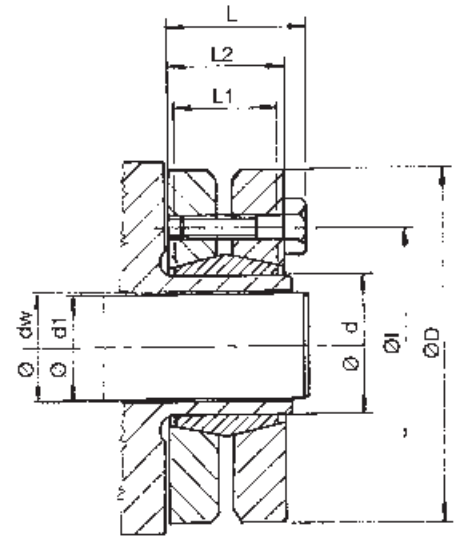


Clamping Elements Type RCK 19 & 20



Types RCK 19 & 20 are normally referred to as Clamping Discs, used to clamp externally onto thin walled hubs to lock them to the shaft. The design permits the use of large diameter shafts with small hub sizes, and is popular for connection of large sprocket and pulleys. The design provides for optimum concentricity, with high torque transmission. A number of shaft diameters can be accommodated by one size of unit, max., min. and an intermediate being shown in table.



Recommended tolerances

Hub Outside Ø:- h8
 *Hub Bore:- H6
 *Shaft Ø:- j6 below 30mm
 h6 30mm plus

*Clearance between hub bore and shaft must not exceed figures in table.

Dimensions

Part No.	Dimensions mm								Torque Cap. M Nm	Axial Force F kN	Clamping Screws		Approx Weight kg
	dw	Max* Clearance	d	D	L ₁	L ₂	L	X [†]			Size	Torque Nm	
RCK19-24x50	19	0.017	24	50	14	19.5	23.0	18	170	18	M5	4	0.2
	20								210	21			
	21								250	24			
RCK19-30x60	24	0.017	30	60	16	21.5	25.0	18	300	25	M5	4	0.3
	25								340	27			
	26								380	29			
RCK19-36x72	28	0.032	36	72	18	23.5	27.5	20	440	31	M6	12	0.4
	30								570	38			
	31								630	41			
RCK19-44x80	32	0.032	40	80	20	25.5	29.5	20	620	39	M6	12	0.6
	35								780	45			
	36								860	48			
RCK19-50x90	38	0.032	50	90	22	27.5	31.5	25	940	49	M6	12	0.8
	40								1160	58			
	42								1380	66			
RCK19-55x100	42	0.032	55	100	23	30.5	34.5	25	1160	55	M6	12	1.1
	45								1520	68			
	48								1880	78			
RCK19-62x110	48	0.048	62	110	23	30.5	34.5	25	1850	77	M6	12	1.3
	50								2200	88			
	52								2400	92			
RCK19-68x115	50	0.048	68	115	23	30.5	34.5	25	2000	80	M6	12	1.4
	55								2500	91			
	60								3150	105			
RCK19-75x138	55	0.048	75	138	25	32.5	37.8	30	2500	91	M8	30	1.7
	60								3200	107			
	65								3950	122			
RCK19-80x145	60	0.048	80	145	25	32.5	37.8	30	3200	107	M8	30	1.9
	65								3900	120			
	70								4600	131			
RCK19-90x155	65	0.048	90	155	30	39.0	44.3	35	4750	146	M8	30	2.9
	70								6000	171			
	75								7250	193			
RCK19-100x170	70	0.048	100	170	34	44.0	49.3	35	6900	197	M8	30	4.0
	75								7500	200			
	80								9000	225			
RCK19-110x185	75	0.048	110	185	39	50.0	56.4	40	7200	192	M10	59	5.3
	80								9000	225			
	85								10800	254			
RCK19-125x215	85	0.069	125	215	42	54.0	60.4	40	11000	259	M10	59	7.9
	90								13000	289			
	95								15000	316			
RCK19-140x230	95	0.069	140	230	46	60.5	68.0	45	15100	318	M12	100	9.0
	100								17600	352			
	105								20100	383			
RCK19-155x265	105	0.069	155	265	50	64.5	72.0	50	22000	419	M12	100	12.0
	110								25000	455			
	115								28000	487			
RCK19-165x290	115	0.069	165	290	56	71.0	81.0	55	31000	539	M16	250	16.5
	120								35000	583			
	125								39000	624			
RCK19-175x300	125	0.079	175	300	56	71.0	81.0	55	40000	640	M16	250	17.5
	130								44000	677			
	135								49000	726			
RCK19-185x330	135	0.079	185	330	71	86.0	96.0	70	55000	815	M16	250	27.5
	140								60000	857			
	145								65000	897			
RCK19-190x330	140	0.079	190	330	71	86.0	96.0	70	53300	761	M16	250	27.1
	145								58500	807			
	150								63500	847			
RCK19-200x350	150	0.079	200	350	71	86.0	96.0	70	73700	983	M16	250	30.7
	155								79800	1030			
	160								85800	1073			

[†] X = minimum clearance required to remove a bolt.
 For assembly and disassembly instructions refer to page 24.
 * Max Clearance = dw-di.

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Clamping Elements Type RCK 19 & 20



Dimensions

Part No.	Dimensions mm								Torque Cap. M Nm	Axial Force F kN	Clamping Screws		Approx Weight kg
	dw	Max* Clearance	d	D	L ₁	L ₂	L	X †			Size	Torque Nm	
RCK19-220x370	160	0.079	220	370	88	104	114	85	95000	1188	M16	250	40.8
	165								102000	1236			
	170								110000	1294			
RCK19-240x405	170	0.090	240	405	92	109	121	90	120000	1412	M20	490	51.3
	180								140000	1556			
	190								160000	1684			
RCK19-260x430	190	0.090	260	430	103	120	132	100	165000	1737	M20	490	63.3
	200								185000	1850			
	210								204000	1943			
RCK19-280x460	210	0.090	280	460	114	134	147	112	216000	2057	M20	490	79.6
	220								245000	2227			
	230								270000	2348			
RCK19-300x485	230	0.090	300	485	122	142	155	120	274000	2383	M20	490	92.8
	240								296000	2467			
	245								316000	2580			
RCK19-330x520	250	0.101	330	520	122	142	155	120	352000	2816	M20	490	103
	260								385000	2962			
	270								420000	3111			
RCK19-350x580	270	0.101	350	580	140	162	175	140	443000	3281	M20	490	157
	280								480000	3429			
	285								500000	3509			
RCK19-380x645	290	0.101	380	645	144	168	183	140	570000	3931	M24	840	205
	300								610000	4067			
	310								660000	4258			
RCK19-400x680	315	0.111	400	680	144	168	183	140	671000	4260	M24	840	228
	320								695000	4344			
	330								745000	4515			
RCK19-420x690	330	0.111	420	690	164	188	203	160	782000	4739	M24	840	258
	340								841000	4947			
	350								902000	5154			
RCK19-440x750	340	0.111	440	750	177	202	217	175	805000	4735	M24	840	342
	350								861000	4920			
	360								920000	5111			
RCK19-460x800	360	0.111	460	800	177	202	217	175	1000000	5556	M24	840	397
	370								1073000	5800			
	380								1141000	6005			
RCK19-480x800	380	0.111	480	800	188	213	228	185	1175000	6184	M24	840	404
	390								1250000	6410			
	400								1312000	6560			
RCK19-500x850	400	0.123	500	850	188	213	230	185	1314000	6570	M27	1250	466
	410								1382000	6741			
	420								1460000	6952			
RCK20-185x330	135	0.079	185	330	92	112	122	90	73000	1081	M16	250	36.0
	140								79000	1129			
	145								87000	1200			
RCK20-200x350	150	0.079	200	350	92	112	122	90	93000	1240	M16	250	39.8
	155								105000	1355			
	160								115000	1438			
RCK20-220x370	160	0.079	220	370	114	134	144	110	128000	1600	M16	250	52.9
	165								137000	1661			
	170								147000	1729			
RCK20-240x405	170	0.090	240	405	120	144	157	120	157000	1847	M20	490	66.9
	180								178000	1978			
	190								199000	2095			
RCK20-260x430	190	0.090	260	430	136	160	173	135	215000	2263	M20	490	83.6
	200								242000	2420			
	210								269000	2562			
RCK20-280x460	210	0.090	280	460	148	172	185	145	286000	2724	M20	490	103
	220								322000	2927			
	230								356000	3096			
RCK20-300x485	230	0.090	300	485	152	176	189	150	342000	2974	M20	490	116
	240								377000	3142			
	250								402000	3216			
RCK20-340x570	250	0.101	340	570	176	200	215	175	490000	3920	M24	840	193
	260								531000	4085			
	270								579000	4289			
RCK20-350x580	270	0.101	350	580	176	200	215	175	557000	4126	M24	840	197
	280								605000	4321			
	290								630000	4345			
RCK20-380x645	290	0.101	380	645	180	204	219	180	619000	4269	M24	840	256
	300								669000	4460			
	310								720000	4645			
RCK20-400x680	310	0.111	400	680	188	212	227	185	752000	4852	M24	840	298
	320								789000	4931			
	330								846000	5127			
RCK20-420x690	330	0.111	420	690	214	238	253	210	1000000	6061	M24	840	336
	340								1070000	6294			
	350								1142000	6526			
RCK20-440x750	340	0.111	440	750	224	252	269	220	1059000	6229	M27	1250	433
	350								1132000	6469			
	360								1205000	6694			
RCK20-460x770	360	0.111	460	770	224	252	269	220	1321000	7339	M27	1250	448
	370								1422000	7686			
	380								1502000	7905			
RCK20-480x800	380	0.111	480	800	246	274	291	240	1540000	8105	M27	1250	528
	390								1630000	8359			
	400								1724000	8620			
RCK20-500x850	400	0.123	500	850	246	274	291	240	1752000	8760	M27	1250	609
	410								1842000	8985			
	420								1943000	9252			

† X = minimum clearance required to remove a bolt.
 For assembly and disassembly instructions refer to page 24.
 * Max Clearance = dw-di.

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Clamping Elements Type RCK 25



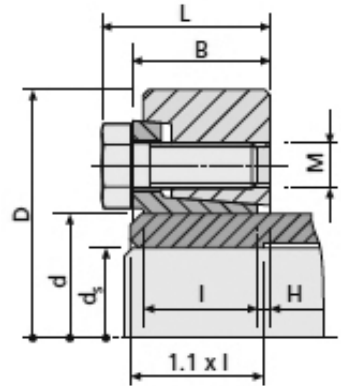
No need for a Torque Wrench with these Clamping elements, just tighten the screws in clockwise sequence in stages until the front faces of the flange and outer ring are aligned. This allows the transmission of torque values shown in the table. This overcomes the problems often encountered where units are either under or over tightened causing failures in transmission. There can also be a time saving in that powered tools can be used for the belt tightening.

Increased torque capacities are achieved by the use of larger screws. The single block design automatically provides parallel setting of the parts, thereby reducing the need for dynamic balancing.

Recommended tolerances

Hub Outside	d	f7
Hub Bore	ds	H7
Shaft Diameter ≤ 160mm		h6
Shaft Diameter ≥ 160mm		g6

Clamping Surfaces to be finished to Rz 3.2µm or better



Dimensions

Part No.	Dimensions mm							Torque Cap. M Nm	Axial Force F kN	Clamping Screws		Approx Weight kg
	ds	d	D	I	B	L	H			Size M	Torque Nm	
RCK25-68x115	50	68	115	24.5	29.5	35.0	3.5	2400	96	M8	34	1.4
	55							116				
	60							133				
RCK25-80x141	60	80	141	25	31.0	38.0	4	4300	143	M10	70	2.2
	65							166				
	70							186				
RCK25-95x170	70	95	170	36.5	43.5	50.5	4.5	7500	214	M10	70	4.8
	75							240				
	80							265				
RCK25-110x185	80	110	185	40.5	49	57	5	10600	320	M12	120	6.0
	85							348				
	90							378				
RCK25-125x215	90	125	215	45	53.5	61.5	5.5	16600	369	M12	120	9.1
	95							400				
	100							430				
RCK25-140x230	100	140	230	47	58	67	7	21500	470	M14	190	10.5
	105							495				
	115							565				
RCK25-150x263	110	150	263	51	63	72	7.5	32500	583	M14	190	16.0
	120							688				
	125							750				
RCK25-160x290	120	160	290	56	68	79	7.5	43000	754	M16	290	21.8
	130							846				
	135							874				
RCK25-170x300	130	170	300	56	69	80	8	59000	846	M16	290	23.0
	140							857				
	145							979				
RCK25-185x320	140	185	320	71.5	85.5	96.5	8	81000	1157	M16	290	32.6
	150							1173				
	155							1303				
RCK25-200x340	150	200	340	71.5	85.5	96.5	8	101000	1293	M16	290	36.1
	160							1300				
	165							1455				
RCK25-220x370	160	220	370	88	105	118	11	120000	1625	M20	570	51.3
	170							1765				
	180							1889				
RCK25-240x405	170	240	405	92	109	122	11	150000	1788	M20	570	64.3
	180							1933				
	190							2190				
RCK25-260x430	190	260	430	103	120	133	11	219000	2293	M20	570	78.8
	200							2400				
	220							2727				
RCK25-300x485	220	300	485	122	140	155	16	300000	3318	M24	990	111
	230							3504				
	250							3896				
RCK25-340x570	250	340	570	137	159	174	18	403000	4288	M24	990	182
	260							4508				
	280							4950				
RCK25-360x590	280	360	590	140	163	178	20	693000	4950	M24	990	193
	270							5089				
	290							5314				
RCK25-390x650	290	390	650	144	167	184	20	744000	5724	M27	1480	245
	300							5924				
	320							6413				
RCK25-420x670	320	420	670	165	186	203	20	962000	6675	M27	1480	279
	330							6656				
	350							6915				
RCK25-440x740	350	440	740	172	194	211	20	1141000	7434	M27	1480	380
	370							7841				
	380							8120				
RCK25-460x770	370	460	770	172	195	212	20	1333000	8681	M27	1480	411
	360							8511				
	390							8789				
RCK25-480x800	390	480	800	188	214	233	22	1532000	9364	M27	1480	485
	380							9589				
	410							9892				
RCK25-500x850	410	500	850	190	215	234	22	1826000	10493	M30	1980	562
	400							10375				
	430							10688				
RCK25-530x850	430	530	850	198	230	249	22	2191000	11312	M30	1980	566
	440							9767				
	460							10000				
RCK25-560x940	460	560	940	213	242	261	22	2200000	10565	M30	1980	773
	450							12440				
	480							12774				
RCK25-590x960	480	590	960	228	260	279	28	2432000	13429	M30	1980	820
	470							13894				
	500							14242				
								3736000	14944			

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Cross Shaft Clamping Elements



In order to make the best selection of a Cross Shaft Clamping Element for your application a number of factors must be taken into consideration. These include the shaft diameter; the outside diameter of the hub of connecting component; the drive torque to be transmitted, and axial thrust loads, and tilting or bending loads, maximum shaft speeds, operating temperature, and general design parameters and space restrictions.

Shaft Diameter:-

The shaft diameter will determine the particular size of clamping element in any series, and by reference to the catalogue details the suitability of that to meet the other parameters can be checked. Also hollow shafts must be checked for any load carrying strength, see below.

Hub Outside Diameter:-

The Hub Diameter has to be sufficient to support the stresses imposed by the shaft clamping element. The catalogue gives maximum hub diameters for medium carbon steel, but for other materials and method of determining refer below. Generally if hub diameter is over 2.5 times shaft diameter all series are suitable, but for smaller ratios consider types RCK 80, ACE 81, CCE 54 and CCE 55, and for very thin walled hubs use types RCK 19, RCK 20 and RCK 25.

Determination of Minimum Hub Diameter and Max. Hollow Shaft Bore:-

The following calculations are for static conditions only, considering only stresses imposed by the clamping element. The hub diameter is controlled by the pressure applied by the outer cone of the clamping element; the shape of the hub bore and total length of hub; and yield stress for permanent elongation of 0.2%.

$$\text{Minimum Hub Dia. } D_m = D \sqrt{\frac{\sigma + PhC}{\sigma - PhC}}$$

Where D = Clamping element outside diameter mm
 σ = Yield strength of material N/mm²
 Ph = Surface pressure on hub N/mm²
 C = Constant for Hub shape - see drawings

The tables in the catalogue give minimum hub diameters for hubs manufactured in medium carbon steel (080M40 or C45) or other material where $\sigma = 320$ N/mm². Values for σ on other commonly used hub materials are:-

220 Grade Cast Iron	$\sigma = 150$ N/mm ²
260 Grade Cast Iron	$\sigma = 180$ N/mm ²
Mild Steels	$\sigma = 220$ N/mm ²
070M55 (En9)	$\sigma = 350$ N/mm ²
Stainless Steel	$\sigma = 200$ N/mm ²
Aluminium	$\sigma = 100$ N/mm ²

For hollow bored Shafting:-

$$\text{Max. Bore in Shaft } D_m = d \sqrt{\frac{\sigma - 1.6 P_s}{\sigma}}$$

Where d = Clamping element bore mm
 P_s = Surface pressure on Shaft N/mm²

For solid shafting yield strength of material σ must be higher than surface pressure P_s .

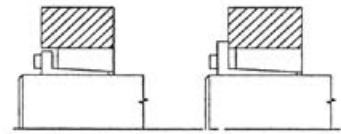
Maximum Shaft Speed:-

The centrifugal forces generated by high shaft speeds can reduce torque capacity and increase stress loads on hubs. Consult Cross & Morse if speed of shaft results in outer clamping diameter D running above 25M/sec.

Operating Temperature:-

Maximum temperatures should not exceed 100°C. At temperatures above 70°C the locking screws should be rechecked after 1 hour operation, whilst assembly is still warm.

Hub Assembly Type A C=1.0



$$L_1 \leq H_w < 2L_1 \quad L_2 \leq H_w < 2L_2$$

Where H_w = Hub Width
 For Dimensions L_1 & L_2 ref. Product Pages

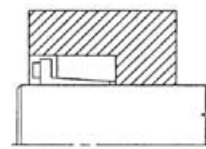
Hub Assembly Type B C=0.8



$$H_w \geq 2L_1$$

$$H_w \geq 2L_2$$

Hub Assembly Type C C=0.6



$$H_w \geq 2L_1 \text{ (All Types)}$$

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Installation Instructions

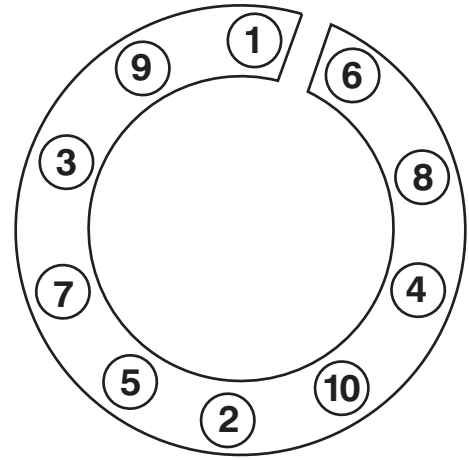


Installation and Removal of Cross Shaft Clamping Elements

Types RCK 10, 11, 12, 13, 15, 16, 61, 70, 71, 80 and ACE81

Installation:-

1. Slacken all screws in element by approx. two turns.
2. Remove two or three screws completely, and fit into equally spaced empty release thread holes. Tighten these screws lightly so as to ensure inner and outer cones are kept apart.
3. Clean all contact surfaces including screw threads, and lightly oil with clean thin unmodified oil.*
4. Insert clamping element into hub and push onto shaft and locate.
5. Remove screws from release holes and replace in original holes.
6. Tighten all screws finger tight and align hub.
7. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half screw catalogue torque, then 3/4 value, and finally full torque. Check all screws at full torque until no further rotation of screws occurs.



Disassembly:-

1. Slacken all clamping screws by couple of turns, completely removing as many as release holes in element.
2. Fit screws in release holes and tighten in sequence as clamping to force inner and outer cones apart.
3. Carefully remove hub and clamping element from shaft, and take element from hub.

Types RCK 40 and 45

Installation:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Fit hub to shaft and insert clamping element.
3. Tighten all screws finger tight and align hub.
4. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half catalogue torque for screw, then at 3/4 value, and finally at full torque. Check all screws are at full torque until no further rotation of screws can be achieved.

Disassembly:-

1. Release clamping screws in same sequence as for clamping. Element should now self release. If required lightly tap clamping screws to aid release. If still not released remove light coloured screws completely and replace with next larger metric size and tighten these screws to jack the cones apart.

Type RCK 50

Installation procedure depends detailed design, but following is typical:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Push hub onto shaft and insert spacer sleeves and clamping ring sets according to application drawing.
3. Insert distance ring if fitted and attach clamping flange lightly tightening screws. Align hub.
4. Tighten all screws in a diametrically opposite sequence, in several stages up to max. torque for screw size.

Disassembly:-

The taper of the individual rings is such that the assembly should automatically release when the locking screws are slackened. If not light tapping on the hub circumference should release them.

Types CCE 54 and 55

Installation:-

1. Clean all contact surfaces, and lightly oil with clean unmodified mineral oil.*
2. Turn locking nut anticlockwise until outer sleeve loose on inner cone.
3. Position hub on shaft and insert clamping element.
4. Align hub and tighten locking nut to catalogue torque value, and bend suitable tab on lock washer to prevent further rotation.

Disassembly:-

1. Release bent washertab and undo nut until sleeve loose.
2. Remove clamping element, If tight give end of tab gentle tap to release.

Types RCK 19/20 and 95

Installation:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Slacken all clamping bolts by a couple of turns.
3. (RCK 19/20 only) Fit clamping element on outer diameter of hub, and slide assembly onto shaft and position.
(RCK 95 only) Fit shaft ends equally into clamping element ensuring small clearance between shafts.
4. Tighten all bolts in a diametrically opposite sequence, in several stages up to max. specified torque.

Disassembly:-

Slacken all bolts and gently tap on bolts to release clamping element.

*WARNING: Never use, lubricant containing Molydenum or E.P additives, synthetic lubricant, or grease.

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