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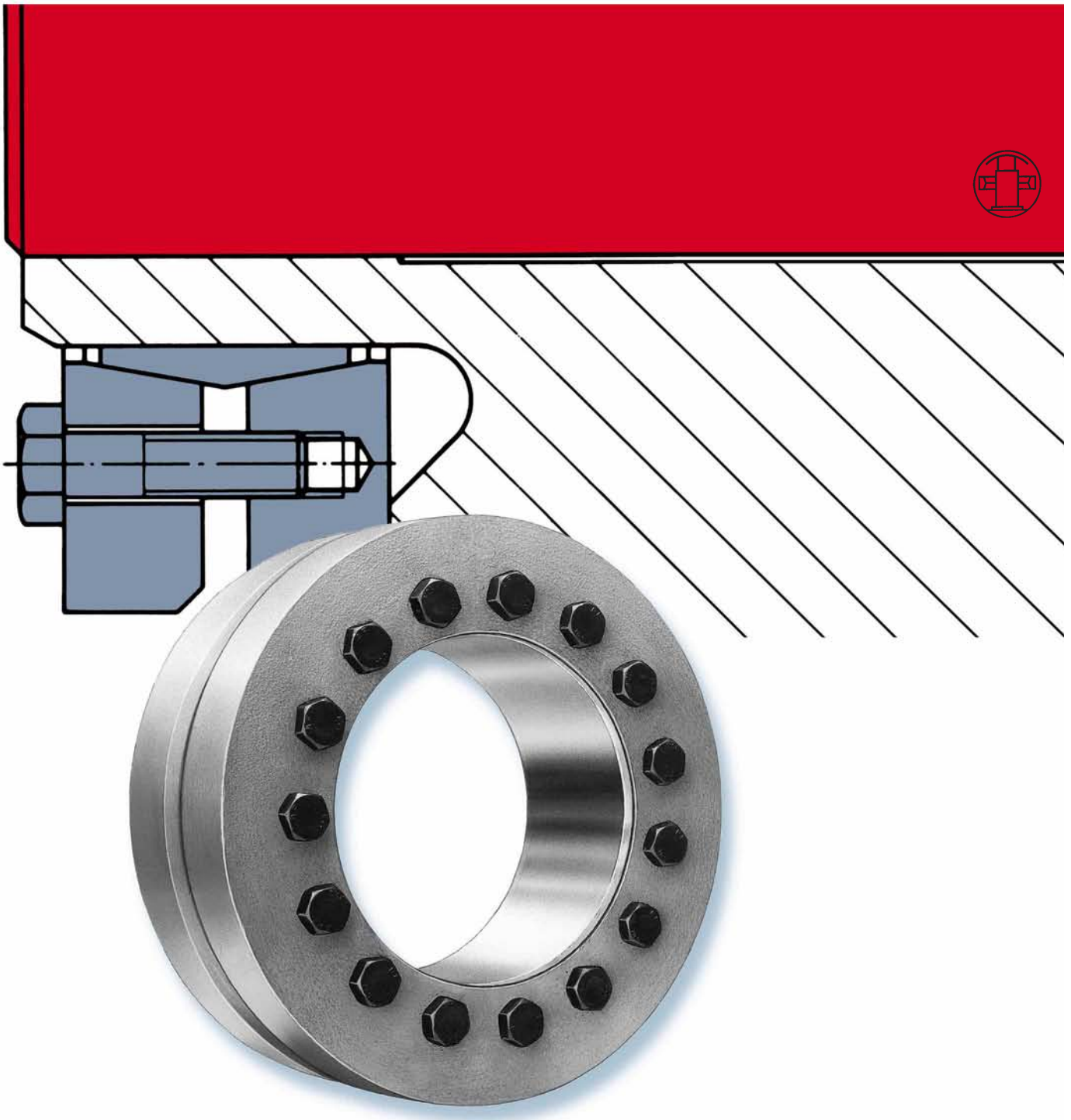
Catalogue

RINGFEDER®

Shrink Discs for external clamping



RINGFEDER Products are available from MARYLAND METRICS

P.O. Box 261 Owings Mills, MD 21117 USA email: sales@mdmetric.com web: http://mdmetric.com
phones: (410)358-3130 (800)638-1830 faxes: (410)358-3142 (800)872-9329

RINGFEDER

Locking Connections

RINGFEDER® Shrink Discs

Please note that our guarantee refers to our products only. Because of the unlimited number of applications and all different types of machines, it is not possible for our engineers to know all factors that may affect or change the technical data of our products.

We reserve the right to modify design by way of technical improvement.

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A certified company in accordance with DIN EN ISO 9001 and VDA 6.1

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RINGFEDER® Shrink Discs

The RINGFEDER® Locking Connection is a shrink fit - a shrink fit of a special kind.

Characteristics

For highly-stressed shaft-hub connections

The shrink fit is unsurpassable. No other shaft-hub connection can offer anywhere near the same performance regarding fatigue strength under alternating torsional stresses. These fits are nevertheless rare, as they call for involved calculations, extremely close machining tolerances, cause considerable trouble when fitting and removing the parts in question, and give rise to problems during repair work (exchangeability, adjustments and centering, etc.).

Fig. 1 · RINGFEDER® Shrink Disc

TRANSMISSION OF HIGH PERIPHERAL FORCES

By the provided number of locking screws in connection with lubricants containing MoS_2 on the cones and the slit inner ring remarkable forces without essential losses can be transmitted.

OPTIMUM DEPENDABILITY

We guarantee the torque/axial thrust transmission values as given in this publication, regardless of whether the connection is subjected to static, dynamic or impact loads. However, the values given in this catalogue must not be exceeded. For the contact surface hub/shaft a coefficient of friction $\mu = 0{,}12$ has been taken into consideration due to the oiled condition.

SIMPLIFIED MANUFACTURE

There are no high demands made to the surface qualities of shaft and hub.

PERFECT EXCHANGEABILITY

RINGFEDER® Shrink Discs need no stops or other mechanical devices of this type. Even when varying the nominal dimensions slightly, almost the same transmissible values can be achieved when using the same clearances.

EASY MOUNTING

The temperature difference between shaft and hub for shrink fits is eliminated. RINGFEDER® Shrink Discs are tightened using standard screws and standard tools. Machining or fitting work is not required.

EASY REMOVAL

After loosening the locking screws the RINGFEDER® Shrink Disc is released. The hub can be moved along the shaft. Shrink Discs RfN 4171 are provided with additional jack off threads.

RINGFEDER® Shrink Discs

LOW SUSCEPTIBILITY TO CONTAMINATION

When the locking screws are tightened the contact (functional) surfaces are pressed firmly together, thus preventing the ingress of dirt and moisture.

UNLIMITED APPLICATION RANGE

RINGFEDER® Shrink Discs are most suitable for securing all types of bosses and hubs on shafts and axles. They efficiently replace shrink fits, key and polygon connections, splined shafts, etc. These Shrink Discs are used for the connection of gearwheels, chain sprockets, levers, cams, cam plates, belt pulleys, brake drums, fly-wheels, couplings and clutches, shaftmounted gears, flanges, rope sheaves, track wheels, impellers, etc., and give every satisfaction in these and countless other applications.

EASY ADJUSTABILITY

RINGFEDER® Shrink Discs need no stops. Bosses and hubs can therefore be located and locked at any point on the shaft.

PERFECT TRUE RUNNING

Forming a frictional locking connection, RINGFEDER® Shrink Discs have absolutely no play.

FREEDOM FROM WEAR

Having no moving parts, RINGFEDER® Shrink Discs can be tightened and released as often as required. The locking screws are standard items and thus, readily available.

HIGH FATIGUE STRENGTH UNDER ALTERNATING TORSIONAL STRESSES

Neither shaft nor hub have keyways. Thus, the notch effect is minimized and a high polar section modulus is at the disposal of the designer.

OVERLOAD PROTECTION EFFECT

When the permissible load is exceeded, RINGFEDER® Shrink Discs will slip. By this, they can safeguard valuable machine components against damage. However, the Shrink Disc connection is subject to the same rules as all other frictional locking connections, and is not suitable for being used as an overload clutch.

EASY CALCULATIONS

This catalogue lists all necessary data in the form of quick-reference tables. The function values are only valid when using a solid shaft.

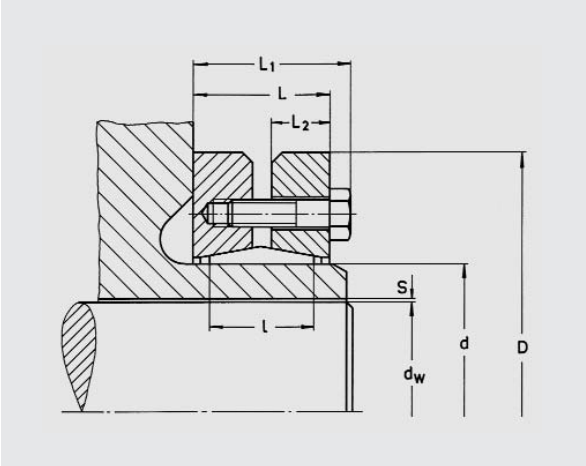

Fig. 2 · RINGFEDER® Shrink Disc

Explanations

D, D, L_1, L, L_2 = basic Shrink Disc dimensions (untightened condition)

S = clearance referring to the admissible tolerances in accordance with the diameter d_w

T_a = required tightening torque per screw (screws installed with MoS_2!)

p = approx. surface pressure on the hub extension (diameter d)

T = transmissible torque

F_{ax} = transmissible axial force

σ_V = calculated combined stress in the hub extension (d/d_w) under consideration of the tangential, radial and torsional stresses following the equation:

$$\sigma_V = \sqrt{2\left[(\sigma_x - \sigma_y)^2 + (\sigma_y - \sigma_z)^2 + (\sigma_z - \sigma_x)^2\right] + 3\tau^2}$$

Additional loads, e.g. tension, thrust or bending have to be taken into consideration accordingly.

The stated combined stresses allow a close estimation of the required hub material.

Function values:

The values T, F_{ax} and p are valid under the following assumptions:

The function values are calculated depending on the stated tightening torques. The locking screws are lubricated using MoS_2 (μ_{tot} = 0,1).

Also on the cones Molybdenum Disulphide is used (μ = 0,05). For the contact surfaces (d_w) the coefficient of friction for oiled condition (usual mounting condition) μ = 0,12 has been taken into consideration.

The chosen modulus of elasticity is 210 000 N/mm². (Lower values result in an increased figure for the values T and F_{ax} and at the same time in a reduced tangential stress - max. stress.)

Also for the calculation of the function values the max. clearances stated in tables on pages 8 and 16 have been taken into consideration.

The function values are only valid when using a solid shaft.

If an external clamping (shrink fit) is used on hollow shafts (see fig. 3) the function values will change.

In these cases do not hesitate to contact us. We like to be of assistance.

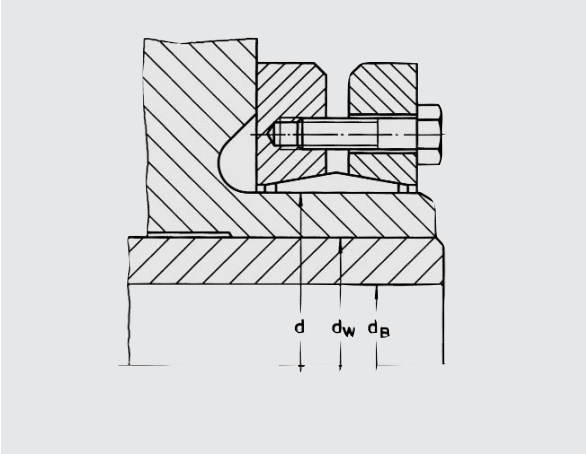

Fig. 3 · RINGFEDER® Shrink Disc application using a hollow shaft

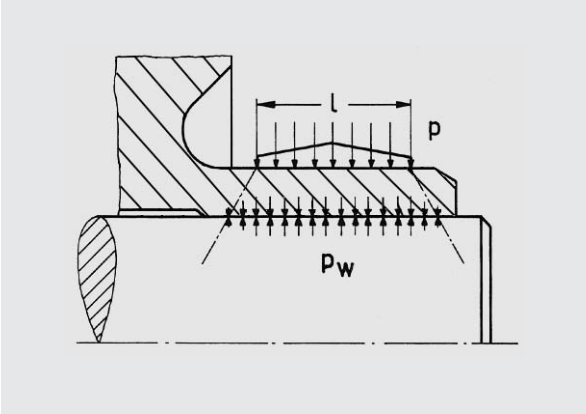

Fig. 4 · Distribution of contact pressure

Explanations

Function values

The assumptions for the calculation of the function values are as already described.

In case of additional loads (e.g. bending), variations concerning the frictional conditions, the clearances, shaft diameters (d_w) differing from those stated in our tables, or materials with a considerably different modulus of elasticity in comparison to steel, the function values will also vary. These variations are not directly proportional and a special calculation will be necessary.

We like to be of assistance with these calculations.

Resulting torque T_R

When torque and axial force act simultaneously, one has to calculate the resulting torque T_R, which as the maximum value has to be compared with the catalogue value T.

$$T_R = \sqrt{T_g^2 + \left(F_g \cdot \frac{d_w}{2}\right)^2} < T$$

Where:

T_g = max. torque to be transmitted
F_g = max. axial force to be transmitted
d_w = shaft diameter
T = transmissible torque

Standard Series RfN 4071
page 8 up to 11

This range is used for most Shrink Disc applications and is also available for larger sizes than stated in the catalogue. By varying the tightening torques of the screws the Shrink Disc is adaptable to design specifications.

Heavy Duty Series RfN 4091
pages 12, 13

In those applications where higher loads have to be transmitted safely, this range offers adequate Shrink Discs. The same diameters (d/d_w) can be chosen.

Light Duty Series RfN 4051
pages 14, 15

The Shrink Discs of this range are advantageous with smaller dimensions having at the same time lower load requirements.

Two-Part Series RfN 4171
pages 16, 17

Particularly designed for applications where higher revolutions may occur. The allocation of the shafts and the transmissible torques are comparable with the series RfN 4071.

Mini Series RfN 4073
page 18

The Shrink Discs of this range are used for axial face seals and for those applications where reduced mounting space is available.

Shrink Discs, split and half form
pages 28, 29 of the appendix

Supplementary dimensions for these designs may be found in the appendix. Moreover, the required screw lengths can be determined.

RINGFEDER® Shrink Discs RfN 4071

Standard Series · Dimensions · Explanations page 6

		Dimensions								Locking screws DIN 931–10.9		
d_w	d	D	L_1	L	d_1	d_2	L_2	l	e	Qty.	Thread	Weight
				mm								kg
10 11 12	**14**	37	15	12	24	15	5	9	1,5	3	M 4 x 10	0,1
12 13 14	**16**	41	18,5	15	27	17	6,25	12	1,5	3	M 5 x 12	0,1
14 15 16	**18**	44	18,5	15	29	19	6,25	12	1,5	4	M 5 x 12	0,1
15 16 17	**20**	46	20,5	17	32	22	7	12	2,5	5	M 5 x 15	0,15
19 20 21	**24**	50	23	19,5	36	26	8	14	2,75	6	M 5 x 18	0,2
24 25 26	**30**	60	25	21,5	44	32	9	16	2,75	7	M 5 x 18	0,3
28 30 31	**36**	72	27,5	23,5	52	38	10	18	2,75	5	M 6 x 20	0,4
30 31 32	**40**	75	28,5	24,5	57	43	10,5	19	2,75	6	M 6 x 20	0,54
32 35 36	**44**	80	29,5	25,5	61	47	11	20	2,75	7	M 6 x 20	0,6
38 40 42	**50**	90	31,5	27,5	70	53	12	22	2,75	8	M 6 x 25	0,8
42 45 48	**55**	100	34,5	30,5	75	58	13	23	3,75	8	M 6 x 25	1,1
48 50 52	**62**	110	34,5	30,5	86	66	13	23	3,75	10	M 6 x 25	1,3
50 55 60	**68**	115	34,5	30,5	86	72	13	23	3,75	10	M 6 x 25	1,4
55 60 65	**75**	138	38	32,5	100	79	14	25	3,75	7	M 8 x 30	1,7
60 65 70	**80**	145	38	32,5	100	84	14	25	3,75	7	M 8 x 30	1,9
65 70 75	**90**	155	44,5	39	114	94	17	30	4,5	10	M 8 x 35	3,3
70 75 80	**100**	170	49,5	44	124	104	19	34	5	12	M 8 x 35	4,7
75 80 85	**110**	185	57	50	136	114	22	39	5,5	9	M 10 x 40	5,9

Surfaces

For shaft and hub (diameters d_w and d):
peak-to-valley height: $R_a \leqq$ 3,2 µm.

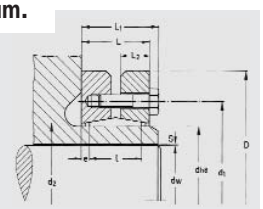

Fig. 5 · RINGFEDER® Shrink Disc

d_w above	d_w up to	ISO	max. clearance S mm
10	18	H6/j6	0,014
18	30		0,017
30	50	H6/h6	0,032
50	80	H6/g6	0,048
80	120	H7/g6	0,069
120	180		0,079
180	250		0,090
250	315		0,101
315	400		0,111
400	500		0,123

Clearances considered for the calculation of the function values:

Any other tolerances can be chosen. As long as the above stated max. clearance is not exceeded, there will be no variations of the function.

RINGFEDER® Shrink Discs RfN 4071

Standard Series · Function values depending on the tightening torque T_A

Transmissible torques / axial-forces					Transmissible torques / axial-forces					Transmissible torques / axial-forces					
T_A	T or	F_{ax}	p	σ_v	T_A	T or	F_{ax}	p	σ_v	T_A	T or	F_{ax}	p	σ_v	d_w
Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		mm
										2	18 27 35	5,3 6,6 8	229	406 416 489	10 11 12
					4	45 60 80	10,6 12,4 14,2	250	412 467 632	3	31 43 58	7,2 8,7 10,3	188	349 372 483	12 13 14
					4	85 100 130	16,1 18,1 20,1	297	464 553 757	3	60 74 94	11,4 13,1 14,7	223	371 426 573	14 15 16
					4	110 130 152	19 21 23	333	467 520 623	3	84 101 118	14 15 17	250	373 402 476	15 16 17
					4	170 210 250	25 27 29	286	430 471 564	3	140 180 210	18 19 21	214	349 376 439	19 20 21
					4	300 335 370	29 31 33	233	347 371 419	3	210 240 265	21 22 24	175	284 300 331	24 25 26
12	440 570 630	50 58 58	307	396 446 541	8	340 420 440	35 38 38	209	293 322 408	7	275 340 355	28 32 31	176	259 281 365	28 30 31
12	605 607 660	62 60 63	314	400 452 465	8	415 401 440	39 36 39	209	280 347 352	7	356 338 374	33 31 33	183	253 322 326	30 31 32
12	710 780 860	64 74 77	317	438 448 763	8	420 580 640	40 47 50	216	344 345 352	7	340 475 520	32 38 41	182	315 312 317	32 35 36
12	940 1160 1380	79 86 92	289	391 405 435	8	670 780 880	50 55 60	197	305 311 325	7	540 635 720	40 45 49	166	277 280 291	38 40 42
12	1160 1520 1880	79 88 97	252	344 362 416	8	720 880 1100	50 57 64	171	269 277 307	7	590 740 900	40 46 53	145	246 251 273	42 45 48
12	1850 2200 2400	100 111 115	279	357 367 425	8	1150 1320 1400	67 72 72	190	273 278 332	7	920 1040 1100	55 59 59	160	246 249 302	48 50 52
12	2000 2500 3150	97 106 120	255	319 372 420	8	1150 1350 1800	61 67 80	173	247 295 319	7	900 1050 1450	50 54 66	146	223 271 288	50 55 60
30	2500 3200 3950	119 137 155	273	368 375 412	20	1450 1850 2400	74 88 102	186	293 294 312	15	950 1250 1650	48 60 72	136	252 249 258	55 60 65
30	3200 3900 4600	124 140 158	256	345 353 388	20	1650 2100 2650	77 90 104	174	274 275 293	15	1100 1450 1850	51 62 73	128	236 234 243	60 65 70
30	4750 6000 7250	170 190 210	271	345 350 368	20	2500 3150 3700	108 123 139	184	269 270 278	15	1680 2140 2600	72 84 97	135	229 226 230	65 70 75
30	6900 7500 9000	195 220 240	258	323 325 334	20	3150 3700 4500	125 141 157	176	252 251 255	15	2080 2530 3100	83 96 109	129	213 211 211	70 75 80
59	7200 9000 10800	229 252 262	244	302 303 343	40	4500 5700 6750	144 161 165	166	235 234 273	32	3400 4350 5050	107 122 123	133	208 206 245	75 80 85

Fig. 6 · RINGFEDER® Shrink Disc

Examples for ordering

Designation of a Shrink Disc with inner diameter d = 140 mm:

RINGFEDER® Shrink Disc

Standard Series	**140 RfN 4071**
Heavy Duty Series	**140 RfN 4091**
Light Duty Series	**140 RfN 4051**
Two-Part Series	**140 RfN 4171**
Mini Series	**140 RfN 4073**

RINGFEDER® Shrink Discs RfN 4071

Standard Series · Basic Dimensions · Explanations page 6 · Further dimensions on request

d_w	d	Dimensions D	L_1	L	d_1	d_2	L_2	l	e	Locking screws DIN 931–10.9 Qty.	Thread	Weight
		mm										kg
85 90 95	125	215	61	54	180	134	23	42	6	12	M 10 x 40	8,3
95 100 105	140	230	68,5	60,5	175	146	26	46	7,25	10	M 12 x 45	10
105 110 115	155	265	72,5	64,5	192	165	28	50	7,25	12	M 12 x 50	15
115 120 125	165	290	81	71	210	175	31	56	7,5	8	M 16 x 55	22
125 130 135	175	300	81	71	220	185	31	56	7,5	8	M 16 x 55	22
135 140 145	185	330	96	86	236	195	38	71	7,5	10	M 16 x 55	37
140 150 155	195	350	96	86	246	210	38	71	7,5	12	M 16 x 65	41
150 155 160	200	350	96	86	246	210	38	71	7,5	12	M 16 x 65	41
160 165 170	220	370	114	104	270	230	47	88	8	15	M 16 x 80	54
170 180 190	240	405	122	109	295	248	49	92	8,5	12	M 20 x 80	67
190 200 210	260	430	133	120	321	268	54	103	8,5	14	M 20 x 90	82
210 220 230	280	460	147	134	346	288	60	114	10	16	M 20 x 100	102
230 240 245	300	485	155	142	364	308	64	122	10	18	M 20 x 100	118
240 250 260	320	520	155	142	386	328	64	122	10	20	M 20 x 100	131
250 260 270	340	570	169	156	408	348	71	134	11	24	M 20 x 110	186
270 280 285	350	580	175	162	432	358	73	140	11	24	M 20 x 110	195
280 290 295	360	590	175	162	432	368	73	140	11	24	M 20 x 110	204
290 300 310	380	645	183	168	458	387	76	144	12	20	M 24 x 120	239
300 310 320	390	660	183	168	468	397	76	144	12	21	M 24 x 120	260
315 320 330	400	680	183	168	480	407	76	144	12	21	M 24 x 120	280
330 340 350	420	690	203	188	504	427	86	164	12	24	M 24 x 130	316
340 350 360	440	750	217	202	527	447	91	177	12,5	24	M 24 x 140	408
360 370 380	460	770	217	202	547	468	91	177	12,5	28	M 24 x 140	420
380 390 400	480	800	228	213	570	488	96	188	12,5	30	M 24 x 140	505
400 410 420	500	850	230	213	590	508	96	188	12,5	24	M 27 x 150	575

RINGFEDER® Shrink Discs RfN 4071

Standard Series · Function values depending on tightening torque T_A

Transmissible torques		axial-forces			Transmissible torques		axial-forces			Transmissible torques		axial-forces			
T_A	T or	F_{ax}	p	σ_v	T_A	T or	F_{ax}	p	σ_v	T_A	T or	F_{ax}	p	σ_v	d_w
Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		mm
	11000	296		345		6800	182		274		5100	133		245	85
59	13000	324	266	345	40	8150	203	181	270	32	6100	151	145	241	90
	15000	352		346		9540	224		270		7240	170		239	95
	15100	367		331		9400	228		259		7050	168		230	95
100	17600	396	264	331	69	11100	250	179	257	55	8300	186	143	227	100
	20100	425		331		12850	272		256		9700	205		225	105
	22000	447		320		13750	280		249		10200	208		218	105
100	25000	478	263	320	69	15800	303	179	247	55	12000	228	142	216	110
	28000	509		322		17900	326		247		13600	248		215	115
	31000	595		328		19850	381		250		15000	286		217	115
250	35000	630	277	329	170	22700	408	189	250	135	17200	309	150	216	120
	39000	655		343		25300	425		263		19200	322		228	125
	36000	605		334		22900	385		247		17100	288		216	125
250	41000	639	261	321	170	26000	411	178	247	135	19600	310	141	215	130
	45000	675		324		29000	438		248		22000	333		215	135
	52000	778		303		33000	498		232		24500	374		203	135
250	57000	819	244	306	170	36500	529	166	233	135	27500	400	132	203	140
	62000	861		312		40000	561		236		30400	427		204	145
	65000	933		327		42000	603		248		31000	456		214	140
250	76000	1025	277	335	170	49500	670	189	251	135	38000	514	150	215	150
	81500	1071		342		53500	705		255		41500	543		217	155
	74000	990		322		48000	645		242		36500	492		208	150
250	80000	1035	270	327	170	52000	678	184	245	135	39800	520	146	210	155
	86000	1080		334		56000	712		248		43000	549		211	160
	95000	1190		295		61000	770		222		46200	585		191	160
250	102000	1239	248	298	170	66000	807	169	223	135	50200	616	134	191	165
	110000	1290		303		71500	845		226		55000	648		193	170
	120000	1464		309		80500	982		234		64200	783		205	170
490	138000	1576	272	315	340	93000	1066	190	237	280	74500	855	157	206	180
	156000	1675		334		105000	1135		251		84500	913		219	190
	164000	1760		306		110500	1183		232		88200	944		203	190
490	184000	1880	262	314	340	125000	1276	183	236	280	100000	1024	151	206	200
	205000	2010		329		140000	1370		245		113000	1105		212	210
	217000	2090		295		146500	1411		224		117500	1131		194	210
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	270000	2350		324		184000	1608		240		148500	1300		207	230
	275000	2431		291		186000	1648		218		150000	1325		189	230
490	295000	2567	246	303	340	201000	1750	172	225	280	162000	1410	142	194	240
	315000	2636		312		215000	1800		231		174000	1455		200	245
	312000	2647		293		211000	1790		218		170000	1445		189	240
490	340000	2786	257	301	340	232000	1900	179	223	280	187000	1530	148	192	250
	374000	2900		320		258000	2000		236		209000	1620		204	260
	390000	3119		295		264000	2115		220		212000	1700		189	250
490	422500	3249	264	307	340	286000	2200	185	230	280	231000	1780	152	198	260
	460000	3400		317		314000	2320		236		254000	1880		202	270
	442000	3276		289		300000	2225		217		241000	1790		187	270
490	480000	3430	245	300	340	327000	2340	172	223	280	264000	1890	141	191	280
	500000	3500		307		341000	2400		228		275000	1940		195	285
	463000	3310		282		314000	2250		211		253000	1810		182	280
490	502000	3461	238	292	340	342000	2360	167	217	280	277000	1910	137	186	290
	522000	3536		298		357000	2420		222		289000	1960		189	295
	567000	3910		300		388000	2680		223		309000	2135		189	290
840	610000	4080	263	307	590	418000	2800	185	228	480	335000	2240	150	193	300
	658000	4248		320		453000	2925		236		363000	2345		200	310
	624000	4160		305		428000	2855		226		341000	2280		192	300
840	671000	4330	270	314	590	461000	2980	189	232	480	368000	2385	154	196	310
	718000	4484		331		494000	3090		244		395000	2470		207	320
	670000	4260		302		459000	2920		224		370000	2355		189	315
840	695000	4345	263	310	590	477000	2985	185	231	480	381000	2385	150	195	320
	744000	4500		324		512000	3110		239		410000	2490		202	330
	780000	4850		295		540000	3330		219		436000	2655		186	330
840	840000	5040	251	306	590	580000	3465	176	226	480	465000	2775	143	191	340
	900000	5220		322		625000	3600		236		502000	2890		198	350
	806000	4740		267		551000	3240		199		438000	2580		169	340
840	860000	4910	223	274	590	590000	3370	156	203	480	470000	2690	126	173	350
	917000	5090		285		630000	3500		210		504000	2805		177	360
	1000000	5670		293		690000	3900		216		555000	3115		184	360
840	1070000	5860	248	301	590	740000	4040	174	222	480	595000	3235	142	188	370
	1140000	6050		314		790000	4180		230		635000	3360		194	380
	1170000	6150		282		804000	4230		207		643000	3385		176	380
840	1240000	6350	240	292	590	854000	4380	168	214	480	684000	3510	137	180	390
	1310000	6550		306		906000	4530		223		727000	3635		187	400
	1312000	6560		284		905000	4525		209		738000	3690		178	400
1250	1380000	6730	242	297	870	951000	4640	170	219	720	776000	3790	140	186	410
	1455000	6930		311		1005000	4790		228		822000	3920		194	420

RINGFEDER® Shrink Discs RfN 4091

Heavy Duty Series · Basic Dimensions · Explanations page 6 · Further dimensions on request

		Dimensions								Locking screws DIN 931–10.9		
d_w	d	D	L_1	L	d_1	d_2	L_2	l	e	Qty.	Thread	Weight
				mm								kg
85 90 95	125	215	73	65	160	129	28	55	5	10	M 12 x 50	11
95 100 105	140	230	82	74	175	144	32	60	7	12	M 12 x 55	13
105 110 115	155	265	88	80	198	164	35	66	7	15	M 12 x 60	20
115 120 125	165	290	98	88	210	174	38	72	8	10	M 16 x 65	26
125 130 135	175	300	98	88	220	184	38	72	8	10	M 16 x 65	29
135 140 145	185	330	122	112	236	194	50	92	10	14	M 16 x 80	47
140 150 155	195	350	122	112	246	204	50	92	10	14	M 16 x 80	53
145 150 155	200	350	122	112	246	204	50	92	10	15	M 16 x 80	50
160 165 170	220	370	144	134	270	224	60	114	10	20	M 16 x 90	65
170 180 190	240	405	157	144	295	244	65	120	12	15	M 20 x 100	87
190 200 210	260	430	173	160	321	265	72	136	12	18	M 20 x 110	100
210 220 230	280	460	185	172	346	285	78	148	12	21	M 20 x 120	132
230 240 245	300	485	189	176	364	305	80	152	12	22	M 20 x 120	140
240 250 260	320	520	197	184	386	325	82	160	12	24	M 20 x 130	165
250 260 270	340	570	215	200	420	345	92	176	12	21	M 24 x 130	240
270 280 285	350	580	215	200	425	355	92	176	12	21	M 24 x 130	247
280 290 295	360	590	219	204	432	365	92	180	12	22	M 24 x 140	250
290 300 310	380	645	219	204	458	387	92	180	12	22	M 24 x 140	320
300 310 320	390	660	227	212	468	397	96	188	12	24	M 24 x 140	350
315 320 330	400	680	227	212	480	407	96	188	12	24	M 24 x 140	370
330 340 350	420	690	253	238	504	427	111	214	12	30	M 24 x 150	410
340 350 360	440	750	269	252	527	448	115	224	14	24	M 27 x 170	540
360 370 380	460	770	269	252	547	468	115	224	14	28	M 27 x 170	540
380 390 400	480	800	291	274	580	488	128	246	14	30	M 27 x 180	650
400 410 420	500	850	291	274	600	508	128	246	14	32	M 27 x 180	750

RINGFEDER® Shrink Discs RfN 4091

Heavy Duty Series · Function values depending on the tightening torque T_A

Transmissible torques and axial-forces					Transmissible torques and axial-forces						
T_A	T or F_{ax}		p	σ_v	T_A	T or F_{ax}		p	σ_v		d_w
Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²			mm
	15000	355		331		9170	215		263		85
100	17500	388	248	331	69	10800	240	169	262		90
	20000	422		337		12700	267		262		95
	20600	433		313		12600	266		247		95
100	23500	469	243	314	69	14700	290	165	246		100
	26500	500		318		16800	320		245		105
	28600	550		310		18000	345		241		105
100	32500	590	249	311	69	20500	370	170	240		110
	36400	630		314		23200	400		241		115
	41000	740		324		27000	470		247		115
250	46000	785	270	328	170	30500	500	184	248		120
	50700	815		344		33000	525		262		125
	47000	750		316		30000	475		244		125
250	52000	795	254	320	170	33000	510	173	244		130
	57000	840		325		37000	545		247		135
	72000	1100		327		47000	700		248		135
250	78000	1150	263	334	170	52000	750	180	251		140
	86000	1200		345		57000	790		257		145
	75000	1075		310		48000	688		234		140
250	88000	1180	250	319	170	57000	770	171	239		150
	96000	1235		330		62000	810		245		155
	85000	1170		317		55000	760		239		145
250	92500	1230	261	322	170	60000	800	178	241		150
	100000	1290		330		65400	840		245		155
	127000	1590		309		82500	1030		230		160
250	136000	1650	255	316	170	89000	1080	174	234		165
	146500	1720		325		96000	1130		239		170
	155000	1820		305		103500	1220		230		170
490	176000	1960	261	315	340	119000	1320	182	236		180
	198000	2080		341		134000	1410		254		190
	213000	2260		308		144000	1510		233		190
490	240000	2420	255	322	340	163000	1630	178	240		200
	268000	2580		346		184000	1750		255		210
	285000	2740		310		194000	1850		232		210
490	320000	2910	254	327	340	218000	1980	178	242		220
	355000	3090		356		243000	2110		261		230
	341000	2960		298		231000	2010		222		230
490	376000	3130	242	316	340	256000	2130	169	233		240
	394000	3215		327		269000	2195		241		245
	378000	3150		282		256000	2130		210		240
490	415000	3325	235	294	340	282000	2260	164	217		250
	451000	3470		318		307500	2365		234		260
	489500	3910		295		333000	2660		220		250
840	530000	4075	253	310	590	361000	2775	178	231		260
	578000	4275		326		395500	2930		241		270
	556000	4122		304		379000	2812		225		270
840	604000	4320	247	320	590	414000	2960	173	235		280
	629000	4415		331		432000	3034		242		285
	612000	4370		303		418000	2985		224		280
840	663000	4570	245	320	590	455000	3135	172	235		290
	689000	4670		332		473500	3210		243		295
	618000	4270		279		422000	2910		208		290
840	668000	4455	233	290	590	457000	3050	164	215		300
	719000	4645		307		494000	3190		226		310
	708000	4715		284		483000	3220		211		300
840	762000	4910	236	297	590	522000	3370	166	219		310
	814500	5090		318		559500	3495		234		320
	765000	4855		285		519000	3300		210		315
840	788000	4927	231	294	590	539500	3375	162	218		320
	845000	5125		312		580000	3520		229		330
	999000	6055		302		684000	4145		222		330
840	1068000	6285	241	318	590	734000	4320	169	233		340
	1140000	6515		342		786000	4495		248		350
	1058000	6230		283		724000	4260		210		340
1250	1130000	6460	231	295	870	775000	4430	163	218		350
	1204000	6690		312		828000	4605		229		360
	1320000	7440		312		922000	5120		229		360
1250	1420000	7700	257	326	870	982000	5310	181	238		370
	1500000	7950		346		1040000	5495		251		380
	1535000	8080		302		1056000	5560		222		380
1250	1626000	8340	241	318	870	1121000	5752	170	232		390
	1720000	8600		340		1189000	5945		246		400
	1750000	8750		309		1200000	6040		225		400
1250	1840000	8980	246	328	870	1270000	6190	173	239		410
	1940000	9250		350		1340000	6390		253		420

For lower transmissible torques, lower hub stresses and other values relative to the diameters (d/d_w) see Standard Series page 10 or Light Duty Series page 14.

RINGFEDER® Shrink Discs RfN 4051

Light Duty Series · Basic Dimensions · Explanations page 6 · Further dimensions on request

		Dimensions								Locking screws DIN 931–10.9		
d_w	d	D	L_1	L	d_1	d_2	L_2	l	e	Qty.	Thread	Weight
				mm								kg
95 100 105	125	185	58	51	158	129	22	39	6	8	M 10 x 40	6
110 120 125	140	220	58	51	175	144	22	39	6	9	M 10 x 40	8
130 135 140	155	245	58	51	192	159	22	39	6	11	M 10 x 40	10
135 140 145	165	260	70	62	210	169	26	46	8	10	M 12 x 50	14
145 150 155	175	275	70	62	220	179	26	46	8	11	M 12 x 50	16
155 160 165	185	295	70	62	225	189	26	46	8	12	M 12 x 50	20
165 170 175	195	315	80	72	237	199	31	56	8	15	M 12 x 55	27
175 180 185	200	330	80	72	242	204	31	56	8	16	M 12 x 55	30
180 190 200	220	345	94	84	265	224	36	66	9	10	M 16 x 65	35
200 210 215	240	370	94	84	290	244	36	66	9	12	M 16 x 65	44
220 230 235	260	395	102	92	310	265	40	72	10	14	M 16 x 70	48
230 240 250	280	425	114	104	333	285	46	84	10	16	M 16 x 75	60
250 260 270	300	460	114	104	358	305	46	84	10	18	M 16 x 75	75
270 280 290	320	495	116	106	378	325	48	84	11	20	M 16 x 75	84
290 300 305	340	535	116	106	402	345	48	84	11	21	M 16 x 75	100
300 305 310	350	545	135	122	413	355	54	100	11	16	M 20 x 90	120
300 310 320	360	555	135	122	423	365	54	100	11	16	M 20 x 90	125
320 325 330	380	585	149	136	442	387	60	112	12	18	M 20 x 100	150
330 340 350	390	595	149	136	452	397	60	112	12	20	M 20 x 100	156
340 350 360	400	615	149	136	462	407	60	112	12	21	M 20 x 100	170
350 360 370	420	630	157	144	485	427	64	120	12	22	M 20 x 100	185
370 380 390	440	660	157	144	505	447	64	120	12	24	M 20 x 100	205
390 400 410	460	685	171	158	527	468	71	132	13	28	M 20 x 110	235
410 420 425	480	715	171	158	547	488	71	132	13	28	M 20 x 110	255
425 430 440	500	750	171	158	567	508	71	132	13	30	M 20 x 110	285

RINGFEDER® Shrink Discs RfN 4051

Heavy Duty Series · Function values depending on the tightening torque T_A

Transmissible torques and axial-forces					Transmissible torques and axial-forces					Transmissible torques and axial-forces					
T_A	T or F_{ax}		p	σ_v	T_A	T or F_{ax}		p	σ_v	T_A	T or F_{ax}		p	σ_v	d_w
Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		Nm	Nm	kN	N/mm²		mm
	10550	220		278		6500	135		227		4750	100		205	95
59	12100	240	191	280	40	7650	150	131	226	32	5750	115	104	203	100
	13800	260		288		8900	170		228		6800	128		204	105
	14800	265		268		9400	170		214		7050	125		192	110
59	18640	310	192	281	40	12100	200	131	219	32	9400	155	105	194	120
	20500	325		315		13500	215		243		10500	165		215	125
	24000	365		293		15600	240		231		12000	180		204	130
59	26400	390	212	306	40	17300	255	145	237	32	13500	200	116	208	135
	29000	410		334		19250	275		252		15100	215		218	140
	32000	475		298		20800	305		231		16000	235		204	135
100	35200	500	224	308	69	23000	325	152	235	55	17800	250	122	206	140
	38500	530		327		25400	350		246		19700	270		213	145
	39000	535		302		25400	350		231		19700	270		202	145
100	42400	560	232	313	69	27900	370	158	237	55	21500	285	126	205	150
	46000	590		334		30500	390		249		23500	305		213	155
	46600	600		307		30600	392		232		23700	306		201	155
100	50300	625	240	319	69	33300	415	163	238	55	26000	324	130	205	160
	54000	650		341		36000	435		251		28200	340		214	165
	63000	760		306		41500	500		230		32300	390		198	165
100	67700	795	233	323	69	44900	525	159	240	55	35000	410	127	204	170
	72500	825		355		48400	550		258		37900	430		218	175
	74000	850		334		49000	565		246		38500	440		208	175
100	79500	890	243	368	69	53000	590	166	267	55	42000	465	132	223	180
	84500	915		440		56500	615		315		44500	480		261	185
	82800	920		277		54600	605		209		42000	465		180	180
250	93500	980	220	306	170	62000	650	151	230	135	48000	506	120	196	190
	105000	1055		367		70900	705		267		55500	550		223	200
	113000	1135		304		75300	750		227		58300	580		193	200
250	127500	1210	243	330	170	85000	810	166	242	135	66400	630	131	203	210
	134500	1250		356		90300	840		258		70500	655		215	215
	149000	1350		303		99500	900		223		77000	700		190	220
250	165000	1435	240	334	170	111000	960	163	241	135	86000	750	130	203	230
	173000	1475		364		116000	990		260		91000	780		216	235
	171000	1485		270		113000	980		201		87500	760		171	230
250	189000	1570	218	287	170	126000	1050	149	211	135	98000	815	118	178	240
	208000	1660		324		139000	1110		234		109000	870		194	250
	215000	1720		279		143000	1140		206		111000	885		174	250
250	234000	1800	229	303	170	156000	1200	157	223	135	122000	935	124	187	260
	255000	1890		342		170000	1270		247		133000	992		205	270
	260000	1940		293		174000	1290		216		136000	1000		182	270
250	284000	2030	239	313	170	191000	1365	163	228	135	149000	1065	129	190	280
	306000	2125		355		208000	1430		254		163000	1120		209	290
	300000	2070		288		200000	1380		211		156000	1080		177	290
250	324000	2160	236	309	170	218000	1450	161	224	135	170000	1135	127	186	300
	337000	2210		326		226000	1485		234		178000	1165		193	305
	372000	2485		292		256000	1705		217		208000	1385		187	300
490	385000	2540	230	304	340	265000	1745	161	224	280	216500	1420	133	192	305
	400000	2590		320		277000	1785		234		225000	1455		200	310
	360000	2400		270		245000	1640		202		199000	1330		175	300
490	388000	2500	223	284	340	265000	1720	156	211	280	216000	1395	129	182	310
	415000	2590		314		285000	1790		231		233000	1455		199	320
	435000	2720		268		297000	1860		201		240000	1505		174	320
490	451000	2780	213	275	340	309000	1900	149	205	280	250000	1545	123	177	325
	467000	2835		285		320000	1945		211		260000	1580		182	330
	505000	3060		285		346000	2100		212		280000	1700		182	330
490	540000	3175	230	304	340	372000	2190	161	224	280	303000	1780	132	191	340
	577000	3295		337		399000	2280		246		325000	1860		208	350
	550000	3235		291		378000	2225		216		307000	1805		186	340
490	587000	3360	236	311	340	405000	2315	165	228	280	330000	1885	136	195	350
	626000	3480		345		433000	2405		251		353500	1965		213	360
	578000	3300		265		396000	2265		198		321000	1835		170	350
490	617000	3425	219	277	340	425000	2355	154	206	280	344000	1915	126	176	360
	655000	3545		297		453000	2445		219		368000	1990		186	370
	677000	3660		274		465000	2515		203		378000	2045		174	370
490	719000	3785	229	287	340	495000	2610	160	211	280	403000	2121	132	181	380
	762000	3910		309		526500	2700		226		430000	2205		192	390
	840000	4320		283		580000	2975		208		472000	2420		178	390
490	890000	4460	232	299	340	615000	3075	162	218	280	500000	2510	134	186	400
	935000	4580		328		645000	3165		238		530000	2585		203	410
	891000	4350		275		613000	2990		204		498000	2430		174	410
490	941000	4480	222	290	340	649000	3090	156	214	280	529000	2518	128	182	420
	966000	4548		301		667500	3140		221		544000	2560		188	425
	986000	4645		275		679000	3195		204		552500	2600		175	425
490	1013000	4712	228	281	340	698000	3245	160	207	280	568000	2645	132	178	430
	1066000	4845		297		736500	3350		218		600000	2730		186	440

RINGFEDER® Shrink Discs RfN 4171

Two-Part Series · Basic dimensions, function values · Explanations page 6

Dimensions								Locking screws DIN 931–10.9			Weight	Axial-force	or	Torque		
d	d_w	D	L_1	L	l	e	d_1	Qty.	Thread	T_A	ca.	F_{ax}		T	p	σ_v
				mm						Nm	kg	kN		Nm	N/mm²	
24	19 20 21	50	22	18	16	2	36	4	M 6	12	0,20	22,5 25 27		185 214 244	345	534 562 652
30	24 25 26	60	24	20	18	2	44	6	M 6	12	0,31	38 40 43		390 430 479	366	523 562 629
36	28 30 31	72	28	22	20	2	52	5	M 8	30	0,46	55 58 60		655 742 792	425	546 639 710
44	34 35 36	80	30	24	22	2	61	5	M 8	30	0,55	50 53 56		726 790 859	315	500 502 509
50	38 40 42	90	32	26	24	3	68	7	M 8	30	0,79	76 80 89		1230 1370 1600	371	524 532 555
55	42 45 48	100	35	29	26	3	72	8	M 8	30	1,12	85 95 106		1524 1835 2174	336	476 492 550
62	48 50 52	110	35	29	26	3	80	8	M 8	30	1,32	87 93 97		1783 1990 2162	298	421 427 462
68	50 55 60	115	35	29	26	3	86	9	M 8	30	1,38	92 105 121		1962 2458 3100	306	412 442 487
75	55 60 65	138	38	31	27	4	100	8	M 10	59	2,20	131 150 168		3075 3826 4660	386	494 503 543
80	60 65 70	145	38	31	27	4	104	8	M 10	59	2,40	136 153 171		3472 4240 5090	362	464 473 511
90	65 70 75	155	45	38	34	4	114	10	M 10	59	3,30	165 185 205		4845 5830 6930	316	407 412 428
100	70 75 80	170	50	43	39	4	124	12	M 10	59	4,50	187 219 241		6230 7400 8700	295	376 379 388
110	80 85 90	185	57	49	44	5	136	10	M 12	100	6,10	248 265 290		8940 10170 11700	286	360 379 390
125	90 95 100	215	61	53	48	6	160	12	M 12	100	9,00	299 325 350		12100 13900 15700	281	357 361 367
140	100 105 110	230	67	58	52	6	173	10	M 14	160	11,00	324 348 372		15400 17300 19000	259	326 328 332
155	110 115 120	263	71	62	56	6	190	12	M 14	160	15,60	405 430 459		21000 23500 26000	263	322 323 327
165	120 125 130	290	78	68	61	7	204	10	M 16	250	22,00	477 497 526		27000 29500 32000	258	314 326 329

Surfaces

For shaft and hub (diameters d_w and d):
peak-to-valley height $R_a \leq 3{,}2$ µm.

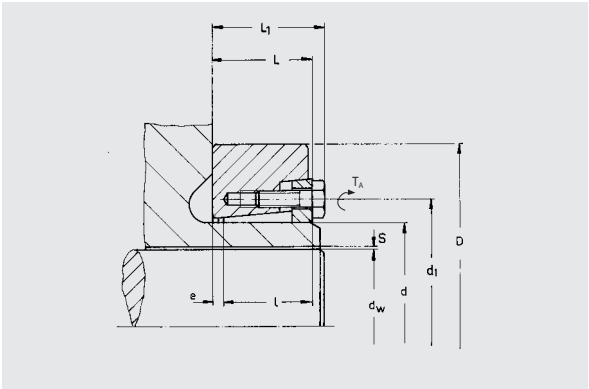


Fig. 7 · RINGFEDER® Shrink Disc RfN 4171

Clearances considered for the calculation of the function values:

d_w above	d_w up to	ISO	max. clearance S mm
10	18	H6/j6	0,014
18	30		0,017
30	50	H6/h6	0,032
50	80	H6/g6	0,048
80	120	H7/g6	0,069
120	180		0,079
180	250		0,090
250	315		0,101
315	400		0,111
400	500		0,123

Any other tolerances can be chosen. As long as the above stated max. clearance is not exceeded, there will be no variations of the function.

RINGFEDER® Shrink Discs RfN 4171

Two-Part Series · Continuation basic dimensions, function values · Explanations page 6

Dimensions								Locking screws DIN 931–10.9			Weight	Axial-force	Torque		
d	d_w	D	L_1	L	l	e	d_1	Qty.	Thread	T_A	ca.	F_{ax}	or T	p	σ_v
				mm						Nm	kg	kN	Nm	N/mm²	
175	130 135 140	300	78	68	60	8	214	12	M 16	250	23	600 623 665	37000 39990 44000	303	363 366 372
185	140 145 150	330	95	85	77	8	224	14	M 16	250	36	750 789 825	49500 54400 58500	255	318 324 335
200	150 155 160	350	95	85	77	8	240	16	M 16	250	40	865 906 945	61000 66000 71500	272	328 332 342
220	160 165 170	370	116	103	94	9	270	16	M 20	490	53	1300 1350 1400	98000 106000 112000	312	364 370 378
240	170 180 190	405	120	107	97	10	296	18	M 20	490	66	1430 1540 1620	115000 131500 146000	312	355 365 385
260	190 200 210	430	132	119	109	10	318	21	M 20	490	81	1770 1895 2000	160000 180000 200000	299	350 362 381
280	210 220 230	460	145	132	122	10	340	22	M 20	490	102	1950 2070 2190	194000 216300 239000	259	312 325 346
300	230 240 245	485	155	140	130	10	360	20	M 24	840	118	2550 2700 2750	280000 308000 321000	296	355 371 382
320	240 250 260	520	155	140	130	10	380	21	M 24	840	137	2643 2775 2890	300000 329900 357000	293	342 352 370
340	255 260 270	560	170	155	143	12	402	22	M 24	840	178	2750 2860 2960	357000 372000 405000	263	313 316 328
360	280 290 300	590	174	159	147	12	424	24	M 24	840	202	3200 3360 3500	450000 487000 525000	263	319 331 349
380	300 310 315	635	180	163	149	14	448	18	M 27	1250	247	3220 3350 3420	480000 520000 538000	243	297 309 316
390	310 315 320	635	180	163	149	14	458	18	M 27	1250	240	3250 3300 3350	503000 522000 538000	237	290 296 304
400	315 320 325	650	190	173	159	14	475	20	M 27	1250	260	3610 3660 3740	568000 586000 605000	240	293 300 306
420	325 330 335	670	200	183	168	15	495	21	M 27	1250	294	3695 3760 3840	600000 620000 642000	227	275 280 284
440	330 340 350	720	210	193	178	15	518	24	M 27	1250	368	4110 4260 4425	677000 724000 772000	233	276 282 290
460	350 360 370	770	210	193	178	15	538	25	M 27	1250	430	4370 4525 4680	762000 812000 865000	232	275 281 289
480	375 380 395	800	230	213	198	15	558	27	M 27	1250	514	4925 5010 5255	920000 950000 1036000	216	265 269 284
500	400 410 420	850	230	213	198	15	580	28	M 27	1250	590	5272 5400 5575	1052000 1105000 1168000	215	268 279 291

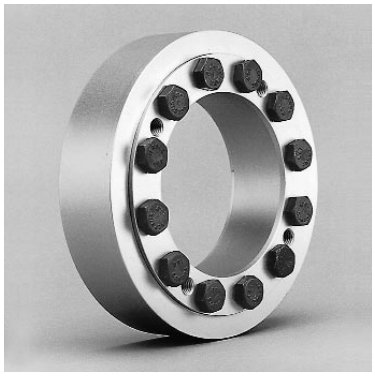


Fig. 8 · RINGFEDER® shrink disc RfN 4171

RINGFEDER® Shrink Discs RfN 4073

Mini Series · Basic dimensions, function values · Explanations page 6 · Clearances, surfaces page 8

		Dimensions										Locking screws DIN 931–10.9					
d_w	d	D	L_1	L	d_1	d_2	L_2	l	e	T	or F_{ax}	Qty.	Thread	T_A	p	σ_v	Weight
				mm						Nm	N			Nm	N/mm²		kg
11										32	7200					408	
12	16	42	14,8	12	30,0	18,0	5,0	9	1,5	41	8500	4	M 4 x 10	2,4	264	414	0,1
13										52	9900					440	
14										41	7300					310	
15	20	47	17,5	14	34,0	22,0	6,0	10	2,0	51	8400	4	M 5 x 12	3	193	311	0,13
16										62	9600					320	
16										68	10500					320	
17	22	50	18,5	15	37,0	24,0	6,5	10	2,5	80	11500	5	M 5 x 12	3	219	326	0,16
18										94	13000					341	
18										81	11000					294	
19	24	52	18,5	15	39,0	26,0	6,5	10	2,5	90	11500	5	M 5 x 12	3	201	321	0,16
20										105	13000					334	
20										77	9600					270	
22	28	56	18,5	15	43,0	30,0	6,5	10	2,5	103	11500	5	M 5 x 12	3	172	271	0,18
24										132	13500					289	
24										110	11000					244	
25	31	60	18,5	15	46,0	33,0	6,5	10	2,5	123	12000	5	M 5 x 12	3	156	246	0,2
27										154	14000					264	
28										161	14000					233	
30	36	66	18,5	15	52,0	38,5	6,5	10	2,5	194	16000	6	M 5 x 12	3	161	239	0,24
32										215	16500					328	
33										265	20000					325	
34	40	68	18,5	15	55,0	41,5	6,5	10	2,5	290	21000	6	M 5 x 12	4	194	329	0,23
35										317	22500					336	
38										402	26000					278	
40	46	80	22,5	19	63,0	49,0	8,0	14	2,5	471	29000	8	M 5 x 16	4	160	288	0,44
42										546	32500					326	
42										440	26000					249	
44	51	86	22,5	19	68,5	53,5	8,0	14	2,5	509	28500	8	M 5 x 16	4	144	255	0,49
45										545	30000					261	
46										555	30000					241	
48	56	91	22,5	19	73,0	59,0	8,0	14	2,5	630	32500	9	M 5 x 16	4	148	245	0,52
50										709	35000					258	
52										711	34000					285	
54	61	96	22,5	19	77,0	63,0	8,0	14	2,5	805	37000	10	M 5 x 16	4	151	291	0,56
56										906	40000					309	
58										854	36500					266	
60	66	100	22,5	19	82,0	68,0	8,0	14	2,5	953	39500	10	M 5 x 16	4	140	276	0,57
62										1059	42500					308	
62										1414	56500					279	
64	70	110	27,5	24	90,0	76,0	10,0	18	3,0	1557	60500	10	M 5 x 20	6	153	300	0,93
65										1632	62500					322	
66										1475	55000					256	
68	75	114	27,5	24	93,0	78,5	10,0	18	3,0	1617	59000	10	M 5 x 20	6	142	268	0,94
70										1765	63000					301	
71										1997	70000					269	
73	80	120	27,5	24	101,0	86,0	10,0	18	3,0	2162	74000	12	M 5 x 20	6	161	285	1,04
75										2334	77500					329	
76										2370	77500					246	
78	85	128	32,0	28	105,0	88,5	11,5	22	3,0	2559	82000	8	M 6 x 25	12	137	266	1,41
80										2756	86000					316	
82										2295	69500					253	
85	94	140	32,0	28	119,0	102,5	11,5	22	3,0	2600	76000	8	M 6 x 25	12	124	262	1,66
88										2924	83000					289	
92										2996	81000					239	
95	105	150	32,0	28	128,0	111,5	11,5	22	3,0	3328	87000	9	M 6 x 25	12	125	246	1,77
98										3679	93500					266	
100										3394	84500					225	
104	112	158	32,0	28	135,0	118,5	11,5	22	3,0	3854	92500	9	M 6 x 25	12	117	241	1,91
106										4096	96000					264	
106										3896	91500					208	
110	120	164	36,0	32	141,0	123,5	13,0	25	3,5	4400	100000	10	M 6 x 25	12	107	217	2,2
112										4666	104000					230	
115										4253	92000					191	
120	130	172	36,0	32	151,0	133,5	13,0	25	3,5	4890	101500	10	M 6 x 25	12	99	202	2,2
122										5100	104000					225	
125										5687	113500					208	
128	140	182	36,0	32	161,0	143,5	13,0	25	3,5	6138	119500	12	M 6 x 25	12	110	213	2,4
130										6448	124000					220	
135										6275	116000					194	
138	150	194	36,0	32	171,0	153,5	13,0	25	3,5	6732	121000	12	M 6 x 25	12	103	200	2,7
140										7046	125000					206	
142										6355	111000					179	
145	160	204	36,0	32	181,0	163,5	13,0	25	3,5	6799	117000	12	M 6 x 25	12	96	182	2,8
148										7259	122000					187	

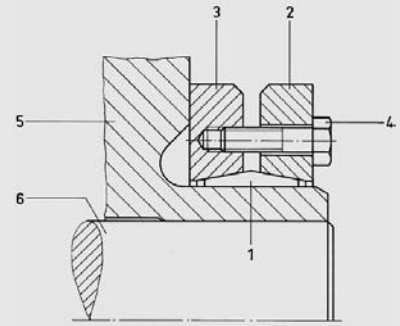
Installation and removal instructions

The following instructions are valid for the RINGFEDER® Shrink Discs:

Standard Series	**RfN 4071**
Heavy Duty Series	**RfN 4091**
Light Duty Series	**RfN 4051**
Two-Part Series	**RfN 4171**
Mini Series	**RfN 4073**

General instructions
RINGFEDER® Shrink Discs are delivered in a ready-to-install condition. Only the bigger and heavier Shrink Discs should be dismantled for easier installation.

Tightening torques for screws
The screws of the Shrink Discs can be tightened with different tightening torques. The maximum and minimum admissible values may be taken from the tables. **The tightening torque to be applied when mounting is shown on the respective assembly drawing or the RINGFEDER® mounting proposal.**



1 inner ring
2 front thrust ring
3 rear thrust ring
4 locking screw
5 hub
6 shaft

Fig. 9 · RINGFEDER® Shrink Disc RfN 4071 /4091/4051/4073 designation of the parts

Installation

1. The contact area for the Shrink Disc on the hub extension has to be cleaned and greased.

2. Distance pieces which have been used for shipping purposes only must be removed (does not apply to RfN 4171).

3. Do not tighten screws before the Shrink Disc is positioned on the hub extension.

4. Shrink Disc to be slipped on to the hub.

   Caution: Do not start to tighten the screws before the shaft is positioned in the hub bore. Otherwise deformations may occur.

5. The hub is to be fitted and positioned onto the shaft as required. For this purpose the contact surfaces of the shaft and the hub should be oiled (on these surfaces no MoS_2 or similar should be used).

6. Before final tightening of the screws both thrust rings should be squarely positioned by preloading the locking screws (does not apply to RfN 4171).

7. Finally the locking screws have to be tightened in several steps clockwise (not in a diametrically opposite sequence). The screws have to be tightened in two, three or more stages up to the indicated tightening torque.

Removal

1. For dismantling the screws should be released clockwise in several stages to avoid tilting of the thrust rings.

   Under no circumstances should the locking screws be taken out of the threads, as due to the pretensioning the Shrink Discs could jump apart (danger of accident). On the Shrink Discs RfN 4171 some of the locking screws can be refitted into the jack off threads and be used for releasing the Shrink Discs.

2. The shaft can be taken out of the hub, i.e. the hub can be withdrawn from the shaft. For easier dismantling any corrosion should be removed from shaft and hub.

3. The Shrink Disc can now be removed from the hub extension.

Cleaning and relubrication

After having been in use Shrink Discs should be dismantled and cleaned. The manufacturer has provided the cones with a solid lubricant (e.g. Molykote G Rapid). If the tapered working surfaces are not damaged, they have to be relubricated with Molykote BR 2. Also the screws (threads and contact areas for the heads) have to be lubricated with Molykote BR 2.

Construction Hints

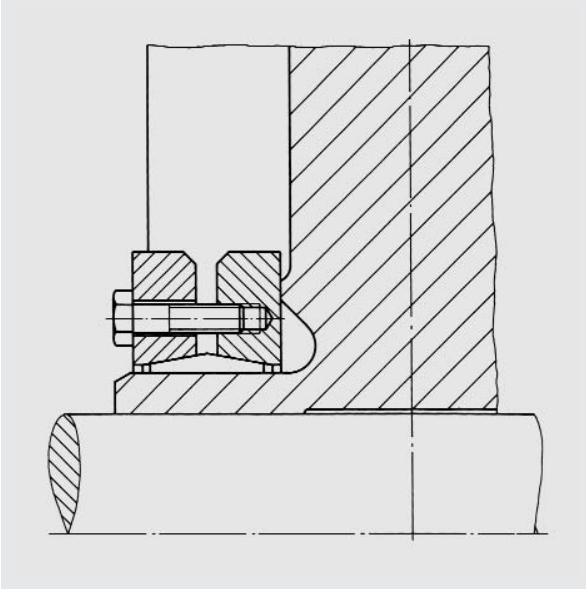


Fig. 10 · RINGFEDER® Shrink Disc
Principle:
It is most convenient to install Shrink Discs always on the hub side where the loads are introduced into the connection. Nevertheless with wide hubs they may be used at both faces to eliminate relative movements which might occur due to a different torsional stiffness of the structural members. In this case due to the power take off, one may also double the transmissible torque.

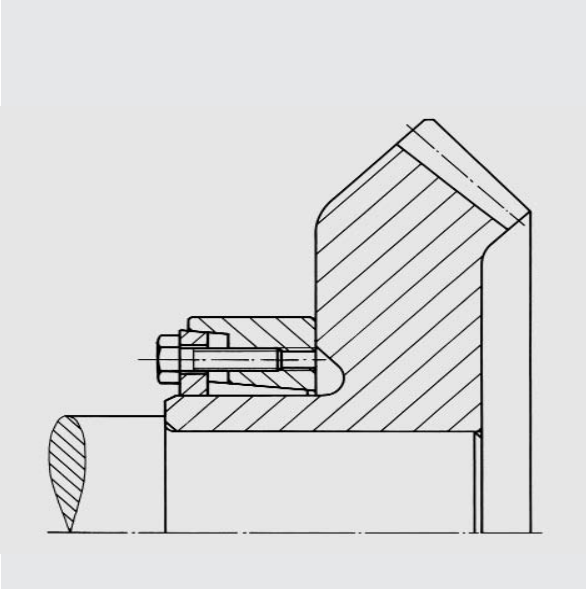


Fig. 11 · RINGFEDER® Shrink Disc RfN 4171
Principle:
For the installation basically the same arguments apply as alleged under Fig. 10. These Shrink Discs are preferably employed in those applications where high revolutions occur and lower amounts of unbalance are of importance.

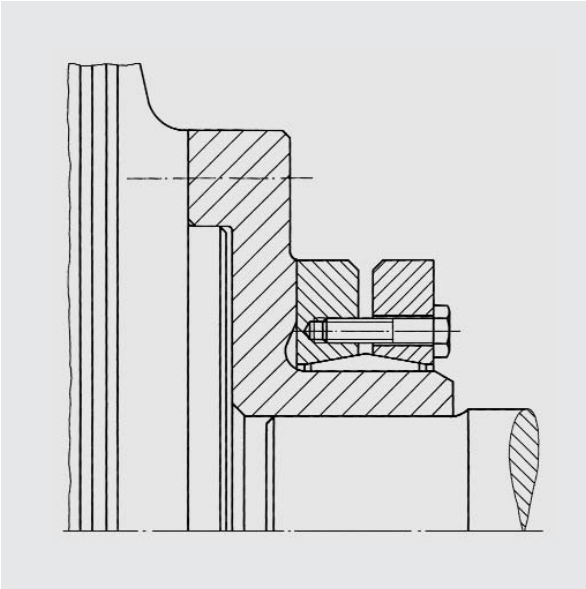


Fig. 12 · RINGFEDER® Shrink Disc, connection with adaptor flange for Hägglunds-drives
When using the specified adaptor flange in combination with the corresponding Shrink Disc, all loads can be transmitted safely.

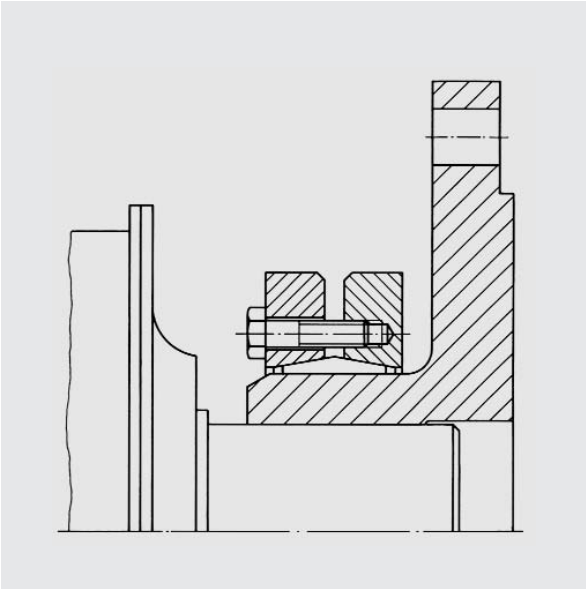


Fig. 13 · RINGFEDER® Shrink Disc Adaptor flange type FK RAG
Similar to that shown in fig. 12 flanges in accordance with the RAG Norm together with the corresponding Shrink Discs are available. A safe power transmission is guaranteed.

Construction Hints

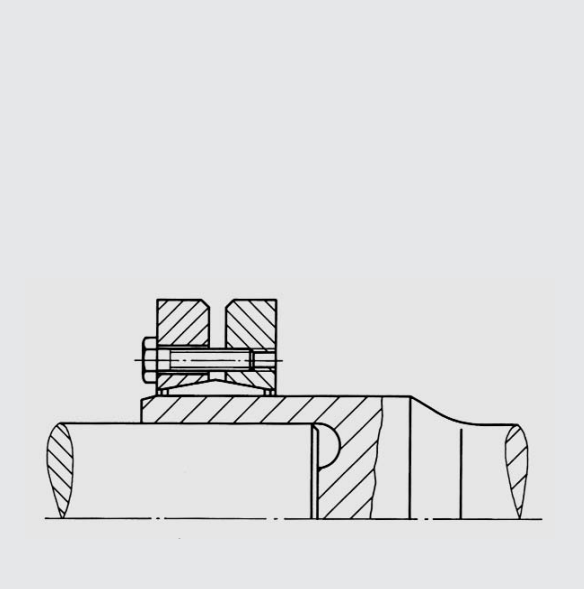


Fig. 14 · Two shafts connected by a Shrink Disc RfN 4051
In this way two shafts can easily be connected.

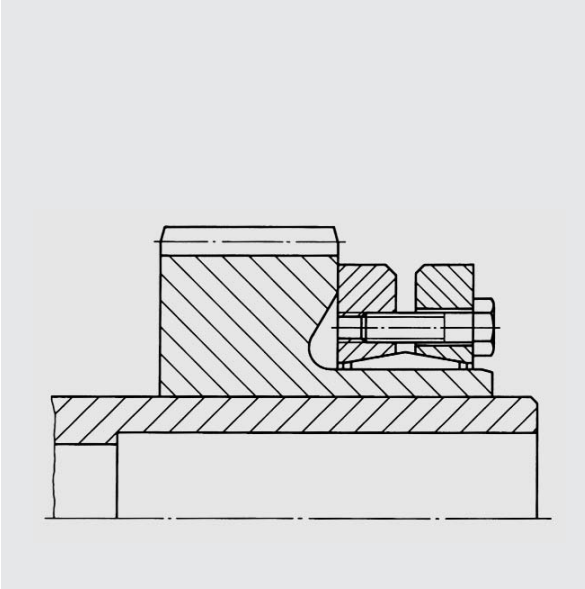


Fig. 15 · Gear wheel mounted with a Shrink Disc RfN 4071 on a hollow shaft
Concerning this construction you have to consider a reduced torque. The clamping within the corresponding cross-sections has to be separately checked.

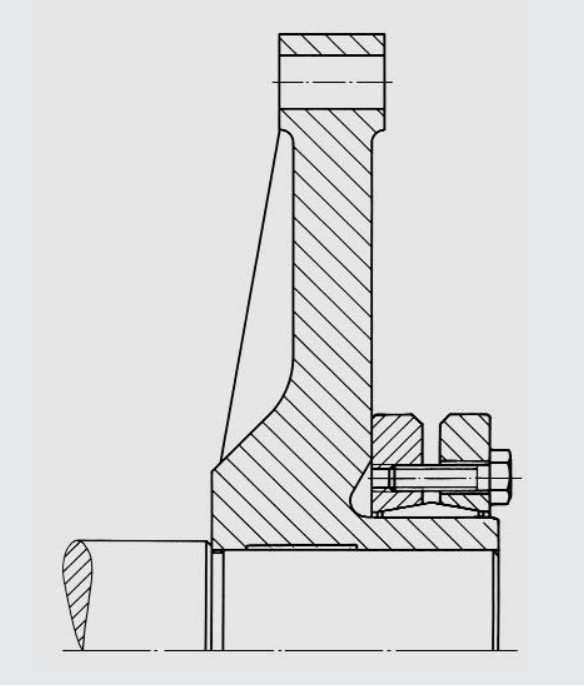


Fig. 16 · Lever mounted using a Shrink Disc RfN 4051
On the application of cast material only relatively low stresses are allowable within the thin-walled cross-section.

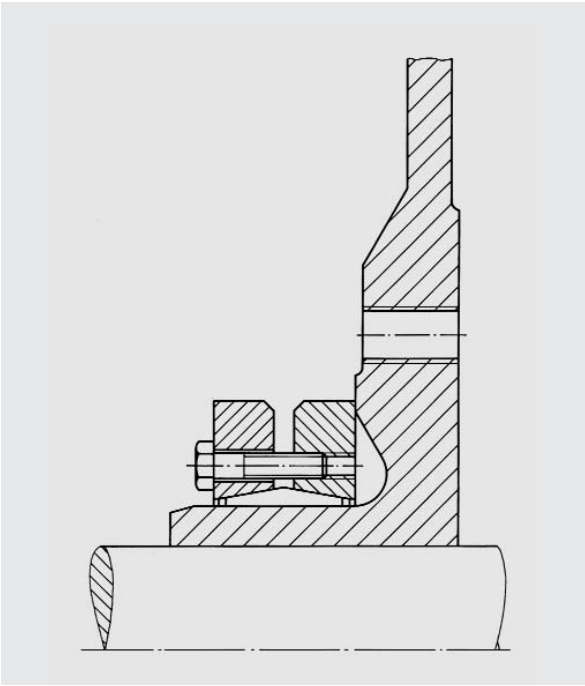


Fig. 17 · Brake disc mounted with a Shrink Disc RfN 4091
In this case it is important that the required torque can be transmitted on high accuracy with maximum safety.

Construction hints for split and half form

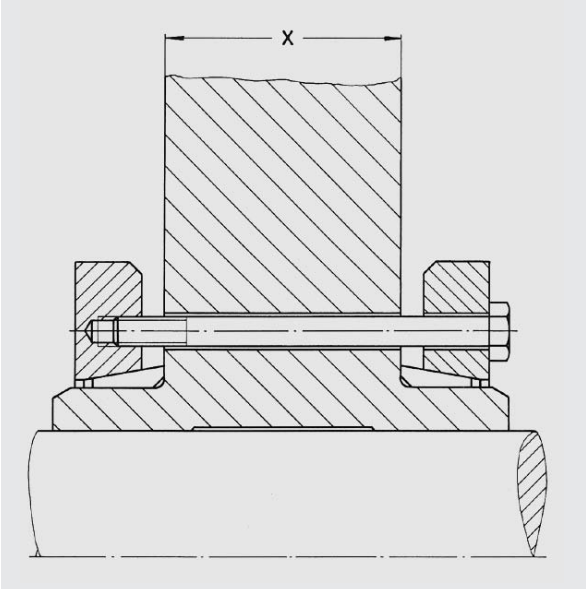


Fig. 18 · RINGFEDER® Shrink Disc, split form
In the application shown above special screws according to the dimension X are required, which have to be ordered accordingly (see page 29). If the dimension X is above 2 x L (L taken from the Standard and the Light Duty Series) or above 1 x L (taken from the Heavy Duty Series) a reduction of the transmissible torque up to 50 % has to be considered.

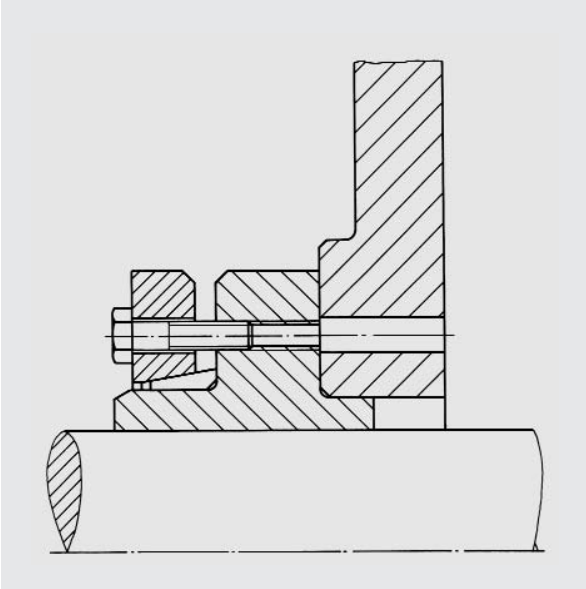


Fig. 19 · RINGFEDER® Shrink Disc, half form HD (thrust ring with through bores)
If the installation space is limited with low torque requirements at the same time, a half Shrink Disc can be used. The example shows the front thrust ring in combination with a corresponding special inner ring.

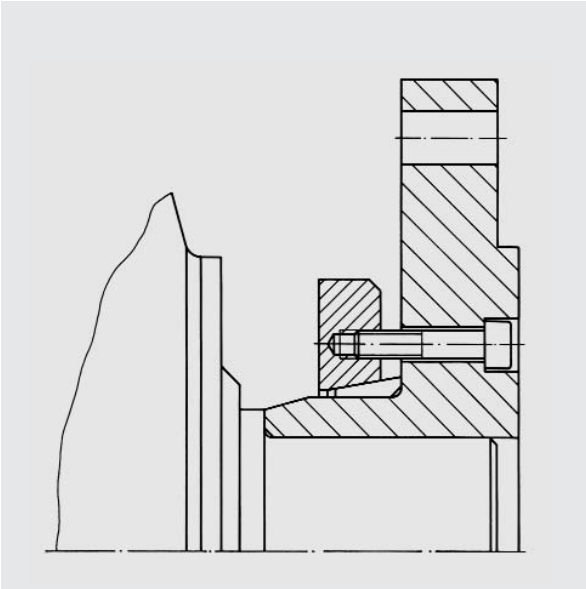


Fig. 20 · RINGFEDER® Shrink Disc, half form HG (thrust ring with thread)
Also in this case the installation space only allows the application of a half Shrink Disc. Here it was convenient to use a rear thrust ring. If shafts are keyed there will not be any negative influence to the connection.

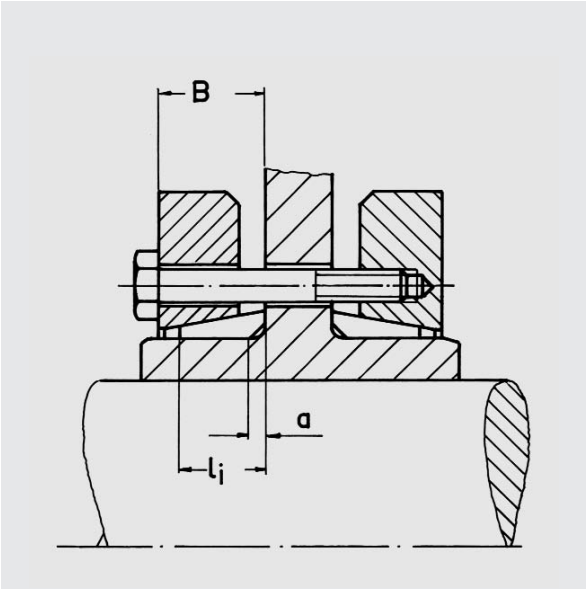


Fig. 21 · RINGFEDER® Shrink Disc, structural dimensions of half inner rings
For reasons of design the dimensions 'B' and 'l_i' are ranging above half of the dimensions 'L' and 'I' of the corresponding one-piece form (see fig. 5, page 8). These dimensions and the required screw lengths are referred to on pages 28 and 29.

Special applications

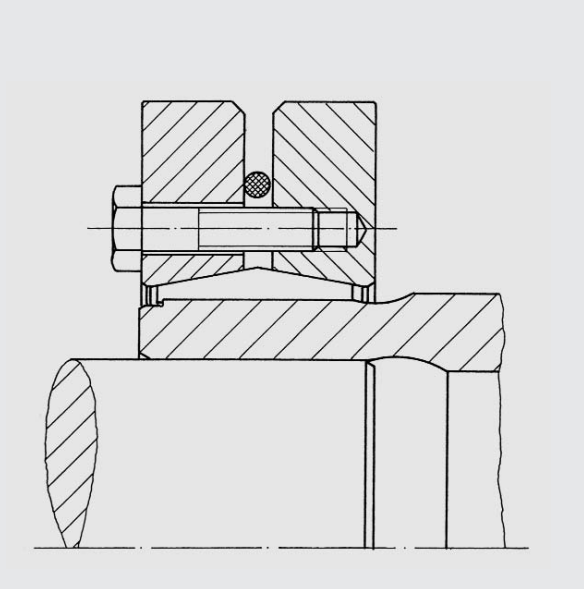


Fig. 22 · RINGFEDER® Shrink Disc · Hägglunds drives
On the Marathon and Compact types the motor hollow shafts are mounted on the shafts to be driven using Shrink Discs RfN 4071 and RfN 4091 of special designs.

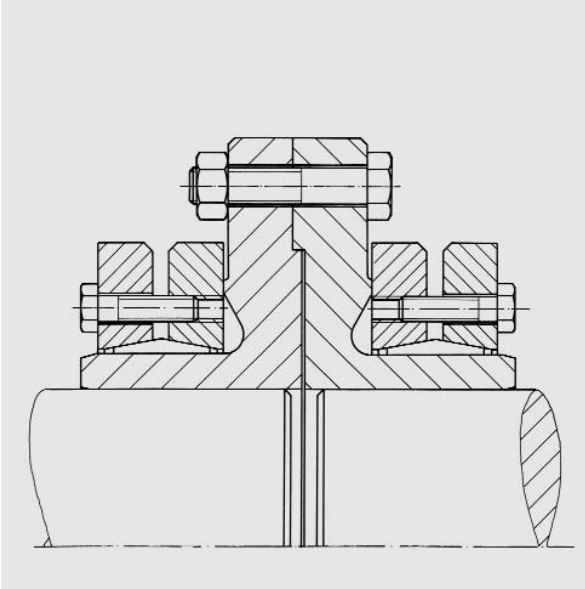


Fig. 23 · RINGFEDER® Shrink Disc · Flange coupling
For these couplings the method of external clamping using Shrink Discs is almost ideal. The flanges are also supplied by us.

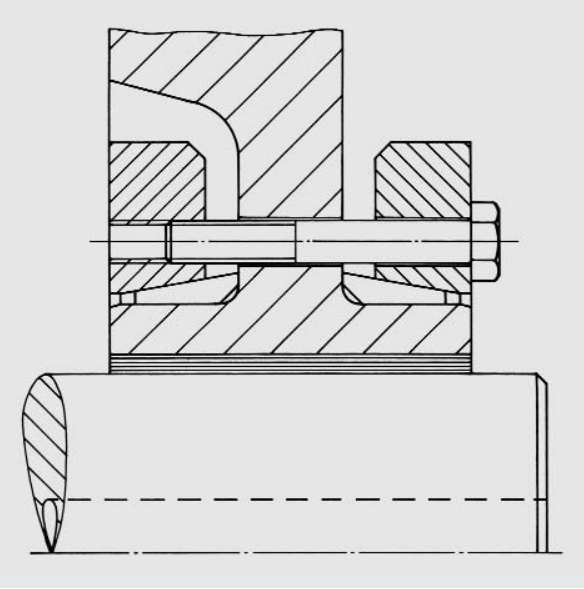


Fig. 24 · RINGFEDER® Shrink Disc · Overload protection
On connections being subjected to a potential overload, e.g. flywheels, a bronze bush is arranged between shaft and hub in order to avoid damages to the shaft in case that the connection momentarily slips.

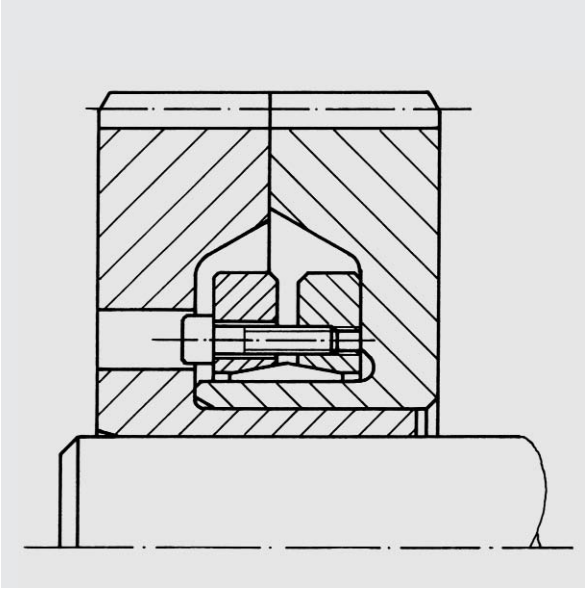


Fig. 25 · RINGFEDER® Shrink Disc · Double clamping
In some cases it is advantageous to clamp with a Shrink Disc two hubs at the same time. In addition to the larger clearances, however, also the stresses in the hubs will particularly have to be checked.

Construction examples

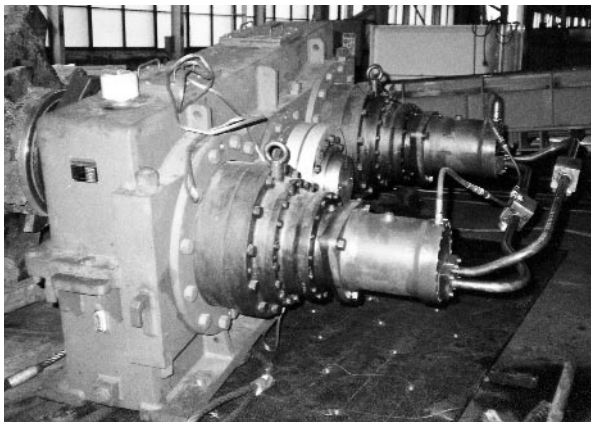


Fig. 26 · Shredder
Rotor mounted using a Shrink Disc 300 RfN 4071.
Messrs. Tezuka Kosan, Japan

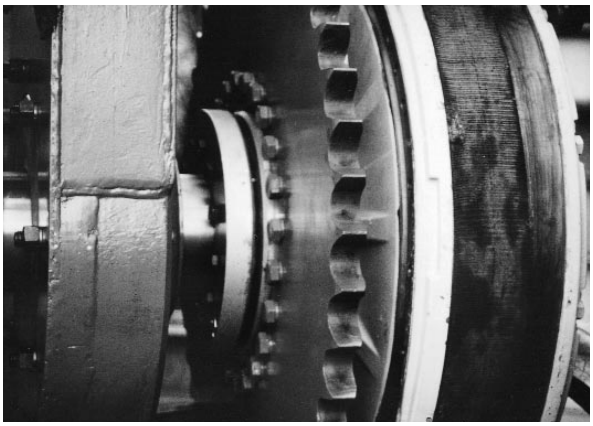


Fig. 27 · Shredder
Hägglunds motor type 63 mounted with Shrink Disc 200 RfN 4071. *Messrs. Newell, Great Britain*

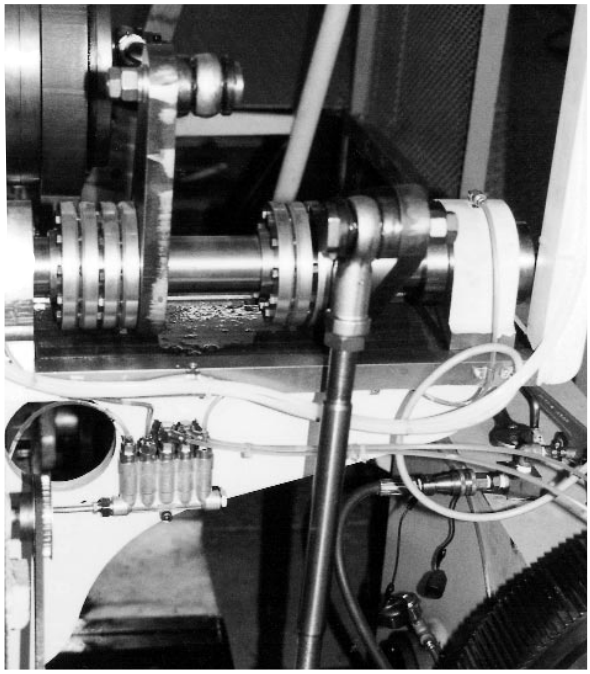


Fig. 28 · Wire gauze loom
Shaft couplings mounted with Shrink Discs 90 RfN 4071.
Messrs. Nippon Filcon Ltd., Japan

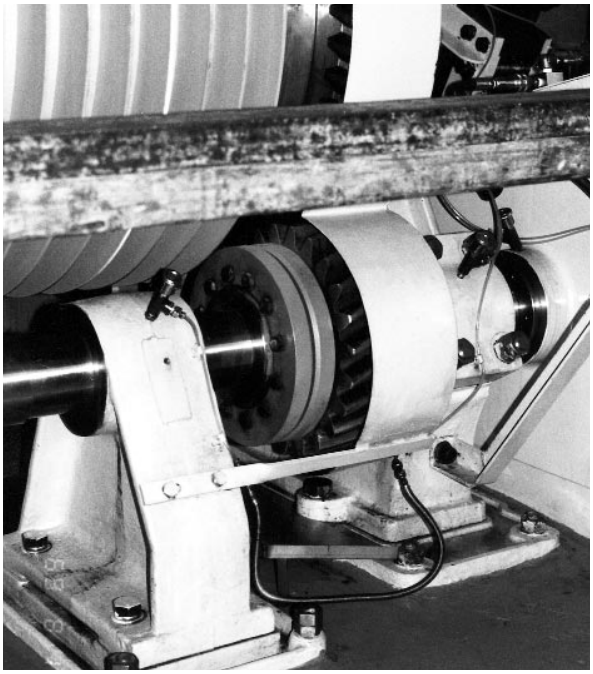


Fig. 29 · Wire gauze loom
Gearwheel mounted with Shrink Disc 100 RfN 4071.
Messrs. Nippon Filcon Ltd., Japan

Construction examples

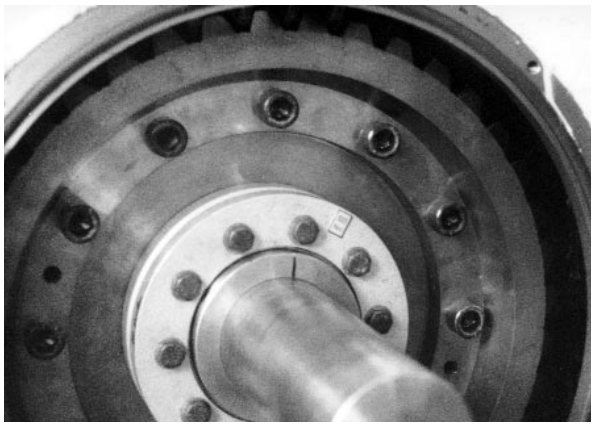


Fig. 30 · Wire gauze loom
Worm wheels mounted with Shrink Discs 140 RfN 4071.
Messrs. Nippon Filcon Ltd., Japan

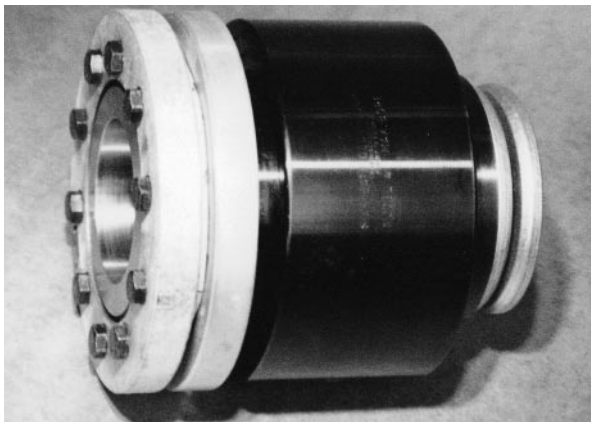


Fig. 31 · Band rolling mill
Coupling mounted with Shrink Discs 80 and 140 RfN 4071.
Messrs. Reynolds Metals Company, USA

Fig. 32 · Supply ship
The propeller-shafts are connected with Shrink Discs 240 RfN 4091. *Messrs. Mangone Shipbuilding, USA*

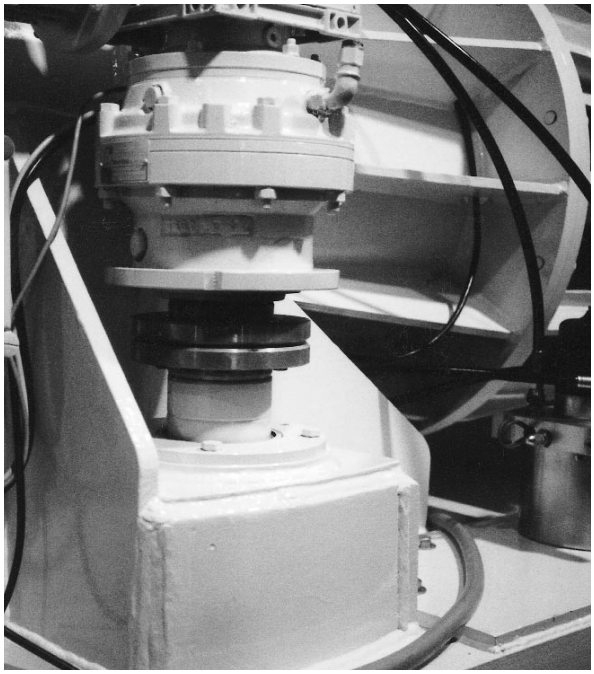


Fig. 33 · Wind-driven generator
Gear is mounted with a Shrink Disc 68 RfN 4071

Material Standards - Selection

Hints on materials and allocated yield points

DIN	Replaced by DIN EN	Designation	Approximate Yield Points* N/mm²
1629		seamless tubes with quality specifications	215 up to 355
1681		cast steel for general use	200 up to 300
Supplement 1 1691		lamellar graphite cast iron (grey cast iron)	98 up to 228 (offset yield stress 0,1 %)
1692		malleable cast iron	200 up to 530
1693		nodular graphite cast iron	250 up to 500
1705		copper - tin - and copper - tin - zinc - alloys	90 up to 180
1725	575	aluminium alloys	70 up to 380
17100	10025	general structural steels	175 up to 365
17200	10083	heat-treatable steels	300 up to 560
17245		heat-resistant ferritic steel casting	125 up to 540
17440		stainless steels	185 up to 600

* dependent on quality, kind of material, intended use

ISO tolerances for shafts and bores

Allowances in µm

Nominal diameter of shaft (mm)		d 11		e 8		e 7		f 8		f 7		g 6		h 11		h 9		h 8		h 7	
above	to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
3	6	– 30	–105	– 20	– 38	– 20	– 32	– 10	– 28	– 10	– 22	– 4	– 12	0	– 75	0	– 30	0	– 18	0	– 12
6	10	– 40	–130	– 25	– 47	– 25	– 40	– 13	– 35	– 13	– 28	– 5	– 14	0	– 90	0	– 36	0	– 22	0	– 15
10	18	– 50	–160	– 32	– 59	– 32	– 50	– 16	– 43	– 16	– 34	– 6	– 17	0	–110	0	– 43	0	– 27	0	– 18
18	30	– 65	–195	– 40	– 73	– 40	– 61	– 20	– 53	– 20	– 41	– 7	– 20	0	–130	0	– 52	0	– 33	0	– 21
30	50	– 80	–240	– 50	– 89	– 50	– 75	– 25	– 64	– 25	– 50	– 9	– 25	0	–160	0	– 62	0	– 39	0	– 25
50	80	–100	–290	– 60	–106	– 60	– 90	– 30	– 76	– 30	– 60	– 10	– 29	0	–190	0	– 74	0	– 46	0	– 30
80	120	–120	–340	– 72	–126	– 72	–107	– 36	– 90	– 36	– 71	– 12	– 34	0	–220	0	– 87	0	– 54	0	– 35
120	180	–145	–395	– 85	–148	– 85	–125	– 43	–106	– 43	– 83	– 14	– 39	0	–250	0	–100	0	– 63	0	– 40
180	250	–170	–460	– 100	–172	– 100	–146	– 50	–122	– 50	– 96	– 15	– 44	0	–290	0	–115	0	– 72	0	– 46
250	315	–190	–510	– 110	–191	– 110	–162	– 56	–137	– 56	–108	– 17	– 49	0	–320	0	–130	0	– 81	0	– 52
315	400	–210	–570	– 125	–214	– 125	–182	– 62	–151	– 62	–119	– 18	– 54	0	–360	0	–140	0	– 89	0	– 57
400	500	–230	–630	– 135	–232	– 135	–198	– 68	–165	– 68	–131	– 20	– 60	0	–400	0	–155	0	– 97	0	– 63

Nominal diameter of shaft (mm)		h 6		h 5		j 6		k 6		k 5		m 6		m 5		n 6		p 6	
above	to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
3	6	0	– 8	0	– 5	+ 7	– 1	–	–	–	–	+ 12	+ 4	+ 9	+ 4	+ 16	+ 8	+ 20	+ 12
6	10	0	– 9	0	– 6	+ 7	– 2	+ 10	+ 1	+ 7	+ 1	+ 15	+ 6	+ 12	+ 6	+ 19	+10	+ 24	+ 15
10	18	0	– 11	0	– 8	+ 8	– 3	+ 12	+ 1	+ 9	+ 1	+ 18	+ 7	+ 15	+ 7	+ 23	+12	+ 29	+ 18
18	30	0	– 13	0	– 9	+ 9	– 4	+ 15	+ 2	+11	+ 2	+ 21	+ 8	+ 17	+ 8	+ 28	+15	+ 35	+ 22
30	50	0	– 16	0	– 11	+ 11	– 5	+ 18	+ 2	+13	+ 2	+ 25	+ 9	+ 20	+ 9	+ 33	+17	+ 42	+ 26
50	80	0	– 19	0	– 13	+ 12	– 7	+ 21	+ 2	+15	+ 2	+ 30	+ 11	+ 24	+11	+ 39	+20	+ 51	+ 32
80	120	0	– 22	0	– 15	+ 13	– 9	+ 25	+ 3	+18	+ 3	+ 35	+ 13	+ 28	+13	+ 45	+23	+ 59	+ 37
120	180	0	– 25	0	– 18	+ 14	– 11	+ 28	+ 3	+21	+ 3	+ 40	+ 15	+ 33	+15	+ 52	+27	+ 68	+ 43
180	250	0	– 29	0	– 20	+ 16	– 13	+ 33	+ 4	+24	+ 4	+ 46	+ 17	+ 37	+17	+ 60	+31	+ 79	+ 50
250	315	0	– 32	0	– 23	+ 16	– 16	+ 36	+ 4	+27	+ 4	+ 52	+ 20	+ 43	+20	+ 66	+34	+ 88	+ 56
315	400	0	– 36	0	– 25	+ 18	– 18	+ 40	+ 4	+29	+ 4	+ 57	+ 21	+ 46	+21	+ 73	+37	+ 98	+ 62
400	500	0	– 40	0	– 27	+ 20	– 20	+ 45	+ 5	+32	+ 5	+ 63	+ 23	+ 50	+23	+ 80	+40	+108	+ 68

Nominal diameter of bore (mm)		D 11		E 8		E 7		F 8		F 7		G 7		H 11		H 9		H 8		H 7	
above	to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
3	6	+ 105	+ 30	+ 38	+ 20	+ 32	+ 20	+ 28	+ 10	+ 22	+ 10	+ 16	+ 4	+ 75	0	+ 30	0	+ 18	0	+ 12	0
6	10	+ 130	+ 40	+ 47	+ 25	+ 40	+ 25	+ 35	+ 13	+ 28	+ 13	+ 20	+ 5	+ 90	0	+ 36	0	+ 22	0	+ 15	0
10	18	+ 160	+ 50	+ 59	+ 32	+ 50	+ 32	+ 43	+ 16	+ 34	+ 16	+ 24	+ 6	+ 110	0	+ 43	0	+ 27	0	+ 18	0
18	30	+ 195	+ 65	+ 73	+ 40	+ 61	+ 40	+ 53	+ 20	+ 41	+ 20	+ 28	+ 7	+ 130	0	+ 52	0	+ 33	0	+ 21	0
30	50	+ 240	+ 80	+ 89	+ 50	+ 75	+ 50	+ 64	+ 25	+ 50	+ 25	+ 34	+ 9	+ 160	0	+ 62	0	+ 39	0	+ 25	0
50	80	+ 290	+ 100	+ 106	+ 60	+ 90	+ 60	+ 76	+ 30	+ 60	+ 30	+ 40	+ 10	+ 190	0	+ 74	0	+ 46	0	+ 30	0
80	120	+ 340	+ 120	+ 126	+ 72	+ 107	+ 72	+ 90	+ 36	+ 71	+ 36	+ 47	+ 12	+ 220	0	+ 87	0	+ 54	0	+ 35	0
120	180	+ 395	+ 145	+ 148	+ 85	+ 125	+ 85	+106	+ 43	+ 83	+ 43	+ 54	+ 14	+ 250	0	+100	0	+ 63	0	+ 40	0
180	250	+ 460	+ 170	+ 172	+100	+ 146	+100	+122	+ 50	+ 96	+ 50	+ 61	+ 15	+ 290	0	+115	0	+ 72	0	+ 46	0
250	315	+ 510	+ 190	+ 191	+110	+ 162	+110	+137	+ 56	+108	+ 56	+ 69	+ 17	+ 320	0	+130	0	+ 81	0	+ 52	0
315	400	+ 570	+ 210	+ 214	+125	+ 182	+125	+151	+ 62	+119	+ 62	+ 75	+ 18	+ 360	0	+140	0	+ 89	0	+ 57	0
400	500	+ 630	+ 230	+ 232	+135	+ 198	+135	+165	+ 68	+131	+ 68	+ 83	+ 20	+ 400	0	+155	0	+ 97	0	+ 63	0

Nominal diameter of bore (mm)		H 6		J 7		J 6		K 7		K 6		M 7		M 6		N 7		N 6		P 7	
above	to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
3	6	+ 8	0	+ 5	– 7	+ 4	– 4	–	–	–	–	0	– 12	– 1	– 9	– 4	– 16	– 5	– 13	– 8	– 20
6	10	+ 9	0	+ 8	– 7	+ 5	– 4	+ 5	– 10	+ 2	– 7	0	– 15	– 3	– 12	– 4	– 19	– 7	– 16	– 9	– 24
10	18	+ 11	0	+ 10	– 8	+ 6	– 5	+ 6	– 12	+ 2	– 9	0	– 18	– 4	– 15	– 5	– 23	– 9	– 20	– 11	– 29
18	30	+ 13	0	+ 12	– 9	+ 8	– 5	+ 6	– 15	+ 2	– 11	0	– 21	– 4	– 17	– 7	– 28	– 11	– 24	– 14	– 35
30	50	+ 16	0	+ 14	– 11	+ 10	– 6	+ 7	– 18	+ 3	– 13	0	– 25	– 4	– 20	– 8	– 33	– 12	– 28	– 17	– 42
50	80	+ 19	0	+ 18	– 12	+ 13	– 6	+ 9	– 21	+ 4	– 15	0	– 30	– 5	– 24	– 9	– 39	– 14	– 33	– 21	– 51
80	120	+ 22	0	+ 22	– 13	+ 16	– 6	+ 10	– 25	+ 4	– 18	0	– 35	– 6	– 28	– 10	– 45	– 16	– 38	– 24	– 59
120	180	+ 25	0	+ 26	– 14	+ 18	– 7	+ 12	– 28	+ 4	– 21	0	– 40	– 8	– 33	– 12	– 52	– 20	– 45	– 28	– 68
180	250	+ 29	0	+ 30	– 16	+ 22	– 7	+ 13	– 33	+ 5	– 24	0	– 46	– 8	– 37	– 14	– 60	– 22	– 51	– 33	– 79
250	315	+ 32	0	+ 36	– 16	+ 25	– 7	+ 16	– 36	+ 5	– 27	0	– 52	– 9	– 41	– 14	– 66	– 25	– 57	– 36	– 88
315	400	+ 36	0	+ 39	– 18	+ 29	– 7	+ 17	– 40	+ 7	– 29	0	– 57	– 10	– 46	– 16	– 73	– 26	– 62	– 41	– 98
400	500	+ 40	0	+ 43	– 20	+ 33	– 7	+ 18	– 45	+ 8	– 32	0	– 63	– 10	– 50	– 17	– 80	– 27	– 67	– 45	– 108

Split and half form · Additional dimensions of the series RfN 4071, 4091, 4051

RfN 4071						RfN 4091						RfN 4051						
l_i	a	d_3	d_a	d_G	l_G	l_i	a	d_3	d_a	d_G	l_G	l_i	a	d_3	d_a	d_G	l_G	d
mm						mm						mm						mm
9,0	1,5	25,2	22,0	M 5														20
9,0	1,5	30,0	28,8	M 5														24
10,0	1,5	36,3	32,8	M 5														30
11,0	1,5	42,7	38,8	M 6														36
12,0	1,5	47,2	43,0	M 6														40
12,5	2,5	52,2	47,8	M 6														44
13,5	2,5	58,6	53,8	M 6														50
14,0	2,5	64,1	69,2	M 6														55
14,0	2,5	72,1	67,2	M 6														62
14,0	2,5	78,1	73,2	M 6														68
16,0	3,0	85,8	80,2	M 8														75
16,0	3,0	89,,5	85,2	M 8														80
18,5	3,5	101,8	95,3	M 8														90
20,5	3,5	112,8	105,6	M 8														100
23,0	3,5	123,9	115,8	M 10														110
26,0	5,0	145,1	135,9	M 10		32,5	3,5	141,5	130,0	M 12		24,5	5,0	139,4	130,8	M 10		125
28,0	5,0	158,0	148,1	M 12		35,0	5,0	158,5	146,1	M 12		24,5	5,0	154,4	145,8	M 10		140
30,0	5,0	177,7	187,1	M 12		38,0	5,0	179,3	165,9	M 12		24,5	5,0	169,4	160,8	M 10		155
33,0	5,0	188,8	177,1	M 16		41,0	5,0	190,6	176,1	M 16		28,0	5,0	181,4	171,5	M 12		165
33,0	5,0	198,7	187,1	M 16		41,0	5,0	200,6	186,1	M 16		28,0	5,0	191,4	181,5	M 12		175
40,5	5,0	210,9	195,6	M 16		51,0	5,0	214,5	196,5	M 16	30	28,0	5,0	201,4	191,5	M 12		185
40,5	5,0	225,9	211,6	M 16		53,5	5,0	225,4	208,5	M 16	30	33,0	5,0	212,4	200,8	M 12		195
40,5	5,0	225,9	211,6	M 16		53,5	5,0	225,4	206,5	M 16	30	33,0	5,0	217,7	206,1	M 12		200
51,5	7,5	249,8	231,6	M 16	32	64,5	6,5	249,3	226,5	M 16	30	38,0	5,0	239,5	226,1	M 16		220
53,5	7,5	268,6	249,8	M 20	32	67,5	6,5	270,6	246,8	M 20	35	38,0	5,0	259,5	246,1	M 16		240
59,0	7,5	290,4	269,6	M 20	36	75,5	6,5	294,4	267,8	M 20	40	42,5	6,5	282,8	287,5	M 16		260
65,5	8,5	313,2	290,1	M 20	40	84,0	8,5	317,4	287,8	M 20	45	49,5	6,5	304,9	287,4	M 16	30	280
69,5	8,5	334,6	310,1	M 20	40	85,0	8,5	338,1	307,8	M 20	45	49,5	6,5	324,9	307,4	M 16	30	300
69,5	8,5	354,6	330,1	M 20	40	90,0	8,5	359,5	327,8	M 20	50	49,5	6,5	344,9	327,4	M 16	30	320
75,5	8,5	377,1	350,5	M 20	40	98,0	8,5	382,4	347,8	M 24	50	49,5	6,5	365,3	347,8	M 16	30	340
78,5	8,5	388,2	360,5	M 20	40	98,0	8,5	392,4	357,8	M 24	50	57,5	6,5	378,3	358,0	M 20	35	350
78,5	8,5	418,2	389,8	M 20	40	102,5	10,0	404,0	367,8	M 24	50	57,5	6,5	388,3	368,0	M 20	35	360
80,5	8,5	418,2	389,8	M 24	45	102,5	10,0	426,0	389,8	M 24	50	63,5	6,5	412,2	389,8	M 20	40	380
80,5	8,5	428,2	399,8	M 24	45	106,5	10,0	437,4	389,8	M 24	50	66,0	8,5	423,1	399,8	M 20	40	390
80,5	8,5	438,2	409,8	M 24	45	106,5	10,0	447,4	409,8	M 24	50	66,0	8,5	433,1	409,8	M 20	40	400
94,5	10,0	483,1	429,8	M 24	45	119,5	10,0	472,0	429,8	M 24	50	70,0	8,5	454,5	429,8	M 20	40	420
101,5	10,0	485,8	450,0	M 24	50	124,5	10,0	494,0	450,1	M 27	55	70,0	8,5	474,7	450,0	M 20	40	440
101,0	10,0	506,6	471,0	M 24	50	127,0	12,5	516,3	471,5	M 27	55	78,5	10,0	498,7	471,0	M 20	40	460
106,5	10,0	528,6	491,0	M 24	50	138,0	12,5	540,2	491,5	M 27	55	78,5	10,0	518,7	491,0	M 20	40	480
106,5	10,0	548,6	511,0	M 27	60	138,0	12,5	560,2	511,5	M 27	55	78,5	10,0	538,7	511,0	M 20	40	500

Where no dimension 'l_G' is given the screw threads are tapped through

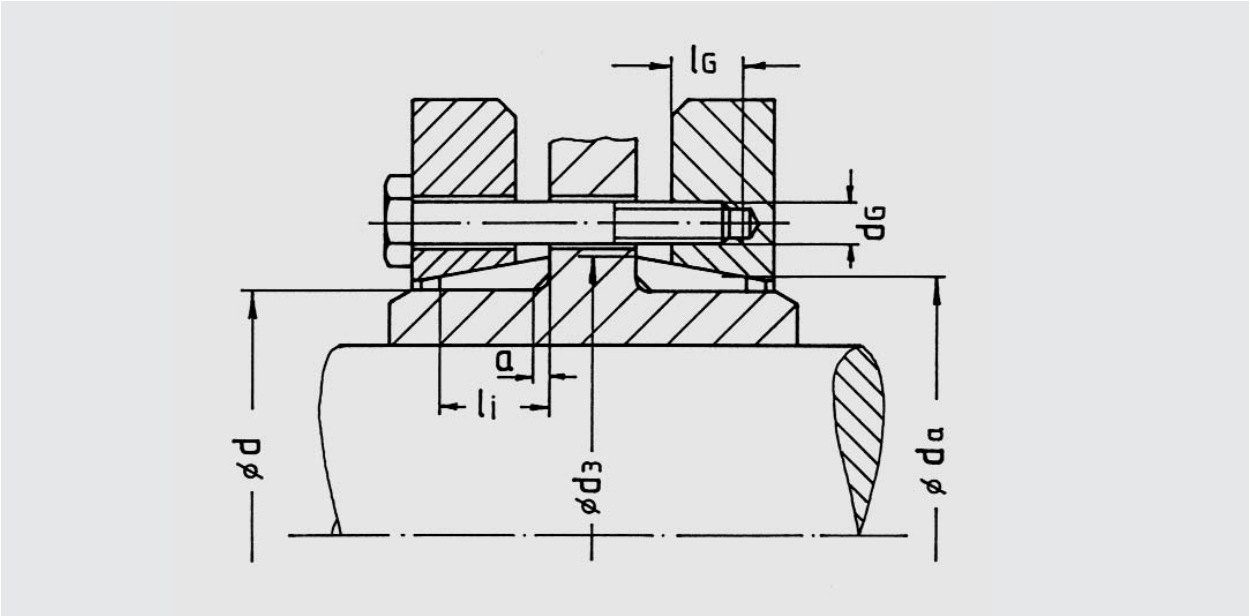


Fig. 34 · Shrink Disc in split form

RINGFEDER® Shrink Discs

Split and half form · Screw lengths for split and half Shrink Discs of the series RfN 4071, 4091, 4051

RfN 4071							RfN 4091							RfN 4051							d
d_G	c	l_G	B	b	l_3	c_1	d_G	c	l_G	B	b	l_3	c_1	d_G	c	l_G	B	b	l_3	c_1	
mm							mm							mm							mm
M 5	5,0		11,50	4,50	18	6,50															20
M 5	6,5		11,75	3,75	18	6,25															24
M 5	5,5		12,75	3,75	18	5,25															30
M 6	5,5		13,75	3,75	20	6,25															36
M 6	6,0		14,75	4,25	22	7,25															40
M 6	6,5		15,25	4,25	22	6,75															44
M 6	9,5		16,25	4,25	22	5,75															50
M 6	7,5		17,75	4,75	25	7,25															55
M 6	7,5		17,75	4,75	25	7,25															62
M 6	7,5		17,75	4,75	25	7,25															68
M 8	11,5		19,75	5,76	30	10,25															75
M 8	11,5		19,75	5,75	30	10,25															80
M 8	13,0		23,00	6,00	35	12,00															90
M 8	10,0		25,50	6,50	35	9,50															100
M 10	12,0		28,50	6,50	40	11,50															110
M 10	9,0		32,00	9,00	45	13,00	M 12	13,0		37,50	9,50	50	12,50	M 10	11,0		30,50	8,50	45	14,50	125
M 12	10,5		35,25	9,25	50	14,75	M 12	13,0		42,00	10,00	60	15,00	M 10	11,0		30,50	8,50	45	14,50	140
M 12	13,5		37,25	9,25	50	12,75	M 12	15,0		45,00	10,00	60	15,00	M 10	11,0		30,50	8,50	45	14,50	155
M 16	15,0		40,50	9,50	60	19,50	M 16	15,0		49,00	11,00	65	16,00	M 12	14,0		36,00	10,00	50	14,00	165
M 16	15,0		40,50	9,50	60	19,50	M 16	15,0		49,00	11,00	65	16,00	M 12	14,0		36,00	10,00	50	14,00	175
M 16	17,0		48,00	10,00	65	17,00	M 16	18,0	30	61,00	11,00	80	19,00	M 12	14,0		36,00	10,00	50	14,00	185
M 16	17,0		48,00	10,00	65	17,00	M 16	18,0	30	63,50	13,50	80	16,50	M 12	14,0		41,00	10,00	55	14,00	195
M 16	17,0		48,00	10,00	65	17,00	M 16	18,0	30	63,50	13,50	80	16,50	M 12	14,0		41,00	10,00	55	14,00	200
M 16	23,0	32	59,50	12,50	80	20,50	M 16	16,0	30	74,50	14,50	95	20,50	M 16	17,0		47,00	11,00	65	18,00	220
M 20	20,0	32	62,00	13,00	85	23,00	M 20	21,0	35	79,50	14,50	100	20,50	M 16	17,0		47,00	11,00	65	18,00	240
M 20	24,0	36	67,50	13,50	90	22,50	M 20	22,0	40	87,50	15,60	110	22,50	M 16	17,0		52,50	12,50	70	17,50	260
M 20	28,0	40	76,50	15,50	100	24,50	M 20	26,0	45	98,00	18,00	120	24,00	M 16	17,0	30	59,50	13,50	80	20,50	280
M 20	22,0	40	79,50	15,50	100	20,50	M 20	24,0	45	98,00	18,00	120	22,00	M 16	17,0	30	59,50	13,50	80	20,50	300
M 20	22,0	40	79,50	15,50	100	20,50	M 20	20,0	50	102,00	20,00	130	28,00	M 16	17,0	30	60,50	12,50	80	19,50	320
M 20	25,0	40	86,50	15,50	110	23,50	M 24	22,0	50	110,00	18,00	140	30,00	M 16	17,0	30	60,50	12,50	80	19,50	340
M 20	21,0	40	89,50	16,50	110	20,50	M 24	22,0	50	110,00	18,00	140	30,00	M 20	22,0	35	68,50	14,50	90	21,50	350
M 20	21,0	40	89,50	16,50	110	20,50	M 24	28,0	50	114,50	22,50	140	25,50	M 20	22,0	35	68,50	14,50	90	21,50	360
M 24	28,0	45	92,50	16,50	120	27,50	M 24	28,0	50	114,50	22,50	140	25,50	M 20	24,0	40	75,50	15,50	100	24,50	380
M 24	28,0	45	92,50	16,50	120	27,50	M 24	24,0	50	118,50	22,50	150	31,50	M 20	24,0	40	78,00	18,00	100	22,00	390
M 24	28,0	45	92,50	16,50	120	27,50	M 24	24,0	50	118,50	22,50	150	31,50	M 20	24,0	40	78,00	18,00	100	22,00	400
M 24	28,0	45	106,50	20,50	140	33,50	M 24	23,0	50	131,50	20,50	160	28,50	M 20	20,0	40	82,00	18,00	110	28,00	420
M 24	29,0	50	113,50	22,50	140	26,50	M 27	33,0	55	138,50	23,50	170	31,50	M 20	20,0	40	82,00	18,00	110	28,00	440
M 24	29,0	50	113,50	22,50	140	26,50	M 27	33,0	55	141,00	26,00	170	29,00	M 20	23,0	40	91,50	20,50	120	28,50	460
M 24	23,0	50	119,00	23,00	150	31,00	M 27	34,0	55	152,00	24,00	180	28,00	M 20	23,0	40	91,50	20,50	120	28,50	480
M 27	33,0	60	119,00	23,00	150	31,00	M 27	34,0	55	152,00	24,00	180	28,00	M 20	23,0	40	91,50	20,50	120	28,50	500

Where no dimension 'l_G' is given the screw threads are tapped through

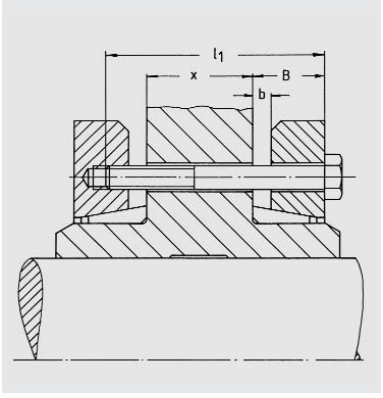


Fig. 35 · split Shrink Disc
l_1 = B + b + c + x

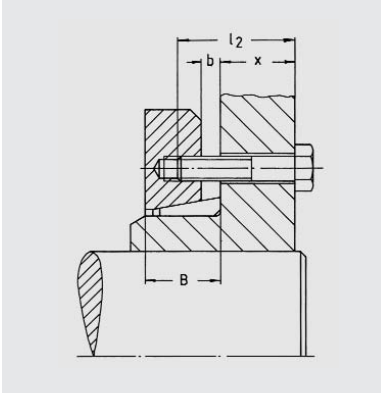


Fig. 36 · half Shrink Disc 'HG'
l_2 = b + c + x

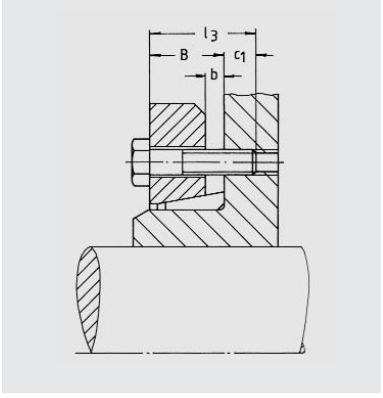


Fig. 37 · half Shrink Disc 'HD'
l_3 to be taken from the table

Shaft Couplings WK RfN 4071/RfN 4091

Ensuring an absolutely rigid connection of shafts and high accuracy of alignment. For additional information see catalogue 'Shaft Couplings'.
Shaft Couplings WK RfN 4071/RfN 4091 ensure an absolutely rigid connection of shafts and the highest accuracy of alignment in horizontal and vertical arrangement. They are available for shaft sizes from about 15 mm up to 850 mm.

In addition to these Shaft Couplings also different modifications for a rigid connection of shafts can be offered as specials.

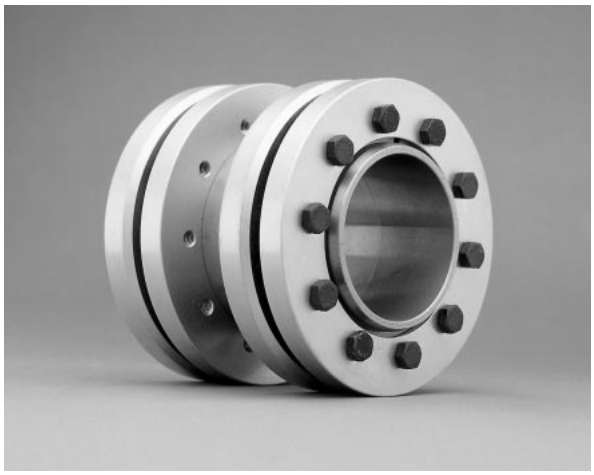


Fig. 38 Ringfeder® Shaft Coupling

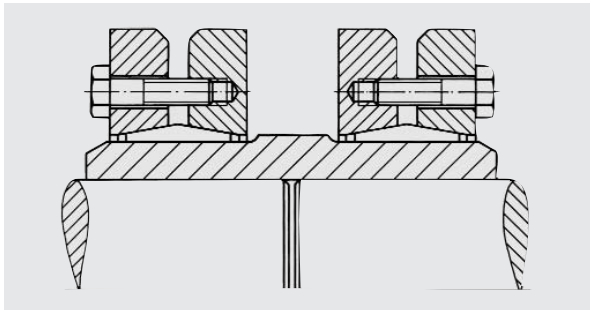


Fig. 39 Ringfeder® Shaft Coupling

Torque Wrenches and accessories

For controlled tightening of locking screws of RINGFEDER® Locking Assemblies, we offer suitable torque wrenches and attachments. These tools facilitate the installation of our Locking Assemblies RfN 7012 particularly on straight through shafts. They can be used, of course, also for mounting of Locking Assemblies RfN 7013, 7014, 7015, Locking Elements RfN 8006, Shrink Discs and other screwed or bolted connections.

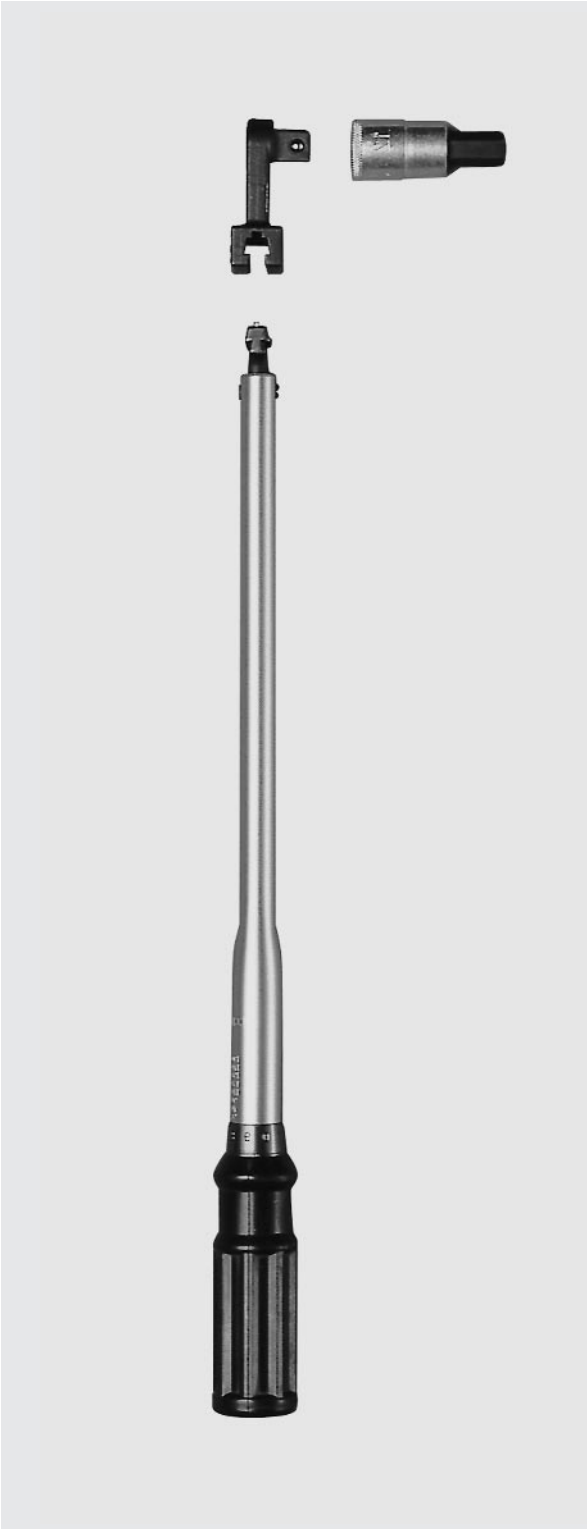


Fig. 40 Torque Wrench

Fax Request (410)358-3142 (800)872-9329 Maryland Metrics

For mounting proposals and consultation

To: RINGFEDER VBG GMBH, Dept. KM

From:

Company: ..... **Address:** .....
....
....

Person in charge: ..... **Telephone:** .....

Department: ..... **Fax:** .....

In order to facilitate the solution of your problem for our engineers and to prevent errors or mistakes, your enquiry should contain the following informations:

Informations required for consultative service

Loads occurring:

Max. torque	T_g max.	=	..... Nm
Max. bending moment	M_g max.	=	..... Nm
Max. axial load	F_g max.	=	..... kN
Max. radial load	F_r max.	=	..... kN

Dimensions, materials:

Diameter of the shaft	d_W	=	. . . . . mm
With hollow shaft inner diameter	d_B	=	. . . . . mm
Revolution of the shaft	n	=	. . . . . 1/min
Outer diameter of hub	D_N	=	. . . . . mm
Hub width	B	=	. . . . . mm
Hub material or yield point	$R_{p0,2N}$	=	. . . . . N/mm^2
Shaft material or yield point	$R_{p0,2W}$	=	. . . . . N/mm^2
Operating temperature of the connection	Temp.	=	. . . . . °C

Other details: .....
.....
.....
.....

Please enclose a drawing or sketch with your enquiry

RINGFEDER Products are available from MARYLAND METRICS

P.O. Box 261 Owings Mills, MD 21117 USA email: sales@mdmetric.com web: http://mdmetric.com

phones: (410)358-3130 (800)638-1830 faxes: (410)358-3142 (800)872-9329

For shaft-hub connections we supply:

RINGFEDER® Locking Assemblies RfN 7012	for highly stressed shaft-hub connections and big machining tolerances
RINGFEDER® Locking Assemblies RfN 7012-IN	for shafts with inch-dimensions
RINGFEDER® Locking Assemblies RfN 7013	for higher demands to concentricity
RINGFEDER® Locking Assemblies RfN 7013-IN	for shafts with inch-dimensions
RINGFEDER® Locking Assemblies RfN 7014	for extremely stressed shaft-hub connections
RINGFEDER® Locking Assemblies RfN 7015	self-centering, for highest transmission values as well as for the use in belt drums
RINGFEDER® Locking Elements RfN 8006	adaptable design for special requirements
RINGFEDER® Shrinc Discs RfN 4071 / 4091 / 4051 / 4073 / 4171	for external clamping
RINGFEDER® Shaft Couplings	for an absolutely rigid connection of shafts and high accuracy if alignment
Special designs	on request
Torque wrenches and accessories	for correct tightening conditions

S. 113.1. 31.04.99

RINGFEDER

Locking Connections

Certified by DIN EN ISO 9001 and VDA 6.1