,1	
Fitting Ø d ₂								
48	61	57						0 -0,25
50	63	59	59	59				
55	68	64	64	64				
57	70	66	66	66				
60	73	69	69	69	69			
65	78	74	74	74	74			
70	83	79	79	79	79			
75	88	84	84	84	84			0 -0,32
80	93	90	90	90	90			
90	103	100	100	100	100	101		
100	113	112	112	112	112	112		
110		122	122	122	122	122		
115		127	127	127	127	127		0 -0,4
125		137	137	137	137	137		
127		139	139	139	139	139		
140		152	152	152	152	152	152	
150		163	163	163	163	163	163	
152		165	165	165	165	165	165	0 -0,55
160		173	173	173	173	173	173	
180		193	193	193	193	193	193	
200					213	213	213	
220					233	233	233	
225					238	238	238	0 -0,55
250					263	263	263	

Ring diameters d₁ and d₂ and ring height h₁ generally as per standard. Production on request of other ring diameters not specified in the table.
Ring diameter d₂: Larger or smaller fitting diameters than shown in the table can be provided depending on lubrication system, ring fixing method, centreability and exchangeability. Other limit dimensions for d₂ on request. The limit dimensions do not apply for oval designs.



HZ Rings of Steel

HZ-DT

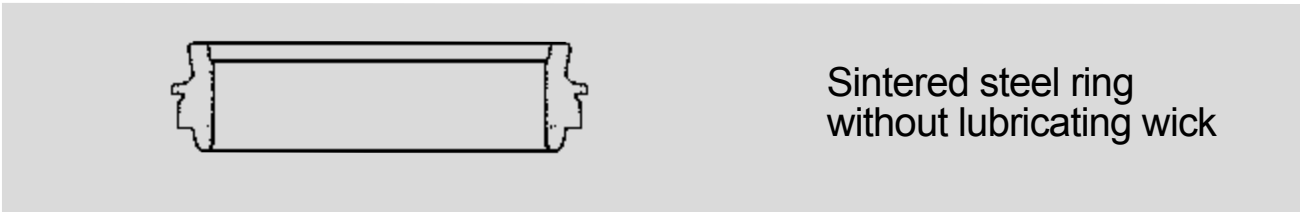


HZ-D-F

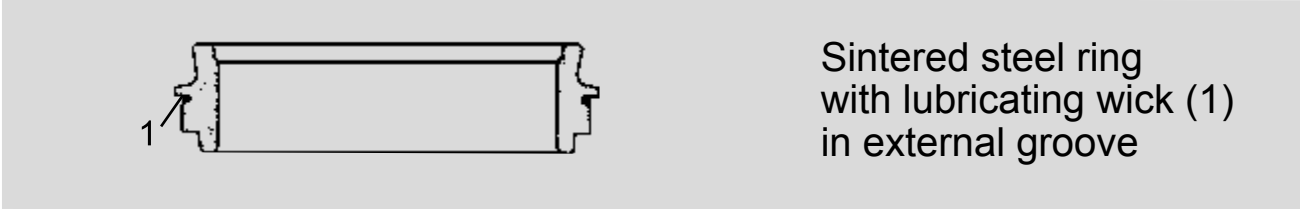


HZ rings of sintered steel are soaked with a special oil on their delivery. They have to be re-lubricated or re-soaked in regular intervals.

HZ-Si

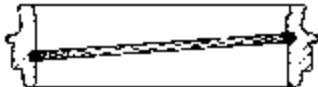
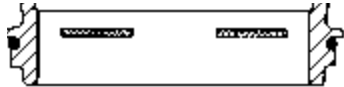


HZ-Si-SR



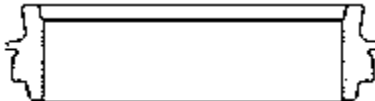

6.3 Lubricants

Lubricants for HZ Rings of Steel

Lubricating Systems				
<div>HZ-DT</div> <div></div> <div>wick mounted on spring wire in slanting groove</div>		<div>HZ-D-F</div> <div></div> <div>combined wick/felt lubricating system</div>		
Ring Heights	ISO Viscosity Grades*			
Designations and sizes	Oils for <u>Steel</u> Travellers		Oils for <u>nylon</u> Travellers	
	synth. oils	mineral oil	synth. oils	mineral oil
HZ 9,5 (9,5 mm)	ISO VG 32	ISO VG 32 (perhaps 46)	ISO VG 32 (perhaps 46)	ISO VG 32 (perhaps 46)
HZ 10,3 (10,3 mm)				
HZ 11,1 (11,1 mm)				
HZ 16,7 (16,7 mm)	ISO VG 32 (perhaps 46)	ISO VG 32 (perhaps 46)	ISO VG 46	ISO VG 46 (perhaps 68)

* Deviations are possible under practical conditions

Lubricants for HZ Rings of sintered Steel

Lubricating Systems				
<div>HZ-Si</div> <div></div> <div>without wick lubrication</div>		<div>HZ-Si-SR</div> <div></div> <div>relubrication with outside wick</div>		
Ring Heights	ISO Viscosity Grades*			
Designations and sizes	Oils for <u>Steel</u> Travellers		Oils for <u>nylon</u> Travellers	
	synth. oils	mineral oil	synth. oils	mineral oil
HZ 6,3 (6,3 mm)	ISO VG 15	ISO VG 32	ISO VG 22 (perhaps 32)	ISO VG 32 (perhaps 46)
HZ 9,5 (9,5 mm)				
HZ 10,3 (10,3 mm)				
HZ 11,1 (11,1 mm)				
HZ 16,7 (16,7 mm)	ISO VG 15 (perh. 22)	ISO VG 32 (perhaps 46)	ISO VG 32 (perhaps 46)	ISO VG 46 (perhaps 68)
HZ 17,1 (17,1 mm)	-			
HZ 25,4 (25,4 mm)	-			
HZ 38,1 (38,1 mm)	-			

* Deviations are possible under practical conditions

6.4 Oil Recommendations from Various Oil Manufacturers

Manufacturer	Synthetic Oils		ISO Viscosity Grades		Mineral Oils	
	ISO VG 15 + 22	ISO VG 32 + 46	ISO VG 32	ISO VG 46	ISO VG 68	
Fuchs	Plantohyd 15 S			Renolin B 15		
	Plantohyd 22 S	Plantohyd 46 S	Renolin B 10	Renotex 452	Renolin B 20	
Klüber		Klüber Silvertex T 32				
		Summit HySyn FG 32				
		Klüber Silvertex T 46	Klüberoil Tex 1-32 N			
	Syntheso XOL 12	Summit HySyn FG 46	Klüber Silvertex W 32	Klüberoil Tex 1-46 N	Klüber Silvertex W 68	
Zeller&Gmelin	Textol RLA ISO 15	Textol RLA ISO VG 46	Textol RLA ISO 32	Textol RLA ISO 46	Textol RLA ISO 68	
Bp	-	Energyn RC ISO 46	Energol HLP-HM 32	Energol HLP-HM 46	Energol HLP-HM 68	
Castrol			Hyspin AWS 32	Hyspin AWS 46	Hyspin AWS 68	
			Hyspin ZZ 32	Hyspin ZZ 46	Hyspin ZZ 68	
		Aircol SR 32	Hyspin DSP 32	Hyspin DSP 46	Hyspin DSP 68	
	Optileb HY 15	Aircol SR 46	Tribol 943 AW 32	Tribol 943 AW 46	Tribol 943 AW 68	
Mobil		Mobil SHC 624 (VG 32)	Teresstic T 32	Teresstic T 46	Teresstic T 68	
	-		Nuto H 32	Nuto H 46	Nuto H 68	
			Mobile Velocite HP 32	Mobile Velocite HP 46	Mobile Velocite HP 68	
			Mobile DTE 24	Mobile DTE 25	Mobile DTE 26	
Shell	-	-	Shell Tellus S2 MA 32	Shell Tellus S2 MA 46	Shell Tellus S2 MA 68	
Texaco /			Rando HD 32	Rando HD 46	Texaco Rando HD 68	
Chevron /			Clarity Synthetic Hydraulic	Clarity Synthetic Hydraulic	Clarity Synthetic Hydraulic	
Caltex	-	Hydra 46	Oil AW 32	Oil AW 46	Oil AW 68	
Vickers	Travol 8112 VG 15					
	Travol 8112 VG 22	Travol 8112 VG 46	Travol SR 32 SE	Travo 8710	Travol SR 68	
Petronaphte		Tixo Slide EM 32 SP	Tixo SEW 300	Tixo SEW 400		
	Tixo Slide EM 22 SP	Tixo Slide TH 27	Tixo Slide PRE 32	Tixo Slide PRE 46	Tixo SEW 500	
		Tixo Slide EM 46 SP	Azolla ZS 32	Azolla ZS 46	Tixo SEW 580	
Aluchem	Alusynt BDH 22	Alusynt BDH 32+46				
	Alusynt FGL 15+22	Alusynt FGL 32+46				
	Alusynt Dinal PS 22	Alusynt Dinal PS 32+46	Alustart SH 32	Alustart SH 46	Alustart SH 68	
	Alusynt Textil S 22	Alusynt Textil S 32+46	Alustart HY 32	Alustart HY 46	Alustart HY 68	
	Alusynt Textil SL 22	Alusynt Textil SL 32+46	Textil White FU 32	Textil White FU 46	Textil White FU 68	

7. HZ Travellers

7.1 HZ Steel Travellers

Surface Treatments:

The surface quality SuperPolish is standard for HZ–travellers. Other surface treatments are available; however, due to the oil lubrication they usually do not yield any notable advantages

For draw-twisting, i.e. when textile titres are processed at very high winding-off speeds, HardDur plated steel travellers are used. Especially that part of the traveller that is getting into direct contact with the yarn is chromium-plated.

Traveller Shapes

the following supplementary designations are possible:

HZ

⌋

Type A

⌋

Type Express A




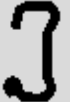






7.2 Table Comparing Weights and Numbers of HZ Steel Travellers

Traveller No.	R+F ISO No.	R+F HZ 9.5 AN ISO No.	Bräcker ISO No.	Traveller No.	R+F ISO No.	R+F HZ 9.5 AN ISO No.	Bräcker ISO No.No.
12	1320			24,5	85		80
12,5	1180			25	75	36	71
13	1060			25,5	67		67
13,5	950			26	60	30	63
14	850			26,5	53		56
14,5	800			27	50	25	50
15	710		710	27,5	45		45
15,5	630		630	28	40	19	40
16	560	356	560	28,5	35,5		35,5
16,5	500		500	29	33,5	16,2	31,5
17	450	259	450	29,5	31,5		30
17,5	400		400	30	30	13	28
18	355	188	355	30,5	28		
18,5	300		280	31	26,5	11,3	25
19	250	136	250	31,5	25		
19,5	224		224	32	23,6	9,7	22,4
20	180	104	180	33	22,4		
20,5	160		170	34	21,2		20
21	150	84	160	35	20		
21,5	140		140	36	18		18
22	132	65	125	37	16		16
22,5	118		118	38	15		
23	112	53	112	39	13,2		
23,5	100		100	40	11,8		
24	90	42	90				

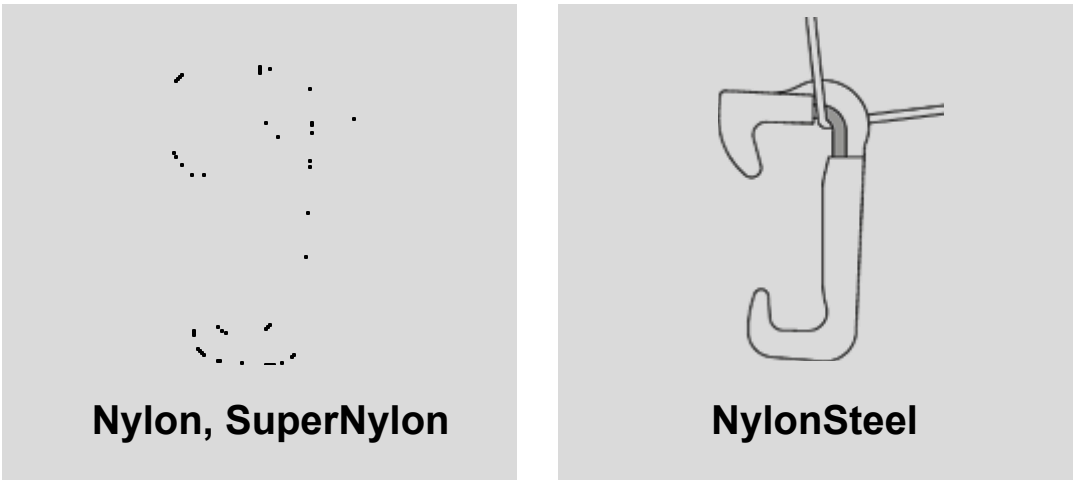
(ISO No. = traveller weight in mg)

7.3 Production Range of HZ Steel Travellers

Designation	Ring Height mm	Traveller Designation	Traveller Number Range		Picture of	
			Hz-No.	ISO-No. (mg/piece)	Wire Profile	Traveller
HZ 9,5	9,5	HZ 9,5 r Express A	19 – 27	50 – 250		 Type Express A
HZ 10,3	10,3	HZ 10,3 r Express A	19 – 32	23,6 – 250		 Type Express A
HZ 11,1	11,1	HZ 11,1 r Express A	18 – 31	26,5 – 355		 Type Express A
HZ 16,7	16,7	HZ 16,7 r A	13 – 20	180 – 1060		 Type A



7.4 Nylon Ring Travellers for HZ Rings



The nylon travellers we offer for the various ring shapes and ring heights were developed in order to comply with the demands encountered in practical applications. The result was a variety of shapes and traveller numbers available in several material variations, namely Nylon, SuperNylon (reinforced by glass fibres) and NylonSteel (with steel insert). The continuity of our research and development which benefit material, shape, surface condition and wear resistance make sure that our customers will always get the best products for processing their yarns and twists.

There is a choice of travellers best suited for yarns and twists consisting of staple fibres, for sewing yarns, glass-fibre yarns, carpet yarns, technical continuous filaments, tyre cord and others. If yarns or twists are processed that have a particularly aggressive effect on the yarn passage of the travellers, the more wear-resistant styles SuperNylon or NylonSteel are recommended.

R+F's Customer Consultants will always be at your disposal giving recommendations regarding the choice of the best suited traveller style. The basis for their recommendations will be the ring model (HZ or J), the ring height, the quality of yarn or twist and the yarn or twist count.

Our nylon travellers are mainly made in ISO numbers (numbers expressed in milligrammes). For certain ring heights we offer in addition NYLON travellers complying with the American designation system. The various traveller numbers are easily distinguished by their different colours.

7.5 Production Range of Nylon Travellers

Nylon Travellers for HZ 9.5 and HZ 11.1 Rings

for rings	Illustration	Traveller Designation	Production Range	
			ISO-No. (mg/piece)	American No.
HZ 4,8 4,8 mm		HZ 4,8 DO Nylon	20 – 40	
HZ 9,5 9,5 mm		HZ 9,5 Nylon	40 – 320	
		glass-fibre reinforced:		
		HZ 9,5 SuperNylon	40 – 400	
		with steel insert:		
		HZ 9,5 NylonSteel	80 – 320	
		HZ 9,5 Nylon H	100 – 360	
		glass-fibre reinforced:		
		HZ 9,5 SuperNylon H	112 – 580	
HZ 11,1 11,1 mm		HZ 9,5 Nylon E-DO	(162 – 421)	25 – 65
		HZ 9,5 Nylon E-C	32 – 104	5 – 16
HZ 11,1 11,1 mm		HZ 11,1 Nylon	40 – 740	
		glass-fibre reinforced:	on request	
		HZ 11,1 SuperNylon	on request	

NylonTraveller Numbers for HZ 9.5 and HZ 11.1 Rings

HZ 9,5		HZ 11,1		Steel Travellers (comparable numbers)	
*Nylon/ SuperNylon	Nylon- Steel	*Nylon/ SuperNylon			
ISO No. = weight in mg			Colour Scale	HZ-No.	ISO-No. (mg)
30			dark brown	25	75
35			violet	24 1/2	85
40		40	green	24	90
45		45	black	23 1/2	100
50		50	red	23	112
55		55	pink	22 1/2	118
60		60	dark blue	22	132
70		70	dark violet	21 1/2	140
80		80	brown	21	150
90		90	blue	20	180
100	100	100	yellow	19 1/2	224
112	112	112	orange	19	250
125	125	125	dark red	18 1/2	300
140	140	140	turquoise	18	355
160	160	160	dark brown	17 1/2	400
180		180	violet	17	450
200	200	200	green	16 1/2	500
225		225	orange	16	560
250		250	red	15 1/2	630
	250		dark blue	15 1/2	630
280		280	dark blue	15	710
320		320	brown	14 1/2	800
360		360	blue	14	850
400		400	yellow	13	1060
450		450	orange	12 1/2	1180
510		510	dark red	12	1320
580		580	dark brown	11 1/2	1400
660		660	green	11	1600
740		740	dark blue	10	1800
830		830	dark violet	9	2120
940		940	brown	8	2360
1060			blue	7	2650
1200			orange	6	3000







* Range of material qualities and traveller types manufactured see page 81

Nylon Travellers for HZ 9.5 Rings
American types and number series

Type E-C			Type E-DO			Steel Travellers (comparable numbers)	
Type and No.	ISO-No.	Colour Scale	Type and No.	ISO-No.	Colour Scale	HZ-No.	ISO-No. (mg)
E-5-C	32	violet					
E-6-C	39	yellow				24	90
E-7-C	45	wine				23 1/2	100
E-8-C	52	orange				23	112
E-9-C	58	dark blue				22	132
E-10-C	65	turquoise				21 1/2	140
E-11-C	71	black				21 1/2	140
E-12-C	78	orange				21	150
E-13-C	84	violet				20 1/2	160
E-14-C	91	light yellow				19 1/2	224
-	-	-	DO	100	yellow	19	250
E-16-C	104	dark green	E-16-DO	104	dark green	19	250
			DO	125	dark red	18 1/2	300
			E-22-DO	143	red	18	355
			E-25-DO	162	black	17 1/2	400
			DO	180	violet	17	450
			E-29-DO	188	blue	17	450
			E-31-DO	200	green	16 1/2	500
			E-33-DO	214	brown	16 1/2	500
			DO	225	orange	16	560
			E-37-DO	240	violet	15 1/2	630
			E-39-DO	253	red	15 1/2	630
			E-45-DO	292	orange	15	710



Production Range of Nylon Travellers for HZ 16.7 Rings





for Rings	Illustration	Traveller Designation	Production Range R+F / ISO No.
HZ16,7 16,7 mm		HZ 16,7 Nylon	100 – 3050
		<u>glass-fibre reinforced:</u>	
		HZ 16,7 SuperNylon	100 – 3850
		HZ 16,7 SuperNylon 3	112 – 1340
		<u>with steel insert:</u>	
		HZ 16,7 NylonSteel	125 – 2000
		HZ 16,7 Nylon C	125 – 1900
		<u>glass-fibre reinforced:</u>	
		HZ 16,7 SuperNylon C	112 – 1500
		<u>glass-fibre reinforced:</u>	
		HZ 16,7 SuperNylon B	400 – 2400
		HZ 16,7 Nylon H	112 – 2400
		<u>glass-fibre reinforced:</u>	
		HZ 16,7 SuperNylon H	160 – 2700
		<u>glass-fibre reinforced:</u>	
		HZ 16,7 SuperNylon G-C	on request

Nylon Traveller Numbers for HZ 16.7 Rings

HZ 16,7 Nylon			HZ 16,7 Nylon American Shape and Number			Steel Travellers (comparable numbers)	
*Nylon R+F/ ISO No.	Nylon- Steel R+F/ISO No.	Colour Scale	No.	ISO No.	Colour Scale	HZ No.	ISO No. (mg)
70	-	dark violet				21 1/2	140
80	-	brown				21	150
90	-	blue				20	180
100	-	yellow				19 1/2	224
112	-	orange				19	250
125	125	dark red				18 1/2	300
140	140	turquoise	G-21-C	136	dark blue	18	355
160	160	dark brown	G-24-C	156	black	17 1/2	400
180	180	violet	G-28-C	181	violet	17	450
200	200	green	-	-	-	16/17	450/560
225	225	orange	G-33-C	214	light yellow	16	560
250	250	red	G-37-C	240	red	15/16	560/710
280	280	dark blue	G-46-C	298	pink	15	710
320	320	brown	G-48-C	311	blue	14/15	710/850
360	360	blue	G-56-C	363	yellow	14	850
400	400	yellow	G-65-C	421	wine red	13	1060
450	450	orange	G-67-C	434	dark green	12/13	1060/1320
-	500	red	-	-	-	12	1320
510	-	dark red	G-78-C	505	black	12	1320
-	560	dark brown	-	-	-	11/12	1320/1600
580	-	dark brown	G-88-C	570	light yellow	11/12	1320/1600
630	630	orange	G-94-C	609	red	11	1600
660	-	green	G-103-C	667	yellow	11	1600
710	710	red	G-110-C	713	dark blue	10/11	1600/1800
740	-	dark blue	G-118-C	767	red	10	1800
-	800	blue	G-124-C	804	dark blue	9/10	1800/2120
830	-	dark violet	G-127-C	823	pink	9	2120
-	900	violet	G-139-C	901	blue	8/9	2120/2360
940	-	brown	G-144-C	933	black	8	2360
-	1000	dark blue	G-152-C	985	violet	7/8	2360/2650
1060	-	blue	G-164-C	1063	pink	7	2650
-	1120	yellow	G-180-C	1166	türkis	6/7	2650/3000
1200	-	orange	G-184-C	1190	dark green	6	3000
-	1250	red	G-186-C	1200	light green	5/6	3000/3350
1340	-	dark red	G-203-C	1320	dark blue	5	3350
-	1400	turquoise	G-225-C	1458	orange	4/5	3350/4000
1500	-	dark brown	G-230-C	1490	blue	4	4000
-	1600	violet	G-248-C	1610	violet	3/4	4000/4500
1700	-	green	G-257-C	1670	light green	3	4500
-	1800	green	G-277-C	1790	yellow		
1900	-	orange	G-282-C	1850	red		
-	2000	orange					
2150		red					
2400		violet					
2700		dark blue					
3050		yellow					
3450		brown					
3850		dark violet					
4350		green					



Production Range of Nylon Travellers for HZ 25.4 and HZ 38.1 Rings

for Rings	Illustration	Traveller Designation	Production Range R+F / ISO No.
HZ 25,4 25,4 mm		HZ 25,4 Nylon	225 – 4900
		<u>glass-fibre reinforced:</u>	
		HZ 25,4 SuperNylon	250 – 6300
		HZ 25,4 SuperNylon 3	3850 – 6300
		<u>with steel insert:</u>	
		HZ 25,4 NylonSteel	650 – 4500
		HZ 25,4 Nylon H	320 – 2150
		<u>glass-fibre reinforced:</u>	
		HZ 25,4 SuperNylon H	360 – 2400
		HZ 25,4 SuperNylon 3 H	400 – 2700
HZ 38,1 38,1 mm		HZ 38,1 Nylon	1500 – 12000
		<u>glass-fibre reinforced:</u>	
		HZ 38,1 SuperNylon	2150 – 20000
		HZ 38,1 SuperNylon 3	on request

Nylon Traveller Numbers for HZ 25.4 and HZ 38.1 Rings

HZ 25,4 Nylon * R+F/ ISO No.	Colour Scale	HZ 38,1 Nylon * R+F/ ISO No.
225	orange	
250	red	
280	dark blue	
320	brown	
360	blue	
400	yellow	
450	orange	
510	dark red	
580	dark brown	
660	green	
710	red	
740	dark blue	
830	dark violet	
940	brown	
1060	blue	
1200	orange	
1340	dark red	
1500	dark brown	1500
1700	green	1700
1900	orange	1900
2150	red	2150
2400	violet	2400
2700	dark blue	2700
3050	yellow	3050
3450	brown	3450
3850	dark violet	3850
4350	green	4350
4900	orange	4900
5500	blue	5500
6300	red	6300
	violet	7100
	dark blue	8000
	yellow	9000
	orange	10000
	green	12000
	brown	14000
	blue	17000
	orange	20000



7.6 Usage recommendations

Choice of Rings and Travellers in Draw Twisting

For processing filament yarns, HZ rings of sintered steel (Si rings) or of steel (HZ-D..F rings) are used in general. The common ring heights are HZ 9.5, HZ 10.3, HZ 11.1 and HZ 16.7. The table below lists the titre ranges common for the various ring heights. The table specifies both steel and sintered steel rings.

Travellers of steel supposed to be used for steel rings should only be used up to a certain yarn thickness/titre on the heavy side. If still heavier travellers are required which may even be part of our product range we recommend to apply NYLON or NylonSteel travellers or to switch to higher rings.

If steel travellers of the "Express" types are used on sintered steel rings the titre range is also limited towards the heavy side, because the use of still heavier travellers would involve the risk of damaging the ring. In this case too, it is recommended to change to NYLON or NylonSteel travellers or to higher rings.

Designation of Ring Heights	Ring Height	Ring Materials and Lubricating Systems	Titre Range	
			dtex	den
HZ 9,5	9,5 mm	Sintered Steel (Si-SR, Si-SR/G)	17 – 140	15 – 125
		Steel (D..F)	17 – 250	15 – 230
HZ 10,3	10,3 mm	Sintered Steel (Si-SR, Si-SR/G)	22 – 167	20 – 150
		Steel (D..F)	22 – 330	20 – 300
HZ 11,1	11,1 mm	Sintered Steel (Si-SR, Si-SR/G)	33 – 200	30 – 180
		Steel (D..F)	33 – 440	30 – 400
HZ 16,7	16,7 mm	Sintered Steel (Si-SR, Si-SR/G)	44 – 400	40 – 360
		Steel	44 – 1100	44 – 1000

More details concerning the use of sintered steel rings mainly used are given in our information sheet RF-T-28.

Yarn Counts and Recommended Traveller Numbers

HZ Traveller Numbers for Draw-Twisting (textile titres)

The choice of the traveller number depends largely on the operating conditions (e.g. material drawn, brilliant or mat titres, special titres, monofilaments or multifilaments, preparations, kind of winding, drawing speed).

Travellers having an Express type foot (Type Express-A) are recommended as standard models.

The lifetime of non chromium-plated travellers ranges between 1 and 5 doffings owing to the very high winding-off speeds and consequently high speed of the thread passing through the traveller bow. These high speeds result in fine incisions in the traveller and finally in capillary damage to the thread. For increasing their resistance to wear travellers with a HardDur-plating are used.

These HD travellers attain lifetimes that are 8 to 10 times longer than those of non-plated travellers.

The following table comprises empirical values regarding the choice of traveller numbers for the field of textiles titres.

Textile Titres		Steel Traveller Numbers				NylonSteel Traveller No. (mg/piece)
dtex	den	ISO No. (mg/piece)	HZ No.	Steel Traveller		
				HZ-EN No.	HZ-AN No.	
17	15	21,2 – 23,6	31 – 32	31 – 32	27 – 28	
22	20	23,6 – 30	30 – 31	30 – 31	26 – 27	
33	30	26,5 – 33,5	29 – 30	29 – 30	26 – 27	
44	40	30 – 40	28 – 30	28 – 30	25 – 26	
56	50	33,5 – 50	27 – 29	27 – 29	24 – 25	
67	60	40 – 60	26 – 28	26 – 28	23 – 24	
78	70	40 – 60	26 – 28	26 – 28	23 – 24	
90	80	50 – 75	25 – 27	25 – 27	22 – 23	
100	90	50 – 75	25 – 27	25 – 27	22 – 23	
110	100	60 – 90	24 – 26	24 – 26	21 – 22	
122	110	60 – 90	24 – 26	24 – 26	21 – 22	
133	120	75 – 112	23 – 25	23 – 25	20 – 21	
150	135	90 – 132	22 – 24	22 – 24	19 – 20	
167	150	112 – 150	21 – 23	21 – 23	19 – 20	80 – 90
200	180	132 – 180	20 – 22	20 – 22	18 – 19	80 – 112
220	200	132 – 250	19 – 22	19 – 22	17 – 20	80 – 125
235	210	132 – 250	19 – 22	19 – 22	17 – 20	90 – 140
277	250	150 – 355	18 – 21	18 – 21	16 – 19	100 – 180
330	300	180 – 450	17 – 20	17 – 20	15 – 18	100 – 225
440	400	180 – 450	17 – 20	17 – 20	15 – 18	125 – 280
550	500	250 – 560	16 – 19	16 – 19	15 – 17	140 – 360



HZ Traveller Numbers for Spinning

Yarn Counts				Ring-Ø	HZ Travellers of		
Nm	tex	Ne _K	Ne _w		Steel	Nylon	
					R+F HZ-No.	ISO-No.(mg)	ISO-No.(mg)
0,1	10000		0,2	250 – 330		25000	17000 – 20000
0,2	5000		0,4			19000	14000 – 17000
0,3	3300		0,6			15000	10000 – 14000
0,4	2500		0,8	180 – 250		10000	7100 – 12000
0,6	1650		1,2			8000	4900 – 8000
0,8	1250		1,6			6300	3450 – 5500
1	1000	0,9	2	160 – 200		5000	1900 – 3450
1,2	840	1,1	2,3		3	4500	1500 – 2150
1,4	710	1,2	2,7		4	4000	1200 – 1700
1,7	590	1,5	3,3	140 – 180	5	3350	1060 – 1340
2	500	1,8	3,9		6	3000	940 – 1200
2,5	400	2,2	4,8		8/9	2120/2360	830 – 1060
3	330	2,7	5,8	110 – 140	10/11	1600/1800	660 – 940
4	250	3,5	7,8		11/12	1320/1600	510 – 740
6	165	5,3	11,6		12/13	1060/1320	320 – 450
8	125	7	15,5	90 – 125	14 – 16	560 – 850	225 – 320
10	100	9	19,4		15 – 17	450 – 710	180 – 250
12	84	10	23,3		16 – 18	355 – 560	140 – 200
14	71	12	27	65 – 95	17 – 19	250 – 450	125 – 180
16	63	14	31		18 – 20	180 – 355	112 – 160
18	56	16	35		19 – 21	150 – 250	100 – 125
20	50	18	39	60 – 90	20 – 22	132 – 180	90 – 100
24	42	21	47		21 – 23	112 – 150	80 – 90
28	36	25	54		22 – 24	90 – 132	70 – 80
32	31	28	62	55 – 70	23 – 25	75 – 112	60 – 70
36	28	32			24 – 26	60 – 90	
40	25	35			25 – 27	50 – 75	
44	22,5	39		55 – 63	26 – 28	40 – 60	
50	20	44			27 – 29	33,5 – 50	
56	18	50			28 – 30	33,5 – 40	
60	16,5	53		52 – 57	29 – 31	30 – 33,5	
70	14,5	62			30 – 32	26,5 – 30	

***Traveller number:** The values indicated are known from practice. Different operating conditions (machine type, ring condition, ring lubrication, traveller type, yarn quality, T/m, yarn tension, amount of fibre fly, spindle speed and traveller speed, ambient climate, etc.) may imply the use of slightly differing traveller numbers.

HZ Traveller Numbers for Twisting

Yarn Counts			HZ Traveller Numbers* for Yarns							
Nm	tex	Ne _c	2-fold		3-fold		4-fold		6-fold	
			Steel travel. HZ No.	Nylon-travel. ISO-No.	Steel travel. HZ No.	Nylon-travel. ISO-No.	Steel travel. HZ No.	Nylon-travel. ISO-No.	Steel travel. HZ No.	Nylon-travel. ISO-No.
0,4	2500	0,25		14000						
0,6	1650	0,35		10000						
0,8	1250	0,5		8000		12000				
1	1000	0,6		6300		9000				
1,2	840	0,7		5500		8000				
1,4	710	0,8		4350		6300		9000		
1,7	590	1		3450		5500		8000		
2	500	1,2		2400		4350		6300		
2,5	400	1,5	4	1700		3450		4900		
3	330	1,8	5	1340	3	2400		3850		6300
4	250	2,5	6	1060	4	1900		2700		4350
6	165	3,5	8	830	6	1200	4	1700		2400
8	125	5	10	660	8	940	6	1200	3	1900
10	100	6	12	510	10	740	8	940	5	1500
12	84	7	13	400	12	580	10	740	6	1200
14	71	8	14	360	13	510	11	660	7	1060
16	63	9	15	280	14	450	12	580	8	940
18	56	11	16	225	15	360	13	510	9	830
20	50	12	17	180	16	320	14	450	10	740
24	42	14	18	140	17	250	15	360	11	660
28	36	17	19	125	18	200	16	320	12	510
34	30	20	19/20	112	18/19	180	16/17	250	13	400
40	25	24	20	100	19	140	17	200	14	360
50	20	30	21	90	19/20	125	18	180		
54	18,5	32	22	80	20	112	18/19	160		
60	16,5	36	22/23	70	20/21	100	19	140		
70	14,5	42	23	60	21	90	19/20	112		
85	12	50	24	50/60	22	80	20	100		
100	10	60	25	50	23	70				
120	8,5	70	26	40/50	24	60				
135	7,7	80	27	40	25	50				
150	6,7	90	28	30/40						
170	6	100	29	30						
180	5,6	105	29							
200	5	120	30							

***Traveller number:** The values indicated are known from practice. Different operating conditions (machine type, ring condition, ring lubrication, traveller type, yarn quality, T/m, yarn tension, amount of fibre fly, spindle speed and traveller speed, ambient climate, etc.) may imply the use of slightly differing traveller numbers. High delivery speeds require heavier travellers (often several numbers heavier).



HZ Nylon Traveller Numbers for Glass Filament Yarns

Yarn Fineness		Yarn Types		HZ NYLON Travellers*	
tex	US-System	ISO No.	US System	ISO No.	American No.
2,8	1770	EC 5 – 2,8	ECD 1770	20 – 25	3 – 4
5,5	900	EC 5 – 5,5	ECD 900	25 – 30	4 – 5
11	450	EC 5 – 11	ECD 450	35 – 50	6 – 8
11	450	EC 7 – 11	ECE 450	35 – 50	6 – 8
22	225	EC 7 – 22	ECE 225	45 – 60	7 – 10
34	150	EC 6 – 34	ECDE 150	60 – 80	10 – 13
34	150	EC 9 – 34	ECG 150	60 – 80	10 – 13
51	97	EC 11 – 51	ECJ 97	90 – 112	14 – 18
68	75	EC 6 – 68	ECDE 75	125 – 160	20 – 25
68	75	EC 9 – 68	ECG 75	125 – 160	20 – 25
102	49	EC 11 – 102	ECT 49	200 – 280	31 – 45
136	37	EC 6 – 136	ECDE 37	250 – 400	37 – 63
136	37	EC 9 – 136	ECG 37	250 – 400	37 – 63
136	37	EC 13 – 136	ECK 37	250 – 400	37 – 63
204	24	EC 11 – 204	ECJ 24	510 – 740	78 – 110
272	18	EC 9 – 272	ECG 18	830 – 1200	127 – 186
272	18	EC 13 – 272	ECK 18	830 – 1200	127 – 186
408	12	EC 11 – 408	ECJ 12	1340 – 1700	203 – 257
544	9	EC 13 – 544	ECK 9	1900 – 3050	286 – 451

* **Traveller number:** The indicated traveller numbers are reference values. Different operating conditions (machine type, ring height and diameter, ring condition, ring lubrication, traveller shape, spindle speed and traveller speed, ambient climate, etc.) may imply the use of slightly differing traveller numbers. The optimum traveller number can be determined in a mill test.

HZ Nylon Traveller Numbers for Tyre Cord

Yarn Counts		HZ NYLON Traveller Numbers for		
denier Td	dtex	1-fold	2-fold	3-fold
750	840	160/180	280/320	510/580
840	940	200/225	320/360	580/660
900	1000	225/250	360/400	580/660
1000	1100	225/250	360/400	660/740
1080	1200	250/280	400/450	660/740
1260	1400	250/280	450/510	740/830
1500	1670	280/320	450/510	740/830
1650	1840	280/320	450/510	740/830
1800	2000	320/360	510/580	740/830
2000	2200	320/360	510/580	830/940
2160	2400	360/400	580/660	830/940

HZ Nylon Traveller Numbers for Add-Twisting of Synthetic Filament Yarns

Yarn Counts		HZ NYLON Traveller Numbers for Filament Yarns				
denier Td	dtex	1-fold	2-fold	3-fold	4-fold	6-fold
35	38				50 – 70	90 – 100
40	44				70 – 90	100 – 125
45	50			40 – 60	90 – 112	112 – 160
50	56			50 – 70	100 – 125	125 – 200
60	67			70 – 90	112 – 140	140 – 250
70	78		40 – 70	80 – 100	125 – 160	225 – 320
80	90		50 – 90	90 – 112	125 – 180	250 – 360
90	100		60 – 100	100 – 125	140 – 200	280 – 400
100	110		80 – 112	112 – 140	160 – 225	320 – 450
120	133	40 – 80	90 – 125	125 – 160	225 – 280	510 – 660
150	167	50 – 90	112 – 140	140 – 200	280 – 450	660 – 830
180	200	70 – 112	125 – 180	180 – 225	360 – 510	830 – 1060
200	220	80 – 125	140 – 200	250 – 280	450 – 580	
300	330	100 – 225	250 – 320	360 – 450	660 – 830	
400	440	125 – 280	360 – 510	510 – 660	940 – 1200	
500	550	140 – 360	450 – 580	660 – 830	1200 – 1500	
600	660	250 – 450	510 – 660	830 – 1060	1500 – 1900	
700	780	320 – 580	660 – 830	940 – 1200	1700 – 2150	
840	940	450 – 740	830 – 1060	1060 – 1340	1900 – 2400	
1050	1160	510 – 830	940 – 1200	1340 – 1700	2400 – 3050	
1260	1400	580 – 940	1060 – 1340	1500 – 1900		
1650	1840	660 – 1060	1200 – 1500	1700 – 2150		
2000	2200	740 – 1200	1340 – 1700	1900 – 2400		
3000	3300	940 – 1340	1500 – 1900	2150 – 2700		
4000	4400	1060 – 1500	1700 – 2150	2400 – 3050		
5000	5600	1200 – 1700	1900 – 2400	2700 – 3450		
6000	6700	1340 – 1900	2150 – 2700	2700 – 3450		
7000	7800	1500 – 2150	2400 – 3050	3050 – 3850		
8000	9000	1700 – 2400	2400 – 3050	3450 – 4350		
9000	10000	1900 – 2700	2700 – 3450	3850 – 4900		
10000	11000	2150 – 3050	3050 – 3850	4350 – 5500		
12500	14000	2400 – 3450	3450 – 4350	4900 – 6300		
15000	17000	2700 – 3850	3850 – 4900	5500 – 7100		



7.7 Tools for Fitting and Removing HZ Travellers

Insertion Device TRAVELLER PIXER LW 26-2
(for fitting travellers on magazines)

Ring			Traveller Designation	Traveller Pixer LW 26-2		Article No.
Designation	Height mm	inch		Designation of stem	HZ-No.	
HZ 9,5	9,5	3/8	HZ 9,5 r Type Express A	HZ 9,5 Ex A	20 – 31	60702
HZ 10,3	10,3	13/32	HZ 10,3 r Type Express A	HZ 10,3 Ex A	19 – 30	60705
HZ 11,1	11,1	7/16	HZ 11,1 r Type Express A	HZ 11,1 Ex A	19 – 30	60707

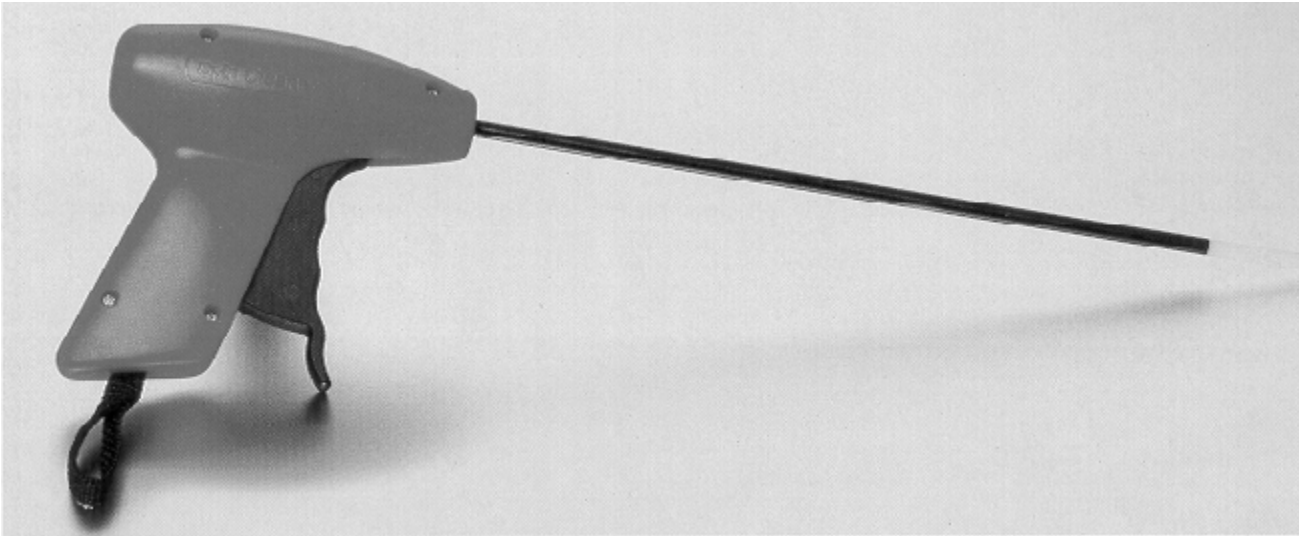
Traveller Pliers and Removing Tools

Ring			Traveller Designation	Traveller Pliers (LZ) Removing Tools(LA)	Article No.
Designation	Height mm	inch			
				LZ with remover for steel travellers	
HZ 9,5	9,5	3/8	HZ 9,5 Steel	LZ/A - HZ 9,5 S	60109
HZ 10,3	10,3	13/32	HZ 10,3 Steel	LZ/A - HZ 10,3 S	60109
HZ 11,1	11,1	7/16	HZ 11,1 Steel	LZ/A - HZ 11,1 S	60110
HZ 16,7	16,7	21/32	HZ 16,7 Steel	LZ/A - HZ 16,7 S	60112
				LZ with remover for nylon travellers	
HZ 9,5	9,5	3/8	HZ 9,5 Nylon	LZ/A - HZ 9,5 N	60119
HZ 10,3	10,3	13/32	HZ 10,3 Nylon	LZ/A - HZ 10,3 N	60119
HZ 16,7	16,7	21/32	HZ 16,7 Nylon	LZ/A - HZ 16,7 N bis max. Nr. 830	60112
HZ 16,7	16,7	21/32	HZ 16,7 Nylon	LZ/A - HZ 16,7 N alle Nummern	60114
HZ 25,4	25,4	1	HZ 25,4 Nylon	LZ/A - HZ 25,4 N	60116
				Traveller remover for sintered ring	
HZ 9,5	9,5	3/8	HZ 9,5 Steel	LA - HZ 9,5 S	60121
HZ 10,3	10,3	13/32	HZ 10,3 Steel	LA - HZ 10,3 S	60121
HZ 11,1	11,1	7/16	HZ 11,1 Steel	LA - HZ 11,1 S	60165
HZ 16,7	16,7	21/32	HZ 16,7 Steel	LA - HZ 16,7 S	60122
HZ 38,1	38,1	1 1/2	HZ 38,1 Nylon	LA - HZ 38,1 N	60123

8. Fluff Collectors

For ensuring a good product quality it is necessary to keep the textile machines free from disturbing fibre accumulations. This cleaning can be done with corresponding fluff collectors which can always be carried along ready at hand. With these devices the fluff-collecting awl, supported by the flywheel, is set into rotation by a soft pressure on the trigger, thus seizing and removing all textile fluff.

8.1 Fluff collectors SPIN CLEANER SC 1



This robust device consists of resistant high-quality parts. Its high-load mechanism is made from particularly wear-resistant materials which guarantee a long service life even if submitted to continuous use. All parts and materials having been carefully selected, the device does not require any maintenance. Since special attention was given to the easy servicing of the device, all components can be exchanged without difficulties. Furthermore, the ergonomical design of handle and trigger will facilitate the daily use of this device.

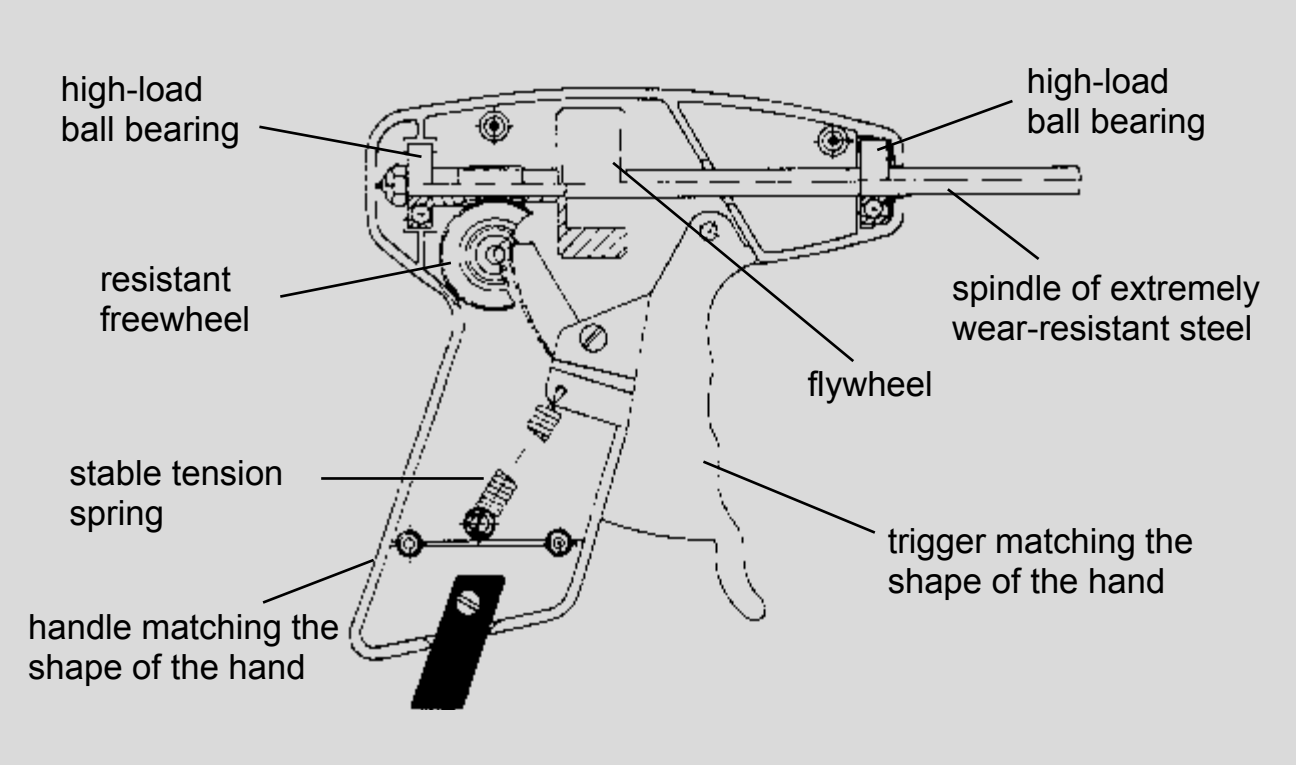
The special merits of the SPIN CLEANER SC 1 are

- better handiness
- lighter weight and
- a considerably longer rotating time of the fluff-collecting awl.

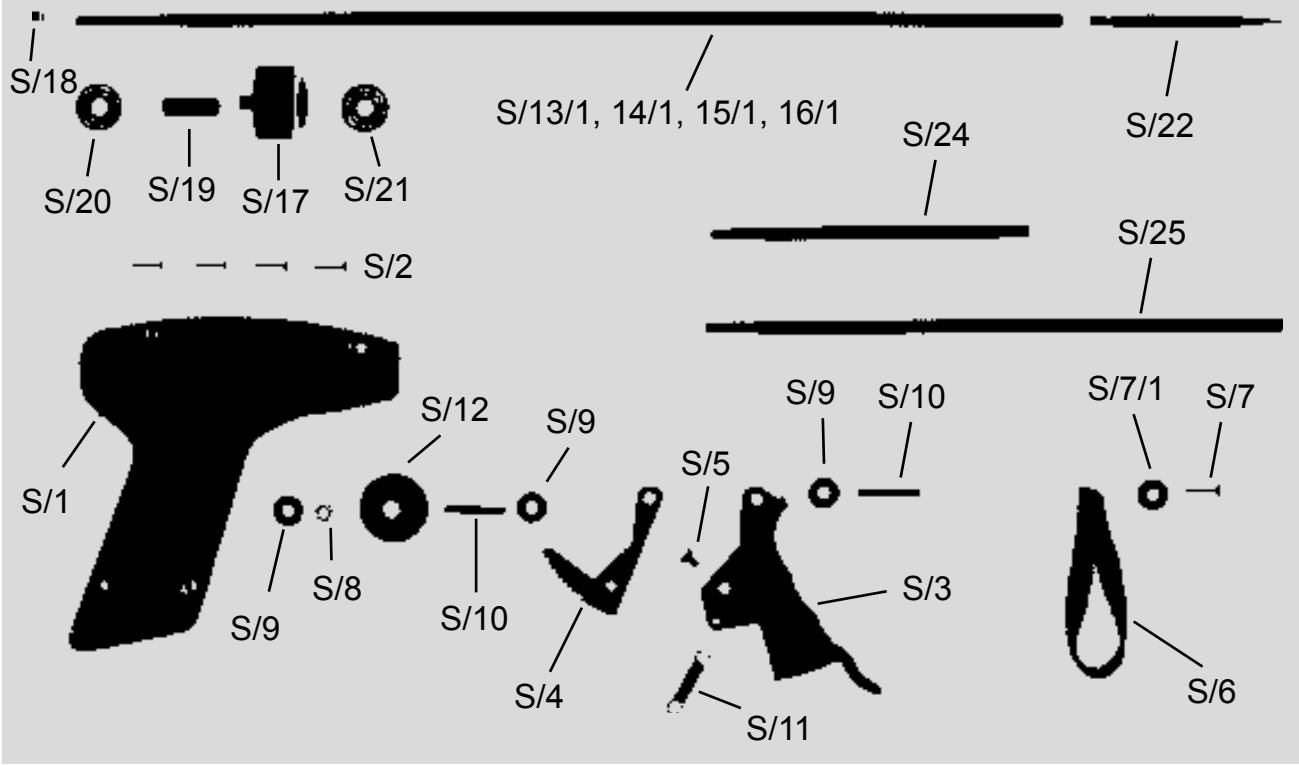
The flywheel of the fluff-collecting awl is situated inside the housing and thus will not be disturbing when the device is operated. Whichever your application, we can offer a SPIN CLEANER SC 1 with the appropriate spindle length: spindle lengths of 200, 300, 400, 500, 600 and 800 mm are available.



Designations of the tool parts



8.2 Survey on spare parts



Art. No.	Part No.	Designation	Art. No.	Part No.	Designation
		SPIN CLEANER SC 1	50688	S/28	spindle compl. 500 mm
		device complete* with	50671	S/16	spindle compl. 600 mm
50657		spindle length 200 mm	50687	S/29	spindle compl. 800 mm
50658		spindle length 300 mm			spindle compl.
50659		spindle length 400 mm			consisting of:
50686		spindle length 500 mm	50662	S/13/1	spindle200 mm
50660		spindle length 600 mm	50668	S/14/1	spindle 300 mm
50685		spindle length 800 mm	50670	S/15/1	spindle400 mm
		Spare parts SC 1:	50689	S/28/1	spindle 500 mm
50673	S/1	housing (2 parts)	50672	S/16/1	spindle600 mm
50674	S/2	4 screws	50690	S/29/1	spindle800 mm
50675	S/3	trigger			plus
50676	S/4	toothed segment			(parts S/17-S/22):
50677	S/5	fillister head screw	50663	S/17	flywheel
50678	S/6	hand loop	50560	S/18	hexagon nut
50674	S/7	screw	50664	S/19	helical gear wheel type bush
50682	S/7/1	washer	50665	S/20	rear ball bearing
50513	S/8	pinion	50666	S/21	front ball bearing
50511	S/9	3 3 starting wheels	50519	S/22	awl tip, nylon Nylon
50567	S/10	2 bearing axles	50569	S/23	tool for removing nylon tips*
50566	S/11	tension spring	50524	S/24	awl extension100 mm
50680	S/12	freewheel complete	50525	S/25	awl extension 200 mm
50661	S/13	spindle compl. 200 mm	50650	S/26	awl extension 400 mm*
50667	S/14	spindle compl. 300 mm	50594	S/27	suspension hook*
50669	S/15	spindle compl. 400 mm	* without illustration		

