Curved Jaw Couplings From Lovejoy

Introduction

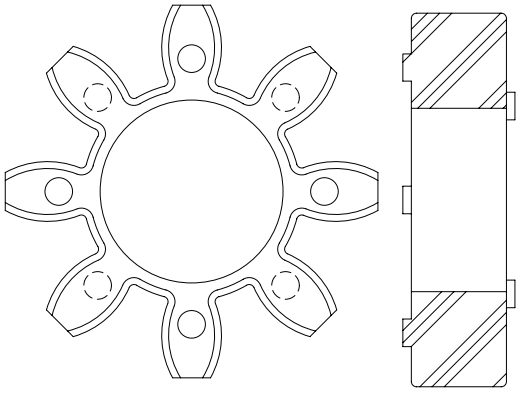
For over 100 years Lovejoy Inc. has set the standard for straight jaw couplings in the United States and around the world. Now, Lovejoy Inc. is proud to present the CJ and GS Series, a full line of curved jaw products for the world market. The CJ Series curved jaw coupling provides highly reliable service for light, medium, and heavy duty electrical motor and internal gas combustion engine applications. The GS Series provides a coupling solution for the motion control industry This product offering will continue Lovejoy's long history of being the world's premier coupling supplier.

The Curved Jaw Design

The three-piece design incorporates a radial curvature to the jaw face and both radial and axial curvature (crowning) to the elastomer (spider). The curved jaw hubs are offered in sintered iron, steel, aluminum, cast and nodular iron materials. The CJ Series curved jaw coupling and the variety of urethane elements allows for angular, parallel, and axial misalignment. The simplicity of the three-piece design makes it easy to assemble. Unlike some metallic coupling designs, the CJ Series design requires no lubrication. When assembled, the CJ Series offers no metal to metal contact of parts. The elastomer in compression design offers the benefit of continuing to function even after the elastomeric element fails (fail-safe design). The torque range of the CJ Series product is 67 to 247.800 in-lbs. Lovejoy offers the CJ Series in a range of product with finished stock metric bores and keyways for sizes 14 through 75/90. Sizes 100-180 are also available with metric bores on a made-to-order basis.

Elastomers (spider materials)

Lovejoy offers four types of spiders for the CJ Series curved jaw coupling product line. Urethane spiders provide high abrasion resistance and elasticity, along with good damping characteristics. The spiders are offered in a variety of shore hardnesses, each providing a different level of torque capacity, damping, and chemical resistance. The 92 shore spider (white or yellow) is standard, offering excellent torque carrying capacity. The 80 shore spider (blue) offers the best damping characteristics. The 95/98 shore spider (red) offers the highest torque carrying capacity. The 64 shore spider (green) is offered for high humidity environments. The standard spiders also feature an open center to accommodate small between shaft end measurements. All standard spiders have a rated temperature capacity of 212 °C. (See page 12 for GS spider temperature ratings.) The urethane material also resists oil, dirt, sand, grease, moisture, many solvents, as well as the atmospheric effects of ozone.



Standard Spider Design

Elastomer Recommendation Chart

Spider Type	Application types requiring:
80 shore A (Blue)	Good damping properties
92 shore A (Yellow)	General & hydraulic applications
95/98 shore A (Red)	High torque requirements
64 shore (green)	High humidity environments

Elastomer Performance Data

			Temperature Range			Misalignment (inches)			
Spider Type	Color	Material	Normal	Maximum	Stock Sizes	Angular	Parallel	Axial	Typical Applications
80 Shore A	Blue	Polyurethane	-40 to 212 F	-40 to 248 F	14 -180	.9 - 1.3 deg	.008 - 027	.039 - 252	Good damping properties
92 Shore A	Yellow	Polyurethane	-40 to 212 F	-50 to 248 F	14 -180	.9 - 1.3 deg	.008 - .027	.039 - 252	General & hydraulic applications
95/98 Shore A	Red	Polyurethane	-40 to 212 F	-40 to 248 F	14 -180	.9 - 1.3 deg	.008 - 027	.039 - 252	High torque requirements

Special Elastomer Data

			Temperature Range			Misalignment (inches)			
Spider Type	Color	Material	Normal	Maximum	Stock Sizes	Angular	Parallel	Axial	Typical Applications
64 Shore D	Green	Polyurethane	-30 to 230 F	-30 to 266 F	14 -180	.9 - 1.3 deg	.008 - 027	.039 - 252	Highly humidity environments

*The CJ Series Selection Process**

Step 1: Determine the nominal torque of your application:

$$\text{in-lbs} = Tkn = \frac{HP \times 63025}{rpm}$$

Step 2: Calculate your Application Service Factor using the charts below. The total Service Factor (K) will be:

K = K1 x K2 x K3

Step 3: Calculate the design torque (DTkmax) of your application.

Design Torque (DT_{kmax}) =
Nominal Torque x service factor.

Step 4: Using the Elastomer performance data charts on pages CJ-4 & CJ-5 select the urethane shore hardness which best corresponds to your relative damping needs in the application.

Step 5: Next find the columns listing Tkn and Tkmax values listed in Nm and compare them against the DTkmax figure for your application. Make sure that the spider/coupling size values are larger than the application values.

Step 6: Once the size is selected using the torque values, check the table on page CJ-6 to make sure the bore size needed will fit in the coupling.

Step 7: Double check the overall dimensions of the coupling to ensure that it will fit in the space allowed for the coupling in the application.

*This selection process is based on application factors only. A selection process is also available using DIN 740 part 2 standard. Consult with Lovejoy Engineering for details.

Application Service Factor (K1)

Application Service Factor	Service Factor (K1)
Uniform operation with small masses to be accelerated. Hydraulic and centrifugal pumps, light generators, blowers, fans, ventilators, belt/screw conveyors.	1.0
Uniform operation with medium masses to be accelerated. Sheet metal bending machines, wood working machines, mills, textile machines, mixers.	1,2
Irregular operation, with medium masses to be accelerated. Rotating ovens, printing presses, generators, shredders, winders, spinning machines, pumps for viscous fluids.	1,3
Irregular operation and shocks, with medium masses to be accelerated Concrete mixers, drop hammers, cable cars, paper mills, compression pumps, propeller pumps, rope winders, centrifuges.	1,4
Irregular operation and very heavy shocks, with large masses to be accelerated. Excavators, hammer mills, piston pumps, presses, rotary boring machines, shears, forge presses, stone crushers.	1,6
Irregular operation and very heavy shocks, with very large masses to be accelerated. Piston type compressors and pumps without speed variations, heavy roll sets, welding machines, brick presses, stone crushers.	1,8

Application Service Factor for Starts per Hour (K2)

Starts per hour	100	200	400	800
Service Factor (K2)	1,0	1,2	1,4	1,6

Application Service Factor for Ambient Temperature (K3)

Ambient Temperature	-30 to +30 C	+40 C	+60 C	+80 C
Service Factor (K3)	1,0	1,2	1,4	1,6

Definition of Terms

T_{kn}	Rated coupling torque
T_{kmax}	Maximum torque of the coupling
P[kW]	Power in kilowatts
rpm[1/min]	Revolutions per minute
Nm	Newton meters
D_{Tkmax}	Maximum torque of the application
T_{kw}	Varying load of an application in kilowatts
P_{kw}	Allowable power loss
BX Hub	Extended length hub

Elastomer Torque Ratings

Size	Maximum Speed	Wind-Up Angle @ Nominal Torque	Wind-Up Angle @ Maximum Torque	Torque [in-lbs] nominal	Torque [in-lbs] maximum	Torque [Nm] nominal	Torque [Nm] maximum	Rated HP @ 1200	Rated HP @ 1800
Urethane Spider - 92 Shore A (Yellow)									
14	19000	6,4°	10°	66	133	7	15	1.2	1.9
19/24	14000			88	177	10	20	1.7	2.5
24/32	10600			310	620	35	70	5.9	8.9
28/38	8500			840	1,680	95	190	16	24
38/45	7100			1,680	3,360	190	380	32	45
42/55	6000			2,345	4,690	265	530	45	65
48/60	5600			2,740	5,480	310	619	52	75
55/70	4750			3,625	7,250	410	819	69	100
65/75	4250	3,2°	5°	5,530	11,060	625	1,250	105	150
75/90	3550			11,320	22,650	1,279	2,559	215	320
90/100	2800			21,240	42,480	2,400	4,799	400	600
100/110	2500			29,200	58,400	3,299	6,598	550	825
110/125	2240			42,480	84,960	4,799	9,599	800	1210
125/145	2000			58,850	117,700	6,649	13,298	1120	1680
140	1800			75,670	151,340	8,549	17,098	1440	2160
160	1500			113,280	226,560	12,798	25,597	2150	3230
180	1400			165,050	330,100	18,647	37,295	3140	4715
Urethane Spider - 98 Shore A (Red)									
14	19000	6,4°	10°	111	221	13	25	2.1	3.2
19/24	14000			150	300	17	34	2.5	4
24/32	10600			530	1,000	60	113	10	15
28/38	8500			1,415	2,830	160	320	25	40
38/45	7100			2,875	5,750	325	650	55	80
42/55	6000			3,980	7,960	450	899	75	110
48/60	5600			4,645	9,290	525	1,050	85	125
55/70	4750			6,060	12,120	685	1,369	115	170
65/75	4250	3,2°	5°	8,320	16,640	940	1,880	150	225
75/90	3550			16,990	33,980	1,920	3,839	320	480
90/100	2800			31,860	63,720	3,600	7,199	600	900
100/110	2500			43,805	87,610	4,949	9,898	800	1250
110/125	2240			63,720	127,440	7,199	14,398	1210	1820
125/145	2000			88,500	177,000	9,999	19,997	1685	2525
140	1800			113,280	226,560	12,798	25,597	2150	3235
160	1500			169,920	339,840	19,198	38,395	3235	4850
180	1400			247,800	495,600	27,996	55,993	4720	7080
Urethane Spider - 80 Shore A Sizes 14 - 125 (Blue)									
14	19000	6,4°	10°	35	71	4	8	1	2
19/24	14000			43	86	5	10	1	3
24/32	10600			151	301	17	34	3	9
28/38	8500			407	814	46	92	8	23
38/45	7100			823	1637	93	185	16	47
42/55	6000			1151	2301	130	260	22	66
48/60	5600			1328	2655	150	300	25	76
55/70	4750			1593	3186	180	360	30	91
65/75	4250	3,2°	5°	1814	3628	205	410	35	104
75/90	3550			4204	8408	475	950	80	240
90/100	2800			10399	20798	1,175	2,350	198	594
100/110	2500			14249	28497	1,610	3,220	271	814
110/125	2240			17258	34515	1,950	3,900	329	986
125/145	2000			21594	43188	2,440	4,879	411	1234

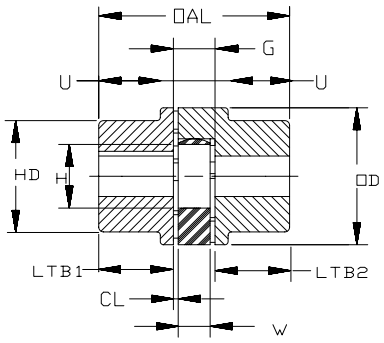
*Lovejoy recommends using 30 m/s as maximum speed. For operating speed above maximum use only steel or nodular iron hubs, dynamic balancing required.

Elastomer Torque Ratings (Continued)

Size	Maximum Speed	Wind-Up Angle @ Nominal Torque	Wind-Up Angle @ Maximum Torque	Torque [in-lbs] nominal	Torque [in-lbs] maximum	Torque [Nm] nominal	Torque [Nm] maximum	Rated HP @ 1200	Rated HP @ 1800
Urethane Spider 64 Shore D (Green)									
14	19000	4,5°	7,0°	142	283	16	32	2.7	4.1
19/24	14000	2,5°	3,6°	185	370	21	42	3.5	5
24/32	10600			660	1,320	75	149	12.5	18
28/38	8500			1,770	3,540	200	400	30	50
38/45	7100			3,585	7,170	405	810	65	100
42/55	6000			4,955	9,910	560	1,120	90	140
48/60	5600			5,795	11,590	655	1,309	110	165
55/70	4750			7,300	14,600	825	1,650	125	200
65/75	4250			10,395	20,790	1,174	2,349	190	290
75/90	3550			21,240	42,480	2,400	4,799	400	600
90/100	2800			39,825	79,650	4,499	8,999	750	1125
100/110	2500			54,735	109,470	6,184	12,368	1040	1550
110/125	2240			79,650	159,300	8,999	17,998	1515	2275
125/145	2000			110,630	221,260	12,499	24,998	2100	3160
140	1800			141,600	283,200	15,998	31,996	2690	4045
160	1500			212,400	424,800	23,997	47,994	4045	6060
180	1400			309,750	619,500	34,996	69,991	5900	8850

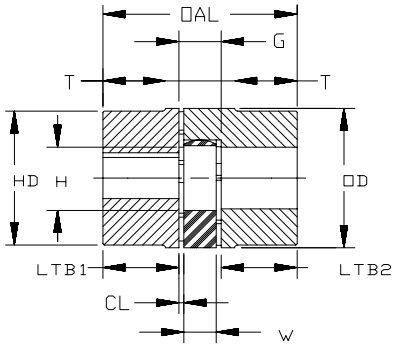
*Lovejoy recommends using 30 m/s as maximum speed. For operating speed above maximum use only steel or nodular iron hubs, dynamic balancing required.

Coupling Dimensions And Materials



Configuration One—2 A Hubs

Curved Jaw Coupling



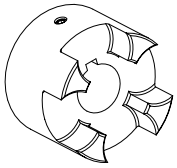
Configuration Two—2 B Hubs

		Hub Dimensions (inches)																			
		Cast AL			Cast Iron			Nodular Iron			PM/*Steel*										
Size	Hub Style	Min. Bore	Max. Bore	HD	Min. Bore	Max. Bore*	HD	Min. Bore	Max. Bore*	HD	Min. Bore	Max. Bore*	HD	LTB1 & LTB2	G	CL	W	OAL	T;U	OD	H
14	B Style	S	0.625	—								**0.625**	—	0.43	0.51	0.06	0.39	1.38		1.18	0.39
	BX Style	S	0.625	—							S	0.625	—	0.73	0.51	0.06	0.39	1.97		1.18	0.39
19/24	A Style	S	0.748	1.26							S	0.748	1.26	0.98	0.63	0.08	0.47	2.60	0.79	1.57	0.71
	B Style	S	0.938	—							**0.236**	**0.938**	—	0.98	0.63	0.08	0.47	2.60		1.57	0.71
	BX Style	S	0.938	—							S	0.938	—	1.46	0.63	0.08	0.47	3.54		1.57	0.71
24/32	A Style	S	0.945	1.57							S	0.945	1.57	1.18	0.70	0.08	0.55	3.07	0.94	2.17	1.06
	B Style	S	1.250	—							**0.315**	**1.250**	—	1.18	0.70	0.08	0.55	3.07		2.17	1.06
	BX Style	S	1.250	—							S	1.250	—	1.97	0.70	0.08	0.55	4.65		2.17	1.06
28/38	A Style	S	1.100	1.89							S	1.100	1.89	1.38	0.79	0.10	0.59	3.54	1.10	2.56	1.18
	B Style	0.374	1.500	—							**0.394**	**1.500**	—	1.38	0.79	0.10	0.59	3.54		2.56	1.18
	BX Style	S	1.500	—							S	1.500	—-	2.36	0.79	0.10	0.59	5.51		2.56	1.18
38/45	A Style	S	1.500	2.60							S	1.500	2.60	1.77	0.94	0.12	0.71	4.49	1.46	3.15	1.50
	B Style	0.472	1.750	—							**0.551**	**1.750**	—	1.77	0.94	0.12	0.71	4.49		3.15	1.50
	BX Style	S	1.750	—							S	1.750	—	2.76	0.94	0.12	0.71	6.46		3.15	1.50
42/55	A Style	S	1.650	2.95	S	1.650	2.95				S	1.650	2.95	1.97	1.02	0.12	0.79	4.96	1.57	3.74	1.81
	B Style	0.984	2.125	—	1.250	2.125	—-				S	2.125	—	1.97	1.02	0.12	0.79	4.96		3.74	1.81
	BX Style	S	2.125	—							S	2.125	—	2.95	1.02	0.12	0.79	6.93		3.74	1.81
48/60	A Style	S	1.875	3.35	S	1.875	3.35				S	1.875	3.35	2.20	1.10	0.14	0.83	5.51	1.77	4.13	2.01
	B Style	1.57	2.312	—	1.570	2.312	—				S	2.312	—-	2.20	1.10	0.14	0.83	5.51		4.13	2.01
	BX Style										S	2.312	—	3.15	1.10	0.14	0.83	7.40		4.13	2.01
55/70	A Style				S	2.125	3.86				S	2.125	3.86	2.56	1.18	0.16	0.87	6.30	2.05	4.72	2.36
	B Style				1.850	2.750	—				S	2.750	—	2.56	1.18	0.16	0.87	6.30		4.72	2.36
	BX Style										S	2.750	—	3.54	1.18	0.16	0.87	8.27		4.72	2.36
65/75	A Style				S	2.500	4.53				S	2.500	4.53	2.95	1.38	0.18	1.02	7.28	1.85	5.31	2.68
	B Style				2.250	2.938	—				S	2.938	—	2.95	1.38	0.18	1.02	7.28		5.31	2.68
	BX Style										S	2.938	—	3.94	1.38	0.18	1.02	9.25		5.31	2.68
75/90	A Style				S	2.938	5.31				S	2.938	5.31	3.35	1.57	0.20	1.18	8.27	2.09	6.30	3.15
	B Style				2.000	3.500	—				S	3.500	—	3.35	1.57	0.20	1.18	8.27		6.30	3.15
	BX Style										S	3.500	—	4.33	1.57	0.20	1.18	10.24		6.30	3.15
90/100	A Style				S	3.500	6.30				S	3.500	6.30	3.94	1.77	0.22	1.34	9.65	2.44	7.87	3.94
	B Style				3.000	3.938	—				S	3.938	—	3.94	1.77	0.22	1.34	9.65		7.87	3.94
	BX Style										S	3.938	—	4.92	1.77	0.22	1.34	11.61		7.87	3.94
100	B Style							1.57	4.250	7.87				4.33	1.97	0.24	1.50	10.63		8.86	4.45
110	B Style							2.36	4.875	9.06				4.72	2.17	0.26	1.65	11.61		10.04	5.00
125	B Style							2.36	5.625	10.43				5.51	2.36	0.28	1.81	13.39		11.42	5.79
140	B Style										2.00	6.250	10.04	6.10	2.56	0.30	2.56	14.76		12.60	6.50
160	B Style										2.00	7.250	11.42	6.89	2.95	0.35	2.95	16.73		14.57	7.48
180	B Style										2.00	7.625	12.80	7.68	3.35	0.41	3.35	18.70		16.54	8.66

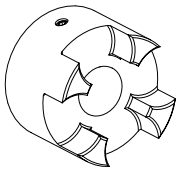
*Maximum bore may be achieved through the use of a shallow keyway
CL = Distance between spider and hub face.
Max Bore refers to maximum straight bore with keyway allowed in hub.
S= Solid hub with no bore.
OD is equal to HD for B style aluminum sizes: 19, 24, and 28.
W = Spider Thickness.
Outside diameter of spider equal to OD.
H = Inside diameter of spider.

Hub Designs (Descriptions)

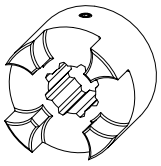
Keyway With Set Screw (KW)
Standard Lovejoy method of securing a hub to a shaft. Clamping style recommended for backlash free torque transmission.



Without Keyway, With Set Screw
Set screw used to secure hub to shaft.



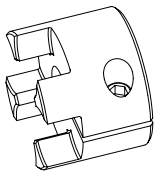
Spline Hub With Set Screw (W/SS)
Hub bored to accept standard S.A.E. and metric spline, secured with set screw to shaft.



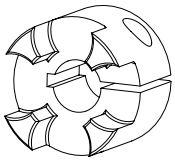
Spline Hub With Clamp (SC)
Hub bored to accept standard S.A.E. and metric spline, secured utilizing a clamping feature.

Spline Hub With L-Loc (L-LOC)
Hub bored to accept standard SAE and metric spline using the more efficient L-Loc feature to secure hub on shaft.

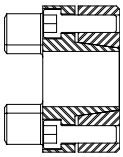
Clamping Hub With Single Slot Without Keyway (C)
Zero backlash clamping style for torque transmission. Torque capacity of hub depends on bore sizes.



Clamping Hub With Single Slot With Keyway (CWK)
Zero backlash clamping style with keyway for torque transmission.



Hub With Frictional Locking Device (LD)
This hub utilizes a shaft locking device to allow for shaft engagement.



CJ Series Powdered Metal (PM) and Cast Iron (CI) Hubs Metric Bore Sizes

When referencing a Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table

Metric Bore Size	Keyway Size	Powdered Metal					Cast Iron									
		14	19/24	24/32	28/38	38/45	42/55		48/60		55/70		65/75		75/90	
		B Hub	B Hub	B Hub	B Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub
RSB*		61150	61154	60880	60881	60882	62414	62048	62415	62059	62416	62060	62417	62061	62418	62062
8mm	2 x 1															
9mm	3 x 1.4															
10mm	3 x 1.4		72152													
11mm	4 x 1.8		71146													
12mm	4 x 1.8	61151	65609		70186		69805									
14mm	5 x 2.3	61152	61155	61101	69376	71147										
15mm	5 x 2.3		69096	71970	71983											
16mm	5 x 2.3		67395	69336	68549	68918										
18mm	6 x 2.8		70481	64810	71984	72149										
19mm	6 x 2.8		61156	61102	61109	71143										
20mm	6 x 2.8		65080	61103	61164	72150										
22mm	6 x 2.8			67509	66855	65804										
24mm	8 x 3.3		61157	61104	61110	66442										
25mm	8 x 3.3			61105	61165	60900	66257									
26mm	8 x 3.3					68741										
28mm	8 x 3.3			61106	61111	60901	62049									
30mm	8 x 3.3			68739	61112	60902	62050		72031							
32mm	10 x 3.3				65320	60903	62051		66897							
34mm	10 x 3.3						67238									
35mm	10 x 3.3				67223	60904	62052		72032		72040		69563			
38mm	10 x 3.3				61113	60905	62053		68037		71385		70240			
40mm	12 x 3.3					69493	66824	70922	69280		70056		69293			
42mm	12 x 3.3					60906	69800	62054	72033		72041		70376			
45mm	14 x 3.8					66765		62055	69326				68074			
48mm	14 x 3.8							62056	72034	71933	71299		70344			
50mm	14 x 3.8							62057	72035	66826	72043		69481		72053	
55mm	16 x 4.3							62058	72036		72044	67513	71739		72054	
60mm	18 x 4.4									69787		69219	68170		72055	
63mm	18 x 4.4														68614	
65mm	18 x 4.4									72038		66195	72050		72056	
70mm	20 x 4.9									72039		72047		67335	72057	
75mm	20 x 4.9									72047		72048		70231	72058	
79mm RSB	n/kw															62063
80mm	22 x 5.4									72049		72049			72059	
85mm	22 x 5.4														72060	
90mm	25 x 5.4														72061	
100mm	28 x 6.4															69066

*RSB maybe supplied as a solid hub or rough stock bore.

CJ Series Aluminum and Steel BX Style Hubs

CJ Series Aluminum Hubs Metric Bore Sizes

When referencing a Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table

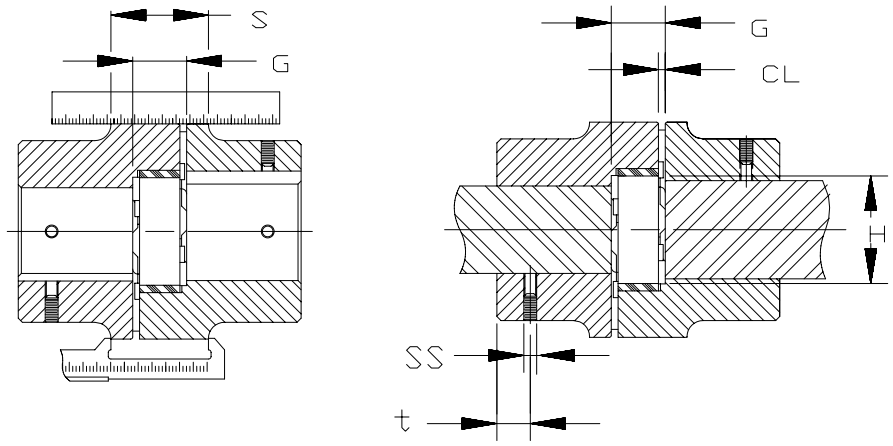
Metric Bore Size	Keyway Size	14	19/24		24/32		28/38		38/45		42/55		48/60	
		B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub	A Hub	B Hub
RSB*	n/kw	71577	71441	71442	71443	71444	71445	71446	71447	71448	71449	71450	71451	71452
6mm	2 x 1	71942												
8mm	2 x 1	71943												
9mm	3 x 1.4	71944												
10mm	3 x 1.4	71945	71951											
11mm	4 x 1.8	71946	71952											
12mm	4 x 1.8	71947	71953											
14mm	5 x 2.3	71948	71954		71961		71971							
15mm	5 x 2.3	71949	71950		71962									
16mm	5 x 2.3		71956		71963		71972							
18mm	6 x 2.8				71964		71973							
19mm	6 x 2.8		71957		71965		71974							
20mm	6 x 2.8			71958	71966		71975		71986					
24mm	8 x 3.3				71967		71976		71987					
25mm	8 x 3.3			71959		71968	71977		71988					
28mm	8 x 3.3					71969	71978		71989					
30mm	8 x 3.3						71979		71990					
32mm	10 x 3.3							71980	71991		72009			
35mm	10 x 3.3								71992		72010		72021	
38mm	10 x 3.3							71981	71993		72011		72022	
40mm	12 x 3.3							71982		71994	72012		72023	
42mm	12 x 3.3									71995	72013		72024	
45mm	14 x 3.8											72014	72025	
48mm	14 x 3.8											72015		
50mm	14 x 3.8											72016	72026	
55mm	16 x 4.3											72017	72027	72028
60mm	18 x 4.4											72019		72029
65mm	18 x 4.4											72020		72030
70mm	20 x 4.9													

*RSB maybe supplied as a solid hub or rough stock bore.

CJ Series Steel BX Style Hub Metric Bore Sizes

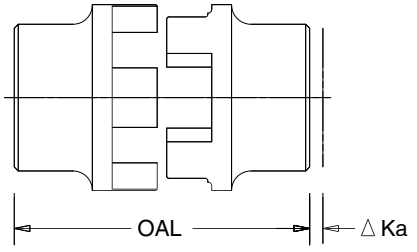
When referencing a Lovejoy Item (UPC) number, include 685144 as a prefix to the number shown in the table

Metric Bore Size	Keyway Size	14	19/24	24/32	28/38	38/45	42/55	48/60	55/70
Solid	n/kw	72062	72066	72067	72070	72073	72076	72080	72082
14mm	5 x 2.3	72063							
19mm	6 x 2.8		72064						
24mm	8 x 3.3		72065	72068					
28mm	8 x 3.3			72069					
30mm	8 x 3.3				72071				
40mm	12 x 3.3				72072	72074			
45mm	14 x 3.8					72075			
48mm	14 x 3.8								
55mm	16 x 4.3						72078		
65mm	18 x 4.4						72079		
70mm	20 x 4.9						72077	72081	

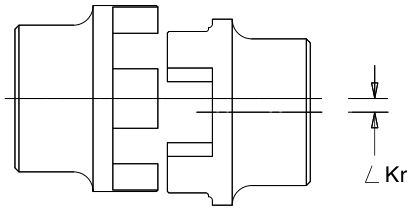


Coupling Installation and Misalignment Capabilities

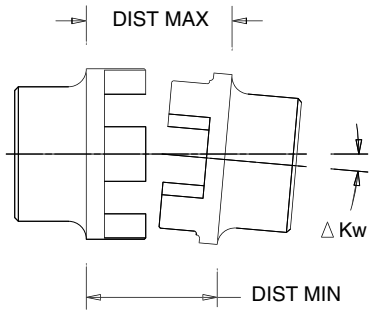
Coupling Size Dimensions	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
G	0.51	0.63	0.7	0.79	0.94	1.02	1.1	1.18	1.38	1.57	1.77	1.97	2.17	2.36	2.56	2.95	3.35
CL	0.06	0.08	0.08	0.10	0.12	0.12	0.14	0.16	0.18	0.2	0.22	0.24	0.26	0.28	0.3	0.35	0.41
H	0.39	0.71	1.06	1.18	1.5	1.81	2.01	2.36	2.68	3.15	3.94	4.45	5.00	5.79	6.50	7.48	8.66
S	—	1.02	1.18	1.34	1.57	1.81	1.97	2.20	2.48	2.83	3.27	3.62	4.06	4.57	5.00	5.71	6.42



Axial Displacement



Radial Displacement



DISPL.[mm] = DIST MAX - DIST MIN

Angular Displacement

Displacement For Displacement/Misalignment (inches)

	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Max. Axail Displ. (Ka)	0.040	0.047	0.055	0.060	0.070	0.079	0.082	0.087	0.102	0.120	0.133	0.150	0.165	0.180	0.190	0.220	0.250
Max. Radial Displ. (Kr)	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.014	0.016	0.018	0.019	0.020	0.021	0.024	0.024	0.025	0.027
Kw Max angular displ n=1500 [1/min] in deg (Kw)	1,2	1,2	0,9	0.9	1,0	1,0	1,1	1,1	1,2	1,2	1,2	1,2	1,3	1,3	1,2	1,2	1,2
Angular Displacement	0.03	0.03	0.04	0.05	0.07	0.07	0.08	0.09	0.11	0.13	0.17	0.19	0.22	0.25	0.26	0.3	0.35
Set Screw Information																	
Set Screw Size (SS)	8-32	10-24	10-24	5/16-18	5/16-18	5/16-18	5/16-18	3/8-16	3/8-16	3/8-16	3/8-16	1/2-13	5/8-11	5/8-11			
Set Screw Location (t)	0.2	0.39	0.39	0.59	0.59	0.79	0.79	0.79	0.79	0.98	1.18	1.18	1.38	1.57	1.77	1.97	1.97

The values regarding displacement are provided assuming normal operating conditions (i.e. temperature, torque with nominal rating of the coupling, speed/RPM rating of the coupling, and misalignment). Careful installation (i.e. alignment) and periodic inspection should be provided to provide the optimum life of the coupling. Special consideration should be given as to the position of the shafts and the amount of axial movement the coupling will be exposed to. The more accurate the alignment of the coupling, will result in greater life of the elastomer. A coupling guard and rotating equipment safety procedures should always be followed. Please consult the Lovejoy web site at www.lovejoy-inc.com for assembly instructions of the curved jaw coupling.

Spacer Type and Center Drop Out Designs

- Hubs available in aluminum, sintered iron, cast iron, and steel.
- Spacer style features an aluminum spacer piece.
- Drop-out style features two inserts for increased damping and parallel misalignment capability.
- Center drop-out design provides easy element replacement.
- Designed to accommodate a larger shaft separation.

Extended Spacer Styles

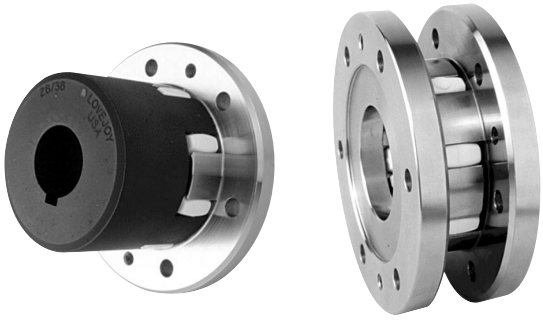
- Extended Spacer Style for extension between shaft end measurements.
- Increased parallel misalignment capacity.
- Easy replacement.

Standard Drop-out Styles

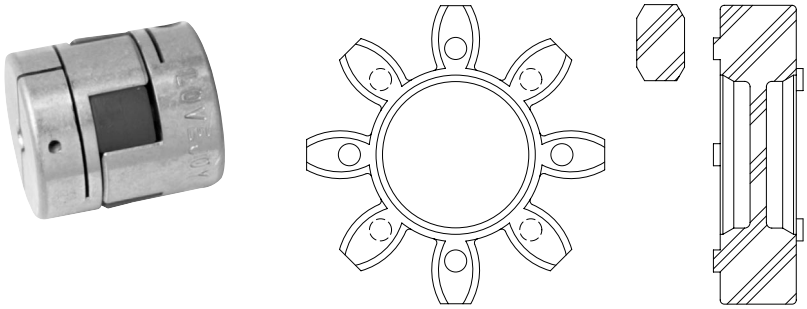
- Standard Drop-out design features easily removable components.
- Available in cast and nodular iron sizes 24-180.

Shaft-to-Flange
Flange-to-Flange Styles

- Flange-to-Flange design available for applications requiring space saving, compact connections.
- Shaft-to-Flange design is also available for special application situations requiring an alternative connection.



Technical Description For The GS Series



The GS Series curved jaw coupling offers zero backlash capability in a 3-piece design. The coupling is provided assembled under prestress. The GS Series can be used in a variety of different applications requiring precision and accuracy.

The GS Series spider features a straight center of the spider tooth, providing higher stiffness due to coupling prestress. The crowning of the ends of the spider legs allows for misalignment, while the curved jaws and solid spider center provide high-speed capability.

The jaws of the hubs and the spider legs are chamfered to provide easy assembly. The GS Series coupling design also allows the blind assembly in tight spaces. Raised spider dots on the legs of the spider ensure proper spacing of hubs and spider.

Proper installation of the coupling can provide isolation of electrical currents. Check the CL dimension listed on page 19 to ensure the proper spacing between spiders and hubs.

The GS Series coupling has spiders available in four different shore hardnesses. Each spider offers benefits for different vibratory, environmental, and torque transmission requirements.

Elastomer Performance Data

Spider Type	Color	Material	Temperature Range		Sizes Available	Typical Applications
			Normal	Maximum		
80 Shore A GS	Blue	Urethane	-50 to 176 F	-80 to 248 F	14 -24	Electric measuring systems
92 Shore A GS	Yellow	Urethane	-40 to 194 F	-50 to 248 F	14 -55	Electric measuring systems and control systems
95/98 Shore A GS	Red	Urethane	-30 to 194 F	-40 to 248 F	14 -75	Positioning drives, main spindle drives, high load applications
64 Shore D GS	Green	Urethane	-20 to 230 F	-30 to 248 F	14 -55	High load applications torsiionally stiff spider material

Coupling Selection For The GS Series

Typical Applications

Measurement And Control Systems
The torsional stiffness of the GS Series coupling provides zero backlash needed for the accuracy for measurement and control systems. The low torques of these applications gives the GS Series the ability to provide zero backlash due to the elastomer pre-stress.

Servo And Positioning Drives
The GS Series provides a zero backlash, flexible connection for servo and positioning drives. An added benefit of the GS Series is its damping capabilities. For applications that have vibrations at critical speeds, the GS Series coupling can provide a zero backlash solution for vibration problems.

Main Spindle Drives
The GS Series coupling is used in main spindle drives for machine tools. Torque spikes and cyclical loading are handled by the GS Series by damping or by shifting the vibratory frequency range to a non-critical speed range.

GS Series Service Factors

Temperature Factor

	-30 to +30C	+40 C	+60 C	+80 C
K3	1	1,2	1,4	1,8

Torsional Stiffness Factor

	Main Spindle Drive Of Machine	Positioning Drive	Shaft Encoders, Angle Encoders
K4	2-5	3-8	10

Shock Load Factors

	K5
Light Shock Loads	1,0
Medium Shock Loads	1,4
Heavy Shock Loads	1,8

Calculation Formula

Rated nominal torque $\text{Tkn [in-lbs]} = \dfrac{\text{HP x 63025}}{\text{RPM}}$

$$\text{Rotational inertia coefficient (driver)} = \frac{\text{Moment of inertia (driver)}}{\text{Moment of inertia (driver) + Moment of inertia (driven)}}$$

$$\text{Rotational inertia coefficient (driven)} = \frac{\text{Moment of inertia (driven)}}{\text{Moment of inertia (driver) + Moment of inertia (driven)}}$$

Check the nominal torque for the application against the rating for the coupling:

Tkn > Rated torque of machine x K3 x K4

Peak Torque

Shock load (driver side) = Peak torque (driver) x rotational inertia coefficient (driver) x K5

Shock load (driven side) = Peak torque (driven) x rotational inertia coefficient (driven) x K5

Check the peak torque for the application against the rating for the coupling (see page 15), checking both driver and driven sides:

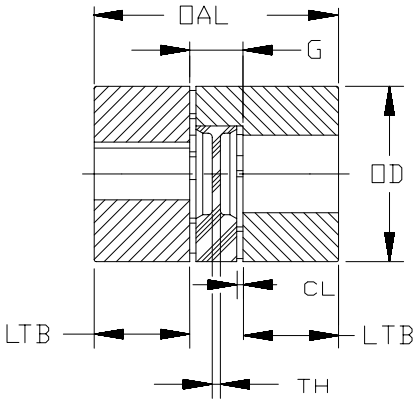
Tkmax > Peak Torque (driver or driven side) x K3 x K4

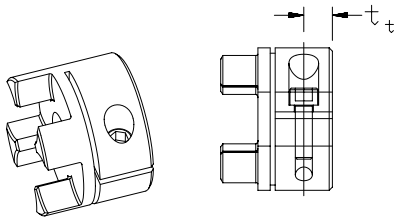
GS Series Technical Description

Coupling Size	Spider Durometer	Maximum Speed for Clamping Styles (RPM)				Torque (in-lbs)		Static Torsional Stiffness	Dynamic Torsional Stiffness	Radial Stiffness	Complete Coupling, maximum bore w/o kw	
		Clamping Hub	Set Screw Hub	Locking Device Hub		Tkn	Tkmax	[lb in/rad]	[lb in/rad]	[b/in]	Weight (lb)	Polar Moment of Inertia J ($lb\text{-}in^2$) ($x10^{-6}$)
14	80 Sh A	12700	15900	25400	31800	35.4	70.8	532.8	1593	874	0.098	57
	92 Sh A					66.4	132.8	1014	3044	1920		
	98 Sh A					110.6	221.3	1521	4540	3452		
	64 Sh D					141.6	283.2	2072	6212	4892		
19/24	80 Sh A	9550	11900	19000	23800	43.4	86.7	3042	9115	3326	0.306	374
	92 Sh A					88.5	177	5071	15222	6401		
	98 Sh A					150.5	300.9	7606	22833	11487		
	64 Sh D					185.9	371.7	10976	32922	16745		
24/32	92 Sh A	6950	8850	13800	17300	309.8	619.5	12673	38019	8458	0.621	965
	98 Sh A					531	1062	18257	54772	14630		
	64 Sh D					663.8	1327	26355	79065	21123		
28/38	92 Sh A	5850	7350	11700	14700	840.8	1681	20284	60852	10173	1.178	3691
	98 Sh A					1416	2832	30426	91278	18288		
	64 Sh D					1770	3540	38497	115492	24849		
38/45	92 Sh A	4750	5950	9550	11900	1681	3363	40568	121705	12430	2.112	7485
	98 Sh A					2876	5752	63366	190151	25146		
	64 Sh D					3584	7168	93279	279837	36999		
42/55	92 Sh A	4000	5000	8050	10000	2345	4690	55755	128236	13887	8.324	40639
	98 Sh A					3982	7965	169920	424800	31833		
	64 Sh D					4956	9912	244083	610207	41548		
48/60	92 Sh A	3600	4550	7200	9100	2743	5487	69472	159786	14745	11.317	68782
	98 Sh A					4646	9292	197974	494936	33890		
	64 Sh D					5796	11593	320370	800925	47286		
55/70	92 Sh A	3150	3950	6350	7950	3628	7257	84075	193372	17031	16.993	135334
	98 Sh A					6062	12124	210630	526575	38210		
	64 Sh D					7301	14602	366921	917302	52852		
65/75	95 Sh A	2800	3500	5650	7050	8319	16638	338070	845175	36679	20.286	216825
75/90	95 Sh A	2350	2950	4750	5950	12965	25930	557815	1393875	49435	32.379	477900

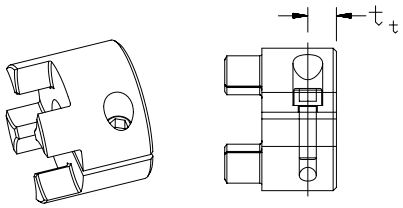
Lovejoy GS Series Curved Jaw Couplings

- No backlash connections for use in machine tool applications.
- Finished metric bores to H7 fit.
- Clamp style and set screw style available.
- Clamping design also available for use with shaft locking device.

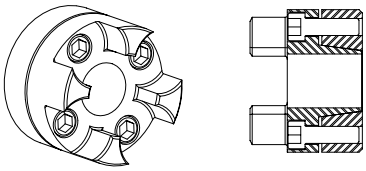




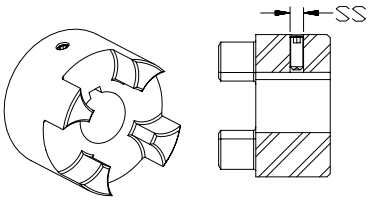
Double Split Clamp Style Hub



Single Slip Clamp Style Hub



Shaft Locking Device Hub



Set Screw Style Hub

Dimensional Data [inches]

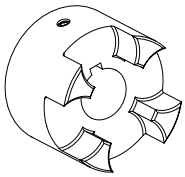
Size	Material	Max Bore	OD	OAL	LTB	G	CL	TH	Set Screw Style		Clamping Bolt Style		
									Set Screw Size (SS)	Set Screw Location (SL)	Bolt Size	Bolt Location (t)	Torque (in-lbs)
14	Aluminum	0.625	1.18	1.38	0.433	0.51	0.06	0.08	8-32	0.20	M3	0.20	11.39
19/24	Aluminum	0.938	1.57	2.6	0.984	0.63	0.08	0.12	10-24	0.39	M6	0.47	92.93
24/32	Aluminum	1.250	2.17	3.07	1.18	0.71	0.08	0.12	10-24	0.39	M6	0.55	92.93
28/38	Aluminum	1.500	2.56	3.54	1.38	0.79	0.10	0.16	5/16-18	0.59	M8	0.59	221.25
38/45	Aluminum	1.750	3.15	4.49	1.77	0.94	0.12	0.16	5/16-18	0.59	M8	0.79	221.25
42/55	Steel	2.125	3.74	4.96	1.97	1.02	0.12	0.16	5/16-18	0.79	M8	0.79	221..25
48/60	Steel	2.312	4.13	5.51	2.2	1.10	0.14	0.16	5/16-18	0.79	M10	0.87	610.65
55/70	Steel	2.750	4.72	6.3	2.56	1.18	0.16	0.18	3/8-16	0.79	M12	0.98	1062.00
65/75	Steel	2.938	5.31	7.28	2.95	1.38	0.18	0.18	3/8-16	0.79	M16	1.26	2610.75

GS Series Hub Design (Descriptions)

The GS Series coupling features different hub designs for different application situations. Each type offers specific benefits for different types of applications. The clamping styles offer the benefit of minimal to zero backlash.

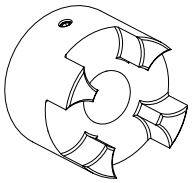
Keyway With Set Screw (KW)

Standard Lovejoy method of securing a hub to a shaft. Clamping style recommended for backlash free torque transmission.



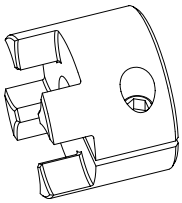
Without Keyway, With Set Screw

Set screw used to secure hub to shaft. This hub design should be used in applications with non-reversing and low torque characteristics.



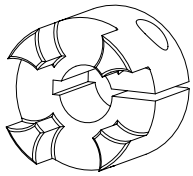
Clamping Hub With Single Slot Without Keyway (C)

Zero backlash, clamping style for torque transmission. Torque capacity of hub depends on bore size. Available standard for sizes 14-19.



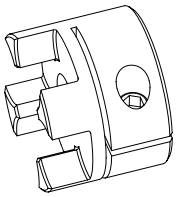
Clamping Hub With Single Slot With Keyway (CWK)

Zero backlash, clamping style with keyway for torque transmission. Usable in applications featuring reversing loads. Available standard for sizes 14-19.



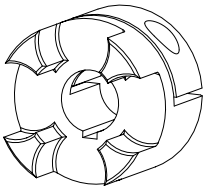
Clamping Hub With Double Slot Without Keyway (DSC)

Transmits torque utilizing a double split clamp to attach hub to shaft. Zero or minimum backlash. Torque capacity of coupling determined by bore size. Available standard for sizes 19-65.



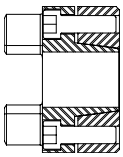
Clamping Hub With Double Slot With Keyway (DSCK)

Transmits torque utilizing a double split clamp to attach hub to shaft. Zero or minimum backlash. Available standard for sizes 24-65.



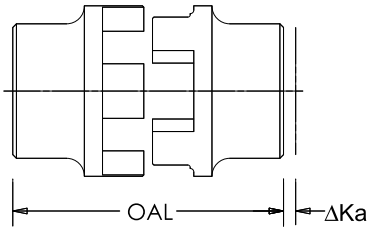
Hub With Frictional Locking (LD)

This hub utilizes a shaft locking device to allow for shaft engagement. This design features bolts tightened on the jaw side of the hub.



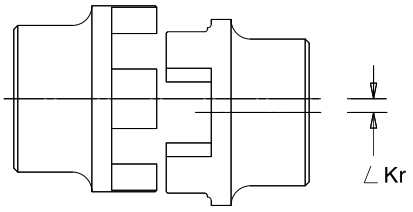
GS Series Misalignment Information

The GS Series coupling handles the following types of misalignment: axial, angular, and radial. The coupling retains its zero backlash properties due to its spider design.



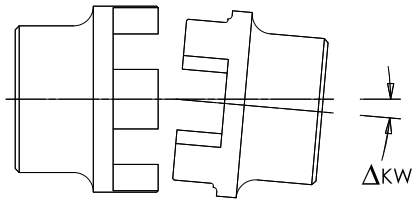
Axial Misalignment

Axial misalignment can be caused by different shaft tolerances or by thermal expansion of shafts. The GS Series coupling handles axial misalignment while keeping reactionary forces low.



Radial Misalignment

Radial misalignment can be defined as a measure of the offset distance between the centerlines of the driving and driven shafts. This type of misalignment, due to the forces involved, causes the highest stress.



Angular Misalignment

Angular misalignment can be defined as a measure of the angle between the centerlines of the driving and driven shafts, where those centerlines would intersect approximately halfway between shaft ends. The GS Series coupling can handle a specific amount of angular misalignment for each given size (refer to chart on right).

GS Series Misalignment Table

Misalignment				
Size	Spider shore	Axial	Radial	Angular
14	80	+0.039 -0.019	0.008	1,1
	92		0.006	1,0
	98		0.003	0,9
	64		0.002	0,8
19	80	+0.047 -0.019	0.006	1,1
	92		0.004	1,0
	98		0.002	0,9
	64		0.001	0,8
24	92	+0.055 -0.019	0.005	1,0
	98		0.004	0,9
	64		0.003	0,8
28	92	+0.059 -0.027	0.006	1,0
	98		0.004	0,9
	64		0.003	0,8
38	92	+0.070 -0.027	0.007	1,0
	98		0.005	0,9
	64		0.003	0,8
42	92	+0.078 -0.039	0.007	1,0
	98		0.005	0,9
	64		0.004	0,8
48	92	+0.082 -0.039	0.009	1,0
	98		0.006	0,9
	64		0.004	0,8
55	92	+0.086 -0.039	0.009	1,0
	98		0.007	0,9
	64		0.005	0,8
65	95	+0.102 -0.039	0.007	0,9

Notes