EN
03|2013

Locking Assemblies for use with bending loads

Partner for performance
www.ringfeder.com

RINGFEDER

A Global Presence For You

The RINGFEDER POWER TRANSMISSION GMBH was founded in 1922 in Krefeld, Germany to fabricate and promote Friction Spring technology. Today we have expanded our offerings to top power transmission and damping products. Innovative thinking sets us apart and allows us to develop progressive and economical solutions to support our customers.

Special applications require special solutions

Our extensive range of RINGFEDER POWER TRANSMISSION products can be applied to solve most applications. We don´t just sell, but by understanding the individual requirements of our customers (e.g. loads on the components, easy installation/removal capability and reduction of production costs) assist you in every step with innovative engineering to plan efficient and technically mature solutions.

Locking Assemblies for use with bending loads

One of the most demanding challenges on our promise of performance is the belt drum application field. The extreme loads which such components are subject to, especially the high bending moment, coupled with the simultaneous indispensable reliability and longest-possible service life require the highest in engineering know-how. Our international development team, which has already set benchmarks in quality Locking Assemblies for the RfN 7012, RfN 7012.2, RfN 7015.0 and RfN 7015.1 products, is now setting a further milestone.

The new development of the RfN 7515 Locking Assemblies has set a new benchmark in this segment with its quality, performance and price range.

Quality means: high-quality materials and material services, and the most precise workmanship, guarantee sustainable product usage.

Performance means: reliability and long service life.

Price means: not just the newest, but also most inexpensive RINGFEDER Locking Assemblies product for bending loads at the high level of performance you are used to.

Belt drum with Locking Assemblies and a shrink disc on the drive side

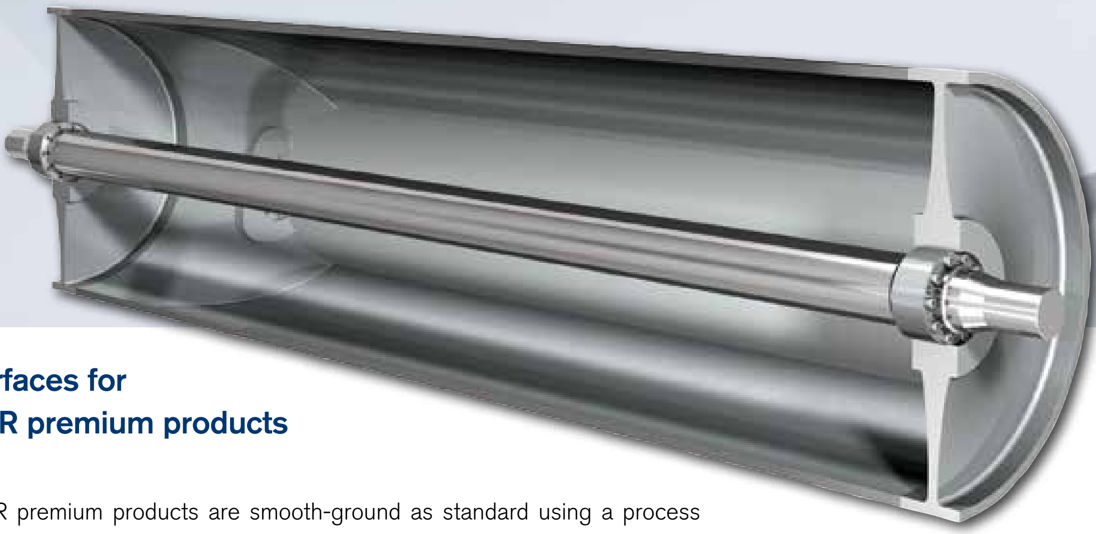
Ready-for-shipping belt drum with Locking Assemblies

Locking Assemblies for use with bending loads

Surface roughness measurement


Hardness measurement


3-D measurement



Special surfaces for RINGFEDER premium products

All RINGFEDER premium products are smooth-ground as standard using a process specially developed for us. Account to this special quality feature, a consistent reproducible coefficient of friction is achieved for all Locking Assembly contact surfaces.

This exceptionally important reproducibility guarantees the consistent of defined pressure on which all Locking Assembly technical values are based.

Merely turned surfaces, even those which are precision-turned, have slip-stick effects if the cone is displaced. A type of indenting also takes place. The considerable coefficient of friction deviations which occur due to this affect the pressure, the torque transfer and the stresses in all components. Removal of the Locking Assembly is also made considerably more difficult.

RfN 7012

RfN 7012.2

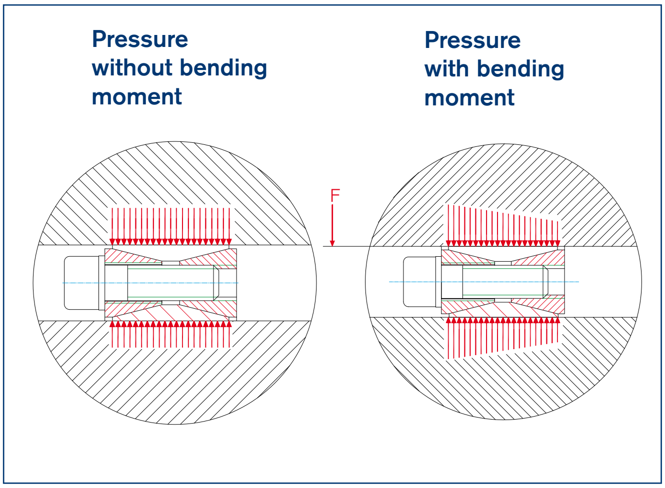
RfN 7015.0

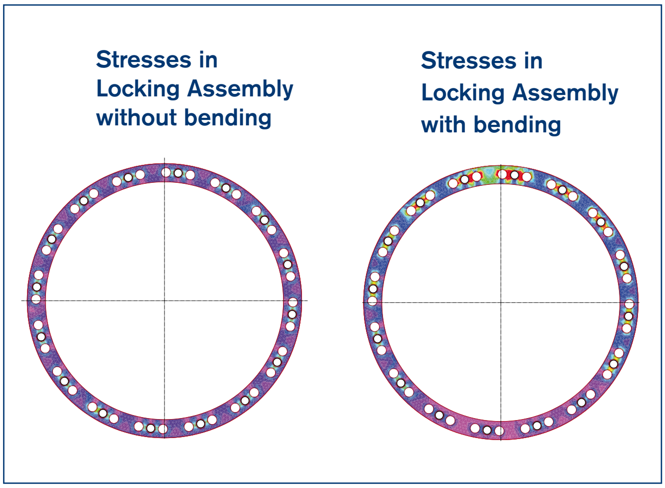
RfN 7015.1

RfN 7515

Pressures and stresses in Locking Assembly taking bending moment into consideration

Without bending moment loading, pressure on the contact areas of the Locking Assembly between the shaft and drum end disc are evenly distributed. Under bending moment, the pressure increases on one side and decreases rotary on the opposing side during each drum rotation. In this case, the stresses in the Locking Assembly between the bores on the side with higher pressure are subject to extreme increases, and these can destroy Locking Assemblies made of too soft or low-quality materials very quickly.

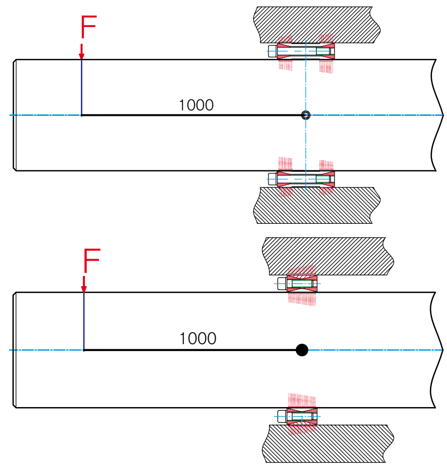




Influence of Locking Assembly width on pressure under bending moment loading

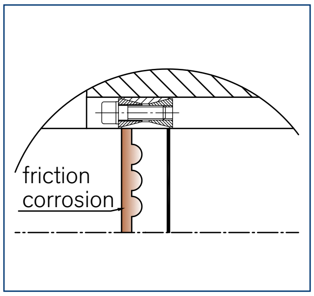
Ever wider the Locking Assembly, so much larger the leverage. In other words, larger Locking Assembly widths produce larger leverage. This means that pressure changes under bending loads are lower for wider Locking Assemblies, which in turn means that their behaviour under bending moment loads are more advantageous.

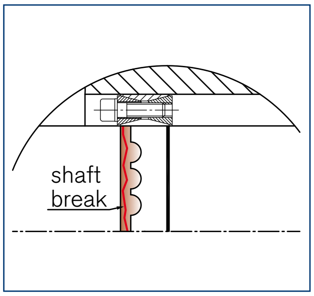
Influence of Locking Assembly width on pressures



Shaft breakage due to friction corrosion

The Locking Assembly can be subject to localised lifting on the side with lower pressure. Micro-movements between the Locking Assembly and the adjacent components occur. The fretting corrosion which results from this causes surface damage, which can lead to cracks or even shaft breakage in worst cases.





Hub loads due to pressure increases

The hub (drum end disc) is loaded over its whole circumference by the increased pressures. This means it is imperative that the drum end disc is designed to meet the maximum occurring pressure. Drum end disc which have been designed too weakly deform in a plastic manner and lead to connection failures. Drive pulleys slip if the drum end disc deforms in a plastic manner and tail pulleys start to „move“ axially.

Influence of material strength on transmissible bending moment

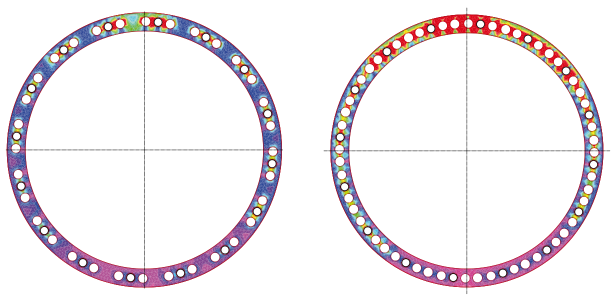
The loading limits can be considerably increased for applications which fall below the stated web stresses for the standard RfN 7012 Locking Assembly through the use of Locking Assemblies made of high-quality materials, e.g.: RfN 7012.2 (here, the material yield strength is around 40% greater than that of the standard Locking Assembly). This results in a tripling of the transmissible bending moment.

Influence of number of bores on stresses in Locking Assemblies

The number of bores made, which weaken the pressure ring, significantly influences the stresses in the Locking Assembly. Stresses can be considerably reduced through the use of lower number of bores, and the reserves made available by this can be used for additional bending moment loads.

Lower number of bores - lower stress at bending moment

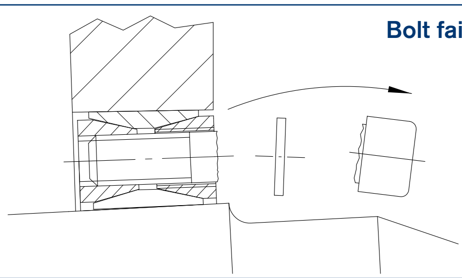
High number of bores - higher stress at bending moment



Bolt failure under excessive bending moment

The shaft deflection caused by the circumferential belt tension applies load to the clamping bolts every drum rotation. This additional axial loading leads to fatigue failures and bolt head breakage if the bolts are fully tightened. For this reason, the bolt tightening torques must be reduced depending on the series if Locking Assembly applications are subject to bending loads.

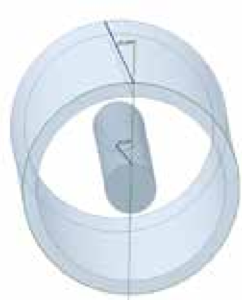
Bolt failure



Shaft torsion and therefore no torque division on both drum ends

The shaft is torsionally softer than the drum body. For this reason, the entire torque must be transferred to the drive side. Torque division on both Locking Assemblies results in the destruction of the Locking Assembly on the drive side. (See drawing)

Shaft torsion



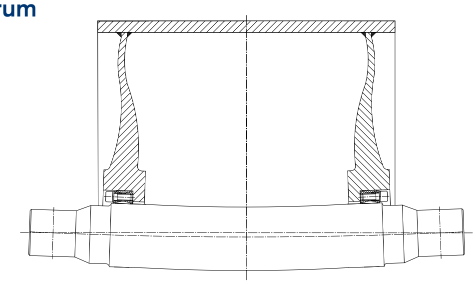
Start-up factor for belt drives

When belt equipment starts up, the electric motor briefly applies around 2.5 times the nominal torque. The drum fixing therefore needs to be designed to accept the start-up torque loading. If not, the connection slips or the Locking Assembly is destroyed after a short time.

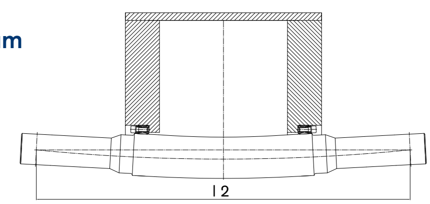
Bending moment division between shaft and drum end disc

The Locking Assembly must transfer the entire bending moment if the end disc is very stiff. If the drum end disc is flexible, the bending moment to be transferred is divided between the end disc and drum shaft - the stresses from the bending moment are reduced and the Locking Assembly is protected.

Soft drum



Stiff drum

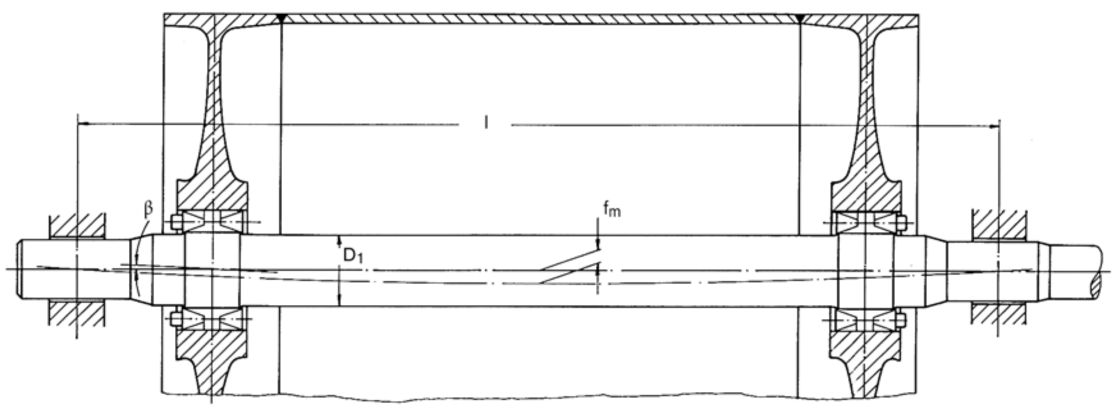


Function between bending moment, torque, pressure and bolt tightening torque

Sample values from calculation for 400 x 495 RfN 7012				
T_a	M_b	pw	pn	$T_{res.}$
Nm	**Nm**	**N/mm²**	**N/mm²**	**Nm**
780	0	123	99	311700
780	73400	169	137	302900
468	0	74	60	187000
468	73400	120	97	172000
780	**146800**	**215**	**174**	**275000**
Sample values from calculation for 400 x 495 RfN 7012.2				
780	**146800**	**228**	**184**	**311200**
780	200000	261	211	280000

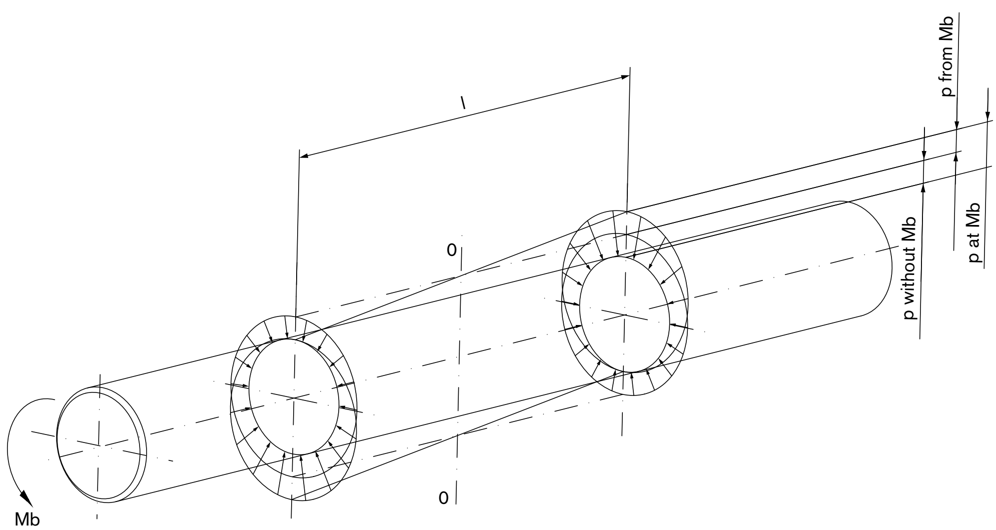
● *This Locking Assembly was destroyed by overloading*

● *This Locking Assembly is able to transfer the required loads*



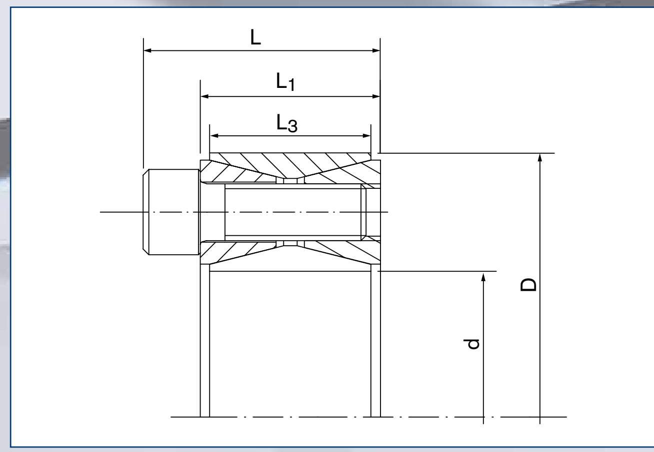
Belt drum mounted using Locking Assemblies RfN 7015

With this and similar constructions the main criterion is to be found in the admissible bending load. For limitation of this load we have on condition of elastic drum bottoms up to now determined acertain shaft deflection as related to the bearing distance and thus as corresponding angle of deflection at the fitting point of the Locking Assembly. Thus, an angle deflection < 5,4' or the maximum shaft deflection fm as related to the bearing distance l were permitted at 1/2000. Constructions based on these experimental values can, however, be optimized by designing in accordance with the permissible bending moment of the Locking Assembly used.



Distribution of surface pressures

The chosen diagram shows the correlation between the surface pressures derived from the clamping and the bending moment. Basic limitations for the superposition of those surface pressures are additionally shown.



Locking Assembly RfN 7012 · Dimensions

Explanations to tables

Basic dimensions when screws are not tightened

d	=	Inner diameter
D	=	Outer diameter
L	=	Overall width
L_1	=	Overall width without screws
L_3	=	Clamping length
n_{Sc}	=	Quantity of locking srews
D_G	=	Clamping thread
$T_{A\ red..}$	=	Reduced tightened torque of the screws under bending load
T without M_b	=	Transmissible torque at given T_A without bending moment
p_W without M_b	=	Surface pressure on shaft at given T_A without bending moment
p_N without M_b	=	Surface pressure on hub at given T_A without bending moment
M_b max.	=	Max. bending moment
$T_{res.}$ at M_b max.	=	Remaining transmissible torque at indicated M_b and T_{Ared}
p_W at M_b max.	=	Surface pressure on the shaft at max. bending moment
p_N at M_b max.	=	Surface pressure on the hub at max. bending moment

Locking Assemblies for bending moments **RfN 7012**

Locking Assembly dimensions															
d	x	D	L	L_1	L_3	n_{Sc}	D_G	$T_{A red.}$	T without M_b	p_W without M_b	p_N without M_b	$M_b$max.	$T_{res.}$	p_W at M_b max.	p_N at M_b max.
mm			mm					Nm	Nm	N/mm²		kNm		N/mm²	
100	x	145	47	33	26	14	M 12 x 30	125	9.591	196	135	2,6	9,2	245	169
110	x	155	47	33	26	14	M 12 x 30	125	10.488	177	126	2,7	10,1	223	158
120	x	165	47	33	26	16	M 12 x 30	125	13.004	184	134	3	12,6	231	168
130	x	180	52	38	34	20	M 12 x 30	125	17.522	162	117	5	16,8	216	156
140	x	190	52	38	34	22	M 12 x 35	125	20.661	164	121	5,3	19,9	218	161
150	x	200	52	38	34	24	M 12 x 35	125	24.046	167	125	5,9	23,3	223	167
160	x	210	52	38	34	26	M 12 x 35	125	27.674	169	129	6,2	26,9	224	170
170	x	225	60	44	38	22	M 14 x 40	190	32.486	157	119	7,8	31,5	206	155
180	x	235	60	44	38	24	M 14 x 40	190	37.391	161	123	8,6	36,3	212	162
190	x	250	68	52	46	28	M 14 x 45	190	45.890	147	111	12	44,3	194	148
200	x	260	68	52	46	30	M 14 x 45	190	51.590	149	114	12,7	50	197	151
220	x	285	74	56	50	26	M 16 x 50	295	64.290	146	112	16,5	64,2	194	150
240	x	305	74	56	50	30	M 16 x 50	295	81.617	153	120	15,6	81,6	195	154
260	x	325	74	56	50	34	M 16 x 50	295	100.624	159	127	13,4	100,6	193	154
280	x	355	86,5	66	60	32	M 18 x 60	405	120.825	140	111	28,9	120,8	188	148
300	x	375	86,5	66	60	36	M 18 x 60	405	147.726	146	117	20,2	147,7	178	142
320	x	405	100,5	78	72	36	M 20 x 70	580	204.771	149	118	31	204,8	181	143
340	x	425	100,5	78	72	36	M 20 x 70	580	213.851	140	112	48,2	213,8	187	150
360	x	455	116	90	84	36	M 22 x 80	780	275.438	138	109	62,4	275,4	181	143
380	x	475	116	90	84	36	M 22 x 80	780	288.145	130	104	72,4	288,1	178	142
400	x	495	116	90	84	36	M 22 x 80	780	302.974	123	99	73,4	302,9	169	137
420	x	515	116	90	84	40	M 22 x 80	780	355.142	130	106	73,1	355,1	173	141
440	x	545	130	102	96	40	M 24 x 90	1.000	432.613	126	102	94,6	432,6	168	136
460	x	565	130	102	96	40	M 24 x 90	1.000	449.347	121	98	106	449,3	165	135
480	x	585	130	102	96	42	M 24 x 90	1.000	492.134	121	99	111	492,1	166	136
500	x	605	130	102	96	44	M 24 x 90	1.000	538.414	121	100	108	538,4	163	135
520	x	630	130	102	96	45	M 24 x 90	1.000	570.164	119	98	120	570,1	164	135
540	x	650	130	102	96	45	M 24 x 90	1.000	591.591	114	95	120	591,6	158	131
560	x	670	130	102	96	48	M 24 x 90	1.000	654.571	117	98	124	654,6	160	134
580	x	690	130	102	96	50	M 24 x 90	1.000	705.667	118	99	128	705,7	161	135
600	x	710	130	102	96	50	M 24 x 90	1.000	728.298	114	96	133	728,3	157	132
620	x	730	130	102	96	52	M 24 x 90	1.000	782.083	114	97	137	782	157	133
640	x	750	130	102	96	54	M 24 x 90	1.000	838.483	115	98	136	838,5	156	133

Ordering example: RfN 7012

Series	d	D
RfN 7012	160	210

- **Surface finishes**
  For shaft and hub bores
  $R_a \leq$ 3,2 µm
- **Tolerances**
  We recommend the following mounting tolerances
  For shaft h8 · Hub H8

Remark! The values of the shaft- and hub pressures have been calculated with the screw tightening shown in the tables. Increase resp. reduction of the screw tightening torque results in different calculation values!

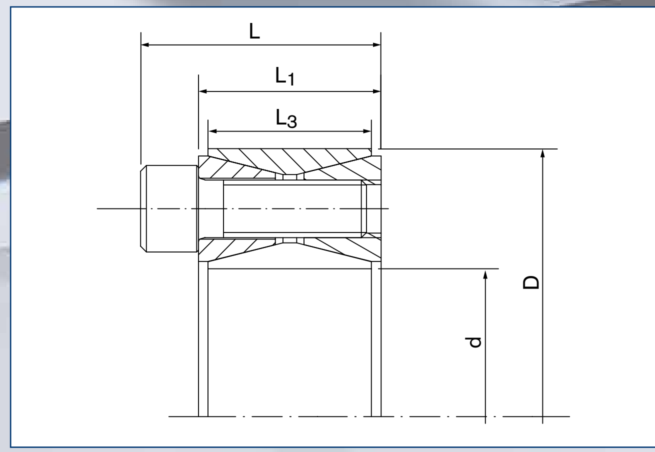
A special bolt for type **RfN 7012.2** has been developed by RINGFEDER for the increased requirements occurring when subject to loading by bending moment.

These special bolts guarantee loadings above strength class 12.9 at simultaneous higher expansion with regard to tensile strength and yield strength.

These bolts were manufactured specially for RINGFEDER with qualified steel analysis.

Every bolt is labelled with RPT-B and the batch number. This allows every bolt to be traced back to manufacture.

The benefit of this bolt is the considerably increased fracture resistance under additional bending stress.



Locking Assembly RfN 7012.2 · Dimensions

Explanations to tables

Basic dimensions when screws are not tightened

d	=	**Inner diameter**
D	=	**Outer diameter**
L	=	**Overall width**
L_1	=	**Overall width without screws**
L_3	=	**Clamping length**
n_{Sc}	=	**Quantity of locking srews**
D_G	=	**Clamping thread**
$T_{A\ red.}$	=	**Reduced tightened torque of the screws under bending load**
T without M_b	=	**Transmissible torque at given T_A without bending moment**
p_W without M_b	=	**Surface pressure on shaft at given T_A without bending moment**
p_N without M_b	=	**Surface pressure on hub at given T_A without bending moment**
M_b max.	=	**Max. bending moment**
$T_{res.}$ at M_b max.	=	**Remaining transmissible torque at indicated M_b and T_{Ared}**
p_W at M_b max.	=	**Surface pressure on the shaft at max. bending moment**
p_N at M_b max.	=	**Surface pressure on the hub at max. bending moment**

Locking Assemblies for bending moments **RfN 7012.2**

Locking Assembly dimensions																
d	x	D	L	L_1	L_3	n_{Sc}	D_G			$T_{Ared.}$	T without M_b	p_W without M_b	p_N without M_b	$M_b$max.	$T_{res.}$	p_W at M_b max.	p_N at M_b max.
mm			mm							Nm	Nm	N/mm²		kNm		N/mm²	
100	x	145	47	33	26	13	M 12	x	30	125	10.409	212	146	10	2,9	400	276
110	x	155	47	33	26	13	M 12	x	30	125	11.382	192	136	10,3	4,8	368	261
120	x	165	47	33	26	15	M 12	x	30	125	14.249	202	147	11,8	7,9	387	281
130	x	180	52	38	34	19	M 12	x	35	125	19.455	180	130	15,2	12,1	346	250
140	x	190	52	38	34	21	M 12	x	35	125	23.050	184	135	16,0	16,6	346	255
150	x	200	52	38	34	23	M 12	x	35	125	26.933	187	140	14,6	22,6	325	244
160	x	210	52	38	34	25	M 12	x	35	125	31.101	190	144	13,3	28,1	308	234
170	x	225	60	44	38	21	M 14	x	40	190	36.243	175	132	25,9	25,4	337	254
180	x	235	60	44	38	23	M 14	x	40	190	41.880	180	138	28,5	30,7	348	267
190	x	250	68	52	46	27	M 14	x	45	190	51.719	165	126	37,0	36,1	312	237
200	x	260	68	52	46	28	M 14	x	45	190	56.277	162	125	40	39,6	313	241
220	x	285	74	56	50	25	M 16	x	50	295	74.592	164	126	50,4	54,9	313	241
240	x	305	74	56	50	26	M 17	x	50	295	84.169	155	122	51,9	66,3	296	233
260	x	325	74	56	50	30	M 18	x	50	295	104.686	164	131	48,9	92,6	287	229
280	x	355	86,5	66	60	29	M 18	x	60	405	131.586	148	117	82	102,9	285	225
300	x	375	86,5	66	60	30	M 18	x	60	405	145.219	143	114	83	119,2	272	217
320	x	405	100,5	78	72	30	M 20	x	70	580	201.713	145	115	126	157,5	276	218
340	x	425	100,5	78	72	31	M 20	x	70	580	220.626	141	113	132	176,8	270	216
360	x	455	116	90	84	32	M 22	x	80	780	293.404	143	113	178	233,2	267	211
380	x	475	116	90	84	33	M 22	x	80	780	318.305	139	111	194	252,4	267	213
400	x	495	116	90	84	34	M 22	x	80	780	344.106	136	110	202	278,6	262	212
420	x	515	116	90	84	37	M 22	x	80	780	391.995	140	114	195	340	256	209
440	x	545	130	102	96	37	M 24	x	90	1.000	478.752	137	110	251	407,7	247	200
460	x	565	130	102	96	38	M 24	x	90	1.000	512.615	134	109	282	428	253	206
480	x	585	130	102	96	39	M 24	x	90	1.000	547.520	131	108	295	461,3	251	206
500	x	605	130	102	96	41	M 24	x	90	1.000	598.054	132	109	304	515	250	207
520	x	630	130	102	96	42	M 24	x	90	1.000	635.586	130	107	315	552	247	204
540	x	650	130	102	96	43	M 24	x	90	1.000	674.155	128	106	324	591,2	244	203
560	x	670	130	102	96	45	M 24	x	90	1.000	729.980	129	108	339	646,5	246	206
580	x	690	130	102	96	47	M 24	x	90	1.000	787.923	129	109	353	704,4	248	208
600	x	710	130	102	96	48	M 24	x	90	1.000	830.673	128	108	366	745,7	246	208
620	x	730	130	102	96	49	M 24	x	90	1.000	874.450	126	107	365	794,6	240	204
640	x	750	130	102	96	52	M 24	x	90	1.000	956.024	129	110	364	884	239	204

Ordering example: RfN 7012.2

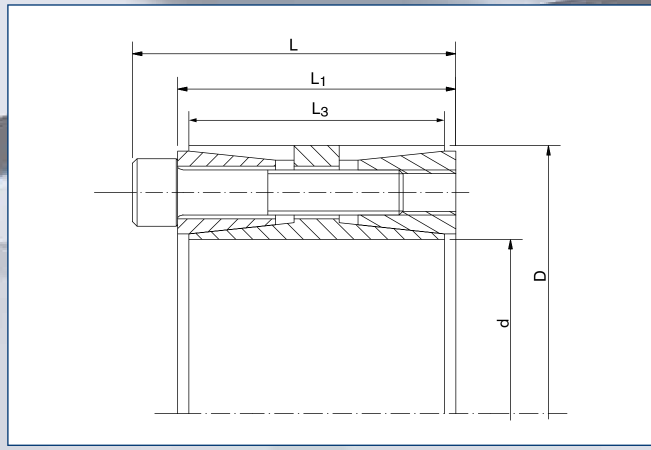
Series	d	D
RfN 7012.2	200	260

- **Surface finishes**
  For shaft and hub bores
  $R_a \leq 3{,}2$ µm

- **Tolerances**
  We recommend the following mounting tolerances
  For shaft h8 · Hub H8

Remark! The values of the shaft- and hub pressures have been calculated with the screw tightening shown in the tables. Increase resp. reduction of the screw tightening torque results in different calculation values!

Locking Assemblies for bending moments **RfN 7015.0**



Locking Assembly RfN 7015.0 · Dimensions

Explanations to tables

Basic dimensions when screws are not tightened

d	=	Inner diameter
D	=	Outer diameter
L	=	Overall width
L_1	=	Overall width without screws
L_3	=	Clamping length
n_{Sc}	=	Quantity of locking srews
D_G	=	Clamping thread
$T_{A\ red.}$	=	Reduced tightened torque of the screws under bending load
T without M_b	=	Transmissible torque at given T_A without bending moment
p_W without M_b	=	Surface pressure on shaft at given T_A without bending moment
p_N without M_b	=	Surface pressure on hub at given T_A without bending moment
M_b max.	=	Max. bending moment
$T_{res.}$ at M_b max.	=	Remaining transmissible torque at indicated M_b and T_{Ared}
p_W at M_b max.	=	Surface pressure on the shaft at max. bending moment
p_N at M_b max.	=	Surface pressure on the hub at max. bending moment

Locking Assemblies for bending moments **RfN 7015.0**

Locking Assembly dimensions																	
d	x	D	L	L_1	L_3	n_{Sc}	D_G			$T_{A red.}$	T without M_b	p_W without M_b	p_N without M_b	$M_b max.$	$T_{res.}$	p_W at M_b max.	p_N at M_b max.
mm			mm							Nm	Nm	N/mm²		kNm		N/mm²	
100	x	145	77	65	60	10	M 12	x	55	115	11.297	157	108	10,9	3	214	147
110	x	155	77	65	60	10	M 12	x	55	115	12.426	142	101	10,9	6	194	138
120	x	165	77	65	60	12	M 12	x	55	115	16.267	157	114	13	9,8	213	155
130	x	180	86	74	68	15	M 12	x	60	115	22.028	156	113	18	12,7	212	153
140	x	190	86	74	68	18	M 12	x	60	115	28.468	174	128	19	21,2	229	169
150	x	200	86	74	68	18	M 12	x	60	115	30.501	163	122	21,5	21,6	220	165
160	x	210	86	74	68	21	M 12	x	60	115	37.957	178	136	20	32,3	228	174
170	x	225	95	81	75	18	M 14	x	65	185	47.955	179	135	32	35,7	241	182
180	x	235	95	81	75	18	M 14	x	65	185	50.776	169	129	32,5	39	229	175
190	x	250	108	94	88	20	M 14	x	75	185	59.552	149	113	41,5	42,7	202	154
200	x	260	108	94	88	24	M 14	x	75	185	75.224	170	131	25	70,9	201	154
220	x	285	120	104	98	18	M 16	x	90	285	84.791	152	117	61	58,9	208	161
240	x	305	120	104	98	24	M 16	x	90	285	123.332	186	146	45	114,8	224	176
260	x	325	120	104	98	25	M 16	x	90	285	139.176	178	143	42,5	132,5	212	169
280	x	355	144	126	120	24	M 18	x	110	390	174.092	161	127	120	126,1	221	174
300	x	375	144	126	120	25	M 18	x	110	390	194.299	157	125	126	147,9	216	172
320	x	405	162	142	135	25	M 20	x	120	550	265.703	159	125	155	215,8	211	167
340	x	425	162	142	135	25	M 20	x	120	550	282.310	149	120	177	219,9	206	164
360	x	455	187	165	158	25	M 22	x	130	745	371.148	149	118	250	274,3	204	161
380	x	475	187	165	158	25	M 22	x	130	745	391.767	141	113	249	302,5	193	154
400	x	495	187	165	158	25	M 22	x	130	745	412.387	134	108	250	327,9	184	148
420	x	515	187	165	158	30	M 22	x	130	745	519.607	153	125	300	424,3	210	171
440	x	545	204	180	172	30	M 24	x	150	960	639.702	154	124	370	521,8	209	169
460	x	565	204	180	172	30	M 24	x	150	960	668.779	147	120	370	557,1	200	163
480	x	585	204	180	172	32	M 24	x	150	960	744.381	150	123	395	630,9	205	168
500	x	605	204	180	172	32	M 24	x	150	960	775.396	144	119	395	667,2	197	163
520	x	630	227	200	190	30	M 27	x	160	1.440	1.014.357	156	129	530	864,9	210	174
540	x	650	227	200	190	30	M 27	x	160	1.440	1.053.370	150	125	530	910,3	203	168
560	x	670	227	200	190	30	M 27	x	160	1.440	1.092.384	145	121	530	955,2	195	163
580	x	690	227	200	190	30	M 27	x	160	1.440	1.131.398	140	118	532	998,5	189	159
600	x	710	227	200	190	32	M 27	x	160	1.440	1.248.439	144	122	566	1.112,8	195	164
620	x	730	227	200	190	32	M 27	x	160	1.440	1.290.054	140	119	573	1.155,8	189	160
640	x	750	227	200	190	35	M 27	x	160	1.440	1.456.512	148	126	576	1.337,8	196	167

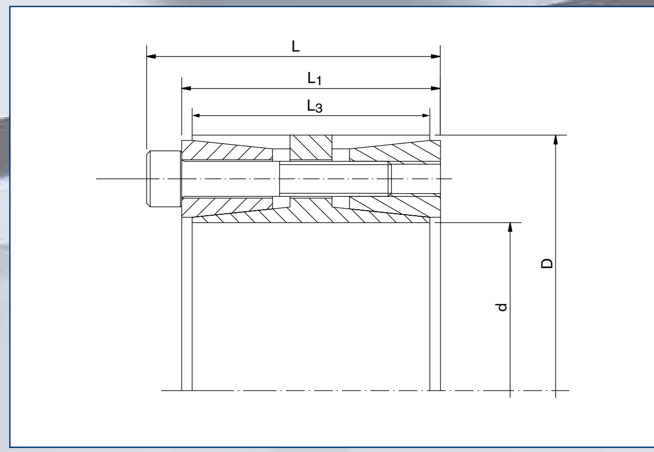
Ordering example: RfN 7015.0

Baureihe/*Series*	d	D
RfN 7015.0	240	305

- **Surface finishes**
  For shaft and hub bores
  $R_a \leq 3{,}2$ µm

- **Tolerances**
  We recommend the following mounting tolerances
  For shaft h8 · *Hub* H8

Remark! The values of the shaft- and hub pressures have been calculated with the screw tightening shown in the tables. Increase resp. reduction of the screw tightening torque results in different calculation values!



Locking Assembly RfN 7015.1 · Dimensions

Explanations to tables

Basic dimensions when screws are not tightened

d = Inner diameter

D = Outer diameter

L = Overall width

L_1 = Overall width without screws

L_3 = Clamping length

n_{Sc} = Quantity of locking srews

D_G = Clamping thread

T_A = Max tightened torque of the screws

T without M_b = Transmissible torque at given T_A without bending moment

p_W without M_b = Surface pressure on shaft at given T_A without bending moment

p_N without M_b = Surface pressure on hub at given T_A without bending moment

M_b max. = Max. bending moment

$T_{res.}$ at M_b max. = Remaining transmissible torque at indicated M_b

p_W at M_b max. = Surface pressure on the shaft at max. bending moment

p_N at M_b max. = Surface pressure on the hub at max. bending moment

Locking Assemblies for bending moments **RfN 7015.1**

Locking Assembly dimensions																
d	x	D	L	L_1	L_3	n_{Sc}	D_G			T_A	T without M_b	p_W without M_b	p_N without M_b	$M_b$max.	$T_{res.}$	p_W at M_b max.	p_N at M_b max.
mm			mm							Nm	Nm	N/mm^2		kNm		N/mm^2	
100	x	145	75	65	60	9	M 10	x	55	83	6.575	91	63	6,1	2,5	123	85
110	x	155	75	65	60	10	M 10	x	55	83	8.037	92	65	6,8	4,3	124	88
120	x	165	75	65	60	12	M 10	x	55	83	10.521	101	74	8,1	6,7	137	99
130	x	180	84	74	68	15	M 10	x	60	83	14.247	101	73	11	9,1	135	98
140	x	190	84	74	68	15	M 10	x	60	83	15.343	94	69	11	10,7	125	92
150	x	200	84	74	68	16	M 10	x	60	83	17.534	94	70	11,7	13,1	125	94
160	x	210	84	74	68	18	M 10	x	60	83	21.041	99	75	13,2	16,4	132	100
170	x	225	93	81	75	15	M 12	x	65	145	27.352	105	80	17,4	21,1	140	106
180	x	235	93	81	75	16	M 12	x	65	145	30.892	106	81	18,2	25	140	107
190	x	250	106	94	88	18	M 12	x	75	145	36.684	96	73	24,5	27,3	128	97
200	x	260	106	94	88	20	M 12	x	75	145	42.906	101	78	27	33,3	135	104
220	x	285	116	104	98	21	M 12	x	80	145	49.556	89	69	34,6	35,5	121	93
240	x	305	116	104	98	24	M 12	x	80	145	61.784	93	73	39	47,9	126	99
260	x	325	116	104	98	27	M 12	x	80	145	75.300	97	77	44,7	60,6	132	105
280	x	355	140	126	120	28	M 14	x	100	230	115.034	106	84	74	88,1	144	113
300	x	375	140	126	120	28	M 14	x	100	230	123.250	99	80	74,1	98,5	134	107
320	x	405	158	142	135	28	M 16	x	110	355	179.962	110	87	113	140,1	148	117
340	x	425	158	142	135	28	M 16	x	110	355	191.209	103	83	111	155,7	139	111
360	x	455	183	165	158	24	M 18	x	140	485	209.622	84	67	132	162,8	113	90
380	x	475	183	165	158	27	M 18	x	140	485	248.927	90	72	149	199,4	121	97
400	x	495	183	165	158	32	M 18	x	140	485	310.552	101	82	177	255,2	136	110
420	x	515	183	165	158	32	M 18	x	140	485	326.079	96	78	177	273,9	130	106
440	x	545	200	180	172	27	M 20	x	140	690	372.775	91	74	206	310,7	122	99
460	x	565	200	180	172	27	M 20	x	140	690	389.719	87	71	211	327,7	118	96
480	x	585	200	180	172	30	M 20	x	140	690	451.848	93	76	234	386,5	125	103
500	x	605	200	180	172	30	M 20	x	140	690	470.675	89	74	236	407,2	120	99
520	x	630	220	200	190	32	M 20	x	150	690	522.135	80	66	272	445,7	108	89
540	x	650	220	200	190	32	M 20	x	150	690	542.218	77	64	274	467,9	104	87
560	x	670	220	200	190	36	M 20	x	150	690	632.587	84	70	309	552	113	95
580	x	690	220	200	190	36	M 20	x	150	690	655.180	81	68	304	580,4	109	92
600	x	710	220	200	190	36	M 20	x	150	690	677.772	78	66	305	605,3	105	89
620	x	730	220	200	190	36	M 20	x	150	690	700.364	76	64	307	629,5	102	87
640	x	750	220	200	190	36	M 20	x	150	690	722.957	73	63	307	654,5	99	85

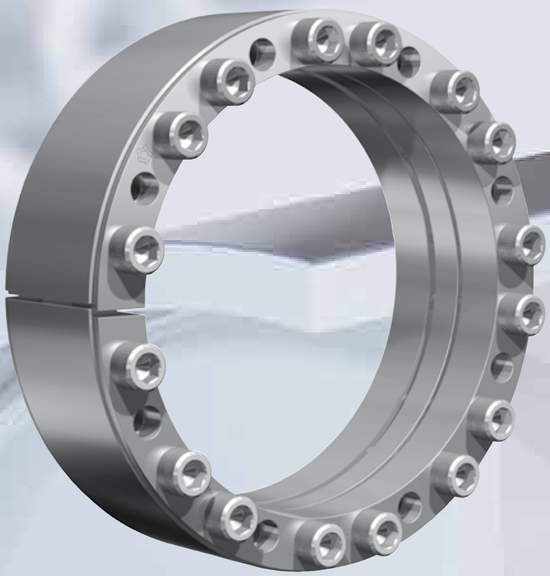
Ordering example: RfN 7015.1

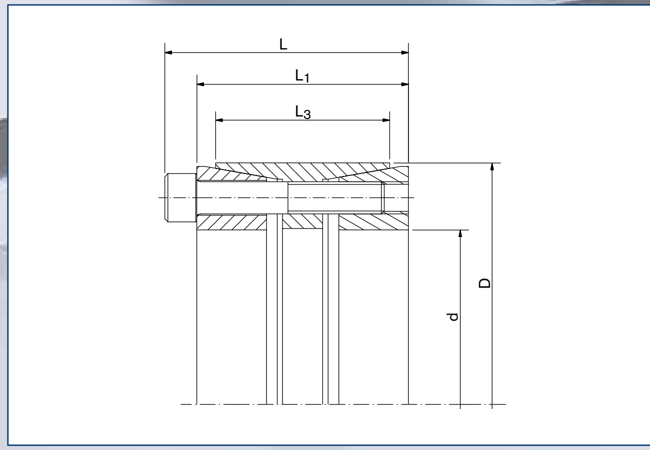
Series	d	D
RfN 7015.1	620	730

- **Surface finishes**
  For shaft and hub bores
  $R_a \leq 3{,}2$ µm
- **Tolerances**
  We recommend the following mounting tolerances
  For shaft k9-h9 · Hub N9-H8

Remark! The values of the shaft- and hub pressures have been calculated with the screw tightening shown in the tables. Increase resp. reduction of the screw tightening torque results in different calculation values!

Locking Assemblies for bending moments **RfN 7515**





Locking Assembly RfN 7515 · Dimensions

Explanations to tables

Basic dimensions when screws are not tightened

d	=	Inner diameter
D	=	Outer diameter
L	=	Overall width
L_1	=	Overall width without screws
L_3	=	Clamping length
n_{Sc}	=	Quantity of locking srews
D_G	=	Clamping thread
T_A	=	Max tightened torque of the screws
T without M_b	=	Transmissible torque at given T_A without bending moment
p_W without M_b	=	Surface pressure on shaft at given T_A without bending moment
p_N without M_b	=	Surface pressure on hub at given T_A without bending moment
M_b max.	=	Max. bending moment
$T_{res.}$ at M_b max.	=	Remaining transmissible torque at indicated M_b
p_W at M_b max.	=	Surface pressure on the shaft at max. bending moment
p_N at M_b max.	=	Surface pressure on the hub at max. bending moment

Locking Assemblies for bending moments **RfN 7515**

Locking Assembly dimensions															
d	x	D	L	L_1	L_3	n_{Sc}	D_G	T_A	T without M_b	p_W without M_b	p_N without M_b	$M_b$max.	$T_{res.}$	p_W at M_b max.	p_N at M_b max.
mm			mm					Nm	Nm	N/mm²		kNm		N/mm²	
60	x	95	58	50	42	8	M 8	41	4.299	186	118	2,6	3,4	225	142
70	x	110	70	60	50	8	M 10	83	7.280	197	125	3,2	6,5	226	144
80	x	120	70	60	50	10	M 10	83	10.399	216	144	5,0	9,1	255	170
90	x	130	70	60	50	11	M 10	83	12.869	211	146	5,6	11,6	250	173
100	x	145	82	70	60	10	M 12	145	18.881	209	144	8,1	17,1	245	169
110	x	155	82	70	60	10	M 12	145	20.769	190	135	9,16	18,6	227	161
120	x	165	82	70	60	11	M 12	145	24.923	191	139	11,0	22,4	233	169
130	x	180	91	79	65	14	M 12	145	34.364	207	150	12,5	32	242	175
140	x	190	91	79	65	15	M 12	145	39.651	206	152	16,4	36,1	249	183
150	x	200	91	79	65	15	M 12	145	42.483	193	144	18,0	38,5	236	177
160	x	210	91	79	65	16	M 12	145	48.336	193	147	19,0	44,4	236	180
170	x	225	106	92	78	15	M 14	230	65.790	195	147	25,0	60,9	234	177
180	x	235	106	92	78	15	M 14	230	69.660	184	141	27,6	64	225	172
190	x	250	116	102	88	16	M 14	230	78.432	165	125	33,5	70,9	202	154
200	x	260	116	102	88	18	M 14	230	92.880	176	135	39,5	84,1	218	168
220	x	285	126	110	96	15	M 16	355	116.459	173	133	52,0	104,2	216	167
240	x	305	126	110	96	20	M 16	355	169.394	211	166	43,0	163,8	244	192
260	x	325	126	110	96	21	M 16	355	192.686	184	148	77,2	176,5	237	190
280	x	355	130	110	96	15	M 20	690	230.199	205	162	105,0	204,9	273	216
300	x	375	130	110	96	16	M 20	690	263.085	204	163	109,5	239,2	271	217
320	x	405	156	136	124	20	M 20	690	350.780	189	150	141,6	320,9	242	191
340	x	425	156	136	124	20	M 20	690	372.704	178	143	154,0	339,4	232	185
360	x	455	177	155	140	20	M 22	930	487.557	174	137	219,0	435,6	228	180
380	x	475	177	155	140	20	M 22	930	514.644	164	132	228,0	461,4	218	174
400	x	495	177	155	140	22	M 22	930	595.903	172	139	240,8	545,1	226	182
420	x	515	177	155	140	24	M 22	930	682.580	179	146	277,6	623,6	237	194
440	x	535	177	155	140	24	M 22	930	715.084	170	140	306,0	646,3	232	191
460	x	555	177	155	140	24	M 22	930	747.588	163	135	320,0	675,6	225	187
480	x	575	177	155	140	25	M 22	930	812.595	163	136	341,0	737,6	226	189
500	x	595	177	155	140	25	M 22	930	846.453	156	131	352,0	769,8	219	184
520	x	615	177	155	140	28	M 22	930	985.949	168	142	418,0	893	240	203
540	x	635	177	155	140	28	M 22	930	1.023.870	162	138	432,0	928,3	233	198
560	x	655	177	155	140	30	M 22	930	1.137.633	167	143	471,0	1.035,6	242	207
580	x	675	177	155	140	30	M 22	930	1.178.263	162	139	479,6	1.076,2	235	202
600	x	695	177	155	140	30	M 22	930	1.218.893	156	135	505,0	1.109,4	231	200
620	x	715	177	155	140	30	M 22	930	1.259.522	151	131	515,0	1.149,4	225	195
640	x	735	177	155	140	30	M 22	930	1.300.152	146	128	522,0	1.190,8	219	191

Ordering example: RfN 7515

Series	d	D
RfN 7515	300	375

- **Surface finishes**
  For shaft and hub bores
  $R_a \leq 1{,}6$ µm

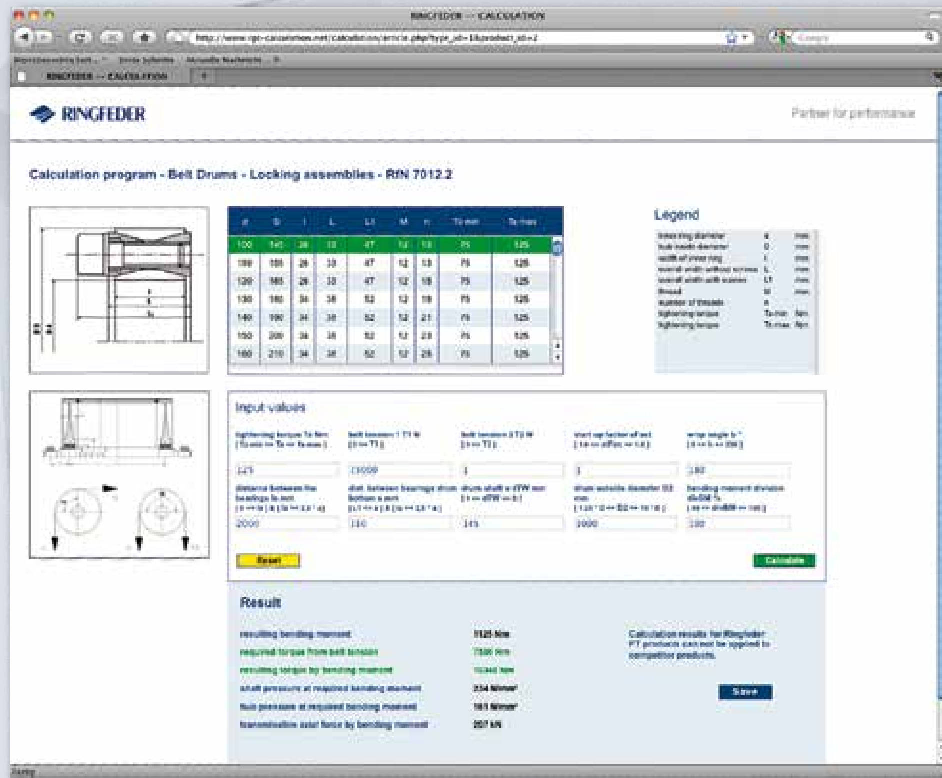
- **Tolerances**
  We recommend the following mounting tolerances
  For shaft k9-h9 · Hub N9-H8

Remark! The values of the shaft- and hub pressures have been calculated with the screw tightening shown in the tables. Increase resp. reduction of the screw tightening torque results in different calculation values!

Notes

Notes

Calculation program



In order to meet the complex requirements on the correct design and selection of RINGFEDER products under bending moment loading, RINGFEDER POWER TRANSMISSION GMBH has developed a calculation program.

This calculation program offers the engineer a valuable aid in the calculation of forces and loads occurring in materials subject to bending moment.

After the product has been selected, e.g. RfN 7012, RfN 7012.2, RfN 7015.0, RfN 7015.1 or RfN 7515, the engineer first selects the required diameter of the Locking Assembly. After this, the engineer can make his input and start the calculation.

The results field shows immediately whether the torque resulting from the belt tensions is above the required torque, in addition to the output of further calculation results, and whether the product complies with the loads under bending moment loading at the selected size.

Interested? Visit our website **www.ringfeder.com!**

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To: RINGFEDER POWER TRANSMISSION GMBH / sales.international@ringfeder.com

From:

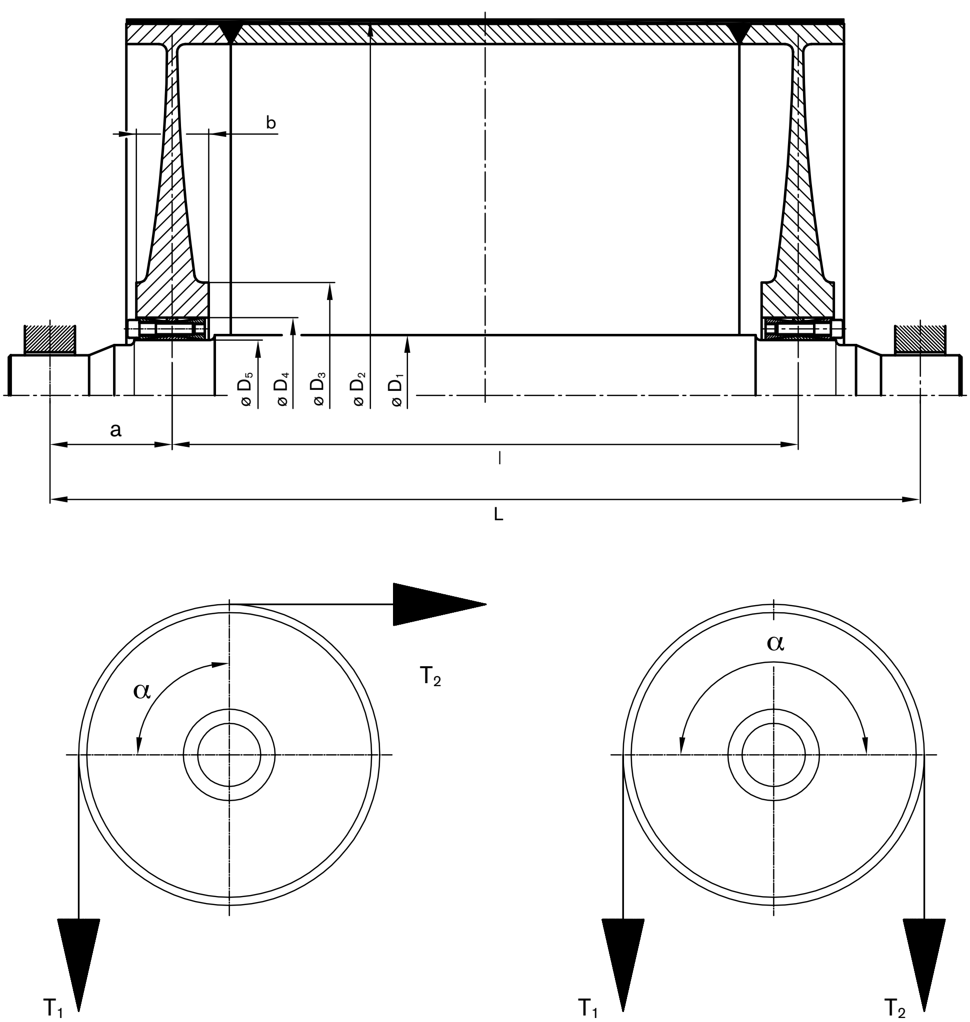
Company: ....

Phone: ....

Contact: ....

Fax: ....

E-Mail: ....



Dimensions:

D_1 = ________ mm

D_2 = ________ mm

D_3 = ________ mm

D_4 = ________ mm

D_5 = ________ mm

L = ________ mm

l = ________ mm

a = ________ mm

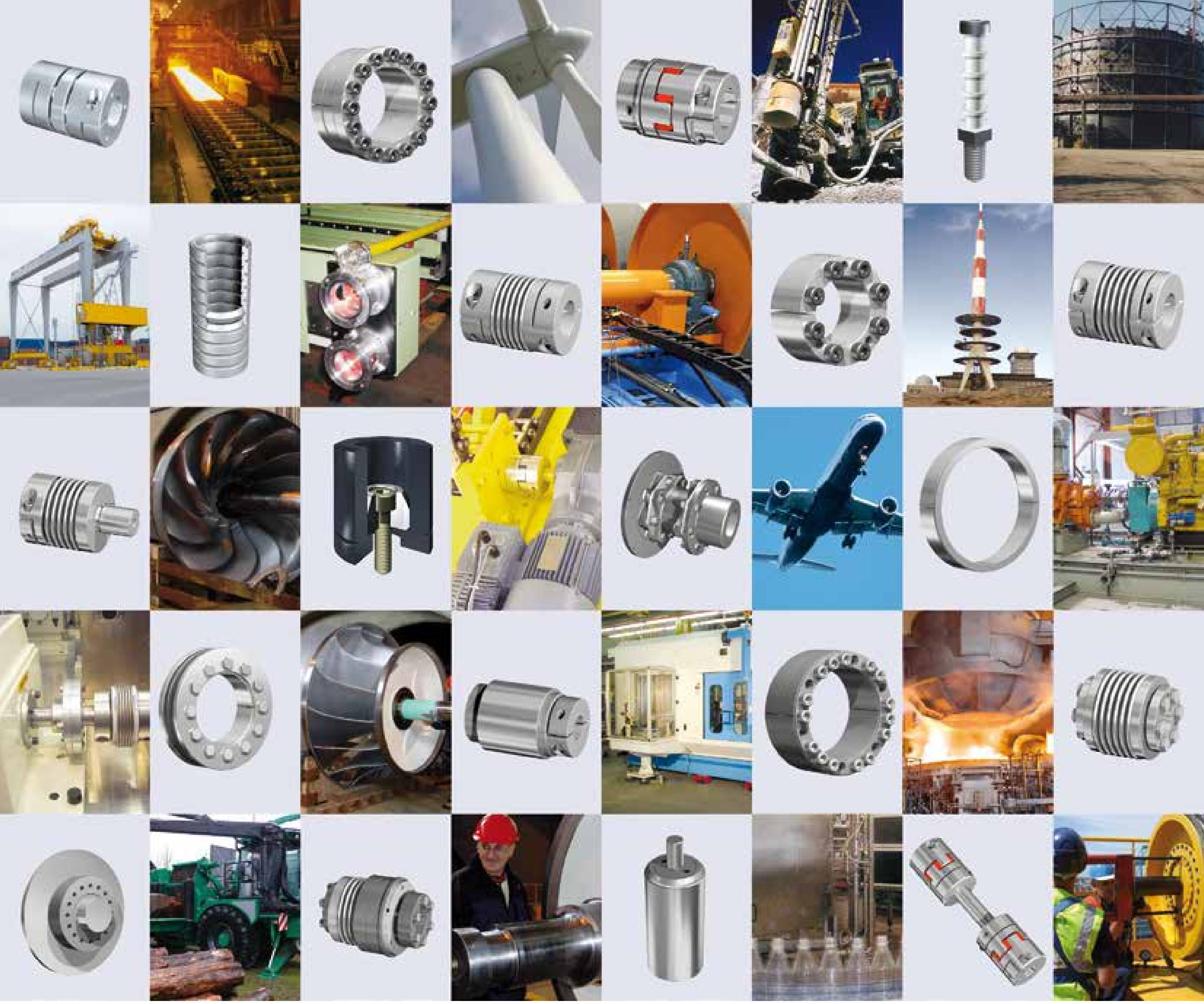
b = ________ mm

Loads:

T_1 = ________ N

α = ________ °

T_2 = ________ N



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