Spur Gears Made from Plastic, with One-Sided Hub, Straight Tooth System, Die-Cast Version

Material: Acetal, nature white or polyketone (PK), nature, ivory-colored.

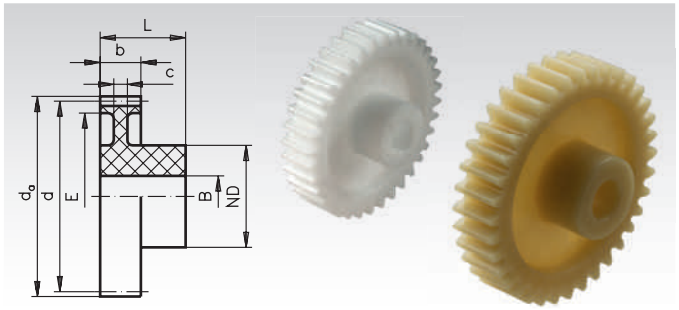
Moulded version. Bores machined. Pressure angle 20°. Usable also under water or other mediums.

Acetal: Standard quality with high hardness.

Polyketone: Lower friction leads to much larger lifespan, even without lubrication. Much higher safety against tooth braking, specially at longterm usage.

Temperature Range: -40°C to +140°C due to the load.
Material reference values page 821.

Ordering Details: e.g.: Product No. 285 012 00, Spur Gear, Acetal, Module 1.5, 12 Teeth



Module 1.5 Tooth Width b = 12 mm / 19 mm

Product No. Acetal	Product No. Polyketone	Number of teeth	b mm	d_a mm	d mm	L mm	E mm	c mm	ND mm	B mm	perm. MT* Acetal Ncm	perm. MT* Polyketone Ncm	Weight Acetal g	Weight Polyketone g
285 012 00	**285 012 01**	12	12	21	18	23	-	-	14	6	33,0	34,7	5,66	5,08
285 013 00	**285 013 01**	13	12	22,5	19,5	23	-	-	14	6	38,0	39,9	6,14	5,51
285 014 00	**285 014 01**	14	12	24	21	23	-	-	14	6	44,0	46,2	6,95	6,23
285 015 00	**285 015 01**	15	12	25,5	22,5	23	-	-	14	6	49,0	51,5	7,90	7,09
285 016 00	**285 016 01**	16	12	27	24	23	-	-	14	6	55,0	57,8	8,69	7,79
285 017 00	**285 017 01**	17	12	28,5	25,5	23	-	-	14	6	57,0	59,9	9,71	8,71
285 018 00	**285 018 01**	18	12	30	27	23	-	-	17	8	65,0	68,3	10,8	9,70
285 019 00	**285 019 01**	19	12	31,5	28,5	23	-	-	17	8	75,0	78,8	12,0	10,8
285 020 00	**285 020 01**	20	12	33	30	23	-	-	17	8	85,0	89,3	12,6	11,3
285 021 00	**285 021 01**	21	12	34,5	31,5	23	22,5	5	17	8	96,0	101	13,1	11,7
285 022 00	**285 022 01**	22	12	36	33	23	22,5	5	17	8	107	112	14,3	12,9
285 023 00	**285 023 01**	23	12	37,5	34,5	23	22,5	5	17	8	119	125	15,5	13,9
285 024 00	**285 024 01**	24	12	39	36	23	26,5	5	19	8	132	139	17,0	15,2
285 025 00	**285 025 01**	25	12	40,5	37,5	23	26,5	5	19	8	146	153	19,0	17,0
285 026 00	**285 026 01**	26	12	42	39	23	26,5	5	19	8	160	168	19,9	17,9
285 027 00	**285 027 01**	27	12	43,5	40,5	23	25,5	5	19	8	175	184	21,9	19,7
285 028 00	**285 028 01**	28	12	45	42	23	25,5	5	19	8	191	201	23,5	21,1
285 030 00	**285 030 01**	30	12	48	45	23	33,5	5	24	10	225	236	26,2	23,5
285 032 00	**285 032 01**	32	12	51	48	23	33,5	5	24	10	262	275	30,2	27,1
285 035 00	**285 035 01**	35	12	55,5	52,5	23	41,5	5	24	10	324	340	31,9	28,6
285 036 00	**285 036 01**	36	12	57	54	23	41,5	5	24	10	347	364	33,3	29,9
285 038 00	**285 038 01**	38	12	60	57	23	41,5	5	24	10	394	414	38,7	34,7
285 040 00	**285 040 01**	40	12	63	60	23	48,5	5	24	10	445	467	37,9	34,0
285 042 00	**285 042 01**	42	12	66	63	23	48,5	5	24	10	500	525	41,8	37,5
285 045 00	**285 045 01**	45	12	70,5	67,5	23	48,5	5	24	10	589	618	50,2	45,1
285 048 00	**285 048 01**	48	12	75	72	23	48,5	5	24	10	635	667	57,7	51,8
285 050 00	**285 050 01**	50	12	78	75	23	63	5	27	12	664	697	52,4	47,0
285 052 00	**285 052 01**	52	12	81	78	23	63	5	27	12	693	728	57,6	51,7
285 054 00	**285 054 01**	54	12	84	81	23	63	5	27	12	721	757	64,2	57,6
285 055 00	**285 055 01**	55	12	85,5	82,5	23	63	5	27	12	735	772	67,9	60,9
285 060 00	**285 060 01**	60	12	93	90	23	63	5	27	12	806	846	85,8	77,0
285 070 00	**285 070 01**	70	12	108	105	23	88	5	30	14	946	993	95,7	85,9
285 080 00	**285 080 01**	80	12	123	120	23	104	5	30	14	1080	1140	117	104
285 090 00	**285 090 01**	90	12	138	135	23	116	5	30	14	1210	1270	144	129
285 100 00	**285 100 01**	100	19	153	150	34	133	8	40	20	1340	1410	290	260
285 110 00	**285 110 01**	110	19	168	165	34	148	8	40	20	1480	1550	336	301
285 120 00	**285 120 01**	120	19	183	180	34	163	8	40	20	1610	1690	389	384
285 130 00	**285 130 01**	130	19	198	195	34	178	8	40	20	1750	1840	440	394
285 140 00	**285 140 01**	140	19	213	210	34	193	8	40	20	1880	1970	498	447
285 150 00	**285 150 01**	150	19	228	225	34	208	8	40	20	2020	2120	566	508

* Basis of calculations see page 197.

Note Regarding the Machining

Inside these die-cast parts are some cavities caused by production. These parts should therefore not be drilled too deep. With larger bores or when grooving the cavities might become visible. This often does not affect the functionality.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Plastic, with One-Sided Hub, Straight Tooth System, Die-Cast Version

Material: Acetal, nature white or polyketone (PK), nature, ivory-colored.

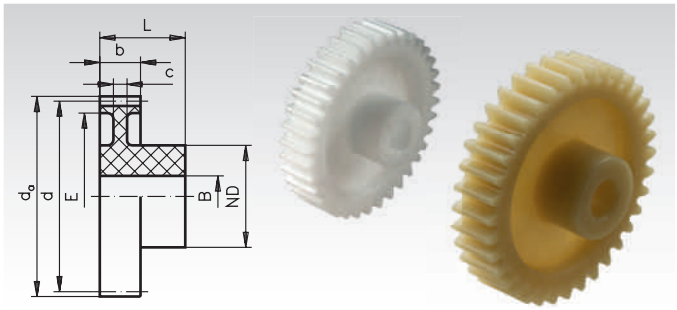
Moulded version. Bores machined. Pressure angle 20°. Usable also under water or other mediums.

Acetal: Standard quality with high hardness.

Polyketone: Lower friction leads to much larger lifespan, even without lubrication. Much higher safety against tooth braking, specially at longterm usage.

Temperature Range: -40°C to +140°C due to the load. Material reference values page 821.

Ordering Details: e.g.: Product No. 286 012 00, Spur Gear, Acetal, Module 2, 12 Teeth



Module 2.0 Tooth Width b = 15 mm

Product No. Acetal	Product No. Polyketone	Number of teeth	b mm	d_a mm	d mm	L mm	E mm	c mm	ND mm	B mm	perm. MT* Acetal Ncm	perm. MT* Polyketone Ncm	Weight Acetal g	Weight Polyketone g
286 012 00	**286 012 01**	12	15	28	24	27	-	-	18,5	8	78	82	11,7	10,5
286 013 00	**286 013 01**	13	15	30	26	27	-	-	18,5	8	91	96	12,9	11,6
286 014 00	**286 014 01**	14	15	32	28	27	-	-	18,5	8	103	108	15,0	13,4
286 015 00	**286 015 01**	15	15	34	30	27	-	-	18,5	8	116	122	15,9	14,3
286 016 00	**286 016 01**	16	15	36	32	27	22	6	17,5	8	130	137	16,7	15,0
286 017 00	**286 017 01**	17	15	38	34	27	24	6	17,5	8	134	141	17,7	15,8
286 018 00	**286 018 01**	18	15	40	36	27	25	6	17,5	8	155	163	19,4	17,4
286 019 00	**286 019 01**	19	15	42	38	27	27	6	17,5	8	178	187	20,8	18,7
286 020 00	**286 020 01**	20	15	44	40	27	28	6	20	10	202	212	24,6	22,1
286 021 00	**286 021 01**	21	15	46	42	27	28	6	20	10	227	238	27,0	24,2
286 022 00	**286 022 01**	22	15	48	44	27	28	6	20	10	255	268	30,3	27,2
286 023 00	**286 023 01**	23	15	50	46	27	35	6	24	10	284	298	32,6	29,2
286 024 00	**286 024 01**	24	15	52	48	27	35	6	24	10	315	331	35,4	31,8
286 025 00	**286 025 01**	25	15	54	50	27	35	6	24	10	347	364	39,2	35,2
286 026 00	**286 026 01**	26	15	56	52	27	38,5	6	24	10	382	401	39,3	35,2
286 027 00	**286 027 01**	27	15	58	54	27	38,5	6	24	10	418	439	42,7	38,3
286 028 00	**286 028 01**	28	15	60	56	27	38,5	6	24	10	457	480	46,5	41,7
286 030 00	**286 030 01**	30	15	64	60	27	43,5	6	24	10	539	566	50,1	44,9
286 032 00	**286 032 01**	32	15	68	64	27	44	6	26	10	629	660	59,7	53,6
286 035 00	**286 035 01**	35	15	74	70	27	54	6	26	12	780	819	61,7	55,3
286 036 00	**286 036 01**	36	15	76	72	27	54	6	26	12	834	876	65,5	58,7
286 038 00	**286 038 01**	38	15	80	76	27	61,5	6	26	12	949	996	66,5	59,7
286 040 00	**286 040 01**	40	15	84	80	27	61,5	6	26	12	1070	1130	77,4	69,4
286 042 00	**286 042 01**	42	15	88	84	27	61,5	6	26	12	1210	1270	87,0	78,0
286 045 00	**286 045 01**	45	15	94	90	27	68	6	30	14	1320	1390	99,1	88,9
286 048 00	**286 048 01**	48	15	100	96	27	74	6	30	14	1420	1490	109	97,7
286 050 00	**286 050 01**	50	15	104	100	27	78	6	30	14	1480	1560	116	104
286 055 00	**286 055 01**	55	15	114	110	27	87,5	6	30	14	1640	1720	134	120
286 060 00	**286 060 01**	60	15	124	120	27	97,5	6	30	14	1800	1890	155	139
286 070 00	**286 070 01**	70	15	144	140	27	117	6	30	14	2100	2210	196	176

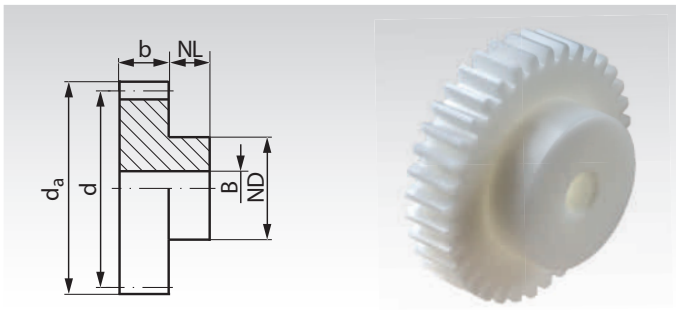
Module 3.0 Tooth Width b = 19 mm

Product No. Acetal	Product No. Polyketone	Number of teeth	b mm	d_a mm	d mm	L mm	E mm	c mm	ND mm	B mm	perm. MT* Acetal Ncm	perm. MT* Polyketone Ncm	Weight Acetal g	Weight Polyketone g
288 012 00	**288 012 01**	12	19	42	36	34	-	-	24	12	240	252	30,4	27,3
288 013 00	**288 013 01**	13	19	45	39	34	-	-	24	12	280	294	35,0	31,4
288 014 00	**288 014 01**	14	19	48	42	34	-	-	24	12	320	336	39,9	35,8
288 015 00	**288 015 01**	15	19	51	45	34	30,5	8	24	12	370	389	40,4	36,3
288 016 00	**288 016 01**	16	19	54	48	34	30,5	8	24	12	400	420	46,5	41,7
288 017 00	**288 017 01**	17	19	57	51	34	30,5	8	24	12	420	441	51,7	46,4
288 018 00	**288 018 01**	18	19	60	54	34	38	8	24	12	490	515	52,2	46,8
288 019 00	**288 019 01**	19	19	63	57	34	38	8	24	12	560	588	58,9	52,8
288 020 00	**288 020 01**	20	19	66	60	34	38	8	24	12	640	672	65,7	58,9
288 021 00	**288 021 01**	21	19	69	63	34	45	8	24	12	720	756	65,8	59,0
288 022 00	**288 022 01**	22	19	72	66	34	45	8	24	12	810	851	73,3	65,8
288 023 00	**288 023 01**	23	19	75	69	34	52	8	24	12	900	945	74,5	66,8
288 024 00	**288 024 01**	24	19	78	72	34	52	8	24	12	1000	1050	82,5	74,0
288 025 00	**288 025 01**	25	19	81	75	34	58	8	28	14	1110	1170	88,2	79,1
288 026 00	**288 026 01**	26	19	84	78	34	58	8	28	14	1220	1280	97,6	87,6
288 027 00	**288 027 01**	27	19	87	81	34	58	8	28	14	1340	1410	108	96,4
288 028 00	**288 028 01**	28	19	90	84	34	65	8	28	14	1460	1530	108	96,4
288 030 00	**288 030 01**	30	19	96	90	34	68	8	28	14	1730	1820	123	110
288 032 00	**288 032 01**	32	19	102	96	34	69	8	32	16	2020	2120	148	133
288 033 00	**288 033 01**	33	19	105	99	34	69	8	32	16	2180	2290	160	144
288 035 00	**288 035 01**	35	19	111	105	34	78	8	32	16	2510	2640	170	153
288 038 00	**288 038 01**	38	19	120	114	34	87	8	32	16	3060	3210	189	170
288 040 00	**288 040 01**	40	19	126	120	34	93	8	32	16	3330	3500	209	187
288 045 00	**288 045 01**	45	19	141	135	34	108	8	32	16	3780	3970	255	228

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d DIN 58405.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 middle.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 291 010 00, Spur Gear, POM, Module 0.5, 10 Teeth

Module 0.5 Tooth Width b = 4 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Ncm	Weight g
291 010 00	10	4	6	5	4	3,5	2	0,7	0,12
291 012 00	12	4	7	6	4	4	2	1,0	0,18
291 013 00	13	4	7,5	6,5	4	5	2	1,2	0,25
291 014 00	14	4	8	7	4	5	2	1,3	0,28
291 015 00	15	4	8,5	7,5	4	6	3	1,5	0,28
291 016 00	16	4	9	8	4	6	3	1,6	0,34
291 017 00	17	4	9,5	8,5	4	6	3	1,7	0,36
291 018 00	18	4	10	9	4	6	3	1,9	0,42
291 019 00	19	4	10,5	9,5	4	8	3	2,2	0,57
291 020 00	20	4	11	10	4	8	3	2,5	0,63
291 021 00	21	4	11,5	10,5	4	8	3	2,8	0,66
291 022 00	22	4	12	11	4	8	3	3,2	0,71
291 023 00	23	4	12,5	11,5	4	8	3	3,5	0,80
291 024 00	24	4	13	12	4	8	3	3,9	0,80
291 025 00	25	4	13,5	12,5	4	10	3	4,3	0,90
291 026 00	26	4	14	13	4	10	3	4,7	1,10
291 027 00	27	4	14,5	13,5	4	10	3	5,1	1,10
291 028 00	28	4	15	14	4	10	3	5,6	1,20
291 030 00	30	4	16	15	4	10	3	6,5	1,40
291 032 00	32	4	17	16	4	12	4	7,6	1,60
291 035 00	35	4	18,5	17,5	4	12	4	9,3	1,70
291 036 00	36	4	19	18	4	12	4	10,0	1,80
291 038 00	38	4	20	19	4	12	4	11,3	2,10
291 040 00	40	4	21	20	4	12	4	12,7	2,20
291 042 00	42	4	22	21	4	12	4	14,2	2,40
291 045 00	45	4	23,5	22,5	4	12	4	16,7	2,70
291 048 00	48	4	25	24	4	12	4	19,3	3,00
291 050 00	50	4	26	25	4	15	4	21,0	3,00
291 052 00	52	4	27	26	4	15	4	23,0	3,80
291 054 00	54	4	28	27	4	15	4	25,0	4,00
291 055 00	55	4	28,5	27,5	4	15	4	26,5	4,20
291 056 00	56	4	29	28	4	15	4	27,0	4,30
291 060 00	60	4	31	30	5	15	4	29,0	5,00
291 064 00	64	4	33	32	5	18	5	31,0	6,00
291 065 00	65	4	33,5	32,5	5	18	5	32,0	6,30
291 070 00	70	4	36	35	5	18	5	34,0	6,80
291 072 00	72	4	37	36	5	18	5	35,5	7,10
291 075 00	75	4	38,5	37,5	5	18	5	37,0	7,70
291 080 00	80	4	41	40	5	18	5	39,5	8,40
291 085 00	85	4	43,5	42,5	5	25	5	41,9	11,50
291 090 00	90	4	46	45	5	25	5	44,0	12,20
291 096 00	96	4	49	48	5	25	5	47,0	13,00
291 100 00	100	4	51	50	5	25	5	49,0	14,30
291 114 00	114	4	58	57	5	25	5	55,0	17,60
291 120 00	120	4	61	60	5	25	5	58,0	18,60

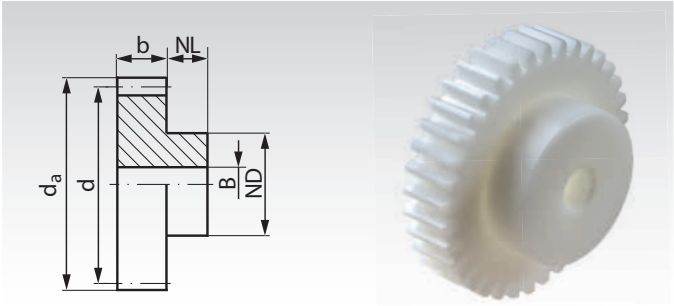
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d DIN 58405.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 middle.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 292 010 00, Spur Gear, POM, Module 0.7, 10 Teeth

Module 0.7 Tooth Width b = 5 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Ncm	Weight g
292 010 00	10	5	8,4	7	6	5	3	1,9	0,30
292 012 00	12	5	9,8	8,4	6	6	3	2,6	0,50
292 013 00	13	5	10,5	9,1	6	7	3	3,0	0,65
292 014 00	14	5	11,2	9,8	6	8	3	3,4	0,85
292 015 00	15	5	11,9	10,5	6	8	3	3,8	0,88
292 016 00	16	5	12,6	11,2	6	8	3	4,3	0,95
292 017 00	17	5	13,3	11,9	6	8	3	4,4	1,00
292 018 00	18	5	14	12,6	6	10	3	5,1	1,40
292 019 00	19	5	14,7	13,3	6	10	3	5,8	1,40
292 020 00	20	5	15,4	14	6	10	4	6,6	1,50
292 021 00	21	5	16,1	14,7	6	10	4	7,4	1,60
292 022 00	22	5	16,8	15,4	6	12	4	8,2	2,10
292 023 00	23	5	17,5	16,1	6	12	4	9,2	2,10
292 024 00	24	5	18,2	16,8	6	12	4	10,1	2,20
292 025 00	25	5	18,9	17,5	6	12	4	11,2	2,40
292 026 00	26	5	19,6	18,2	6	12	4	12,2	2,50
292 027 00	27	5	20,3	18,9	6	12	4	13,4	2,70
292 028 00	28	5	21	19,6	6	12	4	14,6	2,80
292 030 00	30	5	22,4	21	6	15	4	17,1	3,60
292 032 00	32	5	23,8	22,4	6	15	4	20,0	4,10
292 035 00	35	5	25,9	24,5	6	15	4	24,5	4,50
292 036 00	36	5	26,6	25,2	6	15	4	26,0	4,70
292 038 00	38	5	28	26,6	6	15	4	29,5	5,20
292 040 00	40	5	29,4	28	6	15	4	33,5	5,50
292 042 00	42	5	30,8	29,4	6	20	5	37,5	7,10
292 045 00	45	5	32,9	31,5	6	20	5	44,0	7,80
292 048 00	48	5	35	33,6	6	20	5	51,0	8,20
292 050 00	50	5	36,4	35	6	20	5	56,0	9,00
292 052 00	52	5	37,8	36,4	6	20	5	61,5	9,60
292 054 00	54	5	39,2	37,8	6	20	5	65,0	9,00
292 055 00	55	5	39,9	38,5	6	20	5	66,0	8,50
292 056 00	56	5	40,6	39,2	6	20	5	67,5	10,60
292 060 00	60	5	43,4	42	8	20	5	72,5	12,70
292 064 00	64	5	46,2	44,8	8	20	5	77,5	14,40
292 065 00	65	5	46,9	45,5	8	20	5	79,0	14,60
292 070 00	70	5	50,4	49	8	20	5	85,0	16,30
292 072 00	72	5	51,8	50,4	8	20	6	87,0	17,00
292 075 00	75	5	53,9	52,5	8	20	6	90,5	18,10
292 080 00	80	5	57,4	56	8	20	6	96,5	20,10
292 085 00	85	5	60,9	59,5	8	20	6	101,5	22,20
292 090 00	90	5	64,4	63	8	20	6	109,0	24,70
292 096 00	96	5	68,6	67,2	8	25	8	116,0	29,20
292 100 00	100	5	71,4	70	8	25	8	121,0	30,50
292 114 00	114	5	81,2	79,8	8	25	8	137,5	39,80
292 120 00	120	5	85,4	84	8	25	8	144,5	43,20

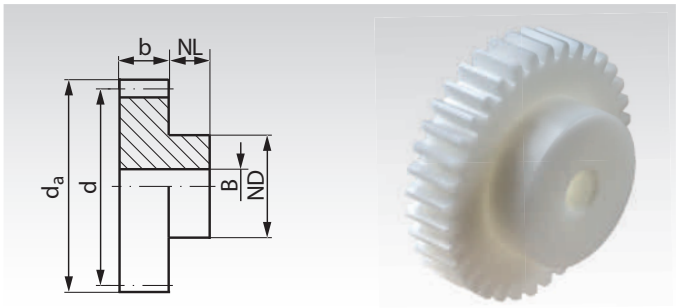
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 middle.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 293 010 00, Spur Gear, POM, Module 1, 10 Teeth

Module 1.0 Tooth Width b = 10 mm

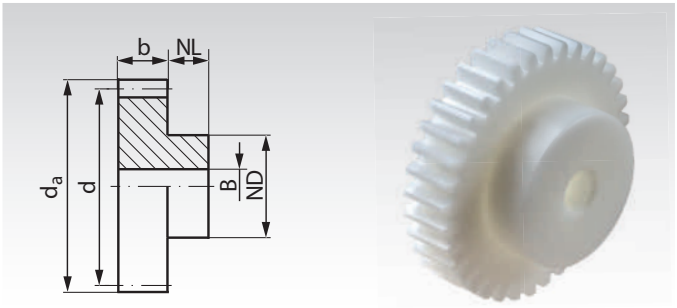
Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Ncm	Weight g
293 010 00	10	10	12	10	6	8	5	8,3	1,0
293 011 00	11	10	13	11	6	8	5	9,8	1,2
293 012 00	12	10	14	12	6	10	5	11,4	1,7
293 013 00	13	10	15	13	6	10	5	13,1	2,0
293 014 00	14	10	16	14	6	10	5	14,9	2,3
293 015 00	15	10	17	15	6	12	5	16,8	2,8
293 016 00	16	10	18	16	6	12	5	18,7	3,2
293 017 00	17	10	19	17	6	12	5	19,3	3,5
293 018 00	18	10	20	18	6	12	5	22,2	4,0
293 019 00	19	10	21	19	6	15	5	25,5	4,9
293 020 00	20	10	22	20	8	15	5	29,0	5,8
293 021 00	21	10	23	21	8	15	5	32,5	6,2
293 022 00	22	10	24	22	8	15	5	36,0	6,5
293 023 00	23	10	25	23	8	15	5	40,0	7,1
293 024 00	24	10	26	24	8	15	5	44,5	7,6
293 025 00	25	10	27	25	8	15	5	49,0	8,2
293 026 00	26	10	28	26	8	15	5	54,0	8,7
293 027 00	27	10	29	27	8	15	5	59,0	9,3
293 028 00	28	10	30	28	8	15	5	64,0	9,9
293 030 00	30	10	32	30	8	15	5	75,5	11,2
293 032 00	32	10	34	32	8	18	6	88,0	13,2
293 035 00	35	10	37	35	8	18	6	109,0	15,4
293 036 00	36	10	38	36	8	18	6	116,0	16,1
293 038 00	38	10	40	38	8	18	6	132,0	17,9
293 040 00	40	10	42	40	8	18	6	148,0	19,6
293 042 00	42	10	44	42	8	18	6	166,0	21,5
293 045 00	45	10	47	45	8	18	6	196,0	24,0
293 048 00	48	10	50	48	8	20	6	228,0	27,8
293 050 00	50	10	52	50	8	20	6	245,0	30,0
293 052 00	52	10	54	52	8	20	6	254,0	32,4
293 054 00	54	10	56	54	8	20	6	264,0	34,6
293 055 00	55	10	57	55	8	20	6	269,0	35,6
293 056 00	56	10	58	56	8	20	6	274,0	36,9
293 060 00	60	10	62	60	8	25	6	295,0	44,1
293 064 00	64	10	66	64	10	25	6	316,0	51,1
293 065 00	65	10	67	65	10	25	6	321,0	52,7
293 070 00	70	10	72	70	10	25	6	347,0	59,6
293 072 00	72	10	74	72	10	30	6	357,0	65,5
293 075 00	75	10	77	75	10	30	6	372,0	71,1
293 080 00	80	10	82	80	10	50	10	397,0	94,7
293 085 00	85	10	87	85	10	50	10	422,0	104,1
293 090 00	90	10	92	90	10	50	10	447,0	113,1
293 096 00	96	10	98	96	10	50	10	468,0	126,1
293 100 00	100	10	102	100	10	50	10	496,0	135,0
293 120 00	120	10	122	120	10	50	10	594,0	182,6

* Basis of calculations see page 197.

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 midle.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 294 010 00, Spur Gear, Delrin, Module 1.25, 10 Teeth

Module 1.25 Tooth Width b = 10 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
294 010 00	10	10	15	12,5	8	10	5	0,14	2,1
294 012 00	12	10	17,5	15	10	10	5	0,19	3,0
294 014 00	14	10	20	17,5	10	12	5	0,25	4,3
294 015 00	15	10	21,25	18,75	10	15	8	0,28	4,7
294 018 00	18	10	25	22,5	10	15	8	0,41	6,4
294 020 00	20	10	27,5	25	10	15	8	0,52	7,8
294 024 00	24	10	32,5	30	10	20	8	0,73	12,7
294 025 00	25	10	33,75	31,25	10	20	8	0,81	13,3
294 030 00	30	10	40	37,5	10	20	8	1,25	18,4
294 032 00	32	10	42,5	40	10	20	8	1,45	20,4
294 035 00	35	10	46,25	43,75	10	20	8	1,79	23,8
294 036 00	36	10	47,5	45	10	20	8	1,92	24,9
294 038 00	38	10	50	47,5	10	20	8	2,18	27,7
294 040 00	40	10	52,5	50	10	20	8	2,46	30,2
294 050 00	50	10	65	62,5	10	20	8	3,83	45,6

Module 1.5 Tooth Width b = 15 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
295 010 00	10	15	18	15	10	12	6	0,30	4,0
295 012 00	12	15	21	18	10	18	8	0,42	6,6
295 013 00	13	15	22,5	19,5	10	18	8	0,48	7,6
295 014 00	14	15	24	21	10	18	8	0,55	8,6
295 015 00	15	15	25,5	22,5	10	18	8	0,63	9,7
295 016 00	16	15	27	24	10	20	10	0,70	10,7
295 018 00	18	15	30	27	10	20	10	0,82	13,4
295 020 00	20	15	33	30	10	25	10	1,06	18,5
295 022 00	22	15	36	33	10	25	10	1,34	21,6
295 024 00	24	15	39	36	10	25	10	1,65	25,0
295 025 00	25	15	40,5	37,5	10	25	10	1,82	26,7
295 028 00	28	15	45	42	10	25	10	2,38	32,7
295 030 00	30	15	48	45	10	30	10	2,81	40,1
295 032 00	32	15	51	48	10	30	10	3,28	44,5
295 035 00	35	15	55,5	52,5	10	30	10	4,05	51,9
295 036 00	36	15	57	54	10	30	10	4,33	54,5
295 038 00	38	15	60	57	10	30	10	4,93	59,7
295 040 00	40	15	63	60	10	30	10	5,57	65,8
295 042 00	42	15	66	63	10	35	10	6,25	75,4
295 045 00	45	15	70,5	67,5	10	35	10	7,36	85,4
295 048 00	48	15	75	72	10	35	10	7,92	96,1
295 050 00	50	15	78	75	10	35	10	8,28	102
295 055 00	55	15	85,5	82,5	10	35	10	9,17	122
295 060 00	60	15	93	90	10	40	10	10,1	147
295 065 00	65	15	100,5	97,5	10	40	10	10,9	171
295 070 00	70	15	108	105	10	40	10	11,8	195
295 072 00	72	15	111	108	10	40	10	11,7	205
295 075 00	75	15	115,5	112,5	10	40	10	13,2	220
295 080 00	80	15	123	120	10	50	10	13,5	265
295 090 00	90	15	138	135	10	50	10	15,1	322
295 100 00	100	15	153	150	10	50	10	16,8	393
295 120 00	120	15	183	180	10	70	15	20,0	588

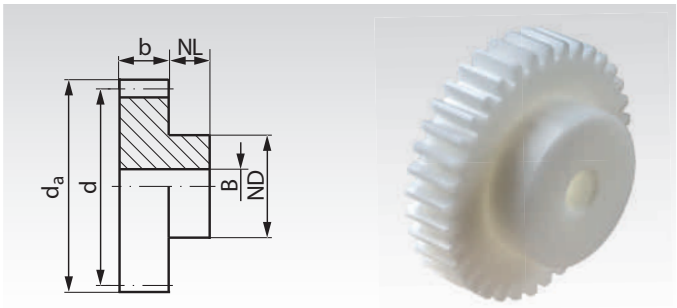
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 m.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 296 010 00, Spur Gear, POM, Module 2.0, 10 Teeth

Module 2.0 Tooth Width b = 16 mm

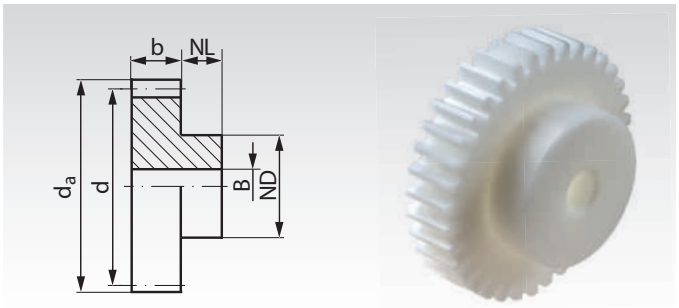
Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
296 010 00	10	16	24	20	15	15	8	0,60	8,0
296 012 00	12	16	28	24	15	20	8	0,83	13,9
296 014 00	14	16	32	28	15	20	8	1,08	18,0
296 015 00	15	16	34	30	15	20	12	1,24	17,0
296 016 00	16	16	36	32	15	25	12	1,38	23,2
296 018 00	18	16	40	36	15	30	12	1,65	32,0
296 020 00	20	16	44	40	15	30	12	2,15	37,3
296 024 00	24	16	52	48	15	30	12	3,40	50,0
296 025 00	25	16	54	50	15	30	12	3,70	53,6
296 028 00	28	16	60	56	15	30	12	4,85	64,4
296 030 00	30	16	64	60	15	30	12	5,75	72,7
296 032 00	32	16	68	64	15	40	12	6,70	92,6
296 035 00	35	16	74	70	15	45	12	7,80	114
296 036 00	36	16	76	72	15	45	12	9,15	118
296 040 00	40	16	84	80	15	50	12	11,5	149
296 045 00	45	16	94	90	15	50	12	14,1	177
296 050 00	50	16	104	100	15	60	12	15,8	231
296 056 00	56	16	116	112	15	60	12	17,7	272
296 060 00	60	16	124	120	15	60	12	19,2	307
296 070 00	70	16	144	140	20	70	15	22,6	439
296 072 00	72	16	148	144	20	70	15	23,3	459
296 075 00	75	16	154	150	20	70	20	24,2	482
296 080 00	80	16	164	160	20	70	20	25,9	536
296 090 00	90	16	184	180	20	70	20	28,9	654
296 100 00	100	16	204	200	20	80	20	32,1	819
296 120 00	120	16	244	240	20	80	20	38,4	1125

* Basis of calculations see page 197.

Spur Gears Made from POM, White, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768m.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Ordering Details: e.g.: Product No. 297 010 00, Spur Gear, POM, Module 2.5, 10 Teeth

Module 2.5 Tooth Width b = 20 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
297 010 00	10	20	30	25	15	20	10	1,23	15,6
297 012 00	12	20	35	30	15	20	10	1,71	21,7
297 014 00	14	20	40	35	15	20	10	2,23	29,3
297 015 00	15	20	42,5	37,5	15	25	12	2,56	35,0
297 016 00	16	20	45	40	15	25	12	2,85	39,5
297 018 00	18	20	50	45	15	30	12	3,40	53,0
297 020 00	20	20	55	50	15	30	12	4,45	63,0
297 024 00	24	20	65	60	15	30	12	7,00	87,0
297 025 00	25	20	67,5	62,5	15	40	12	7,70	105
297 028 00	28	20	75	70	15	40	12	10,1	127
297 030 00	30	20	80	75	15	40	12	12,0	143
297 035 00	35	20	92,5	87,5	15	50	12	17,3	202
297 036 00	36	20	95	90	15	50	15	19,2	226
297 040 00	40	20	105	100	20	50	15	23,9	264
297 045 00	45	20	117,5	112,5	20	50	15	27,6	322
297 050 00	50	20	130	125	20	70	15	31,0	443
297 056 00	56	20	145	140	20	70	20	34,7	515
297 060 00	60	20	155	150	20	70	20	37,4	585
297 072 00	72	20	185	180	20	80	20	45,3	826
297 080 00	80	20	205	200	20	90	20	50,3	1029
297 090 00	90	20	230	225	20	100	20	56,7	1301
297 100 00	100	20	255	250	20	100	25	62,9	1549
297 120 00	120	20	305	300	20	120	25	75,3	2242

Module 3.0 Tooth Width b = 25 mm

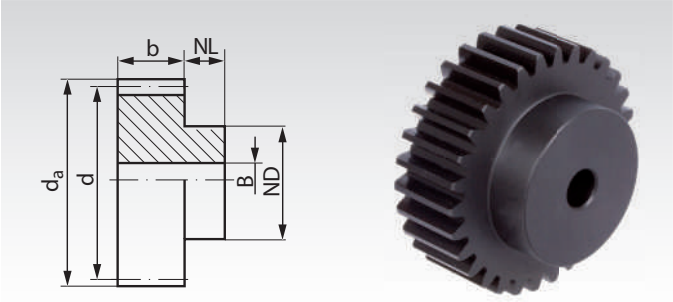
Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
298 010 00	10	25	36	30	15	25	12	2,30	27
298 012 00	12	25	42	36	15	25	12	3,20	38
298 014 00	14	25	48	42	15	25	12	4,20	52
298 015 00	15	25	51	45	15	25	12	4,80	58
298 018 00	18	25	60	54	15	30	12	6,45	87
298 020 00	20	25	66	60	15	30	12	8,40	106
298 024 00	24	25	78	72	15	30	12	13,2	149
298 025 00	25	25	81	75	15	45	15	14,6	179
298 028 00	28	25	90	84	15	45	15	19,2	217
298 030 00	30	25	96	90	15	45	15	22,7	244
298 035 00	35	25	111	105	15	45	15	35,0	325
298 036 00	36	25	114	108	15	45	15	37,5	340
298 040 00	40	25	126	120	15	50	15	43,7	424
298 045 00	45	25	141	135	15	50	20	49,6	521
298 048 00	48	25	150	144	15	50	20	53,2	603
298 050 00	50	25	156	150	20	70	20	55,6	708
298 056 00	56	25	174	168	20	70	20	62,2	854
298 060 00	60	25	186	180	20	70	20	67,5	987

* Basis of calculations see page 197.

Spur Gears made from POM, Black, wide Version, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 m.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Order. Details: e.g.: Product No. 293 110 10, Spur Gear, POM black, Module 1, 10 Teeth

Module 1.0 Tooth Width b = 15 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
293 110 10	10	15	12	10	10	8	4	0,13	1,6
293 110 12	12	15	14	12	10	9	4	0,17	2,2
293 110 15	15	15	17	15	10	12	6	0,25	4,3
293 110 18	18	15	20	18	10	15	6	0,33	6,8
293 110 20	20	15	22	20	10	16	6	0,44	8,3
293 110 24	24	15	26	24	10	20	8	0,67	11,5
293 110 25	25	15	27	25	10	20	8	0,74	12,3
293 110 28	28	15	30	28	10	20	8	0,96	14,9
293 110 30	30	15	32	30	10	20	8	1,13	16,8
293 110 32	32	15	34	32	10	25	8	1,32	21,3
293 110 36	36	15	38	36	10	25	8	1,74	25,7
293 110 40	40	15	42	40	10	25	8	2,22	30,7
293 110 45	45	15	47	45	10	30	8	2,94	40,6
293 110 50	50	15	52	50	10	30	8	3,68	48,4
293 110 56	56	15	58	56	10	40	8	4,11	66,4
293 110 60	60	15	62	60	10	40	8	4,43	73,9
293 110 72	72	15	74	72	10	50	10	5,36	109
293 110 75	75	15	77	75	10	50	10	5,58	116
293 110 80	80	15	82	80	10	60	10	5,96	141
293 110 90	90	15	92	90	10	60	10	6,71	169
293 111 00	100	15	102	100	10	60	10	7,44	200

Module 1.5 Tooth Width b = 17 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
295 110 10	10	17	18	15	13	12	6	0,34	5,0
295 110 12	12	17	21	18	13	14	6	0,48	7,6
295 110 15	15	17	25,5	22,5	13	18	8	0,71	11,9
295 110 18	18	17	30	27	13	20	8	0,93	16,5
295 110 20	20	17	33	30	13	25	8	1,20	22,8
295 110 24	24	17	39	36	13	25	8	1,87	30,2
295 110 25	25	17	40,5	37,5	13	25	8	2,06	32,2
295 110 28	28	17	45	42	13	30	8	2,70	42,7
295 110 30	30	17	48	45	13	30	8	3,18	47,5
295 110 36	36	17	57	54	13	35	8	4,91	68,6
295 110 40	40	17	63	60	13	40	8	6,31	86,6
295 110 45	45	17	70,5	67,5	13	50	12	8,34	115
295 110 50	50	17	78	75	13	50	12	9,38	135
295 110 56	56	17	87	84	13	60	12	9,66	177
295 110 60	60	17	93	90	13	60	12	11,4	196
295 110 72	72	17	111	108	13	80	12	13,3	302
295 110 90	90	17	138	135	13	80	12	17,1	423

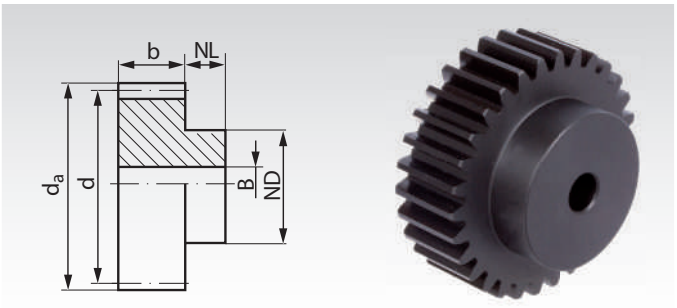
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears made from POM, Black, wide Version, with One-Sided Hub, Straight Tooth System, Milled Teeth

Tooth quality 10d25 DIN 3967.
Pressure angle 20°.
Untoleranced dimensions in accordance with DIN ISO 2768 m.

Temperature limit: continuous 100°C, only short time 140°C.
Water absorption (satiable) 0.5% Cws.
Other material reference values page 821.



Order. Details: e.g.: Product No. 296 110 10, Spur Gear, POM black, Module 2, 10 Teeth

Module 2.0 Tooth Width b = 20 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
296 110 10	10	20	24	20	15	15	8	0,75	9,9
296 110 12	12	20	28	24	15	18	8	1,04	15,4
296 110 15	15	20	34	30	15	24	8	1,55	25,9
296 110 18	18	20	40	36	15	25	8	2,06	35,3
296 110 20	20	20	44	40	15	30	8	2,69	46,4
296 110 24	24	20	52	48	15	35	12	4,25	64,6
296 110 25	25	20	54	50	15	35	12	4,63	68,9
296 110 30	30	20	64	60	15	40	12	7,19	98,9
296 110 36	36	20	76	72	15	50	12	11,5	148
296 110 40	40	20	84	80	15	50	12	14,3	175
296 110 45	45	20	94	90	15	60	12	17,6	230
296 110 50	50	20	104	100	15	70	15	19,8	289
296 110 60	60	20	124	120	15	70	15	24,0	385
296 110 90	90	20	184	180	15	90	20	36,1	821

Module 2.5 Tooth Width b = 25 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
297 110 10	10	25	30	25	15	20	8	1,54	20,0
297 110 12	12	25	35	30	15	20	8	2,14	27,5
297 110 15	15	25	42,5	37,5	15	25	8	3,20	44,9
297 110 18	18	25	50	45	15	35	8	4,25	71,5
297 110 20	20	25	55	50	15	35	12	5,56	81,7
297 110 24	24	25	65	60	15	40	12	8,75	118
297 110 25	25	25	67,5	62,5	15	45	12	9,65	133
297 110 30	30	25	80	75	15	50	12	15,0	187
297 110 36	36	25	95	90	15	60	12	24,0	273
297 110 40	40	25	105	100	15	70	12	30,0	346
297 110 45	45	25	117,5	112,5	15	70	15	34,5	414
297 110 50	50	25	130	125	15	80	15	38,8	519
297 110 60	60	25	155	150	15	90	15	46,8	734

Module 3.0 Tooth Width b = 30 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{JS10} mm	perm. MT* Nm	Weight g
298 110 10	10	30	36	30	20	25	12	2,79	35,1
298 110 12	12	30	42	36	20	25	12	3,84	48,0
298 110 15	15	30	51	45	20	35	12	5,76	84,9
298 110 18	18	30	60	54	20	45	12	7,74	131
298 110 20	20	30	66	60	20	45	12	10,1	154
298 110 24	24	30	78	72	20	50	12	15,8	216
298 110 25	25	30	81	75	20	60	14	17,5	251
298 110 30	30	30	96	90	20	60	14	27,2	332
298 110 35	35	30	111	105	20	80	14	41,9	489
298 110 36	36	30	114	108	20	80	14	45,0	509
298 110 40	40	30	126	120	20	80	14	52,4	599
298 110 45	45	30	141	135	20	90	20	59,5	749
298 110 50	50	30	156	150	20	100	20	66,7	930
298 110 60	60	30	186	180	20	100	20	81,0	1253

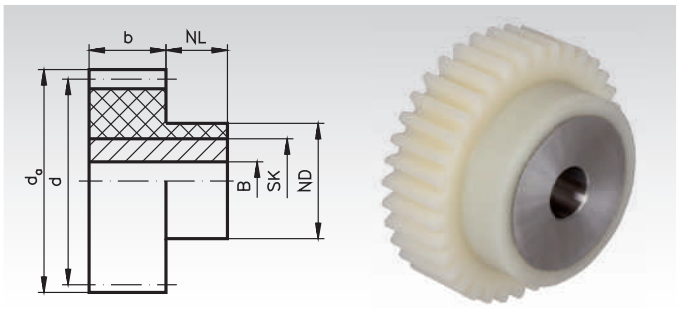
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made From Plastic with Steel Core, Milled, Straight Teeth

Material: Outer part: Plastic PA 12 G.
Steel core: Choice of steel or stainless steel 1.4305.

STAINLESS



Tooth quality 8e25 DIN 3967.
Temperature range -60°C to +120° C, short periods 150° C.

- Special plastic with excellent material properties.
- Enables snugly fitting, high strength shaft-hub connection.
- Optimal force transmission due to cylindrical contact area.
- Light, silent and clean, with excellent dry running properties.

Ordering Details: e.g.: Product No. 218 550 25, spur gear, module 1.5, 25 teeth

Module 1.5 Tooth width b = 17 mm

Product No. Steel Core	Product No. Stainless Core	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	SK mm	B^{H7} mm	perm.MD* Nm	Weight g
218 550 25	218 950 25	25	17	40,5	37,5	13	33	25	10	2,1	112
218 550 30	218 950 30	30	17	48	45	13	35	25	10	3,2	122
218 550 32	218 950 32	32	17	51	48	13	35	25	10	3,7	125
218 550 36	218 950 36	36	17	57	54	13	45	35	10	4,9	238
218 550 40	218 950 40	40	17	63	60	13	50	40	10	6,3	312
218 550 45	218 950 45	45	17	70,5	67,5	13	50	40	10	8,3	325
218 550 48	218 950 48	48	17	75	72	13	55	45	10	9,0	407
218 550 50	218 950 50	50	17	78	75	13	55	45	10	9,4	413
218 550 56	218 950 56	56	17	87	84	13	65	55	15	10,6	582
218 550 60	218 950 60	60	17	93	90	13	70	60	15	11,4	695
218 550 64	218 950 64	64	17	99	96	13	70	60	15	12,2	710
218 550 70	218 950 70	70	17	108	105	13	70	60	15	13,4	735
218 550 72	218 950 72	72	17	111	108	13	80	70	15	13,8	967
218 550 80	218 950 80	80	17	123	120	13	85	75	20	15,3	1096
218 550 90	218 950 90	90	17	138	135	13	90	80	20	17,1	1281
218 551 00	218 951 00	100	17	153	150	13	110	90	20	19,0	1652
218 551 20	218 951 20	120	17	183	180	13	120	90	20	22,7	2114

Module 2.0 Tooth width b = 20 mm

Product No. Steel core	Product No. Stainless Core	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	SK mm	B^{H7} mm	perm.MD* Nm	Weight g
231 550 18	231 950 18	18	20	40	36	15	31	25	10	2,1	127
231 550 20	231 950 20	20	20	44	40	15	35	25	10	2,7	135
231 550 24	231 950 24	24	20	52	48	15	40	30	10	4,2	189
231 550 25	231 950 25	25	20	54	50	15	45	35	10	4,6	271
231 550 28	231 950 28	28	20	60	56	15	45	35	15	6,1	254
231 550 30	231 950 30	30	20	64	60	15	50	40	15	7,2	338
231 550 32	231 950 32	32	20	68	64	15	50	40	15	8,4	345
231 550 35	231 950 35	35	20	74	70	15	55	45	15	10,4	444
231 550 36	231 950 36	36	20	76	72	15	55	45	15	11,1	448
231 550 40	231 950 40	40	20	84	80	15	65	55	20	14,3	631
231 550 45	231 950 45	45	20	94	90	15	70	60	20	17,6	774
231 550 48	231 950 48	48	20	100	96	15	70	60	20	19,0	792
231 550 50	231 950 50	50	20	104	100	15	75	65	20	19,8	930
231 550 56	231 950 56	56	20	116	112	15	80	70	20	23,8	1105
231 550 60	231 950 60	60	20	124	120	15	85	75	20	24,0	1280
231 550 64	231 950 64	64	20	132	128	15	90	80	20	25,7	1467
231 550 70	231 950 70	70	20	144	140	15	90	80	25	28,1	1469
231 550 72	231 950 72	72	20	148	144	15	90	80	25	28,8	1487
231 550 80	231 950 80	80	20	164	160	15	100	90	25	32,0	1905
231 550 90	231 950 90	90	20	184	180	15	110	90	25	36,1	2393
231 551 00	231 951 00	100	20	204	200	15	120	110	25	40,1	2933
231 551 20	231 951 20	120	20	244	240	15	130	120	25	47,8	3671

* Basis of calculations see page 197.

On request:
Other versions and components made from PA 6 G / PA 12 G without core or with aluminium core.

Plastic PA 12 G

Produced using the vertical casting process.
High-molecular, high crystalline and almost stress free.
Very low moisture absorption, excellent dimensional stability.
High viscosity even at very low temperatures.
Very good mechanical and chemical resistance.

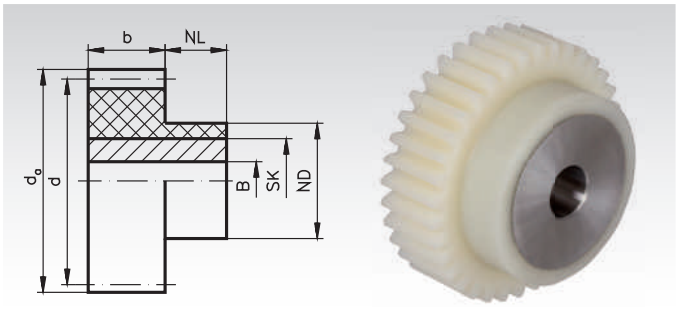
Steel core

Core with cylindrical body surface, knurled, permanently cast-in.
As standard made from normal steel or 1.4305.
On request in aluminium.
Bore tolerance H7, finished after casting.
The steel core allows the transfer of high torque even for small shaft diameters and correspondingly small parallel key connections.

Spur Gears Made From Plastic with Steel Core, Milled, Straight Teeth

Material: Outer part: Plastic PA 12 G.
Steel core: Choice of steel or stainless steel 1.4305.

STAINLESS



Tooth quality 8e25 DIN 3967.
Temperature range -60°C to +120° C, short periods 150° C.

- Special plastic with excellent material properties.
- Enables snugly fitting, high strength shaft-hub connection.
- Optimal force transmission due to cylindrical contact area.
- Light, silent and clean, with excellent dry running properties.

Ordering Details: e.g.: Product No. 232 550 15, spur gear, module 2,5, 15 teeth

Module 2.5 Tooth width b = 25 mm

Product No. Steel Core	Product No. Stainless Core	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	SK mm	B^{H7} mm	perm.MD* Nm	Weight g
232 550 15	232 950 15	15	25	42,5	37,5	15	31	25	10	3,2	148
232 550 18	232 950 18	18	25	50	45	15	35	25	10	4,3	164
232 550 20	232 950 20	20	25	55	50	15	45	35	15	5,6	280
232 550 24	232 950 24	24	25	65	60	15	50	40	15	8,8	388
232 550 25	232 950 25	25	25	67,5	62,5	15	50	40	15	9,6	394
232 550 30	232 950 30	30	25	80	75	15	55	45	15	15,0	525
232 550 32	232 950 32	32	25	85	80	15	65	55	15	17,6	768
232 550 36	232 950 36	36	25	95	90	15	70	60	15	22,8	933
232 550 40	232 950 40	40	25	105	100	15	75	65	20	29,9	1070
232 550 45	232 950 45	45	25	117,5	112,5	15	80	70	20	34,5	1276
232 550 48	232 950 48	48	25	125	120	15	85	75	20	35,3	1475
232 550 50	232 950 50	50	25	130	125	15	85	75	20	38,8	1499
232 550 60	232 950 60	60	25	155	150	15	100	90	20	46,8	2197
232 550 70	232 950 70	70	25	180	175	15	100	90	20	54,8	2358
232 550 72	232 950 72	72	25	185	180	15	110	90	20	56,1	2824
232 550 80	232 950 80	80	25	205	200	15	120	110	20	62,2	3451

Module 3.0 Tooth width b = 30 mm

Product No. Steel Core	Product No. Stainless Core	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	SK mm	B^{H7} mm	perm.MD* Nm	Weight g
233 550 15	233 950 15	15	30	51	45	20	35	25	10	5,8	204
233 550 18	233 950 18	18	30	60	54	20	45	35	10	7,7	398
233 550 20	233 950 20	20	30	66	60	20	45	35	15	10,1	376
233 550 24	233 950 24	24	30	78	72	20	55	45	15	15,8	643
233 550 25	233 950 25	25	30	81	75	20	55	45	15	17,5	654
233 550 30	233 950 30	30	30	96	90	20	70	60	15	27,2	1163
233 550 36	233 950 36	36	30	114	108	20	80	70	20	42,0	1565
233 550 40	233 950 40	40	30	126	120	20	85	75	20	52,4	1837
233 550 45	233 950 45	45	30	141	135	20	85	75	20	59,5	1927
233 550 48	233 950 48	48	30	150	144	20	90	80	20	63,8	2208
233 550 50	233 950 50	50	30	156	150	20	100	90	20	66,7	2734
233 550 60	233 950 60	60	30	186	180	20	100	90	20	81,0	2969

Module 4.0 Tooth width b = 40 mm

Product No. Steel Core	Product No. Stainless Core	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	SK mm	B^{H7} mm	perm.MD* Nm	Weight g
234 550 12	234 950 12	12	40	56	48	20	35	25	10	8,1	256
234 550 15	234 950 15	15	40	68	60	20	50	40	20	12,1	519
234 550 16	234 950 16	16	40	72	64	20	50	40	20	13,5	535
234 550 20	234 950 20	20	40	88	80	20	65	55	20	20,9	1100
234 550 24	234 950 24	24	40	104	96	20	75	65	20	33,4	1588
234 550 25	234 950 25	25	40	108	100	20	75	65	20	38,4	1613
234 550 30	234 950 30	30	40	128	120	20	85	75	20	66,1	2227
234 550 36	234 950 36	36	40	152	144	20	100	90	30	98,7	3081
234 550 40	234 950 40	40	40	168	160	20	100	90	30	120,4	3234
234 550 45	234 950 45	45	40	188	180	20	110	90	30	135,6	4092
234 550 50	234 950 50	50	40	208	200	20	120	110	30	153,0	5042
234 550 60	234 950 60	60	40	248	240	20	130	120	30	185,8	6376

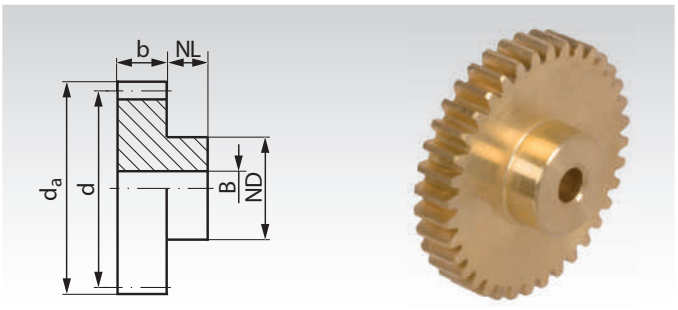
* Basis of calculations see page 197.

Spur Gears Made from Brass, Milled Teeth, Straight Tooth System

Material: Ms58 (2.0401).

Tooth quality 8d DIN 58405.
Pressure angle 20°.

Up to 30 teeth without hub.
From 40 teeth with one-sided hub.



Ordering Details: e.g.: Product No. 260 010 00, Spur Gear Ms, Module 0.3, 10 Teeth

Module 0.3

Product No.	Number of teeth	b** mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
260 010 00	10	5	3,6	3	-	-	1,0	0,14	0,1
260 012 00	12	5	4,2	3,6	-	-	1,5	0,18	0,2
260 014 00	14	5	4,8	4,2	-	-	2,0	0,23	0,4
260 015 00	15	5	5,1	4,5	-	-	2,0	0,25	0,5
260 016 00	16	5	5,4	4,8	-	-	2,0	0,27	0,6
260 018 00	18	5	6,0	5,4	-	-	2,0	0,36	0,8
260 020 00	20	5	6,6	6	-	-	2,0	0,40	1,0
260 022 00	22	5	7,2	6,6	-	-	2,0	0,49	1,3
260 024 00	24	5	7,8	7,2	-	-	2,0	0,60	1,4
260 025 00	25	5	8,1	7,5	-	-	2,0	0,65	1,6
260 030 00	30	5	9,6	9	-	-	2,0	1,00	2,3
260 040 00	40	2	12,6	12	3	10	3,0	1,85	3,5
260 050 00	50	2	15,6	15	5	10	3,0	3,00	5,7
260 060 00	60	2	18,6	18	5	10	3,0	4,50	6,9
260 080 00	80	2	24,6	24	5	15	3,0	8,50	14,7
260 100 00	100	2	30,6	30	5	15	3,0	14,0	18,5
260 120 00	120	2	36,6	36	5	15	3,0	21,0	23,7

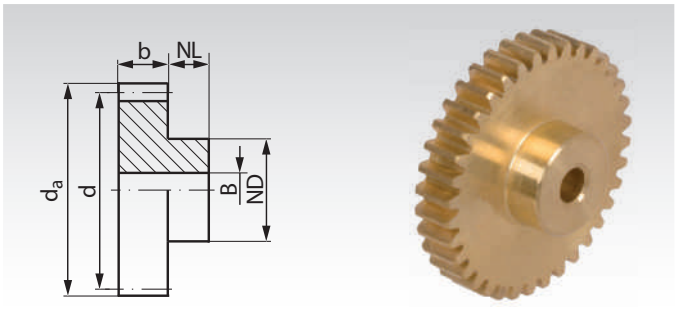
* Basis of calculations see page 197.

** Up to a No. of Teeth of 30 the teeth run over the entire width of the gear.

Spur Gears Made from Brass, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Ms58 (2.0401).

Tooth quality 8d DIN 58405.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 261 010 00, Spur Gear, Ms58, Module 0.5, 10 Teeth

Module 0.5 Tooth Width b = 2 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
261 010 00	10	2	6	5	4	4	2	0,42	0,5
261 012 00	12	2	7	6	4	4	2	0,55	0,7
261 013 00	13	2	7,5	6,5	4	5	2	0,62	1,0
261 014 00	14	2	8	7	4	5	2	0,69	1,1
261 015 00	15	2	8,5	7,5	4	6	2	0,75	1,4
261 016 00	16	2	9	8	4	6	2	0,80	1,5
261 017 00	17	2	9,5	8,5	4	7	2	0,83	2,0
261 018 00	18	2	10	9	4	7	2	0,94	2,2
261 019 00	19	2	10,5	9,5	4	8	2	1,07	2,8
261 020 00	20	2	11	10	4	8	2	1,20	2,8
261 021 00	21	2	11,5	10,5	4	8	2	1,34	2,7
261 022 00	22	2	12	11	4	8	2	1,49	3,1
261 023 00	23	2	12,5	11,5	4	10	2	1,65	4,1
261 024 00	24	2	13	12	4	10	2	1,80	4,3
261 025 00	25	2	13,5	12,5	4	10	2	2,00	4,6
261 026 00	26	2	14	13	4	10	3	2,20	4,4
261 027 00	27	2	14,5	13,5	4	10	3	2,40	4,5
261 028 00	28	2	15	14	4	10	3	2,60	4,8
261 030 00	30	2	16	15	4	10	3	3,00	5,2
261 032 00	32	2	17	16	4	10	3	3,50	5,6
261 035 00	35	2	18,5	17,5	4	12	3	4,20	7,3
261 036 00	36	2	19	18	4	12	3	4,50	7,7
261 038 00	38	2	20	19	4	12	3	5,10	8,0
261 040 00	40	2	21	20	4	12	3	5,70	8,6
261 042 00	42	2	22	21	4	12	3	6,30	8,9
261 045 00	45	2	23,5	22,5	4	12	3	7,40	9,9
261 048 00	48	2	25	24	4	12	3	8,50	10,7
261 050 00	50	2	26	25	4	12	3	9,30	11,4
261 052 00	52	2	27	26	4	12	3	10,2	12,1
261 054 00	54	2	28	27	4	12	3	11,1	13,0
261 055 00	55	2	28,5	27,5	4	12	3	11,5	13,2
261 056 00	56	2	29	28	4	12	3	12,0	13,7
261 060 00	60	2	31	30	4	12	3	14,0	15,4
261 064 00	64	2	33	32	4	15	3	16,0	18,7
261 065 00	65	2	33,5	32,5	4	15	3	16,7	19,0
261 070 00	70	2	36	35	4	15	3	19,7	21,3
261 072 00	72	2	37	36	4	15	3	21,0	22,4
261 075 00	75	2	38,5	37,5	4	15	3	23,0	23,7
261 080 00	80	2	41	40	4	15	3	26,5	26,2
261 085 00	85	2	43,5	42,5	4	15	3	30,5	29,1
261 090 00	90	2	46	45	4	15	3	34,5	32,3
261 096 00	96	2	49	48	4	15	3	40,0	36,1
261 100 00	100	2	51	50	4	15	3	44,0	39,4
261 114 00	114	2	58	57	4	15	3	62,0	47,5
261 120 00	120	2	61	60	4	25	3	72,0	62,8

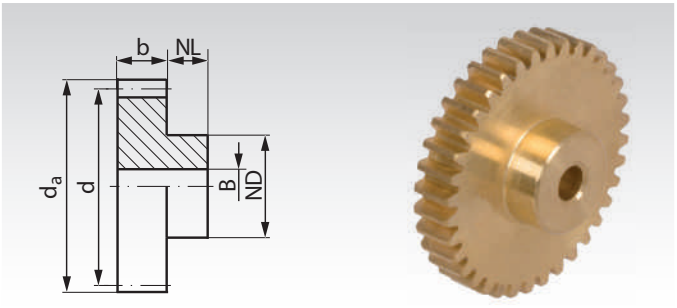
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Brass, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Ms58 (2.0401).

Tooth quality 8d DIN 58405.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 262 010 00, Spur Gear, Ms58, Module 0.7, 10 Teeth

Module 0.7 Tooth Width b = 4 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
262 010 00	10	4	8,4	7	6	5	3	1,7	1,6
262 012 00	12	4	9,8	8,4	6	8	3	2,3	3,3
262 013 00	13	4	10,5	9,1	6	8	3	2,6	4,0
262 014 00	14	4	11,2	9,8	6	8	3	2,8	4,4
262 015 00	15	4	11,9	10,5	6	8	3	3,1	4,8
262 016 00	16	4	12,6	11,2	6	9	3	3,3	5,8
262 017 00	17	4	13,3	11,9	6	10	3	3,5	7,0
262 018 00	18	4	14	12,6	6	10	4	3,9	6,9
262 019 00	19	4	14,7	13,3	6	10	4	4,4	7,4
262 020 00	20	4	15,4	14	6	10	4	5,0	7,9
262 021 00	21	4	16,1	14,7	6	12	4	5,6	10,2
262 022 00	22	4	16,8	15,4	6	12	4	6,2	10,7
262 023 00	23	4	17,5	16,1	6	12	4	6,9	11,2
262 024 00	24	4	18,2	16,8	6	12	4	7,6	12,0
262 025 00	25	4	18,9	17,5	6	12	4	8,3	12,6
262 026 00	26	4	19,6	18,2	6	12	4	9,1	13,2
262 027 00	27	4	20,3	18,9	6	12	4	9,9	13,9
262 028 00	28	4	21	19,6	6	12	4	10,8	14,7
262 030 00	30	4	22,4	21	6	12	4	12,6	16,1
262 032 00	32	4	23,8	22,4	6	12	4	14,5	17,7
262 035 00	35	4	25,9	24,5	6	12	4	17,7	20,0
262 036 00	36	4	26,6	25,2	6	12	4	18,9	21,5
262 038 00	38	4	28	26,6	6	12	4	21,3	22,9
262 040 00	40	4	29,4	28	6	12	5	24,0	24,3
262 042 00	42	4	30,8	29,4	6	12	5	26,5	26,6
262 045 00	45	4	32,9	31,5	6	12	5	31,0	29,8
262 048 00	48	4	35	33,6	6	15	5	36,0	36,5
262 050 00	50	4	36,4	35	6	15	5	39,0	39,1
262 052 00	52	4	37,8	36,4	6	15	5	43,0	41,1
262 054 00	54	4	39,2	37,8	6	15	5	47,0	44,4
262 055 00	55	4	39,9	38,5	6	15	5	49,0	45,8
262 056 00	56	4	40,6	39,2	6	15	5	51,0	47,4
262 060 00	60	4	43,4	42	8	15	5	59,0	56,0
262 064 00	64	4	46,2	44,8	8	15	5	69,0	62,2
262 065 00	65	4	46,9	45,5	8	15	5	71,0	63,7
262 070 00	70	4	50,4	49	8	18	5	84,0	77,8
262 072 00	72	4	51,8	50,4	8	18	5	90,0	80,8
262 075 00	75	4	53,9	52,5	8	18	5	98,0	87,6
262 080 00	80	4	57,4	56	8	18	5	114	97,7
262 085 00	85	4	60,9	59,5	8	20	6	130	109,7
262 090 00	90	4	64,4	63	8	20	6	154	119,9
262 096 00	96	4	68,6	67,2	8	25	6	186	149,6
262 100 00	100	4	71,4	70	8	25	6	210	157,2
262 114 00	114	4	81,2	79,8	8	25	6	310	192,0
262 120 00	120	4	85,4	84	8	25	6	350	216,7

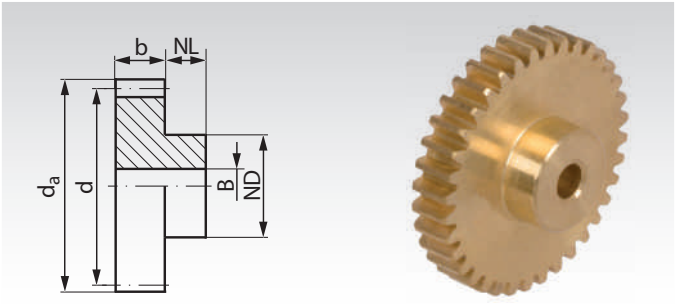
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Brass, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Ms58 (2.0401).

Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 263 010 00, Spur Gear, Ms58, Module 1, 10 Teeth

Module 1.0 Tooth Width b = 6.5 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
263 010 00	10	6,5	12	10	6	8	4	6,1	5,1
263 012 00	12	6,5	14	12	6	10	4	8,0	8,4
263 013 00	13	6,5	15	13	6	10	5	9,1	8,7
263 014 00	14	6,5	16	14	6	10	5	10,0	9,9
263 015 00	15	6,5	17	15	6	12	5	11,1	12,9
263 016 00	16	6,5	18	16	6	12	5	11,8	14,2
263 017 00	17	6,5	19	17	6	12	5	12,2	15,7
263 018 00	18	6,5	20	18	6	12	5	13,8	17,1
263 019 00	19	6,5	21	19	6	15	5	15,8	21,8
263 020 00	20	6,5	22	20	6	15	5	17,8	23,3
263 021 00	21	6,5	23	21	6	15	5	20,0	27,0
263 022 00	22	6,5	24	22	6	15	5	22,2	27,1
263 023 00	23	6,5	25	23	6	15	5	24,5	28,8
263 024 00	24	6,5	26	24	6	15	5	27,0	31,2
263 025 00	25	6,5	27	25	6	15	5	30,0	33,1
263 026 00	26	6,5	28	26	6	15	5	32,5	35,1
263 027 00	27	6,5	29	27	6	15	5	35,5	37,5
263 028 00	28	6,5	30	28	6	15	5	38,5	39,9
263 030 00	30	6,5	32	30	6	15	5	45,0	44,7
263 032 00	32	6,5	34	32	6	15	5	52,0	50,6
263 035 00	35	6,5	37	35	6	15	5	64,0	58,9
263 036 00	36	6,5	38	36	6	15	5	68,0	61,3
263 038 00	38	6,5	40	38	6	18	5	77,0	72,0
263 040 00	40	6,5	42	40	6	18	6	86,0	77,5
263 042 00	42	6,5	44	42	6	18	6	96,0	84,7
263 045 00	45	6,5	47	45	8	18	6	113	99,4
263 048 00	48	6,5	50	48	8	18	6	130	110,4
263 050 00	50	6,5	52	50	8	18	6	143	119,8
263 052 00	52	6,5	54	52	8	18	6	156	127,8
263 054 00	54	6,5	56	54	8	18	6	170	138,3
263 055 00	55	6,5	57	55	8	18	6	177	141,8
263 056 00	56	6,5	58	56	8	18	6	185	146,9
263 060 00	60	6,5	62	60	8	18	6	216	166,6
263 064 00	64	6,5	66	64	8	18	6	250	187,2
263 065 00	65	6,5	67	65	8	18	6	259	195,0
263 070 00	70	6,5	72	70	8	20	6	317	229,2
263 072 00	72	6,5	74	72	10	20	6	345	241,9
263 075 00	75	6,5	77	75	10	40	8	389	335,9
263 080 00	80	6,5	82	80	10	40	8	469	367,5
263 085 00	85	6,5	87	85	12	40	8	560	423,6
263 090 00	90	6,5	92	90	12	40	8	685	466,8
263 096 00	96	6,5	98	96	12	40	8	800	505,6
263 100 00	100	6,5	102	100	12	50	10	880	609,9
263 120 00	120	6,5	122	120	12	50	10	1190	806,5

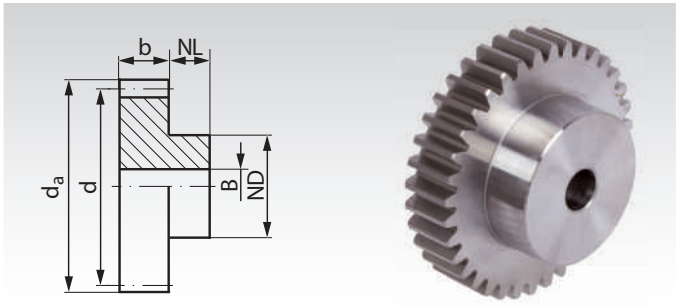
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: 11SMnPb30.

Tooth quality 8d DIN 58405.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 211 010 00, Spur Gear, 11SMnPb30 , Module 0.5, 10 Teeth

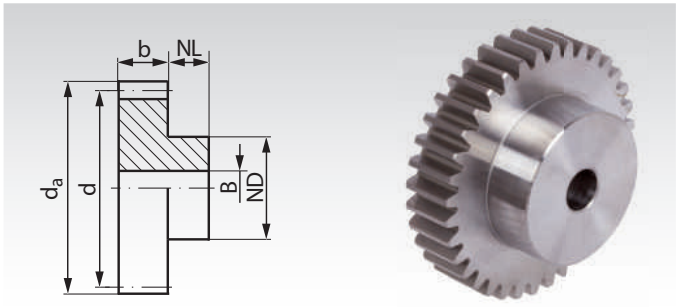
Module 0.5 Tooth Width b = 4 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
211 010 00	10	4	6	5	4	4	2	0,8	0,8
211 012 00	12	4	7	6	4	4	2	1,0	1
211 013 00	13	4	7,5	6,5	4	5	2	1,1	1
211 014 00	14	4	8	7	4	5	2	1,2	2
211 015 00	15	4	8,5	7,5	4	6	3	1,4	2
211 016 00	16	4	9	8	4	6	3	1,5	2
211 017 00	17	4	9,5	8,5	4	6	3	1,6	2
211 018 00	18	4	10	9	4	6	3	1,7	2
211 019 00	19	4	10,5	9,5	4	8	3	1,9	3
211 020 00	20	4	11	10	4	8	3	2,2	3
211 021 00	21	4	11,5	10,5	4	8	3	2,4	4
211 022 00	22	4	12	11	4	8	3	2,7	4
211 023 00	23	4	12,5	11,5	4	8	3	3,0	4
211 024 00	24	4	13	12	4	8	3	3,3	4
211 025 00	25	4	13,5	12,5	4	10	4	3,6	5
211 026 00	26	4	14	13	4	10	4	4,0	5
211 027 00	27	4	14,5	13,5	4	10	4	4,3	5
211 028 00	28	4	15	14	4	10	4	4,7	6
211 030 00	30	4	16	15	4	10	4	5,5	7
211 032 00	32	4	17	16	4	12	4	6,3	9
211 035 00	35	4	18,5	17,5	4	12	4	7,7	10
211 036 00	36	4	19	18	4	12	4	8,2	10
211 038 00	38	4	20	19	4	12	4	9,2	11
211 040 00	40	4	21	20	4	12	4	10,3	12
211 042 00	42	4	22	21	4	15	5	11,5	14
211 045 00	45	4	23,5	22,5	4	15	5	13,4	16
211 048 00	48	4	25	24	4	15	5	15,5	18
211 050 00	50	4	26	25	4	15	5	17,0	19
211 052 00	52	4	27	26	4	15	5	18,5	20
211 054 00	54	4	28	27	4	15	5	20,2	22
211 055 00	55	4	28,5	27,5	4	15	5	21,0	23
211 056 00	56	4	29	28	4	15	5	21,9	23
211 060 00	60	4	31	30	4	20	5	25,5	30
211 064 00	64	4	33	32	4	20	5	29,4	33
211 065 00	65	4	33,5	32,5	4	20	5	30,5	33
211 070 00	70	4	36	35	4	20	5	36,0	39
211 072 00	72	4	37	36	4	20	5	38,3	40
211 075 00	75	4	38,5	37,5	4	20	5	42,0	42
211 080 00	80	4	41	40	4	20	5	48,5	47
211 085 00	85	4	43,5	42,5	4	25	6	55,6	57
211 090 00	90	4	46	45	4	25	6	63,2	62
211 096 00	96	4	49	48	4	25	6	73,2	69
211 100 00	100	4	51	50	4	25	6	80,2	74
211 114 00	114	4	58	57	4	25	6	108	94
211 120 00	120	4	61	60	4	25	6	121	100

* Basis of calculations see page 197.

Spur Gears Made from Steel, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: 11SMnPb30.
Tooth quality 8d DIN 58405.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 212 010 00, Spur Gear, 11 SMnPb30, Module 0.7, 10 Teeth

Module 0.7 Tooth Width b = 5 mm

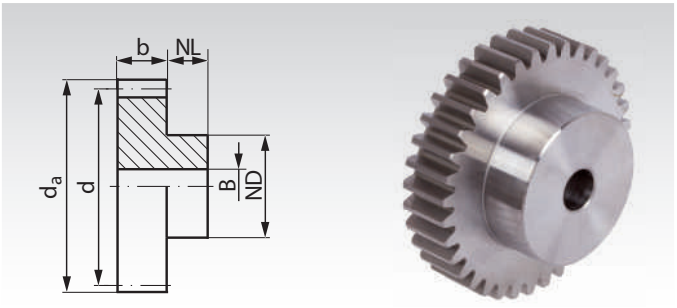
Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
212 010 00	10	5	8,4	7	6	5	3	2,0	2
212 012 00	12	5	9,8	8,4	6	8	3	2,6	3
212 013 00	13	5	10,5	9,1	6	8	3	2,9	4
212 014 00	14	5	11,2	9,8	6	8	3	3,3	5
212 015 00	15	5	11,9	10,5	6	8	3	3,6	5
212 016 00	16	5	12,6	11,2	6	10	4	3,8	6
212 017 00	17	5	13,3	11,9	6	10	4	4,0	6
212 018 00	18	5	14	12,6	6	10	4	4,5	7
212 019 00	19	5	14,7	13,3	6	10	4	5,1	8
212 020 00	20	5	15,4	14	6	10	4	5,7	8
212 021 00	21	5	16,1	14,7	6	12	4	6,4	10
212 022 00	22	5	16,8	15,4	6	12	4	7,1	11
212 023 00	23	5	17,5	16,1	6	12	4	7,9	12
212 024 00	24	5	18,2	16,8	6	12	4	8,7	13
212 025 00	25	5	18,9	17,5	6	15	4	9,5	16
212 026 00	26	5	19,6	18,2	6	15	5	10,4	16
212 027 00	27	5	20,3	18,9	6	15	5	11,3	17
212 028 00	28	5	21	19,6	6	15	5	12,2	18
212 030 00	30	5	22,4	21	6	15	5	14,3	20
212 032 00	32	5	23,8	22,4	6	15	5	16,5	21
212 035 00	35	5	25,9	24,5	6	15	5	20,2	24
212 036 00	36	5	26,6	25,2	6	15	5	21,5	26
212 038 00	38	5	28	26,6	6	18	5	24,3	31
212 040 00	40	5	29,4	28	6	18	5	27,2	33
212 042 00	42	5	30,8	29,4	6	18	6	30,4	35
212 045 00	45	5	32,9	31,5	6	18	6	35,5	39
212 048 00	48	5	35	33,6	6	18	6	41,0	43
212 050 00	50	5	36,4	35	6	18	6	45,0	46
212 052 00	52	5	37,8	36,4	6	18	6	49,0	49
212 054 00	54	5	39,2	37,8	6	18	6	53,4	53
212 055 00	55	5	39,9	38,5	6	18	6	55,6	53
212 056 00	56	5	40,6	39,2	6	18	6	57,9	56
212 060 00	60	5	43,4	42	6	18	6	67,9	63
212 064 00	64	5	46,2	44,8	6	18	6	78,2	70
212 065 00	65	5	46,9	45,5	6	18	6	81,0	72
212 070 00	70	5	50,4	49	6	18	6	95,8	83
212 072 00	72	5	51,8	50,4	6	20	6	102	89
212 075 00	75	5	53,9	52,5	6	20	6	112	97
212 080 00	80	5	57,4	56	6	20	6	130	108
212 085 00	85	5	60,9	59,5	6	20	6	149	121
212 090 00	90	5	64,4	63	6	20	6	170	133
212 096 00	96	5	68,6	67,2	6	25	8	196	157
212 100 00	100	5	71,4	70	6	25	8	216	168
212 114 00	114	5	81,2	79,8	6	25	8	291	217
212 120 00	120	5	85,4	84	6	25	8	327	239

* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, with One-Sided Hub, Slim Design, Milled Teeth, Straight Tooth System

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 213 010 00, Spur Gear, Module 1.0, 10 Teeth

Module 1.0 Tooth Width b = 6.5 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
213 010 00**	10	6,5	12	10	6	8	4	5,5	5
213 012 00**	12	6,5	14	12	6	10	4	7,3	8
213 014 00**	14	6,5	16	14	6	10	5	9,2	9
213 015 00**	15	6,5	17	15	6	10	5	10,1	11
213 016 00**	16	6,5	18	16	6	12	5	10,8	13
213 017 00**	17	6,5	19	17	6	12	5	11,2	14
213 018 00**	18	6,5	20	18	6	15	5	12,7	19
213 020 00**	20	6,5	22	20	6	15	5	16,3	22
213 022 00**	22	6,5	24	22	6	15	5	20,3	25
213 024 00**	24	6,5	26	24	6	15	5	24,7	28
213 025 00**	25	6,5	27	25	6	15	5	27,1	30
213 028 00**	28	6,5	30	28	6	15	5	35,1	37
213 030 00**	30	6,5	32	30	6	15	5	41,0	41
213 032 00**	32	6,5	34	32	6	15	5	47,5	46
213 035 00**	35	6,5	37	35	6	15	5	58,1	54
213 036 00***	36	6,5	38	36	6	15	5	61,9	57
213 040 00**	40	6,5	42	40	6	18	6	78,6	71
213 042 00**	42	6,5	44	42	6	18	6	87,7	78
213 045 00	45	6,5	47	45	6	18	6	277	88
213 048 00	48	6,5	50	48	8	18	6	320	103
213 050 00**	50	6,5	52	50	8	18	6	130	111
213 054 00	54	6,5	56	54	8	18	6	419	127
213 060 00**	60	6,5	62	60	8	18	6	197	155
213 064 00	64	6,5	66	64	8	18	6	616	174
213 065 00	65	6,5	67	65	8	18	8	637	175
213 070 00	70	6,5	72	70	8	25	8	756	219
213 072 00	72	6,5	74	72	10	25	8	806	236
213 075 00	75	6,5	77	75	10	40	8	886	313
213 080 00	80	6,5	82	80	10	40	10	994	342
213 090 00	90	6,5	92	90	12	40	10	1190	426
213 100 00	100	6,5	102	100	12	40	10	1400	501
213 120 00	120	6,5	122	120	12	40	10	1930	674

Spur gears made from Steel Module 1 with and without hub Wide version page 222-223.

* Basis of calculations see page 197.

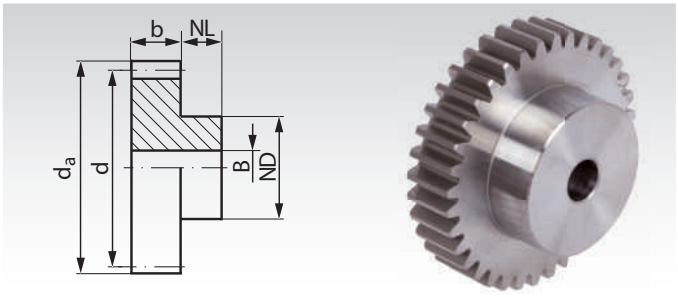
** 11SMnPb30.

*** 11SMnPb30 / C45.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 1.0, Tooth Width b = 10 mm, Milled Teeth, Straight Teethed

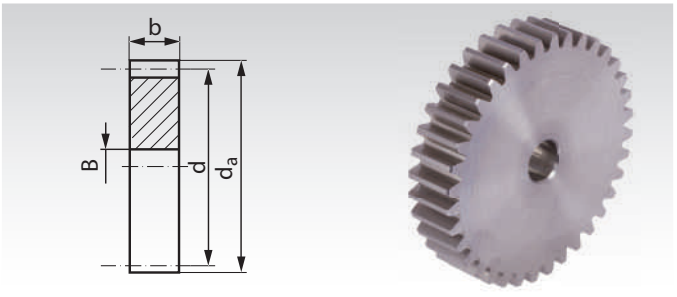
Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 214 010 00, Spur Gear, Module 1, 10 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
214 010 00**	10	10	12	10	6	8	4	0,08	7
214 011 00**	11	10	13	11	6	8	4	0,10	8
214 012 00**	12	10	14	12	6	10	4	0,11	10
214 013 00**	13	10	15	13	6	10	5	0,13	11
214 014 00**	14	10	16	14	6	10	5	0,14	14
214 015 00**	15	10	17	15	6	12	5	0,15	16
214 016 00**	16	10	18	16	6	12	5	0,16	18
214 017 00**	17	10	19	17	6	12	6	0,17	19
214 018 00**	18	10	20	18	6	15	6	0,19	24
214 019 00**	19	10	21	19	6	15	6	0,22	26
214 020 00**	20	10	22	20	6	15	6	0,25	28
214 021 00**	21	10	23	21	6	15	6	0,28	31
214 022 00**	22	10	24	22	6	15	6	0,31	33
214 023 00**	23	10	25	23	6	15	6	0,35	36
214 024 00**	24	10	26	24	6	15	6	0,38	39
214 025 00**	25	10	27	25	6	20	8	0,42	46
214 026 00**	26	10	28	26	6	20	8	0,46	49
214 027 00**	27	10	29	27	6	20	8	0,50	52
214 028 00**	28	10	30	28	6	20	8	0,54	55
214 029 00	29	10	31	29	6	20	8	1,59	59
214 030 00**	30	10	32	30	8	25	8	0,63	77
214 031 00**	31	10	33	31	8	25	8	0,68	80
214 032 00**	32	10	34	32	8	25	8	0,73	85
214 033 00**	33	10	35	33	8	25	8	0,79	89
214 034 00**	34	10	36	34	8	25	8	0,84	92
214 035 00**	35	10	37	35	8	25	8	0,90	96
214 036 00**	36	10	38	36	8	25	8	0,96	102
214 037 00	37	10	39	37	8	25	8	2,75	106
214 038 00	38	10	40	38	8	25	8	2,92	110
214 039 00	39	10	41	39	8	25	8	3,08	115
214 040 00**	40	10	42	40	8	25	8	1,21	120
214 041 00	41	10	43	41	8	25	8	3,46	125
214 042 00	42	10	44	42	8	25	8	3,65	131
214 043 00	43	10	45	43	8	25	8	3,86	134
214 044 00**	44	10	46	44	8	25	8	1,50	140
214 045 00	45	10	47	45	10	30	10	4,27	165
214 046 00	46	10	48	46	10	30	10	4,48	171
214 047 00	47	10	49	47	10	30	10	4,70	178
214 048 00	48	10	50	48	10	30	10	4,94	182
214 049 00	49	10	51	49	10	30	10	5,18	188
214 050 00**	50	10	52	50	10	30	10	2,00	193
214 052 00	52	10	54	52	10	40	10	5,91	249
214 053 00	53	10	55	53	10	40	10	6,16	254
214 054 00	54	10	56	54	10	40	10	6,43	262
214 055 00	55	10	57	55	10	40	10	6,72	269
214 056 00	56	10	58	56	10	40	10	6,99	275
214 057 00	57	10	59	57	12	40	10	7,29	300
214 058 00	58	10	60	58	12	40	10	7,59	307
214 060 00**	60	10	62	60	12	40	10	3,03	320
214 062 00	62	10	64	62	12	40	10	8,83	337
214 064 00**	64	10	66	64	12	40	10	3,51	352
214 065 00	65	10	67	65	12	40	10	9,83	360
214 068 00	68	10	70	68	12	40	10	10,9	386
214 070 00**	70	10	72	70	12	40	10	4,31	401
214 072 00	72	10	74	72	12	50	10	12,4	484
214 074 00	74	10	76	74	12	50	10	13,2	502
214 075 00	75	10	77	75	12	50	10	13,6	510
214 076 00	76	10	78	76	12	50	10	13,8	521
214 078 00	78	10	80	78	12	50	10	14,0	541
214 080 00	80	10	82	80	12	50	10	14,5	560
214 082 00	82	10	84	82	12	50	10	15,0	583
214 083 00	83	10	85	83	12	50	10	15,3	594
214 085 00	85	10	87	85	12	50	10	15,9	611
214 087 00	87	10	89	87	12	50	10	16,5	633
214 090 00	90	10	92	90	12	50	12	17,5	659
214 095 00	95	10	97	95	12	60	12	19,0	795
214 100 00	100	10	102	100	12	60	12	20,7	856
214 110 00	110	10	112	110	12	60	12	26,5	983
214 114 00	114	10	116	114	12	60	12	27,3	1036
214 120 00	120	10	122	120	12	60	12	28,6	1125

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 224 018 00, Spur Gear, Module 1, 18 Teeth

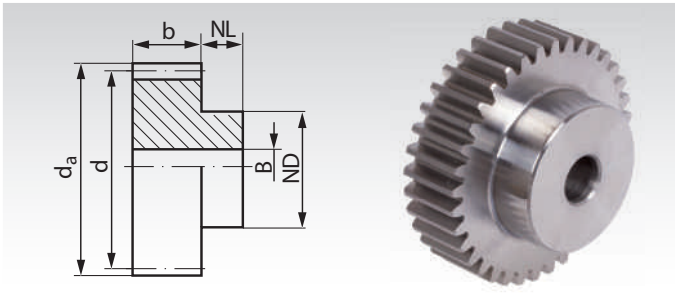
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
224 018 00**	18	10	20	18	6	0,19	17
224 020 00**	20	10	22	20	6	0,25	21
224 021 00	21	10	23	21	6	0,76	26
224 022 00**	22	10	24	22	6	0,31	26
224 023 00**	23	10	25	23	6	0,35	29
224 024 00**	24	10	26	24	6	0,38	32
224 025 00**	25	10	27	25	6	0,42	35
224 026 00**	26	10	28	26	6	0,46	38
224 027 00	27	10	29	27	6	1,35	41
224 028 00**	28	10	30	28	6	0,54	44
224 030 00**	30	10	32	30	8	0,63	50
224 032 00**	32	10	34	32	8	0,73	54
224 033 00	33	10	35	33	8	2,13	61
224 034 00**	34	10	36	34	8	0,84	65
224 035 00**	35	10	37	35	8	0,90	69
224 036 00**	36	10	38	36	8	0,96	74
224 037 00	37	10	39	37	8	2,75	79
224 038 00**	38	10	40	38	8	1,08	82
224 039 00	39	10	41	39	8	3,08	87
224 040 00**	40	10	42	40	8	1,21	92
224 041 00	41	10	43	41	8	3,46	97
224 042 00**	42	10	44	42	8	1,35	101
224 043 00	43	10	45	43	8	3,86	108
224 044 00**	44	10	46	44	8	1,50	113
224 045 00	45	10	47	45	10	4,27	116
224 046 00	46	10	48	46	10	4,48	121
224 047 00	47	10	49	47	10	4,70	128
224 048 00**	48	10	50	48	10	1,83	133
224 049 00	49	10	51	49	10	5,18	139
224 050 00**	50	10	52	50	10	2,00	145
224 051 00	51	10	53	51	10	5,62	152
224 052 00	52	10	54	52	10	5,91	157
224 053 00	53	10	55	53	10	6,16	163
224 054 00	54	10	56	54	10	6,43	170
224 055 00	55	10	57	55	10	6,72	176
224 056 00	56	10	58	56	10	6,99	183
224 059 00	59	10	61	59	10	7,88	204
224 060 00**	60	10	62	60	10	3,03	212
224 061 00	61	10	63	61	10	8,51	218
224 063 00	63	10	65	63	10	9,15	234
224 064 00	64	10	66	64	10	9,48	242
224 065 00	65	10	67	65	10	9,83	249
224 066 00	66	10	68	66	10	10,2	260
224 067 00	67	10	69	67	10	10,4	265
224 068 00	68	10	70	68	10	10,9	274
224 069 00	69	10	71	69	10	11,3	283
224 070 00	70	10	72	70	10	11,6	290
224 071 00	71	10	73	71	10	12,0	301
224 072 00**	72	10	74	72	10	4,59	309
224 073 00	73	10	75	73	10	12,8	317
224 075 00	75	10	77	75	10	13,6	334
224 076 00	76	10	78	76	10	13,8	343
224 077 00	77	10	79	77	10	13,9	351
224 078 00	78	10	80	78	10	14,0	366
224 079 00	79	10	81	79	10	14,3	373
224 080 00	80	10	82	80	10	14,5	384
224 082 00	82	10	84	82	10	15,0	401
224 084 00	84	10	86	84	10	15,6	423
224 085 00	85	10	87	85	12	15,9	427
224 090 00	90	10	92	90	12	17,5	486
224 092 00	92	10	94	92	12	18,1	508
224 096 00	96	10	98	96	12	19,4	550
224 100 00	100	10	102	100	12	20,7	601
224 105 00	105	10	107	105	12	25,5	662
224 110 00	110	10	112	110	12	26,5	728
224 114 00	114	10	116	114	12	27,3	783
224 120 00	120	10	122	120	12	28,6	870
224 124 00	124	10	126	124	12	29,1	934

* Basis of calculations see page 197.

** 11SMnPb30.

Spur Gears Made from Steel, Module 1.0, Tooth Width b = 15 mm, Milled Teeth, Straight Tooth System

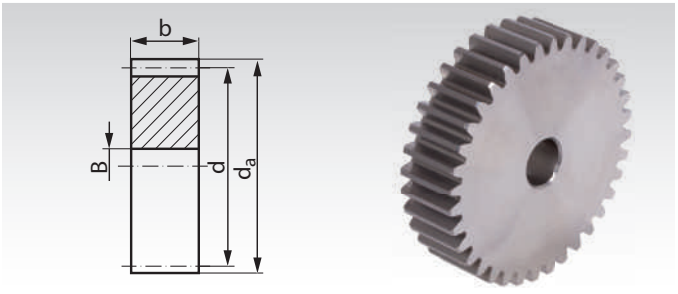
Material: C45. Gear-tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 214 110 11, Spur Gear, C45, Module 1.0, 11 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
214 110 11	11	15	13	11	10	8	5	0,30	12
214 110 12	12	15	14	12	10	9	6	0,35	13
214 110 13	13	15	15	13	10	10	6	0,40	16
214 110 14	14	15	16	14	10	11	6	0,45	20
214 110 15	15	15	17	15	10	12	6	0,49	24
214 110 16	16	15	18	16	10	13	6	0,53	28
214 110 17	17	15	19	17	10	14	6	0,55	33
214 110 18	18	15	20	18	10	15	8	0,62	33
214 110 19	19	15	21	19	10	15	8	0,72	37
214 110 20	20	15	22	20	10	16	8	0,81	42
214 110 21	21	15	23	21	10	16	8	0,91	46
214 110 22	22	15	24	22	10	16	8	1,01	50
214 110 23	23	15	25	23	10	18	8	1,12	58
214 110 24	24	15	26	24	10	20	10	1,25	61
214 110 25	25	15	27	25	10	20	10	1,36	66
214 110 26	26	15	28	26	10	20	10	1,50	70
214 110 27	27	15	29	27	10	20	10	1,64	75
214 110 28	28	15	30	28	10	20	10	1,77	80
214 110 29	29	15	31	29	10	20	10	1,95	85
214 110 30	30	15	32	30	10	20	10	2,09	90
214 110 31	31	15	33	31	10	25	10	2,24	110
214 110 32	32	15	34	32	10	25	10	2,43	120
214 110 33	33	15	35	33	10	25	10	2,62	120
214 110 34	34	15	36	34	10	25	10	2,79	130
214 110 35	35	15	37	35	10	25	10	2,99	135
214 110 36	36	15	38	36	10	25	10	3,18	140
214 110 37	37	15	39	37	10	25	10	3,29	145
214 110 38	38	15	40	38	10	25	10	3,64	155
214 110 39	39	15	41	39	10	25	10	3,85	160
214 110 40	40	15	42	40	10	25	10	4,09	170
214 110 41	41	15	43	41	10	30	10	4,36	190
214 110 42	42	15	44	42	10	30	10	4,59	200
214 110 43	43	15	45	43	10	30	10	4,86	210
214 110 44	44	15	46	44	10	30	10	5,11	215
214 110 45	45	15	47	45	10	30	10	5,38	225
214 110 46	46	15	48	46	10	30	10	5,66	230
214 110 47	47	15	49	47	10	30	10	6,02	240
214 110 48	48	15	50	48	10	30	10	6,42	250
214 110 49	49	15	51	49	10	30	10	6,82	260
214 110 50	50	15	52	50	10	30	12	7,25	260
214 110 51	51	15	53	51	10	40	12	7,69	310
214 110 52	52	15	54	52	10	40	12	8,18	320
214 110 53	53	15	55	53	10	40	12	8,43	330
214 110 54	54	15	56	54	10	40	12	8,93	340
214 110 55	55	15	57	55	10	40	12	9,34	350
214 110 56	56	15	58	56	10	40	12	9,72	360
214 110 57	57	15	59	57	10	40	12	10,1	370
214 110 58	58	15	60	58	10	40	12	10,5	380
214 110 59	59	15	61	59	10	40	12	11,0	390
214 110 60	60	15	62	60	10	40	12	11,5	400
214 110 61	61	15	63	61	10	50	12	12,0	470
214 110 62	62	15	64	62	10	50	12	12,7	480
214 110 63	63	15	65	63	10	50	12	13,3	490
214 110 64	64	15	66	64	10	50	12	14,0	500
214 110 65	65	15	67	65	10	50	12	14,6	515
214 110 66	66	15	68	66	10	50	12	15,0	525
214 110 67	67	15	69	67	10	50	12	15,5	540
214 110 68	68	15	70	68	10	50	12	15,9	550
214 110 69	69	15	71	69	10	50	12	16,3	560
214 110 70	70	15	72	70	10	50	12	16,7	575

Material: C45. Gear-tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 224 110 18, Spur Gear, C45, Module 1.0, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
224 110 18	18	15	20	18	8	0,62	24
224 110 20	20	15	22	20	8	0,81	30
224 110 24	24	15	26	24	10	1,25	43
224 110 25	25	15	27	25	10	1,36	48
224 110 30	30	15	32	30	10	2,09	72
224 110 35	35	15	37	35	10	2,99	102
224 110 36	36	15	38	36	10	3,18	108
224 110 40	40	15	42	40	10	4,09	136
224 110 45	45	15	47	45	10	5,38	174
224 110 48	48	15	50	48	10	6,42	200
224 110 50	50	15	52	50	12	7,25	214
224 110 52	52	15	54	52	12	8,18	232
224 110 60	60	15	62	60	12	11,46	313
224 110 72	72	15	74	72	12	17,29	460
224 110 75	75	15	77	75	12	18,38	510
224 110 76	76	15	78	76	12	18,72	520
224 110 80	80	15	82	80	12	20,3	580
224 110 85	85	15	87	85	12	22,3	650
224 110 90	90	15	92	90	12	24,5	730
224 110 95	95	15	97	95	12	26,6	820
224 111 00	100	15	102	100	12	28,9	910
224 111 10	110	15	112	110	12	37,1	1084
224 111 14	114	15	116	114	12	38,2	1165
224 111 20	120	15	122	120	12	40,0	1320
224 111 27	127	15	129	127	12	42,0	1470

* Basis of calculations see page 197.

Gears with hardened teeth
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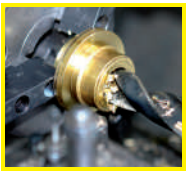
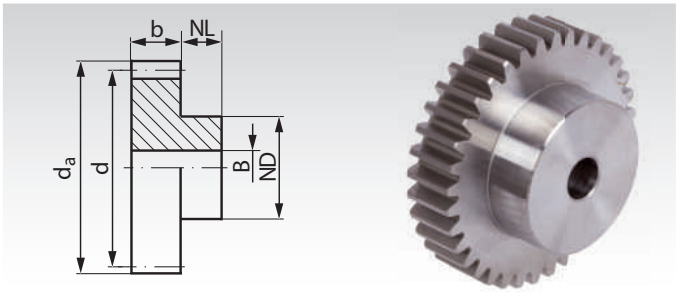


Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 1.25, Tooth Width b = 10 mm, Milled Teeth, Straight Tooth System

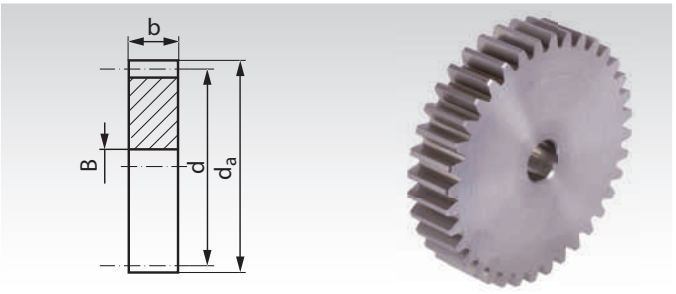
Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 216 012 00, Spur Gear, Module 1.25, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
216 012 00**	12	10	17,5	15	10	12	5	0,19	19
216 013 00	13	10	18,75	16,25	10	12	5	0,57	21
216 014 00	14	10	20	17,5	10	12	5	0,62	24
216 015 00**	15	10	21,25	18,75	10	15	6	0,26	30
216 016 00**	16	10	22,5	20	10	15	6	0,27	33
216 017 00	17	10	23,75	21,25	10	15	6	0,76	36
216 018 00**	18	10	25	22,5	10	15	6	0,32	40
216 019 00	19	10	26,25	23,75	10	15	6	1,00	43
216 020 00**	20	10	27,5	25	10	15	6	0,41	46
216 021 00**	21	10	28,75	26,25	10	15	6	0,46	50
216 022 00**	22	10	30	27,5	10	20	8	0,51	61
216 023 00	23	10	31,25	28,75	10	20	8	1,54	66
216 024 00**	24	10	32,5	30	10	20	8	0,63	70
216 025 00	25	10	33,75	31,25	10	20	8	1,86	75
216 026 00	26	10	35	32,5	10	20	8	2,03	80
216 027 00	27	10	36,25	33,75	10	20	8	2,21	88
216 028 00	28	10	37,5	35	10	20	8	2,40	90
216 030 00**	30	10	40	37,5	10	25	10	1,04	111
216 032 00	32	10	42,5	40	10	25	10	3,27	121
216 035 00	35	10	46,25	43,75	10	25	10	4,00	140
216 036 00	36	10	47,5	45	10	25	10	4,27	147
216 037 00	37	10	48,75	46,25	10	25	10	4,54	154
216 038 00**	38	10	50	47,5	10	30	10	1,78	179
216 040 00**	40	10	52,5	50	12	30	10	2,00	204
216 042 00	42	10	55	52,5	12	30	10	6,05	218
216 045 00	45	10	58,75	56,25	12	30	10	7,05	244
216 048 00	48	10	62,5	60	12	30	10	8,18	268
216 050 00	50	10	65	62,5	12	30	10	8,30	291
216 052 00	52	10	67,5	65	12	30	10	9,80	307
216 054 00	54	10	70	67,5	12	40	10	10,7	380
216 055 00	55	10	71,25	68,75	12	40	10	11,2	392
216 056 00	56	10	72,5	70	12	40	10	11,6	402
216 057 00	57	10	73,75	71,25	12	40	10	12,1	407
216 060 00	60	10	77,5	75	12	40	10	14,0	444
216 064 00	64	10	82,5	80	12	40	10	17,0	491
216 065 00	65	10	83,75	81,25	12	40	10	17,6	507
216 070 00	70	10	90	87,5	12	40	12	20,9	566
216 072 00	72	10	92,5	90	12	40	12	22,2	594
216 075 00	75	10	96,25	93,75	12	40	12	23,6	634
216 076 00	76	10	97,5	95	12	50	12	24,1	712
216 080 00	80	10	102,5	100	12	50	12	26,0	772
216 085 00	85	10	108,75	106,25	12	50	12	28,5	868
216 090 00	90	10	115	112,5	12	50	12	31,1	938
216 100 00	100	10	127,5	125	12	50	12	39,6	1119
216 120 00	120	10	152,5	150	12	50	12	43,9	1537

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 226 016 00, Spur Gear, Module 1.25, 16 Teeth

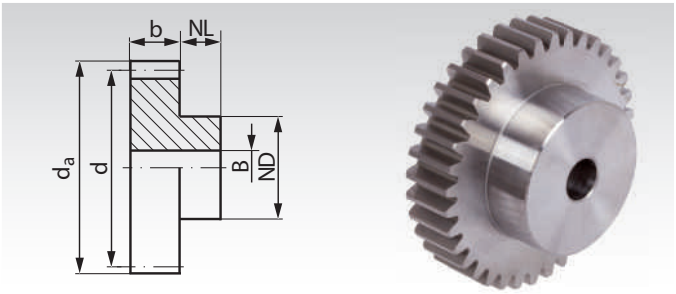
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
226 016 00	16	10	22,5	20	6	0,73	21
226 017 00	17	10	23,75	21,25	6	0,76	25
226 019 00	19	10	26,25	23,75	6	1,00	32
226 020 00**	20	10	27,5	25	6	0,41	35
226 021 00	21	10	28,75	26,25	6	1,24	40
226 022 00	22	10	30	27,5	6	1,38	43
226 023 00	23	10	31,25	28,75	6	1,54	48
226 024 00	24	10	32,5	30	8	1,70	50
226 025 00	25	10	33,75	31,25	8	1,86	55
226 026 00	26	10	35	32,5	8	2,03	59
226 027 00	27	10	36,25	33,75	8	2,21	64
226 028 00	28	10	37,5	35	8	2,40	70
226 030 00	30	10	40	37,5	10	2,59	81
226 032 00	32	10	42,5	40	10	2,81	90
226 034 00	34	10	45	42,5	10	3,73	103
226 035 00	35	10	46,25	43,75	10	4,00	109
226 036 00	36	10	47,5	45	10	4,27	117
226 038 00	38	10	50	47,5	10	4,81	129
226 040 00	40	10	52,5	50	10	5,40	144
226 042 00	42	10	55	52,5	10	6,05	159
226 045 00	45	10	58,75	56,25	10	7,05	184
226 048 00	48	10	62,5	60	10	8,18	209
226 050 00	50	10	65	62,5	10	8,30	229
226 052 00	52	10	67,5	65	10	9,80	250
226 054 00	54	10	70	67,5	10	10,7	267
226 055 00	55	10	71,25	68,75	10	11,2	278
226 056 00**	56	10	72,5	70	10	4,3	291
226 060 00	60	10	77,5	75	10	14,0	334
226 064 00	64	10	82,5	80	10	17,0	384
226 070 00	70	10	90	87,5	12	20,9	460
226 072 00	72	10	92,5	90	12	22,2	488
226 075 00	75	10	96,25	93,75	12	23,6	525
226 080 00	80	10	102,5	100	12	26,0	601
226 090 00	90	10	115	112,5	12	31,1	758
226 095 00	95	10	121,25	118,75	12	38,1	842
226 100 00	100	10	127,5	125	15	39,6	940
226 114 00	114	10	145	142,5	15	43,0	1220
226 120 00	120	10	152,5	150	20	43,9	1335

* Basis of calculations see page 197.

** 11SMnPb30.

Spur Gears Made from Steel, Module 1.5, Tooth Width b = 10 mm, with Hub, Milled Teeth, Straight Tooth System

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 217 012 00, Spur Gear, Module 1.5, 12 Teeth

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
217 012 00**	12	10	21	18	10	15	8	0,28	24
217 015 00**	15	10	25,5	22,5	10	18	10	0,38	37
217 018 00**	18	10	30	27	10	22	10	0,48	61
217 020 00**	20	10	33	30	10	25	10	0,62	79
217 024 00**	24	10	39	36	10	25	10	0,94	101
217 025 00**	25	10	40,5	37,5	10	25	10	1,03	110
217 028 00	28	10	45	42	10	25	10	3,62	131
217 030 00	30	10	48	45	10	25	10	4,23	148
217 032 00	32	10	51	48	10	25	10	4,90	164
217 035 00	35	10	55,5	52,5	10	25	10	6,01	204
217 040 00	40	10	63	60	10	25	10	8,15	242
217 042 00	42	10	66	63	10	25	10	9,13	267
217 045 00	45	10	70,5	67,5	10	25	10	10,7	301
217 048 00	48	10	75	72	10	25	10	12,4	339
217 050 00	50	10	78	75	10	30	10	13,6	382
217 055 00	55	10	85,5	82,5	10	30	10	18,2	460
217 060 00	60	10	93	90	10	30	10	22,3	535
217 065 00	65	10	100,5	97,5	15	45	12	28,3	742
217 070 00	70	10	108	105	15	45	12	34,3	839
217 080 00	80	10	123	120	15	45	12	41,5	1041

Spur gears made from Steel

Module 1.5 with and without hub Wide Version page 226.

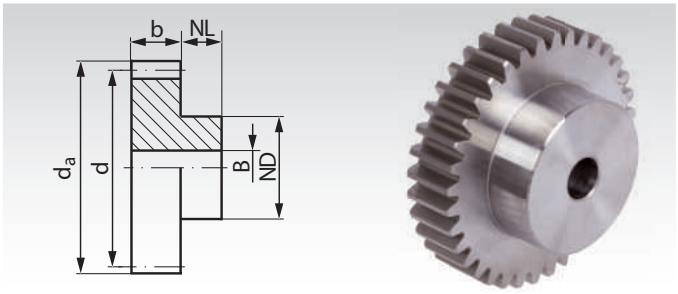
* Basis of calculations see page 197.

** 11SMnPb30.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 1.5, Tooth Width b = 15 mm, Milled Teeth, Straight Tooth System

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



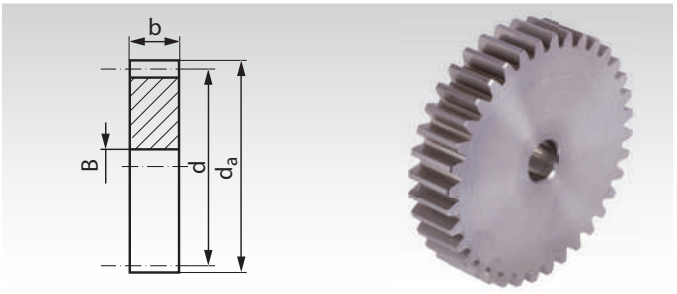
Ordering Details: e.g.: Product No. 218 011 00, Spur Gear, Module 1.5, 11 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
218 011 00	11	15	19,5	16,5	10	12	6	0,95	28
218 012 00**	12	15	21	18,0	10	15	8	0,41	32
218 013 00**	13	15	22,5	19,5	10	15	8	0,47	37
218 014 00**	14	15	24	21,0	10	15	8	0,52	42
218 015 00**	15	15	25,5	22,5	10	18	10	0,57	49
218 016 00**	16	15	27	24,0	10	20	10	0,62	60
218 017 00**	17	15	28,5	25,5	10	20	10	0,67	66
218 018 00**	18	15	30	27,0	10	22	10	0,72	79
218 019 00	19	15	31,5	28,5	10	25	10	2,21	95
218 020 00**	20	15	33	30,0	10	25	10	0,92	103
218 021 00	21	15	34,5	31,5	15	25	10	2,78	128
218 022 00**	22	15	36	33,0	15	25	10	1,15	136
218 023 00	23	15	37,5	34,5	15	25	10	3,46	145
218 024 00**	24	15	39	36,0	15	25	10	1,41	154
218 025 00**	25	15	40,5	37,5	15	25	10	1,55	166
218 026 00**	26	15	42	39,0	15	25	10	1,69	175
218 027 00	27	15	43,5	40,5	15	25	10	5,00	185
218 028 00	28	15	45	42,0	15	25	10	5,43	198
218 030 00**	30	15	48	45,0	15	30	10	2,35	246
218 031 00	31	15	49,5	46,5	15	30	10	6,83	263
218 032 00**	32	15	51	48,0	15	30	10	2,72	273
218 034 00	34	15	54	51,0	15	30	10	8,45	298
218 035 00	35	15	55,5	52,5	15	30	10	9,02	317
218 036 00	36	15	57	54,0	15	40	10	9,61	392
218 038 00	38	15	60	57,0	15	40	10	10,88	422
218 040 00**	40	15	63	60,0	15	40	10	4,53	454
218 042 00	42	15	66	63,0	15	40	10	13,7	488
218 044 00	44	15	69	66,0	15	40	10	15,2	523
218 045 00	45	15	70,5	67,5	15	40	10	16,0	541
218 046 00	46	15	72	69,0	15	40	10	16,9	560
218 048 00	48	15	75	72,0	15	40	10	18,6	599
218 050 00	50	15	78	75,0	15	50	10	20,4	721
218 052 00	52	15	81	78,0	15	50	10	24,0	765
218 054 00	54	15	84	81,0	15	50	10	26,2	810
218 055 00	55	15	85,5	82,5	15	50	10	27,4	831
218 056 00	56	15	87	84,0	15	50	10	28,5	855
218 057 00	57	15	88,5	85,5	15	50	10	29,7	880
218 058 00	58	15	90	87,0	15	50	10	30,9	905
218 060 00	60	15	93	90,0	15	60	12	33,6	1041
218 062 00	62	15	96	93,0	15	60	12	37,1	1096
218 063 00	63	15	97,5	94,5	15	60	12	39,0	1122
218 064 00	64	15	99	96,0	15	60	12	40,9	1148
218 065 00	65	15	100,5	97,5	15	60	12	42,8	1172
218 068 00	68	15	105	102,0	15	60	12	46,7	1254
218 070 00	70	15	108	105,0	20	60	12	48,7	1423
218 072 00	72	15	111	108	20	70	12	50,7	1683
218 075 00	75	15	115,5	112,5	20	70	12	53,9	1726
218 076 00	76	15	117	114	20	70	15	54,9	1746
218 078 00	78	15	120	117	20	70	15	57,1	1782
218 080 00	80	15	123	120	20	70	15	59,2	1878
218 082 00	82	15	126	123	20	70	15	61,0	1941
218 085 00	85	15	130,5	127,5	20	70	15	73,3	2038
218 090 00	90	15	138	135	20	70	15	77,1	2221
218 095 00	95	15	145,5	142,5	20	70	15	80,8	2398
218 100 00	100	15	153	150	20	70	15	83,8	2620
218 114 00	114	15	174	171	20	70	20	87,5	3166
218 120 00	120	15	183	180	20	70	20	91,6	3468

* Basis of calculations see page 197.

** 11SMnPb30.

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



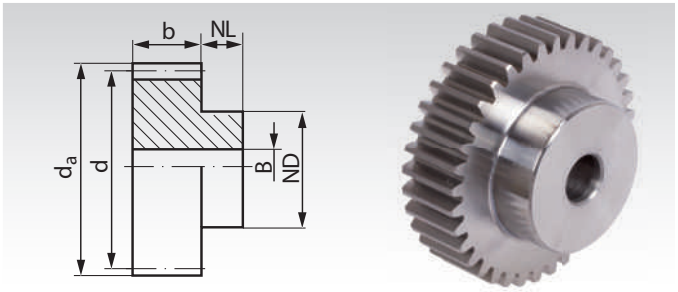
Ordering Details: e.g.: Product No. 228 018 00, Spur Gear, Module 1.5, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
228 018 00	18	15	30	27	8	1,94	60
228 020 00**	20	15	33	30	8	0,92	75
228 021 00**	21	15	34,5	31,5	8	1,03	83
228 023 00**	23	15	37,5	34,5	8	1,28	101
228 024 00	24	15	39	36	8	3,81	110
228 025 00	25	15	40,5	37,5	8	4,19	120
228 026 00	26	15	42	39	8	1,69	131
228 027 00	27	15	43,5	40,5	8	5,00	141
228 028 00	28	15	45	42	10	5,43	149
228 029 00	29	15	46,5	43,5	10	5,89	161
228 030 00**	30	15	48	45	10	2,35	174
228 032 00**	32	15	51	48	10	2,72	199
228 033 00	33	15	52,5	49,5	10	7,88	212
228 035 00	35	15	55,5	52,5	10	9,02	240
228 036 00	36	15	57	54	10	9,61	255
228 037 00	37	15	58,5	55,5	10	10,2	267
228 038 00	38	15	60	57	10	10,9	284
228 039 00	39	15	61,5	58,5	10	11,6	300
228 040 00**	40	15	63	60	10	4,53	316
228 041 00	41	15	64,5	61,5	10	13,0	336
228 043 00	43	15	67,5	64,5	10	14,5	367
228 045 00	45	15	70,5	67,5	10	16,0	403
228 047 00	47	15	73,5	70,5	10	17,7	441
228 048 00	48	15	75	72	10	18,6	460
228 050 00	50	15	78	75	10	20,4	500
228 051 00	51	15	79,5	76,5	10	21,3	525
228 052 00	52	15	81	78	10	24,0	545
228 053 00	53	15	82,5	79,5	10	25,1	574
228 054 00	54	15	84	81	12	26,2	585
228 055 00	55	15	85,5	82,5	12	27,4	607
228 056 00	56	15	87	84	12	28,5	629
228 060 00	60	15	93	90	12	33,6	726
228 064 00	64	15	99	96	12	40,9	832
228 065 00	65	15	100,5	97,5	12	42,8	850
228 067 00	67	15	103,5	100,5	12	45,7	909
228 070 00	70	15	108	105	12	48,7	990
228 071 00	71	15	109,5	106,5	12	49,7	1022
228 072 00	72	15	111	108	12	50,7	1051
228 075 00	75	15	115,5	112,5	12	53,9	1146
228 076 00	76	15	117	114	15	54,9	1166
228 080 00	80	15	123	120	15	59,2	1298
228 085 00	85	15	130,5	127,5	15	73,3	1455
228 088 00	88	15	135	132	15	75,6	1576
228 090 00	90	15	138	135	15	77,1	1659
228 095 00	95	15	145,5	142,5	15	80,8	1825
228 096 00	96	15	147	144	15	81,5	1878
228 100 00	100	15	153	150	15	83,8	2048
228 110 00	110	15	168	165	20	86,2	2465
228 114 00	114	15	174	171	20	87,5	2647
228 120 00	120	15	183	180	20	91,6	2939

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 1.5, Tooth Width b = 17 mm, Milled Teeth, Straight Tooth System

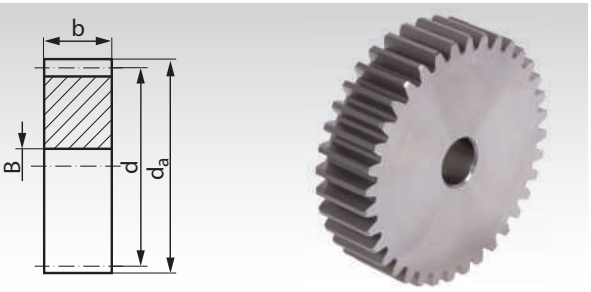
Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 218 110 11, Spur Gear, C45, Module 1.5, 11 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
218 110 11	11	17	19,5	16,5	13	12	6	0,99	33
218 110 12	12	17	21	18	13	14	8	1,14	40
218 110 13	13	17	22,5	19,5	13	15	8	1,30	50
218 110 14	14	17	24	21	13	17	8	1,46	60
218 110 15	15	17	25,5	22,5	13	18	8	1,58	70
218 110 16	16	17	27	24	13	19	8	1,71	80
218 110 17	17	17	28,5	25,5	13	20	8	1,79	90
218 110 18	18	17	30	27	13	20	8	1,99	100
218 110 19	19	17	31,5	28,5	13	20	8	2,31	100
218 110 20	20	17	33	30	13	25	8	2,60	130
218 110 21	21	17	34,5	31,5	13	25	10	2,92	130
218 110 22	22	17	36	33	13	25	10	3,25	140
218 110 23	23	17	37,5	34,5	13	25	10	3,61	160
218 110 24	24	17	39	36	13	25	10	4,02	170
218 110 25	25	17	40,5	37,5	13	25	10	4,38	180
218 110 26	26	17	42	39	13	30	12	4,83	200
218 110 27	27	17	43,5	40,5	13	30	12	5,28	220
218 110 28	28	17	45	42	13	30	12	5,72	230
218 110 29	29	17	46,5	43,5	13	30	12	6,29	240
218 110 30	30	17	48	45	13	30	12	6,74	260
218 110 31	31	17	49,5	46,5	13	35	12	7,23	300
218 110 32	32	17	51	48	13	35	12	7,84	310
218 110 33	33	17	52,5	49,5	13	35	12	8,44	330
218 110 34	34	17	54	51	13	35	12	9,01	340
218 110 35	35	17	55,5	52,5	13	35	12	9,66	360
218 110 36	36	17	57	54	13	35	12	10,3	370
218 110 37	37	17	58,5	55,5	13	40	12	10,6	420
218 110 38	38	17	60	57	13	40	12	11,7	440
218 110 39	39	17	61,5	58,5	13	40	12	12,4	460
218 110 40	40	17	63	60	13	40	12	13,2	480
218 110 41	41	17	64,5	61.5	13	40	12	14,1	500
218 110 42	42	17	66	63	13	50	12	14,8	590
218 110 43	43	17	67,5	64.5	13	50	12	15,7	610
218 110 44	44	17	69	66	13	50	12	16,5	630
218 110 45	45	17	70,5	67,5	13	50	12	17,3	650
218 110 46	46	17	72	69	13	50	14	18,3	660
218 110 47	47	17	73,5	70,5	13	50	14	19,4	700
218 110 48	48	17	75	72	13	50	14	20,7	700
218 110 49	49	17	76,5	73,5	13	50	14	22,0	730
218 110 50	50	17	78	75	13	50	14	23,4	760
218 110 51	51	17	79,5	76.5	13	60	14	24,8	860
218 110 52	52	17	81	78	13	60	14	26,4	890
218 110 53	53	17	82,5	79.5	13	60	14	27,2	910
218 110 54	54	17	84	81	13	60	14	28,8	940
218 110 55	55	17	85,5	82.5	13	60	14	30,1	960
218 110 56	56	17	87	84	13	60	16	31,4	980
218 110 59	59	17	91,5	88,5	13	60	16	35,5	1060
218 110 60	60	17	93	90	13	60	16	37,0	1090
218 110 64	64	17	99	96	13	70	16	45,0	1310
218 110 65	65	17	100,5	97,5	13	70	16	47,1	1340
218 110 66	66	17	102	99	13	70	16	48,5	1370
218 110 68	68	17	105	102	13	70	16	51,4	1430
218 110 69	69	17	106,5	103,5	13	70	16	52,6	1460
218 110 70	70	17	108	105	13	70	16	53,7	1500
218 110 72	72	17	111	108	13	80	16	55,8	1660
218 110 75	75	17	115,5	112,5	13	80	16	59,3	1760
218 110 80	80	17	123	120	13	80	16	65,1	1940
218 110 90	90	17	138	135	13	80	16	84,8	2330
218 111 00	100	17	153	150	13	80	16	92,2	2770
218 111 20	120	17	183	180	13	80	16	100,8	3790

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 228 110 18, Spur Gear, C45, Module 1.5, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
228 110 18	18	17	30	27	8	1,99	68
228 110 20	20	17	33	30	8	2,60	86
228 110 24	24	17	39	36	10	4,02	123
228 110 25	25	17	40,5	37,5	10	4,38	135
228 110 30	30	17	48	45	12	6,74	195
228 110 35	35	17	55,5	52,5	12	9,66	270
228 110 36	36	17	57	54	12	10,3	285
228 110 40	40	17	63	60	12	13,2	355
228 110 45	45	17	70,5	67,5	12	17,3	455
228 110 48	48	17	75	72	14	20,7	510
228 110 50	50	17	78	75	14	23,4	560
228 110 60	60	17	93	90	16	37,0	810
228 110 72	72	17	111	108	16	55,8	1190
228 110 75	75	17	115,5	112,5	16	59,3	1300
228 110 76	76	17	117	114	16	60,4	1330
228 110 80	80	17	123	120	16	65,1	1480
228 110 85	85	17	130,5	127,5	16	80,6	1670
228 110 90	90	17	138	135	16	84,8	1880
228 110 95	95	17	145,5	142,5	16	88,9	2090
228 111 00	100	17	153	150	16	92,2	2320
228 111 10	110	17	168	165	16	94,2	2820
228 111 14	114	17	174	171	16	96,2	3030
228 111 20	120	17	183	180	16	100,8	3360
228 111 27	127	17	193,5	190,5	16	107,0	3770

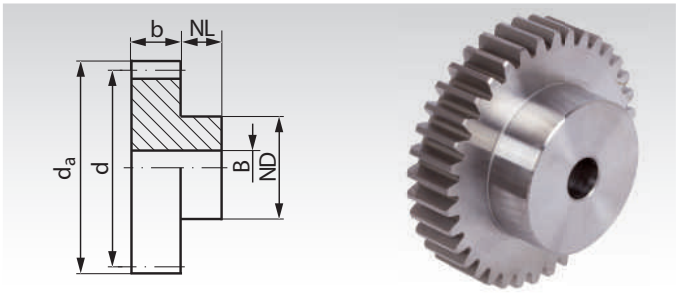
* Basis of calculations see page 197.

Gears with hardened teeth Page 240

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 2.0, Tooth Width b = 16 mm, Milled Teeth, Straight Tooth System

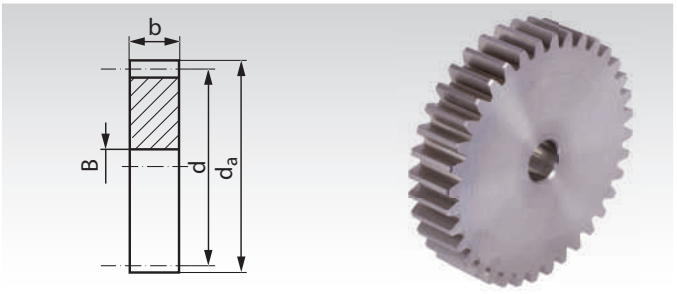
Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 231 010 00, Spur Gear, Module 2, 10 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
231 010 00**	10	16	24	20	15	15	8	0,6	45
231 012 00**	12	16	28	24	15	20	10	0,8	70
231 013 00**	13	16	30	26	15	20	10	0,9	81
231 014 00**	14	16	32	28	15	25	10	1,1	110
231 015 00**	15	16	34	30	15	25	12	1,2	114
231 016 00**	16	16	36	32	15	25	12	1,3	126
231 017 00	17	16	38	34	15	25	12	3,8	139
231 018 00**	18	16	40	36	15	30	12	1,5	179
231 019 00	19	16	42	38	15	30	12	4,6	192
231 020 00**	20	16	44	40	15	30	12	1,9	207
231 021 00	21	16	46	42	15	30	12	5,7	224
231 022 00	22	16	48	44	15	30	12	6,2	240
231 023 00**	23	16	50	46	15	30	12	2,6	257
231 024 00**	24	16	52	48	15	30	12	2,9	275
231 025 00**	25	16	54	50	15	30	12	3,2	295
231 026 00	26	16	56	52	15	35	12	9,5	344
231 027 00	27	16	58	54	15	35	12	10,3	364
231 028 00**	28	16	60	56	15	35	12	4,1	386
231 029 00	29	16	62	58	15	35	12	12,2	409
231 030 00**	30	16	64	60	15	40	12	4,8	466
231 031 00	31	16	66	62	15	40	12	14,0	489
231 032 00	32	16	68	64	15	40	12	15,1	514
231 034 00	34	16	72	68	15	40	12	17,3	566
231 035 00	35	16	74	70	15	45	12	18,6	632
231 036 00	36	16	76	72	15	45	12	19,7	659
231 037 00	37	16	78	74	15	45	12	21,1	689
231 038 00	38	16	80	76	15	45	12	24,1	720
231 040 00	40	16	84	80	15	50	12	27,1	825
231 042 00	42	16	88	84	15	50	12	30,4	891
231 044 00	44	16	92	88	15	50	12	33,8	955
231 045 00	45	16	94	90	15	50	12	35,6	991
231 046 00	46	16	96	92	15	50	12	37,5	1025
231 047 00	47	16	98	94	15	50	12	39,8	1066
231 048 00	48	16	100	96	15	50	12	42,5	1098
231 050 00	50	16	104	100	15	50	12	48,0	1174
231 052 00	52	16	108	104	15	60	12	54,0	1357
231 053 00	53	16	110	106	15	60	12	57,1	1396
231 054 00	54	16	112	108	15	60	12	60,3	1442
231 055 00	55	16	114	110	15	60	12	63,6	1485
231 056 00	56	16	116	112	15	60	12	67,1	1527
231 057 00	57	16	118	114	15	70	12	70,6	1688
231 058 00	58	16	120	116	15	70	12	74,2	1737
231 059 00	59	16	122	118	15	70	12	77,6	1784
231 060 00	60	16	124	120	15	70	12	81,1	1827
231 062 00	62	16	128	124	15	70	12	88,8	1929
231 063 00	63	16	130	126	15	70	12	92,6	1969
231 064 00	64	16	132	128	15	70	12	95,1	2028
231 065 00	65	16	134	130	20	70	15	97,2	2194
231 067 00	67	16	138	134	20	70	15	102	2306
231 068 00	68	16	140	136	20	70	15	104	2360
231 070 00	70	16	144	140	20	70	15	108	2463
231 072 00	72	16	148	144	20	80	15	113	2769
231 074 00	74	16	152	148	20	80	15	137	2883
231 075 00	75	16	154	150	20	80	15	138	2945
231 076 00	76	16	156	152	20	80	15	140	2982
231 078 00	78	16	160	156	20	80	15	143	3129
231 080 00	80	16	164	160	20	80	20	146	3196
231 085 00	85	16	174	170	20	80	20	149	3513
231 090 00	90	16	184	180	20	80	20	150	3875
231 095 00	95	16	194	190	20	100	20	151	4652
231 100 00	100	16	204	200	20	100	20	154	5056
231 110 00	110	16	224	220	20	100	20	168	5856
231 114 00	114	16	232	228	20	100	20	173	6179
231 120 00	120	16	244	240	20	100	20	181	6822

Material: C45. Gears marked with ** are from 11SMnPb30.
Tooth quality 8d25 DIN 3967. Pressure angle 20°.

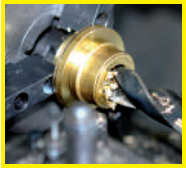


Ordering Details: e.g.: Product No. 241 018 00, Spur Gear, Module 2, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
241 018 00**	18	16	40	36	12	1,5	108
241 020 00**	20	16	44	40	12	1,9	138
241 021 00	21	16	46	42	12	5,7	154
241 022 00	22	16	48	44	12	6,2	170
241 023 00	23	16	50	46	12	7,0	187
241 024 00**	24	16	52	48	12	2,9	206
241 025 00**	25	16	54	50	12	3,2	225
241 026 00	26	16	56	52	12	9,5	244
241 027 00	27	16	58	54	12	10,3	265
241 028 00**	28	16	60	56	12	4,1	286
241 030 00**	30	16	64	60	12	4,8	330
241 032 00**	32	16	68	64	12	5,6	380
241 035 00	35	16	74	70	12	18,6	457
241 036 00	36	16	76	72	12	19,7	486
241 037 00	37	16	78	74	12	21,1	514
241 038 00	38	16	80	76	12	24,1	545
241 039 00	39	16	82	78	12	25,6	578
241 040 00	40	16	84	80	12	27,1	605
241 041 00	41	16	86	82	12	28,7	639
241 042 00	42	16	88	84	12	30,4	668
241 043 00	43	16	90	86	12	32,1	703
241 045 00	45	16	94	90	12	35,6	773
241 047 00	47	16	98	94	12	39,8	843
241 048 00	48	16	100	96	12	42,5	879
241 049 00	49	16	102	98	12	45,2	921
241 050 00	50	16	104	100	12	48,0	954
241 051 00	51	16	106	102	12	50,9	995
241 052 00	52	16	108	104	12	54,0	1038
241 053 00	53	16	110	106	12	57,1	1092
241 054 00	54	16	112	108	12	60,3	1124
241 055 00	55	16	114	110	12	63,6	1153
241 056 00	56	16	116	112	12	67,1	1208
241 057 00	57	16	118	114	12	70,6	1249
241 060 00	60	16	124	120	12	81,1	1385
241 061 00	61	16	126	122	12	85,1	1443
241 063 00	63	16	130	126	12	92,6	1530
241 064 00	64	16	132	128	15	95,1	1576
241 065 00	65	16	134	130	15	97,2	1625
241 067 00	67	16	138	134	15	102	1733
241 070 00	70	16	144	140	15	108	1886
241 072 00	72	16	148	144	15	113	1988
241 075 00	75	16	154	150	15	138	2178
241 076 00	76	16	156	152	15	140	2229
241 078 00	78	16	160	156	15	143	2358
241 080 00	80	16	164	160	20	146	2458
241 085 00	85	16	174	170	20	149	2782
241 090 00	90	16	184	180	20	150	3134
241 095 00	95	16	194	190	20	151	3493
241 096 00	96	16	196	192	20	152	3556
241 100 00	100	16	204	200	20	154	3870
241 114 00	114	16	232	228	20	173	5052
241 120 00	120	16	244	240	20	181	5585

* Basis of calculations see page 197.

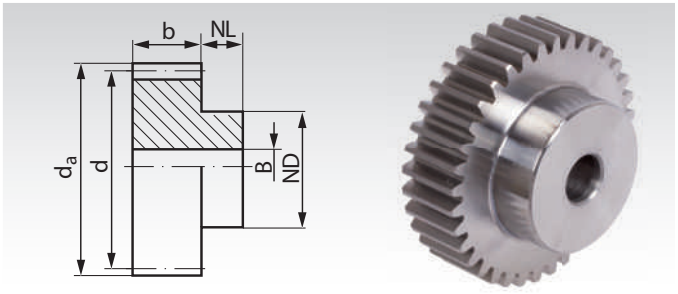
** 11SMnPb30.



Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 2.0, Tooth Width b = 20 mm, Milled Teeth, Straight Tooth System

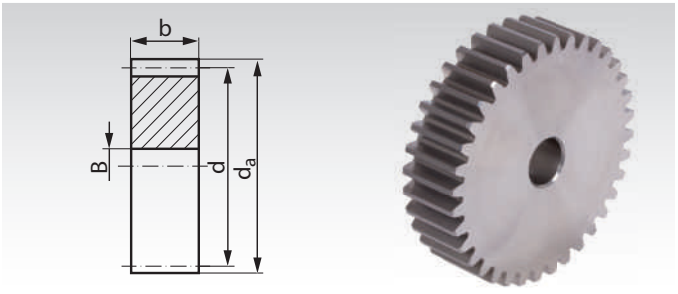
Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 231 110 12, Spur Gear, C45, Module 2.0, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
231 110 12	12	20	28	24	15	18	10	2,8	80
231 110 13	13	20	30	26	15	20	10	3,2	100
231 110 14	14	20	32	28	15	22	10	3,6	120
231 110 15	15	20	34	30	15	24	10	3,9	140
231 110 16	16	20	36	32	15	25	10	4,2	160
231 110 17	17	20	38	34	15	25	10	4,4	180
231 110 18	18	20	40	36	15	25	10	4,9	190
231 110 19	19	20	42	38	15	25	10	5,7	210
231 110 20	20	20	44	40	15	30	10	6,4	260
231 110 21	21	20	46	42	15	30	12	7,2	270
231 110 22	22	20	48	44	15	30	12	8,0	290
231 110 23	23	20	50	46	15	30	12	8,9	310
231 110 24	24	20	52	48	15	35	12	9,9	360
231 110 25	25	20	54	50	15	35	12	10,8	390
231 110 26	26	20	56	52	15	40	12	11,9	450
231 110 27	27	20	58	54	15	40	12	13,0	470
231 110 28	28	20	60	56	15	40	12	14,1	500
231 110 29	29	20	62	58	15	40	14	15,5	520
231 110 30	30	20	64	60	15	40	14	16,6	550
231 110 31	31	20	66	62	15	45	14	17,8	610
231 110 32	32	20	68	64	15	45	14	19,3	650
231 110 33	33	20	70	66	15	45	14	20,8	680
231 110 34	34	20	72	68	15	45	14	22,2	710
231 110 35	35	20	74	70	15	45	14	23,8	740
231 110 36	36	20	76	72	15	45	14	25,3	780
231 110 37	37	20	78	74	15	50	14	26,1	860
231 110 38	38	20	80	76	15	50	14	28,9	900
231 110 39	39	20	82	78	15	50	14	30,6	930
231 110 40	40	20	84	80	15	50	14	32,5	970
231 110 41	41	20	86	82	15	55	16	34,6	1050
231 110 42	42	20	88	84	15	55	16	36,5	1090
231 110 43	43	20	90	86	15	55	16	38,6	1130
231 110 44	44	20	92	88	15	60	16	40,6	1230
231 110 45	45	20	94	90	15	60	16	42,7	1270
231 110 46	46	20	96	92	15	60	16	45	1310
231 110 47	47	20	98	94	15	70	16	47,8	1480
231 110 48	48	20	100	96	15	70	16	51	1530
231 110 49	49	20	102	98	15	70	16	54,2	1570
231 110 50	50	20	104	100	15	70	16	57,6	1620
231 110 51	51	20	106	102	15	70	16	61,1	1670
231 110 52	52	20	108	104	15	70	16	64,8	1720
231 110 53	53	20	110	106	15	70	16	68,5	1780
231 110 54	54	20	112	108	15	70	16	72,4	1830
231 110 55	55	20	114	110	15	70	16	76,3	1880
231 110 56	56	20	116	112	15	70	16	80,5	1940
231 110 57	57	20	118	114	15	70	16	84,7	1990
231 110 58	58	20	120	116	15	70	16	89	2050
231 110 60	60	20	124	120	15	70	16	97,3	2160
231 110 62	62	20	128	124	15	80	16	107	2420
231 110 63	63	20	130	126	15	80	16	111	2480
231 110 64	64	20	132	128	15	80	16	114	2550
231 110 65	65	20	134	130	15	80	16	117	2610
231 110 66	66	20	136	132	15	80	16	120	2670
231 110 67	67	20	138	134	15	80	16	122	2740
231 110 69	69	20	142	138	15	80	16	127	2870
231 110 70	70	20	144	140	15	80	16	130	2940
231 110 75	75	20	154	150	15	80	20	166	3250
231 110 80	80	20	164	160	15	80	20	175	3600
231 110 90	90	20	184	180	15	90	20	180	4570
231 111 00	100	20	204	200	15	100	20	185	5670
231 111 20	120	20	244	240	15	100	20	217	7790

Material: C45. Tooth quality 8d25 DIN 3967. Pressure angle 20°.



Ordering Details: e.g.: Product No. 241 110 18, Spur Gear, C45 Module 2.0, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight g
241 110 18	18	20	40	36	10	4,9	145
241 110 20	20	20	44	40	10	6,4	180
241 110 24	24	20	52	48	12	9,9	260
241 110 25	25	20	54	50	12	10,8	285
241 110 30	30	20	64	60	14	16,6	410
241 110 35	35	20	74	70	14	23,8	570
241 110 36	36	20	76	72	14	25,3	600
241 110 40	40	20	84	80	14	32,5	750
241 110 45	45	20	94	90	16	42,7	950
241 110 48	48	20	100	96	16	51	1080
241 110 50	50	20	104	100	16	57,6	1180
241 110 72	72	20	148	144	16	135	2500
241 110 75	75	20	154	150	20	166	2710
241 110 76	76	20	156	152	20	168	2790
241 110 80	80	20	164	160	20	175	3090
241 110 85	85	20	174	170	20	179	3500
241 110 90	90	20	184	180	20	180	3930
241 110 95	95	20	194	190	20	181	4390
241 111 00	100	20	204	200	20	185	4870
241 111 10	110	20	224	220	20	201	5900
241 111 14	114	20	232	228	20	208	6340
241 111 20	120	20	244	240	20	217	7030
241 111 27	127	20	258	254	20	235	7890

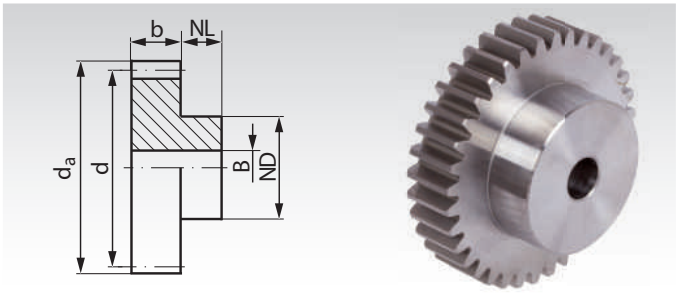
* Basis of calculations see page 197.

Gears with hardened teeth Page 240

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 2.5, Tooth Width b = 20 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

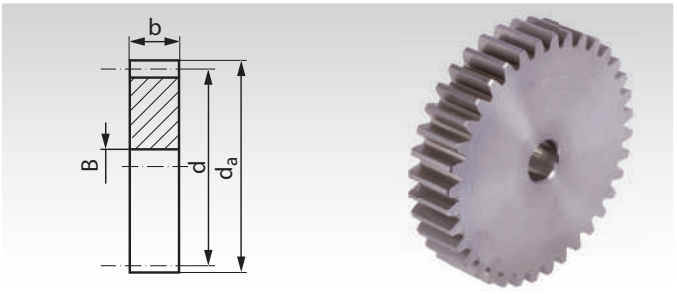


Ordering Details: e.g.: Product No. 232 012 00, Spur Gear, Steel C45, Module 2.5, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
232 012 00	12	20	35	30	15	20	12	4,9	0,11
232 013 00	13	20	37,5	32,5	15	20	12	5,6	0,12
232 014 00	14	20	40	35	15	20	12	6,3	0,14
232 015 00	15	20	42,5	37,5	15	25	12	6,9	0,19
232 016 00	16	20	45	40	15	25	12	7,4	0,21
232 017 00	17	20	47,5	42,5	15	25	12	7,7	0,23
232 018 00	18	20	50	45	15	30	12	8,7	0,29
232 019 00	19	20	52,5	47,5	15	30	12	9,9	0,31
232 020 00	20	20	55	50	15	30	12	11,2	0,34
232 021 00	21	20	57,5	52,5	15	30	12	12,6	0,38
232 022 00	22	20	60	55	15	30	12	14,1	0,41
232 023 00	23	20	62,5	57,5	15	40	12	15,6	0,51
232 024 00	24	20	65	60	15	40	12	17,3	0,54
232 025 00	25	20	67,5	62,5	15	40	12	19,0	0,58
232 026 00	26	20	70	65	15	40	12	20,8	0,62
232 027 00	27	20	72,5	67,5	15	40	12	22,7	0,66
232 028 00	28	20	75	70	15	40	12	24,7	0,70
232 030 00	30	20	80	75	15	40	12	29,1	0,79
232 032 00	32	20	85	80	15	50	15	33,8	0,95
232 034 00	34	20	90	85	15	50	15	38,9	1,04
232 035 00	35	20	92,5	87,5	15	50	15	41,6	1,10
232 036 00	36	20	95	90	15	60	15	44,4	1,25
232 038 00	38	20	100	95	15	60	15	50,7	1,38
232 040 00	40	20	105	100	20	60	15	59,3	1,60
232 042 00	42	20	110	105	20	60	15	68,5	1,72
232 045 00	45	20	117,5	112,5	20	60	15	83,9	1,92
232 046 00	46	20	120	115	20	60	15	89,4	1,98
232 048 00	48	20	125	120	20	60	15	100	2,14
232 050 00	50	20	130	125	20	70	15	112	2,43
232 052 00	52	20	135	130	20	70	15	124	2,60
232 054 00	54	20	140	135	20	70	20	137	2,73
232 055 00	55	20	142,5	137,5	20	70	20	144	2,78
232 056 00	56	20	145	140	20	70	20	151	2,89
232 060 00	60	20	155	150	20	70	20	181	3,24
232 062 00	62	20	160	155	20	70	20	197	3,43
232 065 00	65	20	167,5	162,5	20	80	20	238	3,90
232 070 00	70	20	180	175	20	80	20	270	4,44
232 072 00	72	20	185	180	20	80	20	276	4,62
232 075 00	75	20	192,5	187,5	20	90	20	282	5,19
232 080 00	80	20	205	200	20	90	20	285	5,79
232 082 00	82	20	210	205	20	90	20	286	6,05
232 085 00	85	20	217,5	212,5	20	100	20	288	6,69
232 090 00	90	20	230	225	20	100	20	290	7,31
232 092 00	92	20	235	230	20	100	20	292	7,60
232 095 00	95	20	242,5	237,5	20	100	25	301	7,97
232 100 00	100*	20	255	250	20	100	25	315	8,74
232 110 00	110*	20	280	275	20	120	25	340	10,86
232 120 00	120*	20	305	300	20	120	25	365	12,64
232 127 00	127*	20	322,5	317,5	20	120	25	380	13,96

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

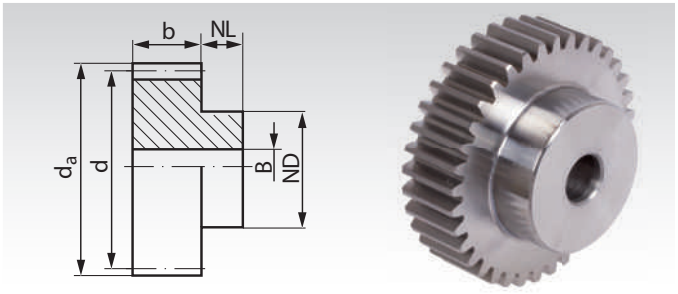


Ordering Details: e.g.: Product No. 242 018 00, Spur Gear, Steel C45, Module 2.5, 18 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
242 018 00	18	20	50	45	12	8,7	0,23
242 020 00	20	20	55	50	12	11,2	0,29
242 022 00	22	20	60	55	12	14,1	0,34
242 023 00	23	20	62,5	57,5	12	15,6	0,37
242 024 00	24	20	65	60	12	17,3	0,41
242 025 00	25	20	67,5	62,5	12	19,0	0,45
242 026 00	26	20	70	65	12	20,8	0,49
242 029 00	29	20	77,5	72,5	12	26,0	0,61
242 030 00	30	20	80	75	12	29,1	0,66
242 031 00	31	20	82,5	77,5	12	31,4	0,70
242 033 00	33	20	87,5	82,5	15	36,3	0,79
242 034 00	34	20	90	85	15	38,9	0,84
242 035 00	35	20	92,5	87,5	15	41,6	0,89
242 037 00	37	20	97,5	92,5	15	47,3	1,00
242 038 00	38	20	100	95	15	50,7	1,06
242 039 00	39	20	102,5	97,5	15	54,9	1,12
242 040 00	40	20	105	100	15	59,3	1,18
242 041 00	41	20	107,5	102,5	15	65,8	1,24
242 043 00	43	20	112,5	107,5	15	73,5	1,38
242 044 00	44	20	115	110	15	78,6	1,43
242 045 00	45	20	117,5	112,5	15	83,9	1,50
242 047 00	47	20	122,5	117,5	15	95,0	1,64
242 048 00	48	20	125	120	15	100	1,71
242 049 00	49	20	127,5	122,5	15	107	1,79
242 050 00	50	20	130	125	15	112	1,86
242 051 00	51	20	132,5	127,5	15	118	1,94
242 053 00	53	20	137,5	132,5	15	131	2,10
242 054 00	54	20	140	135	20	137	2,17
242 056 00	56	20	145	140	20	151	2,33
242 057 00	57	20	147,5	142,5	20	158	2,43
242 060 00	60	20	155	150	20	181	2,69
242 070 00	70	20	180	175	20	270	3,68
242 076 00	76	20	195	190	20	284	4,35
242 080 00	80	20	205	200	20	285	4,83
242 090 00	90	20	230	225	20	290	6,13
242 100 00	100	20	255	250	20	315	7,62
242 114 00	114	20	290	285	25	349	9,80
242 120 00	120	20	305	300	25	365	10,94

Spur Gears Made from Steel, Module 2.5, Tooth Width b = 25 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

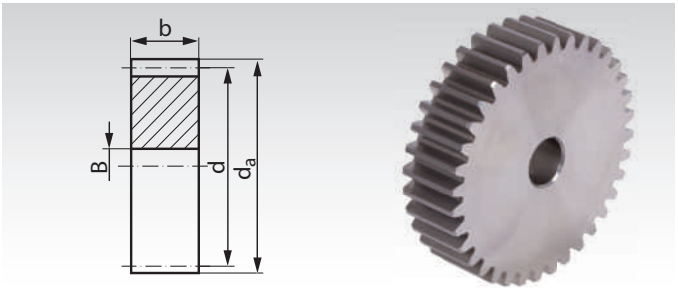


Ordering Details: e.g.: Product No. 232 110 12, Spur Gear, C45, Module 2.5, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
232 110 12	12	25	35	30	20	22	10	5,9	0,17
232 110 13	13	25	37,5	32,5	20	25	10	6,7	0,21
232 110 14	14	25	40	35	20	28	10	7,6	0,25
232 110 15	15	25	42,5	37,5	20	30	10	8,3	0,30
232 110 16	16	25	45	40	20	32	12	8,9	0,33
232 110 17	17	25	47,5	42,5	20	35	12	9,2	0,38
232 110 18	18	25	50	45	20	35	12	10,4	0,42
232 110 19	19	25	52,5	47,5	20	35	12	11,9	0,45
232 110 20	20	25	55	50	20	40	12	13,4	0,54
232 110 21	21	25	57,5	52,5	20	40	14	15,1	0,56
232 110 22	22	25	60	55	20	45	14	16,9	0,66
232 110 23	23	25	62,5	57,5	20	45	14	18,7	0,70
232 110 24	24	25	65	60	20	45	14	20,8	0,74
232 110 25	25	25	67,5	62,5	20	50	14	22,8	0,85
232 110 26	26	25	70	65	20	50	14	25,0	0,90
232 110 27	27	25	72,5	67,5	20	50	14	27,3	0,95
232 110 28	28	25	75	70	20	50	14	29,6	1,00
232 110 29	29	25	77,5	72,5	20	50	14	32,7	1,06
232 110 30	30	25	80	75	20	55	14	34,9	1,18
232 110 31	31	25	82,5	77,5	20	55	16	37,5	1,22
232 110 32	32	25	85	80	20	55	16	40,6	1,28
232 110 33	33	25	87,5	82,5	20	55	16	43,8	1,34
232 110 34	34	25	90	85	20	55	16	46,7	1,41
232 110 35	35	25	92,5	87,5	20	60	16	50,2	1,54
232 110 36	36	25	95	90	20	60	16	53,3	1,61
232 110 37	37	25	97,5	92,5	20	60	16	54,9	1,68
232 110 38	38	25	100	95	20	60	16	60,8	1,75
232 110 39	39	25	102,5	97,5	20	60	16	65,3	1,83
232 110 40	40	25	105	100	20	70	16	71,2	2,06
232 110 41	41	25	107,5	102,5	20	70	16	77,4	2,14
232 110 42	42	25	110	105	20	70	16	82,2	2,22
232 110 43	43	25	112,5	107,5	20	70	16	92,4	2,30
232 110 44	44	25	115	110	20	70	16	96,6	2,38
232 110 45	45	25	117,5	112,5	20	70	16	100	2,47
232 110 46	46	25	120	115	20	70	20	107	2,52
232 110 47	47	25	122,5	117,5	20	80	20	114	2,80
232 110 48	48	25	125	120	20	80	20	120	2,88
232 110 49	49	25	127,5	122,5	20	80	20	128	2,98
232 110 50	50	25	130	125	20	80	20	135	3,07
232 110 51	51	25	132,5	127,5	20	80	20	143	3,17
232 110 52	52	25	135	130	20	90	20	149	3,48
232 110 53	53	25	37,5	132,5	20	90	20	156	3,58
232 110 54	54	25	140	135	20	90	20	165	3,68
232 110 55	55	25	142,5	137,5	20	90	20	173	3,78
232 110 56	56	25	145	140	20	100	20	181	4,13
232 110 57	57	25	147,5	142,5	20	100	20	190	4,23
232 110 58	58	25	150	145	20	100	20	199	4,34
232 110 59	59	25	152,5	147,5	20	100	20	208	4,46
232 110 60	60	25	155	150	20	100	20	217	4,57
232 110 70	70	25	180	175	20	100	20	324	5,74
232 110 90	90	25	230	225	20	120	25	348	9,24
232 111 20	120	25	305	300	20	120	25	438	15,19

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 242 110 18, Spur Gear, C45, Module 2.5, 18 Teeth

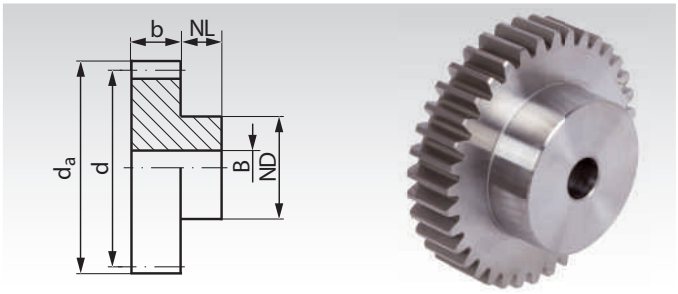
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
242 110 18	18	25	50	45	12	10,4	0,28
242 110 20	20	25	55	50	12	13,4	0,36
242 110 22	22	25	60	55	14	16,9	0,43
242 110 24	24	25	65	60	14	20,8	0,51
242 110 25	25	25	67,5	62,5	14	22,8	0,56
242 110 30	30	25	80	75	14	34,9	0,82
242 110 40	40	25	105	100	16	71,2	1,47
242 110 48	48	25	125	120	20	120	2,12
242 110 50	50	25	130	125	20	135	2,30
242 110 60	60	25	155	150	20	217	3,34
242 110 65	65	25	167,5	162,5	20	286	3,99
242 110 70	70	25	180	175	20	324	4,64
242 110 72	72	25	185	180	20	332	4,91
242 110 75	75	25	192,5	187,5	20	338	5,33
242 110 76	76	25	195	190	20	340	5,48
242 110 80	80	25	205	200	25	342	6,04
242 110 85	85	25	217,5	212,5	25	346	6,84
242 110 90	90	25	230	225	25	348	7,68
242 110 95	95	25	242,5	237,5	25	361	8,57
242 111 00	100	25	255	250	25	378	9,51
242 111 10	110	25	280	275	25	408	11,53
242 111 14	114	25	290	285	25	419	12,39
242 111 20	120	25	305	300	25	438	13,74
242 111 27	127	25	322,5	317,5	25	453	15,40

Gears with hardened teeth
Page 241

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 3.0, Tooth Width b = 25 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

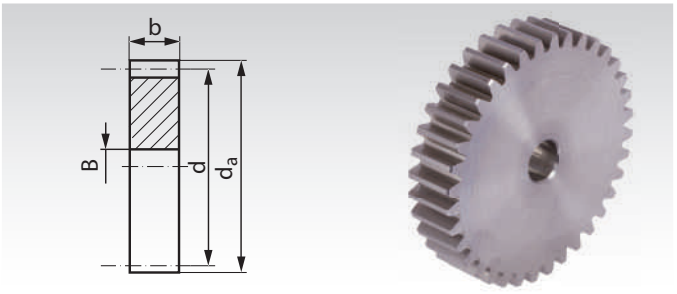


Ordering Details: e.g.: Product No. 233 012 00, Spur Gear, Steel C45, Module 3, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT** Nm	Weight kg
233 012 00	12	25	42	36	15	25	12	9,3	0,21
233 013 00	13	25	45	39	15	25	12	10,5	0,24
233 014 00	14	25	48	42	15	25	12	11,8	0,28
233 015 00	15	25	51	45	15	35	12	13,0	0,37
233 016 00	16	25	54	48	15	35	12	14,0	0,41
233 017 00	17	25	57	51	15	35	12	14,8	0,46
233 018 00	18	25	60	54	15	45	12	16,5	0,58
233 019 00	19	25	63	57	15	45	12	18,8	0,63
233 020 00	20	25	66	60	15	45	15	21,3	0,67
233 021 00	21	25	69	63	15	45	15	23,9	0,72
233 022 00	22	25	72	66	15	45	15	26,7	0,78
233 023 00	23	25	75	69	15	50	15	29,6	0,89
233 024 00	24	25	78	72	15	50	15	32,7	0,95
233 025 00	25	25	81	75	15	50	15	36,0	1,01
233 026 00	26	25	84	78	15	50	15	39,5	1,08
233 027 00	27	25	87	81	15	50	15	43,2	1,16
233 028 00	28	25	90	84	15	50	20	47,0	1,19
233 030 00	30	25	96	90	15	50	20	55,2	1,35
233 032 00	32	25	102	96	15	60	20	64,9	1,62
233 035 00	35	25	111	105	15	60	20	85,0	1,90
233 036 00	36	25	114	108	15	60	20	92,4	2,00
233 038 00	38	25	120	114	20	60	20	108	2,30
233 040 00	40	25	126	120	20	70	20	125	2,67
233 042 00	42	25	132	126	20	70	20	142	2,89
233 045 00	45	25	141	135	20	70	20	170	3,26
233 048 00	48	25	150	144	20	80	20	202	3,84
233 050 00	50	25	156	150	20	80	20	224	4,10
233 052 00	52	25	162	156	20	80	20	249	4,39
233 054 00	54	25	168	162	20	80	20	275	4,66
233 055 00	55	25	171	165	20	80	20	288	4,82
233 056 00	56	25	174	168	20	90	20	302	5,18
233 057 00	57	25	177	171	20	90	20	317	5,33
233 058 00	58	25	180	174	20	90	20	332	5,49
233 060 00	60	25	186	180	20	90	20	380	5,83
233 065 00	65	25	201	195	20	90	20	462	6,67
233 067 00	67	25	207	201	20	90	20	476	7,04
233 070 00	70	25	216	210	20	90	20	480	7,64
233 072 00	72	25	222	216	20	100	20	482	8,22
233 075 00	75	25	231	225	20	100	20	484	8,87
233 076 00	76	25	234	228	20	100	30	486	8,94
233 080 00	80	25	246	240	20	100	30	490	9,77
233 090 00	90*	25	276	270	20	100	30	530	12,12
233 100 00	100*	25	306	300	20	100	30	580	14,72
233 114 00	114*	25	348	342	20	100	30	644	18,79
233 120 00	120*	25	366	360	20	100	30	673	21,00

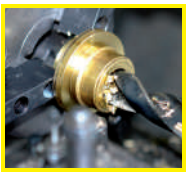
* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 243 018 00, Spur Gear, Steel C45 , Module 3, 18 Teeth

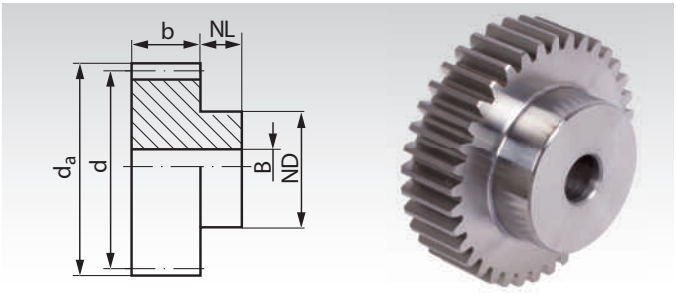
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT** Nm	Weight kg
243 018 00	18	25	60	54	12	16,5	0,42
243 020 00	20	25	66	60	15	21,3	0,50
243 021 00	21	25	69	63	15	23,9	0,55
243 024 00	24	25	78	72	15	32,7	0,74
243 025 00	25	25	81	75	15	36,0	0,81
243 028 00	28	25	90	84	15	47,0	1,02
243 030 00	30	25	96	90	20	55,2	1,15
243 035 00	35	25	111	105	20	85,0	1,61
243 037 00	37	25	117	111	20	100	1,80
243 038 00	38	25	120	114	20	108	1,91
243 040 00	40	25	126	120	20	125	2,11
243 042 00	42	25	132	126	20	142	2,34
243 045 00	45	25	141	135	20	170	2,70
243 046 00	46	25	144	138	20	180	2,81
243 047 00	47	25	147	141	20	191	2,95
243 048 00	48	25	150	144	20	202	3,09
243 050 00	50	25	156	150	20	224	3,34
243 052 00	52	25	162	156	20	249	3,64
243 053 00	53	25	165	159	20	261	3,78
243 056 00	56	25	174	168	20	302	4,23
243 058 00	58	25	180	174	20	332	4,54
243 060 00	60	25	186	180	20	380	4,87
243 065 00	65	25	201	195	20	462	5,72
243 067 00	67	25	207	201	20	476	6,09
243 070 00	70	25	216	210	20	480	6,67
243 072 00	72	25	222	216	30	482	6,99
243 076 00	76	25	234	228	30	486	7,80
243 080 00	80	25	246	240	30	490	8,63
243 090 00	90	25	276	270	30	530	11,00
243 096 00	96	25	294	288	30	559	12,53
243 100 00	100	25	306	300	30	580	13,61
243 114 00	114	25	348	342	30	644	17,72



Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 3.0, Tooth Width b = 30 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

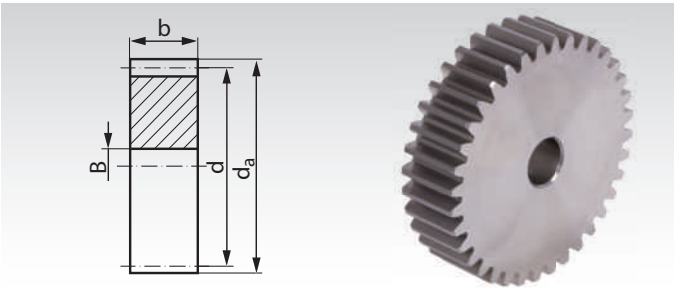


Ordering Details: e.g.: Product No. 233 110 12, Spur Gear, C45, Module 3.0, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
233 110 12	12	30	42	36	20	27	12	10,7	0,28
233 110 13	13	30	45	39	20	30	12	12,1	0,34
233 110 14	14	30	48	42	20	33	12	13,6	0,41
233 110 15	15	30	51	45	20	35	12	15	0,47
233 110 16	16	30	54	48	20	38	14	16,1	0,54
233 110 17	17	30	57	51	20	42	14	17	0,63
233 110 18	18	30	60	54	20	45	14	19	0,72
233 110 19	19	30	63	57	20	45	14	21,6	0,78
233 110 20	20	30	66	60	20	45	14	24,5	0,84
233 110 21	21	30	69	63	20	45	16	27,5	0,89
233 110 22	22	30	72	66	20	50	16	30,7	1,02
233 110 23	23	30	75	69	20	50	16	34	1,10
233 110 24	24	30	78	72	20	50	16	37,6	1,18
233 110 25	25	30	81	75	20	60	16	41,4	1,39
233 110 26	26	30	84	78	20	60	16	45,4	1,48
233 110 27	27	30	87	81	20	60	16	49,7	1,56
233 110 28	28	30	90	84	20	60	16	54,1	1,66
233 110 29	29	30	93	87	20	60	16	59,2	1,75
233 110 30	30	30	96	90	20	60	16	63,5	1,85
233 110 31	31	30	99	93	20	60	16	69,2	1,95
233 110 32	32	30	102	96	20	70	16	74,6	2,21
233 110 33	33	30	105	99	20	70	16	82,8	2,32
233 110 34	34	30	108	102	20	70	16	88,6	2,43
233 110 35	35	30	111	105	20	70	16	97,8	2,55
233 110 36	36	30	114	108	20	70	20	106	2,62
233 110 37	37	30	117	111	20	70	20	115	2,74
233 110 38	38	30	120	114	20	80	20	124	3,05
233 110 39	39	30	123	117	20	80	20	135	3,18
233 110 40	40	30	126	120	20	80	20	143	3,31
233 110 41	41	30	129	123	20	80	20	155	3,44
233 110 42	42	30	132	126	20	80	20	164	3,58
233 110 43	43	30	135	129	20	80	20	175	3,72
233 110 44	44	30	138	132	20	90	20	186	4,07
233 110 45	45	30	141	135	20	90	20	196	4,22
233 110 46	46	30	144	138	20	90	20	207	4,37
233 110 47	47	30	147	141	20	100	20	220	4,76
233 110 48	48	30	150	144	20	100	20	232	4,92
233 110 50	50	30	156	150	20	100	20	258	5,18
233 110 60	60	30	186	180	20	100	20	437	6,97
233 110 65	65	30	201	195	20	100	20	531	7,99
233 110 70	70	30	216	210	20	100	25	552	9,03
233 110 75	75	30	231	225	20	120	25	557	10,75
233 110 90	90	30	276	270	20	120	25	610	14,79
233 111 20	120	30	366	360	20	120	30	774	24,98

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 243 110 18, Spur Gear, C45, Module 3.0, 18 Teeth

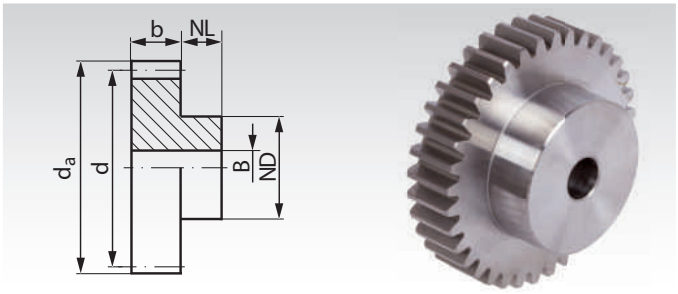
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
243 110 18	18	30	60	54	14	19	0,49
243 110 20	20	30	66	60	14	24,5	0,62
243 110 24	24	30	78	72	16	37,6	0,89
243 110 25	25	30	81	75	16	41,4	0,97
243 110 30	30	30	96	90	16	63,5	1,42
243 110 40	40	30	126	120	20	143	2,54
243 110 48	48	30	150	144	20	232	3,69
243 110 50	50	30	156	150	20	258	4,06
243 110 52	52	30	162	156	20	286	4,40
243 110 55	55	30	171	165	20	331	4,93
243 110 57	57	30	177	171	20	364	5,30
243 110 60	60	30	186	180	20	437	5,89
243 110 65	65	30	201	195	20	531	6,92
243 110 70	70	30	216	210	25	552	8,00
243 110 72	72	30	222	216	25	554	8,47
243 110 75	75	30	231	225	25	557	9,21
243 110 76	76	30	234	228	25	559	9,46
243 110 80	80	30	246	240	25	564	10,49
243 110 85	85	30	261	255	25	580	11,86
243 110 90	90	30	276	270	25	610	13,32
243 110 95	95	30	291	285	25	640	14,86
243 111 00	100	30	306	300	25	667	16,48
243 111 10	110	30	336	330	25	705	19,97
243 111 14	114	30	348	342	30	740	21,40
243 111 20	120	30	366	360	30	774	23,74
243 111 27	127	30	387	381	30	800	26,61

Gears with hardened teeth Page 241

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 4.0, Tooth Width b = 30 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

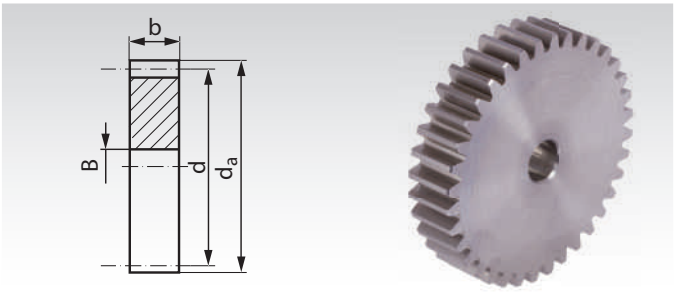


Ordering Details: e.g.: Product No. 234 012 00, Spur Gear, Steel C45, Module 4, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT** Nm	Weight kg
234 012 00	12	30	56	48	20	35	15	21	0,48
234 013 00	13	30	60	52	20	35	15	24	0,55
234 014 00	14	30	64	56	20	40	15	27	0,68
234 015 00	15	30	68	60	20	40	15	30	0,76
234 016 00	16	30	72	64	20	40	20	32	0,80
234 017 00	17	30	76	68	20	40	20	34	0,90
234 018 00	18	30	80	72	20	50	20	38	1,11
234 019 00	19	30	84	76	20	50	20	43	1,21
234 020 00	20	30	88	80	20	50	20	49	1,33
234 021 00	21	30	92	84	20	50	20	55	1,45
234 022 00	22	30	96	88	20	50	20	62	1,58
234 023 00	23	30	100	92	20	50	20	69	1,70
234 024 00	24	30	104	96	20	60	20	76	1,98
234 025 00	25	30	108	100	20	60	20	87	2,12
234 026 00	26	30	112	104	20	60	20	97	2,28
234 027 00	27	30	116	108	20	60	20	109	2,43
234 028 00	28	30	120	112	20	60	20	122	2,58
234 030 00	30	30	128	120	20	70	20	148	3,08
234 032 00	32	30	136	128	20	70	20	176	3,44
234 035 00	35	30	148	140	20	70	25	222	3,97
234 036 00	36	30	152	144	20	70	25	239	4,18
234 038 00	38	30	160	152	20	70	25	275	4,61
234 040 00	40	30	168	160	20	80	25	315	5,27
234 042 00	42	30	176	168	20	80	25	358	5,77
234 044 00	44	30	184	176	20	80	25	404	6,24
234 045 00	45	30	188	180	20	80	25	429	6,52
234 046 00	46	30	192	184	20	80	25	456	6,79
234 048 00	48	30	200	192	20	100	25	510	7,78
234 050 00	50	30	208	200	20	100	25	568	8,36
234 052 00	52	30	216	208	20	100	25	636	8,96
234 054 00	54	30	224	216	20	100	25	698	9,50
234 055 00	55	30	228	220	20	100	25	730	10,00
234 056 00	56	30	232	224	20	100	25	763	10,50
234 058 00	58	30	240	232	20	100	25	832	11,00
234 060 00	60	30	248	240	20	100	25	905	11,50
234 065 00	65*	30	268	260	20	100	30	976	13,50
234 067 00	67*	30	276	268	20	100	30	980	14,00
234 070 00	70*	30	288	280	20	100	30	985	15,30
234 072 00	72*	30	296	288	20	100	30	993	16,00
234 075 00	75*	30	308	300	20	100	30	1030	17,50
234 076 00	76*	30	312	304	20	120	30	1042	18,38
234 080 00	80*	30	328	320	20	120	30	1083	20,00
234 090 00	90*	30	368	360	20	120	30	1200	25,20
234 096 00	96*	30	392	384	20	120	30	1270	28,50
234 100 00	100*	30	408	400	20	120	30	1320	31,00

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

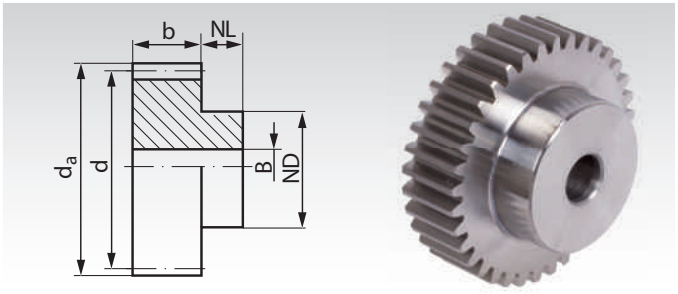


Ordering Details: e.g.: Product No. 244 020 00, Spur Gear, Steel C45 , Module 4, 20 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT** Nm	Weight kg
244 020 00	20	30	88	80	20	49	1,07
244 024 00	24	30	104	96	20	76	1,59
244 025 00	25	30	108	100	20	87	1,73
244 030 00	30	30	128	120	25	148	2,49
244 035 00	35	30	148	140	25	222	3,44
244 036 00	36	30	152	144	25	239	3,55
244 037 00	37	30	156	148	25	256	3,86
244 038 00	38	30	160	152	25	275	4,04
244 040 00	40	30	168	160	25	315	4,55
244 042 00	42	30	176	168	25	358	5,02
244 045 00	45	30	188	180	25	429	5,78
244 046 00	46	30	192	184	25	456	6,08
244 047 00	47	30	196	188	25	483	6,34
244 048 00	48	30	200	192	25	510	6,62
244 050 00	50	30	208	200	25	568	7,18
244 052 00	52	30	216	208	25	636	7,78
244 056 00	56	30	232	224	25	763	9,06
244 060 00	60	30	248	240	25	905	10,42
244 065 00	65	30	268	260	30	976	12,19
244 067 00	67	30	276	268	30	980	12,99
244 070 00	70	30	288	280	30	985	14,14
244 076 00	76	30	312	304	30	1042	17,00
244 080 00	80	30	328	320	30	1083	18,50
244 090 00	90	30	368	360	30	1200	23,50
244 096 00	96	30	392	384	30	1270	26,89

Spur Gears Made from Steel, Module 4.0, Tooth Width b = 40 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

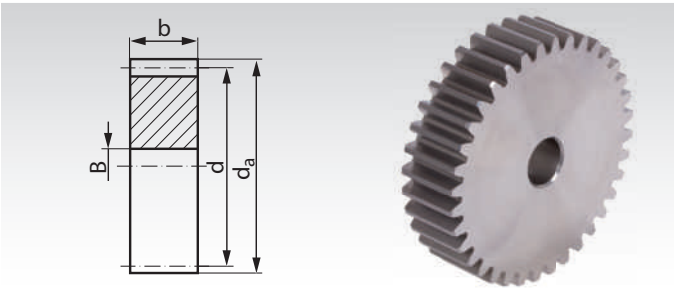


Ordering Details: e.g.: Product No. 234 110 12, Spur Gear, C45, Module 4.0, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
234 110 12	12	40	56	48	20	35	14	26	0,63
234 110 13	13	40	60	52	20	40	14	30	0,78
234 110 14	14	40	64	56	20	45	14	34	0,93
234 110 15	15	40	68	60	20	45	14	38	1,05
234 110 16	16	40	72	64	20	50	16	40	1,20
234 110 17	17	40	76	68	20	50	16	43	1,33
234 110 18	18	40	80	72	20	50	16	48	1,47
234 110 19	19	40	84	76	20	60	16	54	1,75
234 110 20	20	40	88	80	20	60	16	61	1,90
234 110 21	21	40	92	84	20	70	16	69	2,22
234 110 22	22	40	96	88	20	70	16	78	2,39
234 110 23	23	40	100	92	20	75	20	86	2,60
234 110 24	24	40	104	96	20	75	20	95	2,79
234 110 25	25	40	108	100	20	75	20	109	2,98
234 110 26	26	40	112	104	20	75	20	121	3,18
234 110 27	27	40	116	108	20	75	20	136	3,39
234 110 28	28	40	120	112	20	75	20	153	3,60
234 110 29	29	40	124	116	20	75	20	171	3,83
234 110 30	30	40	128	120	20	75	20	185	4,06
234 110 31	31	40	132	124	20	80	20	205	4,39
234 110 32	32	40	136	128	20	80	20	220	4,64
234 110 33	33	40	140	132	20	80	20	248	4,90
234 110 34	34	40	144	136	20	80	20	264	5,16
234 110 35	35	40	148	140	20	80	20	278	5,43
234 110 36	36	40	152	144	20	80	25	299	5,63
234 110 38	38	40	160	152	20	80	25	344	6,14
234 110 40	40	40	168	160	20	80	25	394	6,74
234 110 50	50	40	208	200	20	100	25	710	10,66
234 110 60	60	40	248	240	20	100	25	1131	14,92
234 110 90	90	40	368	360	20	120	30	1500	32,76

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 244 110 20, Spur Gear, C45, Module 4.0, 20 Teeth

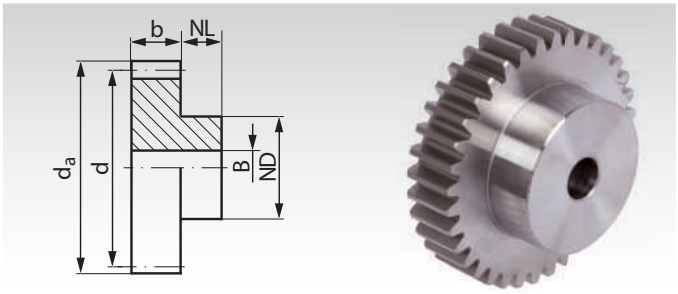
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
244 110 20	20	40	88	80	16	61	1,49
244 110 24	24	40	104	96	20	95	2,13
244 110 25	25	40	108	100	20	109	2,32
244 110 30	30	40	128	120	20	185	3,38
244 110 35	35	40	148	140	20	278	4,64
244 110 36	36	40	152	144	25	299	4,86
244 110 38	38	40	160	152	25	344	5,20
244 110 40	40	40	168	160	25	394	6,11
244 110 45	45	40	188	180	25	536	7,78
244 110 48	48	40	200	192	25	638	8,87
244 110 50	50	40	208	200	25	710	9,65
244 110 52	52	40	216	208	25	795	10,45
244 110 55	55	40	228	220	25	913	11,71
244 110 57	57	40	236	228	25	1020	12,59
244 110 60	60	40	248	240	25	1131	13,97
244 110 65	65	40	268	260	25	1220	16,43
244 110 70	70	40	288	280	25	1231	19,09
244 110 75	75	40	308	300	25	1288	21,94
244 110 76	76	40	312	304	30	1303	22,47
244 110 80	80	40	328	320	30	1354	24,93
244 110 85	85	40	348	340	30	1430	28,18
244 110 90	90	40	368	360	30	1500	31,62
244 110 95	95	40	388	380	30	1580	35,26
244 111 00	100	40	408	400	30	1650	39,11
244 111 10	110	40	448	440	30	1744	47,38
244 111 14	114	40	464	456	30	1830	50,91

Gears with hardened teeth
Page 241

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 5.0, Tooth Width b = 40 mm, Milled Teeth, Straight Tooth System

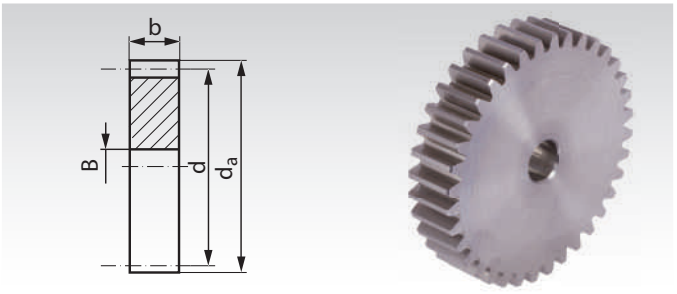
Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 235 012 00, Spur Gear, Steel C45, Module 5, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT** Nm	Weight kg
235 012 00	12	40	70	60	25	40	15	49	0,99
235 013 00	13	40	75	65	25	40	15	54	1,14
235 014 00	14	40	80	70	25	50	15	60	1,45
235 015 00	15	40	85	75	25	60	15	66	1,79
235 016 00	16	40	90	80	25	60	15	72	1,98
235 017 00	17	40	95	85	25	60	20	74	2,11
235 018 00	18	40	100	90	25	60	20	84	2,33
235 019 00	19	40	105	95	25	60	20	97	2,55
235 020 00	20	40	110	100	25	60	20	113	2,78
235 021 00	21	40	115	105	25	60	20	132	3,03
235 022 00	22	40	120	110	25	60	20	152	3,30
235 023 00	23	40	125	115	25	60	20	173	3,57
235 024 00	24	40	130	120	25	80	20	195	4,29
235 025 00	25	40	135	125	25	80	20	219	4,59
235 026 00	26	40	140	130	25	80	25	242	4,80
235 027 00	27	40	145	135	25	80	25	267	5,13
235 028 00	28	40	150	140	25	80	25	293	5,47
235 030 00	30	40	160	150	25	80	25	351	6,18
235 032 00	32	40	170	160	30	80	25	416	7,14
235 035 00	35	40	185	175	30	80	25	526	8,36
235 036 00	36	40	190	180	30	100	25	566	9,45
235 038 00	38	40	200	190	30	100	25	656	10,33
235 040 00	40	40	210	200	30	100	25	750	11,30
235 045 00	45	40	235	225	30	100	25	1010	13,87
235 048 00	48**	40	250	240	30	100	30	1186	15,44
235 050 00	50**	40	260	250	30	120	30	1312	17,50
235 052 00	52**	40	270	260	30	120	30	1446	18,75
235 055 00	55**	40	285	275	30	150	30	1662	22,00
235 056 00	56**	40	290	280	30	150	30	1739	23,00
235 060 00	60**	40	310	300	30	160	30	1850	26,50

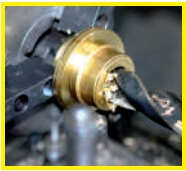
Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 245 020 00, Spur Gear, Steel C45, Module 5, 20 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT** Nm	Weight kg
245 020 00	20	40	110	100	20	113	2,29
245 025 00	25	40	135	125	25	219	3,61
245 030 00	30	40	160	150	25	351	5,29
245 035 00	35	40	185	175	25	526	7,27
245 036 00	36	40	190	180	25	566	7,71
245 038 00	38	40	200	190	25	656	8,63
245 040 00	40	40	210	200	25	750	9,57
245 045 00	45	40	235	225	25	1010	12,15
245 048 00	48	40	250	240	30	1186	13,02
245 050 00	50	40	260	250	30	1312	13,59
245 052 00	52	40	270	260	30	1446	16,28
245 060 00	60	40	310	300	30	1850	22,00
245 065 00	65	40	335	325	30	1953	25,50
245 070 00	70	40	360	350	30	2086	30,00

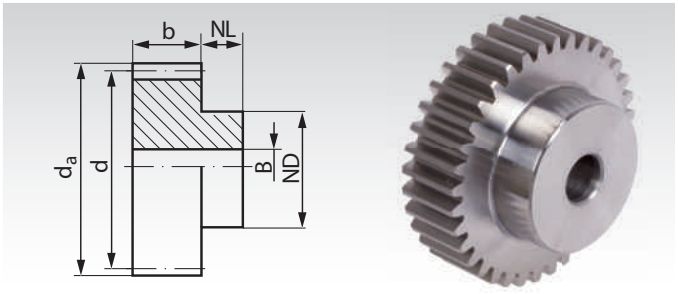
* Basis of calculations see page 197.
** The hubs on these gears are welded on.



Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 5.0, Tooth Width b = 50 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

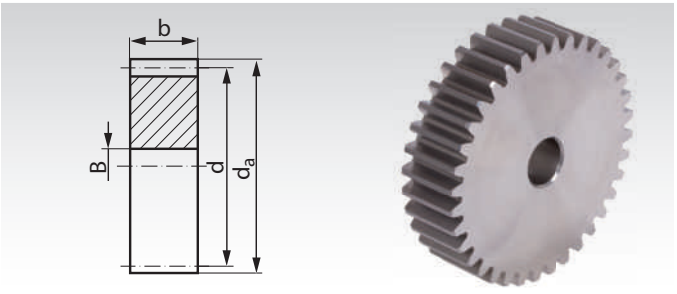


Ordering Details: e.g.: Product No. 235 110 12, Spur Gear, C45, Module 5.0, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
235 110 12	12	50	70	60	25	45	20	58	1,21
235 110 13	13	50	75	65	25	50	20	64	1,47
235 110 14	14	50	80	70	25	55	20	71	1,76
235 110 15	15	50	85	75	25	60	20	79	2,07
235 110 16	16	50	90	80	25	65	20	86	2,40
235 110 17	17	50	95	85	25	70	20	88	2,75
235 110 18	18	50	100	90	25	70	20	100	3,02
235 110 19	19	50	105	95	25	70	20	115	3,30
235 110 20	20	50	110	100	25	80	20	134	3,83
235 110 21	21	50	115	105	25	80	20	157	4,15
235 110 22	22	50	120	110	25	80	20	181	4,48
235 110 23	23	50	125	115	25	90	20	206	5,08
235 110 24	24	50	130	120	25	90	20	232	5,44
235 110 25	25	50	135	125	25	90	20	261	5,82
235 110 26	26	50	140	130	25	100	20	288	6,50
235 110 27	27	50	145	135	25	100	20	318	6,91
235 110 28	28	50	150	140	25	100	25	349	7,22
235 110 29	29	50	155	145	25	110	25	385	7,98
235 110 30	30	50	160	150	25	110	25	418	8,44
235 110 32	32	50	170	160	25	110	25	495	9,30
235 110 36	36	50	190	180	25	120	25	674	11,70
235 110 40	40	50	210	200	25	120	25	893	14,00
235 110 50	50	50	260	250	25	120	30	1561	20,67
235 110 60	60	50	310	300	25	160	30	2202	30,69

* Basis of calculations see page 197.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 245 110 20, Spur Gear, C45, Module 5.0, 20 Teeth

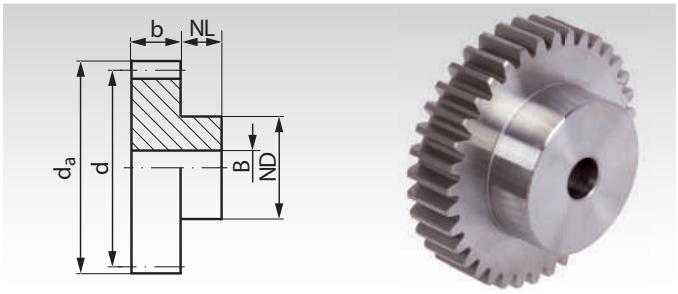
Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
245 110 20	20	50	110	100	20	134	2,90
245 110 24	24	50	130	120	20	232	4,23
245 110 25	25	50	135	125	20	261	4,60
245 110 30	30	50	160	150	25	418	6,61
245 110 32	32	50	170	160	25	495	7,62
245 110 35	35	50	185	175	25	626	9,16
245 110 38	38	50	200	190	25	781	10,84
245 110 40	40	50	210	200	25	893	12,04
245 110 45	45	50	235	225	25	1202	15,30
245 110 48	48	50	250	240	25	1411	17,44
245 110 50	50	50	260	250	30	1561	18,86
245 110 52	52	50	270	260	30	1721	20,43
245 110 55	55	50	285	275	30	1978	22,89
245 110 57	57	50	295	285	30	2030	24,62
245 110 60	60	50	310	300	30	2202	27,31
245 110 65	65	50	335	325	30	2324	32,12
245 110 70	70	50	360	350	30	2482	37,31
245 110 75	75	50	385	375	30	2576	42,88
245 110 76	76	50	390	380	30	2606	44,04
245 110 80	80	50	410	400	30	2708	48,84
245 110 85	85	50	435	425	30	2860	55,19
245 110 90	90	50	460	450	30	3000	61,92
245 110 95	95	50	485	475	30	3160	69,03
245 111 00	100	50	510	500	30	3300	76,53
245 111 10	110	50	560	550	30	3450	92,69
245 111 14	114	50	580	570	30	3600	99,59

Gears with hardened teeth
Page 241

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Steel, Module 6.0, Tooth Width b = 50 mm, Milled Teeth, Straight Tooth System

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



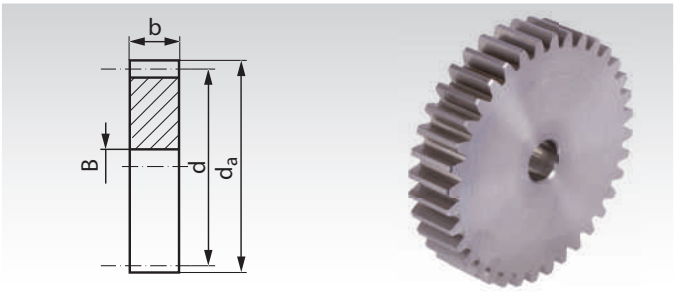
Ordering Details: e.g.: Product No. 236 012 00, Spur Gear, Steel C45, Module 6, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT** Nm	Weight kg
236 012 00	12	50	84	72	25	50	20	96	1,72
236 013 00	13	50	90	78	25	50	20	112	1,99
236 014 00	14	50	96	84	25	60	20	128	2,45
236 015 00	15	50	102	90	25	60	20	140	2,79
236 016 00	16	50	108	96	25	60	20	145	3,12
236 017 00	17	50	114	102	25	60	20	150	3,47
236 018 00	18	50	120	108	25	70	20	175	4,05
236 019 00	19	50	126	114	25	70	20	207	4,46
236 020 00	20	50	132	120	25	70	20	241	4,88
236 021 00	21	50	138	126	25	70	25	276	5,24
236 022 00	22	50	144	132	25	80	25	312	5,94
236 023 00	23	50	150	138	25	80	25	350	6,43
236 024 00	24	50	156	144	25	80	25	391	6,93
236 025 00	25	50	162	150	25	80	25	436	7,49
236 026 00	26	50	168	156	25	80	25	483	8,05
236 027 00	27	50	174	162	25	80	25	533	8,62
236 028 00	28	50	180	168	25	90	25	587	9,78
236 030 00	30	50	192	180	30	100	25	703	11,33
236 032 00	32	50	204	192	30	100	25	836	12,74
236 035 00	35	50	222	210	30	100	25	1045	14,95
236 036 00	36	50	228	216	30	100	25	1120	15,70
236 038 00	38	50	240	228	30	120	25	1280	18,00
236 040 00	40**	50	252	240	30	120	30	1460	19,69
236 045 00	45**	50	282	270	30	120	30	1955	24,50
236 048 00	48**	50	300	288	30	120	30	2300	27,66
236 050 00	50**	50	312	300	30	140	30	2550	30,61
236 052 00	52**	50	324	312	30	140	30	2800	34,91
236 055 00	55**	50	342	330	30	150	40	3060	35,84
236 060 00	60**	50	372	360	30	150	40	3350	43,00

* Basis of calculations see page 197.

** The hubs on these gears are welded on.

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.

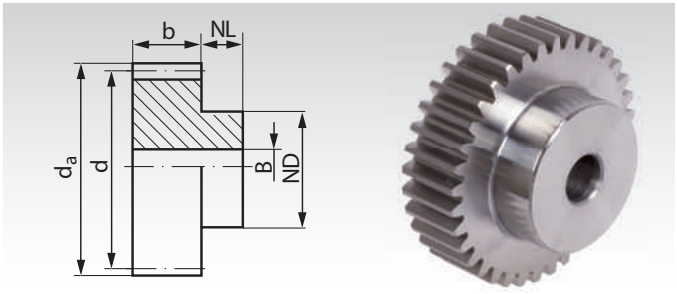


Ordering Details: e.g.: Product No. 246 020 00, Spur Gear, Steel C45 , Module 6, 20 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT** Nm	Weight kg
246 020 00	20	50	132	120	20	241	4,23
246 024 00	24	50	156	144	25	391	6,08
246 025 00	25	50	162	150	25	436	6,50
246 030 00	30	50	192	180	25	703	9,50
246 035 00	35	50	222	210	25	1045	13,14
246 036 00	36	50	228	216	25	1120	14,00
246 040 00	40	50	252	240	30	1460	17,50
246 045 00	45	50	282	270	30	1955	22,00
246 048 00	48	50	300	288	30	2300	25,00
246 050 00	50	50	312	300	30	2550	27,00
246 052 00	52	50	324	312	30	2800	29,50
246 056 00	56	50	348	336	40	3120	34,00
246 060 00	60	50	372	360	40	3350	39,00

Spur Gears Made from Steel, Module 6.0, Tooth Width b = 60 mm, Milled Teeth, Straight Tooth System

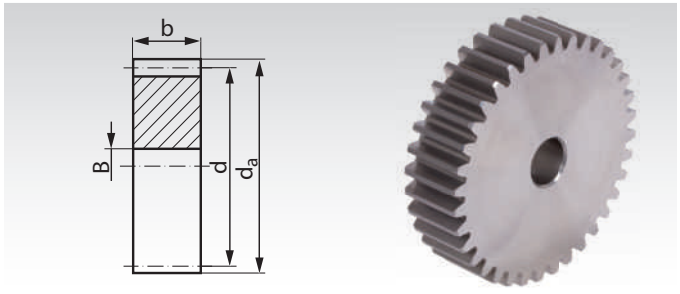
Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 236 110 12, Spur Gear, C45, Module 6.0, 12 Teeth

Product No. with Hub	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
236 110 12	12	60	84	72	20	54	20	110	1,82
236 110 13	13	60	90	78	20	60	20	129	2,20
236 110 14	14	60	96	84	20	65	20	147	2,88
236 110 15	15	60	102	90	20	70	20	161	3,01
236 110 16	16	60	108	95	20	75	20	167	3,46
236 110 17	17	60	114	102	20	75	20	172	4,26
236 110 18	18	60	120	108	20	80	20	201	4,33
236 110 20	20	60	132	120	20	90	20	277	5,43
236 110 21	21	60	138	126	20	90	25	317	6,44
236 110 22	22	60	144	132	20	100	25	358	7,23
236 110 24	24	60	156	144	20	110	25	450	7,88
236 110 25	25	60	162	150	20	110	25	500	8,42
236 110 30	30	60	192	180	20	120	25	808	13,20
236 110 36	36	60	228	216	20	130	25	1284	18,68
236 110 50	50	60	312	300	20	140	30	2924	34,59
236 110 60	60	60	372	360	20	150	40	3842	48,97

Material: C45. Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



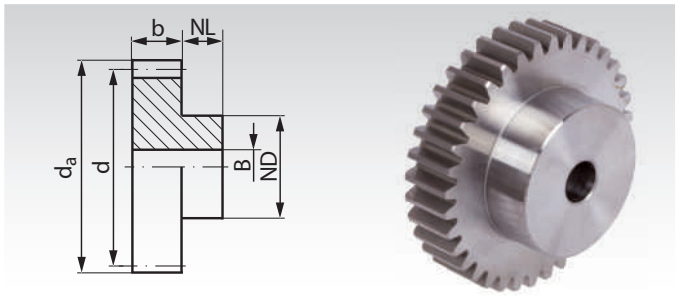
Ordering Details: e.g.: Product No. 246 110 20, Spur Gear, C45, Module 6.0, 20 Teeth

Product No. without Hub	Number of teeth	b mm	d_a mm	d mm	B^{H7} mm	perm. MT* Nm	Weight kg
246 110 20	20	60	132	120	20	277	5,08
246 110 24	24	60	156	144	25	450	7,29
246 110 25	25	60	162	150	25	500	7,93
246 110 28	28	60	180	168	25	675	10,00
246 110 30	30	60	192	180	25	808	11,52
246 110 32	32	60	204	192	25	960	13,14
246 110 35	35	60	222	210	25	1200	15,77
246 110 36	36	60	228	216	25	1284	16,69
246 110 38	38	60	240	228	25	1470	18,63
246 110 40	40	60	252	240	25	1680	20,66
246 110 50	50	60	312	300	30	2924	32,31
246 110 60	60	60	372	360	40	3842	46,42

* Basis of calculations see page 197.

Spur Gears Made from Steel, Module 8, with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: C45.
Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



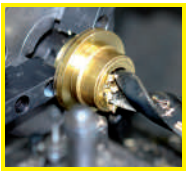
Ordering Details: e.g.: Product No. 238 012 00, Spur Gear, C45, Module 8, 12 Teeth

Module 8.0 Tooth Width b = 65 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
238 012 00	12	65	112	96	30	70	25	240	4,20
238 015 00	15	65	136	120	30	80	25	370	6,50
238 018 00	18	65	160	144	30	80	25	495	9,00
238 020 00	20	65	176	160	30	100	30	655	11,50
238 024 00	24	65	208	192	30	120	30	1045	16,90
238 025 00	25	65	216	200	30	120	30	1160	18,10
238 030 00	30	65	256	240	30	150	30	1834	26,60
238 036 00	36	65	304	288	30	160	40	2900	36,90
238 040 00**	40	65	336	320	30	180	40	3790	46,00

* Basis of calculations see page 197.

** The hubs on these gears are welded on.

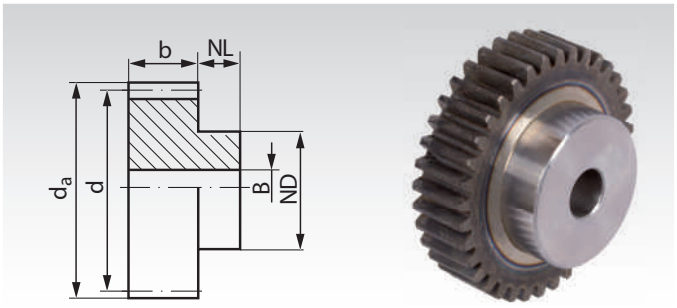


Reworking within 24h-service possible. Custom made parts on request.

Spur Gears with One-Sided Hub, Milled Teeth, Straight Tooth System, Teeth Induction Hardened

Material: C45. Teeth milled in quality 8d25 DIN 3967.
After milling, the tooth area is induction hardened, 54 + 4 HRC.
The hardening sets the tooth quality to 10-11.

Pressure angle 20°.



Ordering Details: e.g.: Product No. 214 881 12, Spur Gear, Hardened, Module 1, 12 Teeth

Module 1 Tooth Width b = 15 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
214 881 12	12	15	14	12	10	9	6	1,2	13
214 881 13	13	15	15	13	10	10	6	1,3	16
214 881 14	14	15	16	14	10	11	6	1,5	20
214 881 15	15	15	17	15	10	12	6	1,6	24
214 881 16	16	15	18	16	10	13	6	1,6	28
214 881 17	17	15	19	17	10	14	6	1,7	33
214 881 18	18	15	20	18	10	15	8	2,0	33
214 881 20	20	15	22	20	10	16	8	2,7	42
214 881 24	24	15	26	24	10	20	10	4,1	61
214 881 25	25	15	27	25	10	20	10	4,5	66
214 881 26	26	15	28	26	10	20	10	5,0	70
214 881 28	28	15	30	28	10	20	10	5,8	80
214 881 30	30	15	32	30	10	20	10	6,9	90
214 881 32	32	15	34	32	10	25	10	8,0	120
214 881 36	36	15	38	36	10	25	10	10,5	140
214 881 40	40	15	42	40	10	25	10	13,5	170
214 881 50	50	15	52	50	10	30	12	23,9	260
214 881 60	60	15	62	60	10	40	12	37,8	400

Module 1.5 Tooth Width b = 17 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
218 881 12	12	17	21	18	13	14	8	3,8	40
218 881 15	15	17	25,5	22,5	13	18	8	5,2	70
218 881 16	16	17	27	24	13	19	8	5,6	80
218 881 18	18	17	30	27	13	20	8	6,6	100
218 881 20	20	17	33	30	13	25	8	8,6	130
218 881 22	22	17	36	33	13	25	10	10,7	140
218 881 24	24	17	39	36	13	25	10	13,3	170
218 881 25	25	17	40,5	37,5	13	25	10	14,5	180
218 881 30	30	17	48	45	13	30	12	22,2	260
218 881 36	36	17	57	54	13	35	12	34	370
218 881 40	40	17	63	60	13	40	12	44	480
218 881 50	50	17	78	75	13	50	14	77	760
218 881 60	60	17	93	90	13	60	16	122	1090

Module 2 Tooth Width b = 20 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
231 881 12	12	20	28	24	15	18	10	9,0	80
231 881 13	13	20	30	26	15	20	10	10,6	100
231 881 14	14	20	32	28	15	22	10	11,9	120
231 881 15	15	20	34	30	15	24	10	12,9	140
231 881 16	16	20	36	32	15	25	10	13,5	160
231 881 18	18	20	40	36	15	25	10	16,2	190
231 881 20	20	20	44	40	15	30	10	21,1	260
231 881 22	22	20	48	44	15	30	12	26,4	290
231 881 24	24	20	52	48	15	35	12	32,7	360
231 881 25	25	20	54	50	15	35	12	35,6	390
231 881 30	30	20	64	60	15	40	14	55	550
231 881 32	32	20	68	64	15	45	14	64	650
231 881 36	36	20	76	72	15	45	14	84	780
231 881 40	40	20	84	80	15	50	14	107	970
231 881 50	50	20	104	100	15	70	16	190	1620
231 881 60	60	20	124	120	15	70	16	321	2160

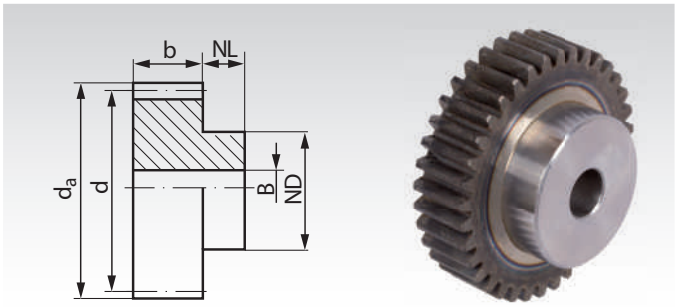
Reworking within 24h-service possible. Custom made parts on request.

* Basis of calculations see page 197.

Spur Gears with One-Sided Hub, Milled Teeth, Straight Tooth System, Teeth Induction Hardened

Material: C45. Teeth milled in quality 8d25 DIN 3967.
After milling, the tooth area is induction hardened, 54 + 4 HRC.
The hardening sets the tooth quality to 10-11.

Pressure angle 20°.



Ordering Details: e.g.: Product No. 232 881 12, Spur Gear, Hardened, Module 2.5, 12 Teeth

Module 2.5 Tooth Width b = 25 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
232 881 12	12	25	35	30	20	22	10	19,5	0,17
232 881 15	15	25	42,5	37,5	20	30	10	27,4	0,30
232 881 18	18	25	50	45	20	35	12	34,3	0,42
232 881 20	20	25	55	50	20	40	12	44,2	0,54
232 881 24	24	25	65	60	20	45	14	69	0,74
232 881 25	25	25	67,5	62,5	20	50	14	75	0,85
232 881 30	30	25	80	75	20	55	14	115	1,18
232 881 36	36	25	95	90	20	60	16	176	1,61
232 881 40	40	25	105	100	20	70	16	235	2,06
232 881 50	50	25	130	125	20	80	20	446	3,07
232 881 60	60	25	155	150	20	100	20	716	4,57

Module 3 Tooth Width b = 30 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
233 881 12	12	30	42	36	20	27	12	35	0,28
233 881 15	15	30	51	45	20	35	12	49	0,47
233 881 18	18	30	60	54	20	45	14	63	0,72
233 881 20	20	30	66	60	20	45	14	81	0,84
233 881 24	24	30	78	72	20	50	16	124	1,18
233 881 25	25	30	81	75	20	60	16	137	1,39
233 881 30	30	30	96	90	20	60	16	210	1,85
233 881 36	36	30	114	108	20	70	20	350	2,62
233 881 40	40	30	126	120	20	80	20	472	3,31
233 881 50	50	30	156	150	20	100	20	851	5,18
233 881 60	60	30	186	180	20	100	20	1442	6,97

Module 4 Tooth Width b = 40 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
234 881 12	12	40	56	48	20	35	14	86	0,63
234 881 15	15	40	68	60	20	45	14	125	1,05
234 881 18	18	40	80	72	20	50	16	158	1,47
234 881 20	20	40	88	80	20	60	16	201	1,90
234 881 24	24	40	104	96	20	75	20	314	2,79
234 881 25	25	40	108	100	20	75	20	360	2,98
234 881 30	30	40	128	120	20	75	20	611	4,06
234 881 36	36	40	152	144	20	80	25	987	5,63
234 881 40	40	40	168	160	20	80	25	1300	6,74
234 881 50	50	40	208	200	20	100	25	2343	10,66
234 881 60	60	40	248	240	20	100	25	3732	14,92

Module 5 Tooth Width b = 50 mm

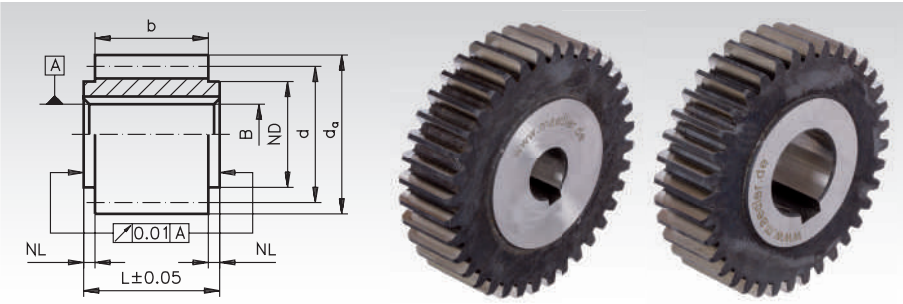
Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight kg
235 881 12	12	50	70	60	25	45	20	191	1,21
235 881 15	15	50	85	75	25	60	20	261	2,07
235 881 18	18	50	100	90	25	70	20	330	3,02
235 881 20	20	50	110	100	25	80	20	442	3,83
235 881 24	24	50	130	120	25	90	20	766	5,44
235 881 25	25	50	135	125	25	90	20	861	5,82
235 881 30	30	50	160	150	25	110	25	1380	8,44

* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Precision Spur Gears Made From Steel 16MnCr5, Hardened with Ground Tooth Flanks

Tooth quality 7e25.
Pressure angle 20°.
Case hardened HRC 58± 2.
Feather keyways in accordance with DIN 6885/1, Tol. P9.
Teeth, bores and faces ground.



Ordering Details: e.g.: Product No. 224 818 00, spur gear, steel 16MnCr5 module 1.0, 18 teeth, ground

Module 1.0 tooth width b = 10 mm, various bore sizes

Product No.	Number of teeth	b mm	$d_a^{-0,1}$ mm	d mm	NL mm	ND mm	$L^{\pm 0,05}$ mm	B^{H6} mm	perm. MT* Nm	Weight g
224 818 00	18	10	20	18	1,5/1,5	15	13	8	5,7	19
224 820 00	20	10	22	20	1,5/1,5	15	13	8	7,5	23
224 824 00	24	10	26	24	1,5/1,5	18	13	10	12,2	33
224 824 12	24	10	26	24	1,5/1,5	18	13	12	12,2	30
224 825 00	25	10	27	25	1,5/1,5	20	13	10	13,5	41
224 825 12	25	10	27	25	1,5/1,5	20	13	12	13,5	38
224 830 00	30	10	32	30	1,5/1,5	25	13	10	16,1	58
224 830 12	30	10	32	30	1,5/1,5	25	13	12	16,1	54
224 836 00	36	10	38	36	1,5/1,5	25	13	10	19,3	82
224 836 15	36	10	38	36	1,5/1,5	25	13	15	19,3	72
224 840 00	40	10	42	40	1,5/1,5	30	13	12	21,4	102
224 840 15	40	10	42	40	1,5/1,5	30	13	15	21,4	95
224 848 00	48	10	50	48	1,5/1,5	40	13	12	25,7	158
224 848 15	48	10	50	48	1,5/1,5	40	13	15	25,7	151
224 850 00	50	10	52	50	1,5/1,5	40	13	12	26,8	170
224 850 20	50	10	52	50	1,5/1,5	40	13	20	26,8	149
224 860 00	60	10	62	60	1,5/1,5	50	13	12	32,6	253
224 860 20	60	10	62	60	1,5/1,5	50	13	20	32,6	232

* Basis of calculations see page 197.

Module 1.5 tooth width b = 15 mm, various bore sizes

Product No.	Number of teeth	b mm	$d_a^{-0,1}$ mm	d mm	NL mm	ND mm	$L^{\pm 0,05}$ mm	B^{H6} mm	perm. MT* Nm	Weight g
228 812 00	12	15	21	18	1,5/1,5	14	18	8	12,5	25
228 815 00	15	15	25,5	22,5	1,5/1,5	18	18	10	18,1	40
228 815 12	15	15	25,5	22,5	1,5/1,5	18	18	12	18,1	36
228 818 00	18	15	30	27	1,5/1,5	22	18	10	23,0	63
228 818 12	18	15	30	27	1,5/1,5	22	18	12	23,0	58
228 820 00	20	15	33	30	1,5/1,5	25	18	10	30,3	82
228 820 15	20	15	33	30	1,5/1,5	25	18	15	30,3	63
228 824 00	24	15	39	36	1,5/1,5	25	18	10	45,5	115
228 824 15	24	15	39	36	1,5/1,5	25	18	15	45,5	104
228 825 00	25	15	40,5	37,5	1,5/1,5	28	18	12	50,3	126
228 825 15	25	15	40,5	37,5	1,5/1,5	28	18	15	50,3	117
228 830 00	30	15	48	45	1,5/1,5	30	18	12	60,2	185
228 830 15	30	15	48	45	1,5/1,5	30	18	15	60,2	176
228 836 00	36	15	57	54	1,5/1,5	40	18	12	72,0	277
228 836 20	36	15	57	54	1,5/1,5	40	18	20	72,0	251
228 840 00	40	15	63	60	1,5/1,5	40	18	12	80,0	345
228 840 20	40	15	63	60	1,5/1,5	40	18	20	80,0	313
228 848 00	48	15	75	72	1,5/1,5	40	18	15	96,8	474
228 848 20	48	15	75	72	1,5/1,5	40	18	20	96,8	458
228 850 00	50	15	78	75	1,5/1,5	50	18	15	101,0	545
228 850 25	50	15	78	75	1,5/1,5	50	18	25	101,0	490
228 860 00	60	15	93	90	1,5/1,5	60	18	15	122,0	777
228 860 25	60	15	93	90	1,5/1,5	60	18	25	122,0	736

* Basis of calculations see page 197.

Precision Gear Racks
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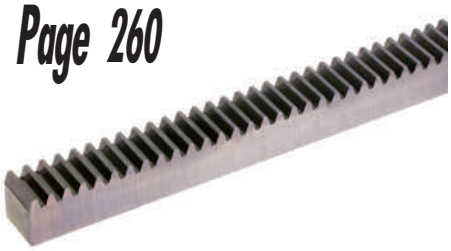
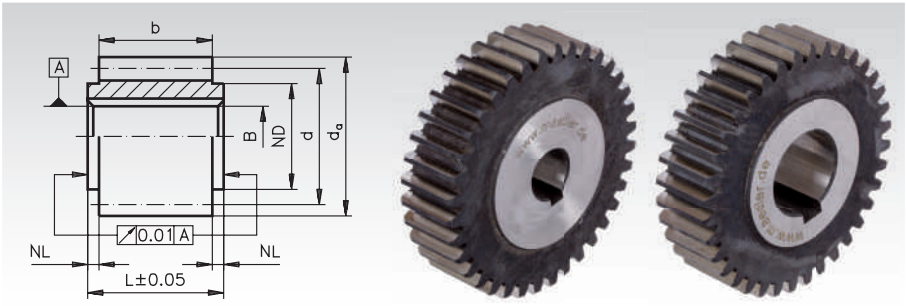


Precision Spur Gears Made From Steel 16MnCr5, Hardened with Ground Tooth Flanks

Tooth quality 7e25.
Pressure angle 20°.
Case hardened HRC 58±2.
Feather keyways in accordance with DIN 6885/1, Tol. P9.
Teeth, bores and faces ground.



Ordering Details: e.g.: Product No. 241 812 00, spur gear, steel 16MnCr5 module 2, 12 teeth, ground

Module 2.0 tooth width b = 20 mm, various bore sizes

Product No.	Number of teeth	b mm	$d_a^{-0,1}$ mm	d mm	NL mm	ND mm	L± 0,05 mm	B^{H6} mm	perm. MT* Nm	Weight g
241 812 00	12	20	28	24	1,5/1,5	18	23	10	30,5	61
241 815 00	15	20	34	30	1,5/1,5	25	23	12	44,4	100
241 815 15	15	20	34	30	1,5/1,5	25	23	15	44,4	88
241 818 00	18	20	40	36	1,5/1,5	28	23	12	56,4	150
241 818 15	18	20	40	36	1,5/1,5	28	23	15	56,4	139
241 820 00	20	20	44	40	1,5/1,5	30	23	12	74,2	190
241 820 15	20	20	44	40	1,5/1,5	30	23	15	74,2	179
241 824 00	24	20	52	48	1,5/1,5	30	23	12	113,3	271
241 824 15	24	20	52	48	1,5/1,5	30	23	15	113,3	265
241 824 20	24	20	52	48	1,5/1,5	30	23	20	113,3	240
241 825 00	25	20	54	50	1,5/1,5	35	23	15	125,2	294
241 825 20	25	20	54	50	1,5/1,5	35	23	20	125,2	269
241 830 00	30	20	64	60	1,5/1,5	40	23	15	151,0	430
241 830 20	30	20	64	60	1,5/1,5	40	23	20	151,0	411
241 830 25	30	20	64	60	1,5/1,5	40	23	25	151,0	379
241 836 00	36	20	76	72	1,5/1,5	45	23	15	188,3	629
241 836 20	36	20	76	72	1,5/1,5	45	23	20	188,3	612
241 836 25	36	20	76	72	1,5/1,5	45	23	25	188,3	580
241 840 00	40	20	84	80	1,5/1,5	50	23	15	213,3	793
241 840 20	40	20	84	80	1,5/1,5	50	23	20	213,3	769
241 840 25	40	20	84	80	1,5/1,5	50	23	25	213,3	737
241 848 00	48	20	100	96	1,5/1,5	50	23	15	261,2	1137
241 848 20	48	20	100	96	1,5/1,5	50	23	20	261,2	1122
241 848 25	48	20	100	96	1,5/1,5	50	23	25	261,2	1080
241 850 00	50	20	104	100	1,5/1,5	60	23	20	273,7	1225
241 850 25	50	20	104	100	1,5/1,5	60	23	25	273,7	1196
241 850 30	50	20	104	100	1,5/1,5	60	23	30	273,7	1157
241 860 00	60	20	124	120	1,5/1,5	70	23	20	337,0	1788
241 860 30	60	20	124	120	1,5/1,5	70	23	30	337,0	1717
241 860 35	60	20	124	120	1,5/1,5	70	23	35	337,0	1671

* Basis of calculations see page 197.

Module 3.0 tooth width b = 25 mm, various bore sizes

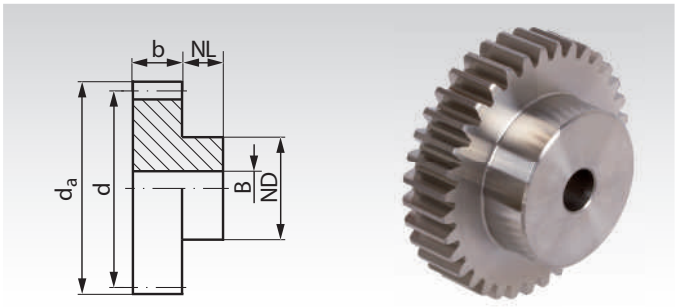
Product No.	Number of teeth	b mm	$d_a^{-0,1}$ mm	d mm	NL mm	ND mm	L± 0,05 mm	B^{H6} mm	perm. MT* Nm	Weight g
243 812 00	12	25	42	36	1,5/1,5	25	28	12	90	183
243 812 15	12	25	42	36	1,5/1,5	25	28	15	90	169
243 815 00	15	25	51	45	1,5/1,5	35	28	12	130	305
243 815 20	15	25	51	45	1,5/1,5	35	28	20	130	261
243 818 00	18	25	60	54	1,5/1,5	40	28	15	167	434
243 818 20	18	25	60	54	1,5/1,5	40	28	20	167	402
243 820 00	20	25	66	60	1,5/1,5	45	28	15	220	550
243 820 25	20	25	66	60	1,5/1,5	45	28	25	220	477
243 824 00	24	25	78	72	1,5/1,5	50	28	15	336	780
243 824 25	24	25	78	72	1,5/1,5	50	28	25	336	727
243 824 35	24	25	78	72	1,5/1,5	50	28	35	336	624
243 825 00	25	25	81	75	1,5/1,5	50	28	25	371	792
243 825 35	25	25	81	75	1,5/1,5	50	28	35	371	688
243 830 00	30	25	96	90	1,5/1,5	50	28	20	463	1220
243 830 25	30	25	96	90	1,5/1,5	50	28	25	463	1171
243 830 35	30	25	96	90	1,5/1,5	50	28	35	463	1068
243 836 00	36	25	114	108	1,5/1,5	60	28	20	575	1762
243 836 30	36	25	114	108	1,5/1,5	60	28	30	575	1688
243 836 35	36	25	114	108	1,5/1,5	60	28	35	575	1632
243 840 00	40	25	126	120	1,5/1,5	70	28	20	650	2250
243 840 35	40	25	126	120	1,5/1,5	70	28	35	650	2073
243 840 40	40	25	126	120	1,5/1,5	70	28	40	650	2008
243 848 00	48	25	150	144	1,5/1,5	80	28	20	795	3208
243 848 35	48	25	150	144	1,5/1,5	80	28	35	795	3066
243 848 45	48	25	150	144	1,5/1,5	80	28	45	795	2928
243 850 00	50	25	156	150	1,5/1,5	80	28	20	830	3500
243 850 35	50	25	156	150	1,5/1,5	80	28	35	830	3355
243 850 45	50	25	156	150	1,5/1,5	80	28	45	830	3197
243 860 00	60	25	186	180	1,5/1,5	90	28	25	1060	4972
243 860 35	60	25	186	180	1,5/1,5	90	28	35	1060	4875
243 860 45	60	25	186	180	1,5/1,5	90	28	45	1060	4737

* Basis of calculations see page 197.

Spur Gears Made from Stainless Steel with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Stainless steel 1.4305.

Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 214 990 10, Spur Gear, Stainless Steel, Module 1, 10 Teeth

Module 1 Tooth Width b = 10 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
214 990 10	10	10	12	10	6	8	4	0,11	7
214 990 11	11	10	13	11	6	8	4	0,14	8
214 990 12	12	10	14	12	6	10	4	0,15	10
214 990 13	13	10	15	13	6	10	5	0,18	11
214 990 14	14	10	16	14	6	10	5	0,19	14
214 990 15	15	10	17	15	6	12	5	0,21	16
214 990 16	16	10	18	16	6	12	5	0,22	18
214 990 17	17	10	19	17	6	12	6	0,23	19
214 990 18	18	10	20	18	6	15	6	0,26	24
214 990 19	19	10	21	19	6	15	6	0,30	26
214 990 20	20	10	22	20	6	15	6	0,33	28
214 990 22	22	10	24	22	6	15	6	0,42	33
214 990 24	24	10	26	24	6	15	6	0,51	39
214 990 25	25	10	27	25	6	20	8	0,56	46
214 990 26	26	10	28	26	6	20	8	0,61	49
214 990 28	28	10	30	28	6	20	8	0,72	55
214 990 30	30	10	32	30	8	25	8	0,84	77
214 990 36	36	10	38	36	8	25	8	1,27	102
214 990 40	40	10	42	40	8	25	8	1,62	120
214 990 45	45	10	47	45	10	30	10	2,11	165
214 990 48	48	10	50	48	10	30	10	2,44	182
214 990 50	50	10	52	50	10	30	10	2,68	193
214 990 54	54	10	56	54	10	40	10	3,19	262
214 990 60	60	10	62	60	12	40	10	4,05	320
214 990 64	64	10	66	64	12	40	10	4,69	352
214 990 65	65	10	67	65	12	40	10	4,86	360
214 990 70	70	10	72	70	12	40	10	5,76	401
214 990 72	72	10	74	72	12	50	10	6,14	484
214 990 75	75	10	77	75	12	50	10	6,74	510
214 990 80	80	10	82	80	12	50	10	7,82	560
214 991 00	100	10	102	100	12	60	12	13,1	856
214 991 20	120	10	122	120	12	60	12	21,5	1125

Module 1.5 Tooth Width b = 15 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
218 990 11	11	15	19,5	16,5	10	12	6	0,47	28
218 990 12	12	15	21	18	10	15	8	0,55	32
218 990 14	14	15	24	21	10	15	8	0,69	42
218 990 15	15	15	25,5	22,5	10	18	10	0,76	49
218 990 16	16	15	27	24	10	20	10	0,83	60
218 990 17	17	15	28,5	25,5	10	20	10	0,89	66
218 990 18	18	15	30	27	10	22	10	0,96	79
218 990 20	20	15	33	30	10	25	10	1,23	103
218 990 22	22	15	36	33	15	25	10	1,53	136
218 990 24	24	15	39	36	15	25	10	1,88	154
218 990 25	25	15	40,5	37,5	15	25	10	2,07	166
218 990 28	28	15	45	42	15	25	10	2,69	198
218 990 30	30	15	48	45	15	30	10	3,14	246
218 990 35	35	15	55,5	52,5	15	30	10	4,47	317
218 990 40	40	15	63	60	15	40	10	6,06	454
218 990 45	45	15	70,5	67,5	15	40	10	7,93	541
218 990 48	48	15	75	72	15	40	10	9,20	599
218 990 50	50	15	78	75	15	50	10	10,1	721
218 990 55	55	15	85,5	82,5	15	50	10	12,6	831
218 990 60	60	15	93	90	15	60	12	15,4	1041
218 990 65	65	15	100,5	97,5	15	60	12	18,5	1172
218 990 70	70	15	108	105	20	60	12	21,9	1423
218 990 80	80	15	123	120	20	70	15	29,9	1878

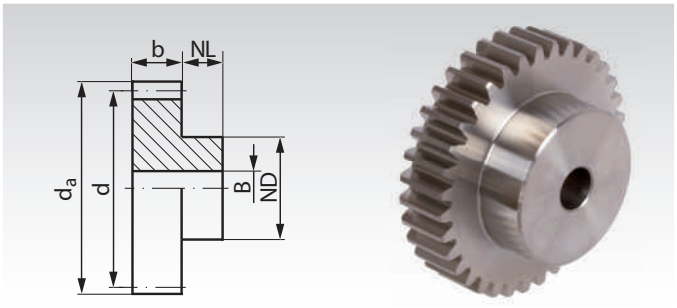
* Basis of calculations see page 197.

Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Made from Stainless Steel with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Stainless steel 1.4305.

Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 231 990 10, Spur Gear, Stainless Steel, Module 2, 10 Teeth

Module 2 Tooth Width b = 16 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
231 990 10	10	16	24	20	15	15	8	0,8	45
231 990 11	11	16	26	22	15	18	10	0,9	55
231 990 12	12	16	28	24	15	20	10	1,1	70
231 990 14	14	16	32	28	15	25	10	1,4	110
231 990 15	15	16	34	30	15	25	12	1,5	114
231 990 16	16	16	36	32	15	25	12	1,6	126
231 990 18	18	16	40	36	15	30	12	1,9	179
231 990 20	20	16	44	40	15	30	12	2,5	207
231 990 22	22	16	48	44	15	30	12	3,0	240
231 990 24	24	16	52	48	15	30	12	3,8	275
231 990 25	25	16	54	50	15	30	12	4,2	295
231 990 28	28	16	60	56	15	35	12	5,5	389
231 990 30	30	16	64	60	15	40	12	6,4	466
231 990 35	35	16	74	70	15	45	12	9,2	632
231 990 40	40	16	84	80	15	50	12	12,5	825
231 990 45	45	16	94	90	15	50	12	16,4	911
231 990 48	48	16	100	96	15	50	12	19,0	1098
231 990 50	50	16	104	100	15	50	12	20,9	1174
231 990 55	55	16	114	110	15	60	12	26,0	1485
231 990 60	60	16	124	120	15	70	12	31,9	1827
231 990 80	80	16	164	160	20	80	20	57,4	3196

Module 2.5 Tooth Width b = 20 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
232 990 12	12	20	35	30	15	20	12	2,3	110
232 990 14	14	20	40	35	15	20	12	2,9	140
232 990 15	15	20	42,5	37,5	15	25	12	3,2	190
232 990 16	16	20	45	40	15	25	12	3,4	210
232 990 18	18	20	50	45	15	30	12	4,0	290
232 990 20	20	20	55	50	15	30	12	5,2	340
232 990 24	24	20	65	60	15	40	12	7,9	540
232 990 25	25	20	67,5	62,5	15	40	12	8,7	580
232 990 28	28	20	75	70	15	40	12	11,4	700
232 990 30	30	20	80	75	15	40	12	13,4	790
232 990 32	32	20	85	80	15	50	15	15,5	950
232 990 35	35	20	92,5	87,5	15	50	15	19,1	1100
232 990 40	40	20	105	100	20	60	15	26,0	1600
232 990 45	45	20	117,5	112,5	20	60	15	34,3	1920
232 990 48	48	20	125	120	20	60	15	39,8	2140
232 990 50	50	20	130	125	20	70	15	43,8	2430
232 990 55	55	20	142,5	137,5	20	70	20	55,2	2780
232 990 60	60	20	155	150	20	70	20	72,0	3240

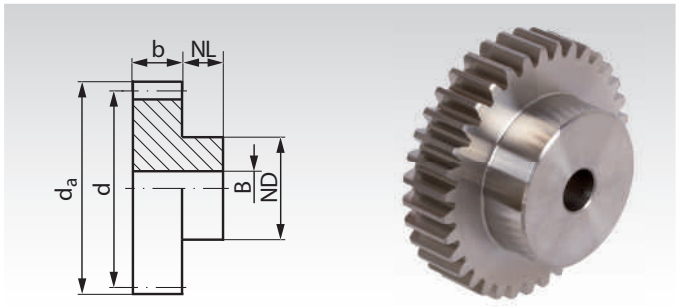
Reworking within 24h-service possible. Custom made parts on request.

* Basis of calculations see page 197.

Spur Gears Made from Stainless Steel with One-Sided Hub, Milled Teeth, Straight Tooth System

Material: Stainless steel 1.4305.

Tooth quality 8d25 DIN 3967.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 233 990 12, Spur Gear, Stainless Steel, Module 3, 12 Teeth

Module 3 Tooth Width b = 25 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
233 990 12	12	25	42	36	15	25	12	4,3	210
233 990 14	14	25	48	42	15	25	12	5,4	280
233 990 15	15	25	51	45	15	35	12	6,0	378
233 990 16	16	25	54	48	15	35	12	6,5	410
233 990 18	18	25	60	54	15	45	12	7,6	586
233 990 20	20	25	66	60	15	45	15	9,8	670
233 990 22	22	25	72	66	15	45	15	12,2	780
233 990 24	24	25	78	72	15	50	15	15,0	957
233 990 25	25	25	81	75	15	50	15	16,6	1019
233 990 26	26	25	84	78	15	50	15	18,2	1080
233 990 28	28	25	90	84	15	50	20	21,6	1190
233 990 30	30	25	96	90	15	50	20	25,4	1355
233 990 35	35	25	111	105	15	60	20	33,9	1904
233 990 36	36	25	114	108	15	60	20	36,8	2000
233 990 40	40	25	126	120	20	70	20	49,7	2670
233 990 45	45	25	141	135	20	70	20	65,5	3263
233 990 48	48	25	150	144	20	80	20	77,6	3841
233 990 50	50	25	156	150	20	80	20	88,0	4101
233 990 60	60	25	186	180	20	90	20	149,2	5830

Module 4 Tooth Width b = 30 mm

Product No.	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Nm	Weight g
234 990 12	12	30	56	48	20	35	15	9,8	480
234 990 14	14	30	64	56	20	40	15	12,4	680
234 990 15	15	30	68	60	20	40	15	13,8	760
234 990 16	16	30	72	64	20	40	20	14,7	800
234 990 18	18	30	80	72	20	50	20	17,5	1110
234 990 20	20	30	88	80	20	50	20	22,6	1330
234 990 24	24	30	104	96	20	60	20	35,0	1980
234 990 25	25	30	108	100	20	60	20	40,0	2120
234 990 28	28	30	120	112	20	60	20	49,0	2580
234 990 30	30	30	128	120	20	70	20	60,0	3080
234 990 35	35	30	148	140	20	70	25	85,0	3970
234 990 40	40	30	168	160	20	80	25	125,0	5270
234 990 45	45	30	188	180	20	80	25	176,0	6520
234 990 48	48	30	200	192	20	100	25	214,0	7780
234 990 50	50	30	208	200	20	100	25	240,0	8360
234 990 60	60	30	248	240	20	100	25	382,0	11500

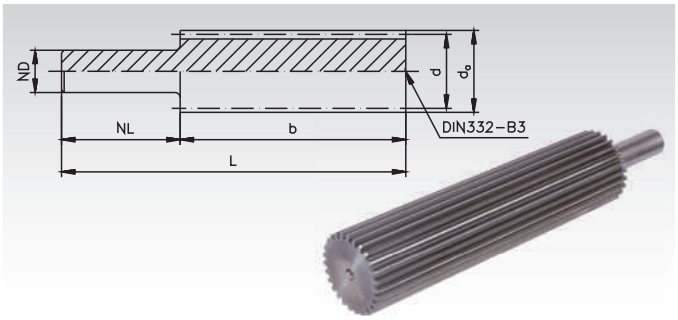
* Basis of calculations see page 197.

Gears Stainless Module 1.59 and 3.18 Page 248
Gear Racks stainless Page 261
Round Gear Racks stainless Page 263

Reworking within 24h-service possible. Custom made parts on request.

Spur Gear Shafts Made From Steel with One-Sided Hub, Milled, Straight Teeth

Material: C45.
Pressure angle 20°.



Ordering Details: e.g.: Product No. 214 511 00, spur gear, module 1, 11 teeth

Module 1.0

Product No.	Number of teeth	d mm	d_a mm	ND mm	NL mm	b mm	L mm	Weight kg
214 511 00	11	11	13	12	50	150	200	0,14
214 513 00	13	13	15	12	50	150	200	0,18
214 514 00	14	14	16	12	50	150	200	0,21
214 516 00	16	16	18	12	50	150	200	0,27
214 517 00	17	17	19	16	50	150	200	0,33
214 519 00	19	19	21	16	50	180	230	0,46
214 521 00	21	21	23	16	50	180	230	0,55
214 523 00	23	23	25	16	50	180	230	0,64
214 527 00	27	27	29	16	50	180	230	0,86
214 531 00	31	31	33	16	50	180	230	1,12
214 535 00	35	35	37	16	50	180	230	1,40
214 537 00	37	37	39	16	50	180	230	1,56
214 545 00	45	45	47	16	50	180	230	2,28
214 552 00	52	52	54	16	50	180	230	3,02
214 557 00	57	57	59	16	50	180	230	3,61

Module 1.5

Product No.	Number of teeth	d mm	d_a mm	ND mm	NL mm	b mm	L mm	Weight kg
218 513 00	13	19,5	22,5	16	50	150	200	0,41
218 514 00	14	21	24	16	50	150	200	0,46
218 516 00	16	24	27	16	50	150	200	0,58
218 517 00	17	25,5	28,5	16	50	180	230	0,77
218 519 00	19	28,5	31,5	16	50	180	230	0,94
218 521 00	21	31,5	34,5	16	50	180	230	1,14
218 527 00	27	40,5	43,5	16	50	180	230	1,84
218 532 00	32	48	51	16	50	180	230	2,57

Module 2.0

Product No.	Number of teeth	d mm	d_a mm	ND mm	NL mm	b mm	L mm	Weight kg
241 513 00	13	26	30	16	50	200	250	0,87
241 514 00	14	28	32	16	50	200	250	0,99
241 516 00	16	32	36	16	50	200	250	1,28
241 517 00	17	34	38	16	50	200	250	1,44
241 519 00	19	38	42	16	50	200	250	1,79
241 521 00	21	42	46	16	50	200	250	2,17
241 523 00	23	46	50	16	50	200	250	2,61
241 527 00	27	54	58	16	30	220	250	3,89
241 529 00	29	58	62	16	30	220	250	4,49
241 542 00	42	84	88	16	30	220	250	9,48

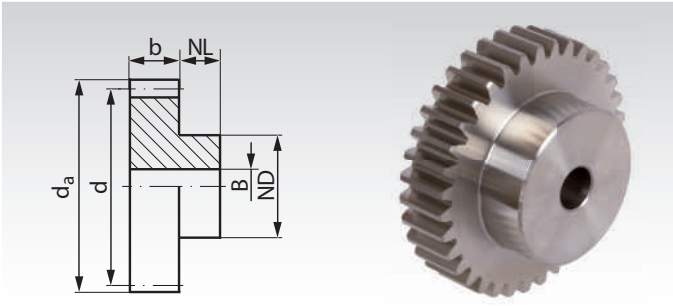
Reworking within 24h-service possible. Custom made parts on request.

Spur Gears Metric Pitch, Straight Teeth, Made from Steel and Stainless Steel

Material: Steel C45.
Stainless steel 1.4305

STAINLESS

Tooth quality 8d25 DIN 3967.
Pressure angle 20°.
Standard design with one-sided hub.
Other models and number of teeth on request.



Ordering Details: e.g.: Product No. 205 012 00, spur gear, steel C45, pitch 5 mm, 12 teeth

Pitch 5mm (Module 1.59) Tooth width b = 12 mm

Product No. Steel	Product No. Stainless Steel	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Steel Nm	per. MT* Stainless Steel Nm	Weight kg
205 012 00	**205 990 12**	12	12	22,3	19,1	13	14	6	0,8	0,4	0,03
205 015 00	**205 990 15**	15	12	27,0	23,9	13	18	6	1,1	0,5	0,06
205 018 00	**205 990 18**	18	12	31,8	28,6	13	20	8	1,4	0,7	0,07
205 020 00	**205 990 20**	20	12	35,0	31,8	13	20	8	1,9	0,9	0,10
205 024 00	**205 990 24**	24	12	41,4	38,2	13	25	8	2,9	1,3	0,14
205 025 00	**205 990 25**	25	12	43,0	39,8	13	25	8	3,1	1,4	0,14
205 030 00	**205 990 30**	30	12	50,9	47,7	13	30	10	4,8	2,2	0,20
205 036 00	**205 990 36**	36	12	60,5	57,3	13	40	10	7,3	3,4	0,32
205 040 00	**205 990 40**	40	12	66,8	63,6	13	40	10	9,4	4,3	0,36
205 045 00	**205 990 45**	45	12	74,8	71,6	13	45	10	12,4	5,7	0,45
205 050 00	**205 990 50**	50	12	82,7	79,6	13	50	12	16,7	7,7	0,56
205 060 00	**205 990 60**	60	12	98,6	95,5	13	60	12	26,4	12,1	0,82

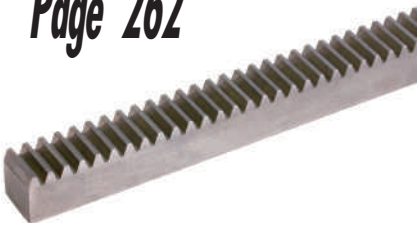
Pitch 10mm (Module 3.18) Tooth width b = 25 mm

Product No. Steel	Product No. Stainless Steel	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Steel Nm	per. MT* Stainless Steel Nm	Weight kg
210 012 00	**210 990 12**	12	25	44,6	38,2	15	25	10	9,8	4,5	0,22
210 015 00	**210 990 15**	15	25	54,1	47,7	15	30	12	13,7	6,3	0,38
210 018 00	**210 990 18**	18	25	63,7	57,3	15	40	15	17,3	8,0	0,50
210 020 00	**210 990 20**	20	25	70,0	63,7	15	40	15	22,4	10,3	0,60
210 024 00	**210 990 24**	24	25	82,8	76,4	15	50	15	34,3	15,8	0,86
210 025 00	**210 990 25**	25	25	85,9	79,6	15	50	15	37,8	17,4	0,96
210 030 00	**210 990 30**	30	25	101,9	95,5	15	60	20	58	27	1,45
210 036 00	**210 990 36**	36	25	121,0	114,6	15	70	20	97	45	2,15
210 040 00	**210 990 40**	40	25	133,7	127,3	15	80	20	131	60	2,68
210 045 00	**210 990 45**	45	25	149,6	143,2	20	80	20	179	82	3,44
210 050 00	**210 990 50**	50	25	165,5	159,2	20	80	20	236	108	4,10
210 060 00	**210 990 60**	60	25	197,3	191,0	20	90	25	399	184	5,79

* Basis of calculations see page 197.

Matching Gear Racks

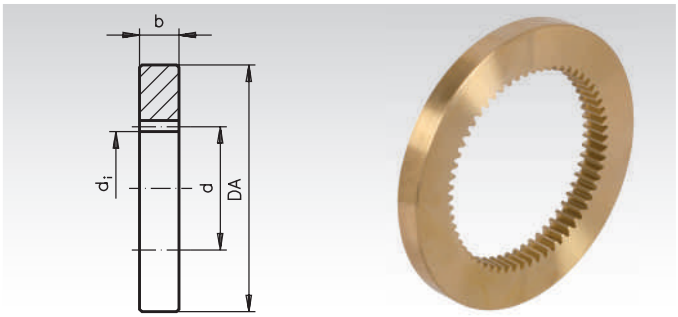
Page 262



Reworking within 24h-service possible. Custom made parts on request.

MÄDLER® GEGRÜNDET 1882

Straight-Toothed Internal Gears Made from Brass



Tooth quality: 8, Teeth generated.

Pressure angle 20°.
Outside-diameter tolerance in accordance with DIN ISO 2768 middle.

Ordering Details: e.g.: Product No. 261 440 00, Internal Gear, Brass, Module 0.5, 40 Teeth

Module 0.5 / b = 4 mm, Brass Ms58 (2.0401)

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
261 440 00	40	4	20	19	36	23
261 445 00	45	4	22,5	21,5	40	28
261 448 00	48	4	24	23	40	27
261 450 00	50	4	25	24	45	37
261 460 00	60	4	30	29	50	42
261 470 00	70	4	35	34	55	45
261 490 00	90	4	45	44	70	74
261 410 00	100	4	50	49	70	63

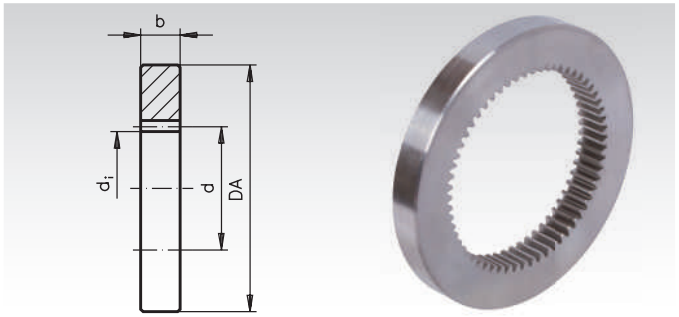
Module 0.7 / b = 6 mm, Brass Ms58 (2.0401)

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
262 440 00	40	6	28	26,6	48	59
262 445 00	45	6	31,5	30,1	50	58
262 448 00	48	6	33,6	32,2	55	75
262 450 00	50	6	35	33,6	55	74
262 460 00	60	6	42	40,6	65	96
262 470 00	70	6	49	47,6	70	97
262 480 00	80	6	56	54,6	80	126
262 490 00	90	6	63	61,6	85	128
262 410 00	100	6	70	68,6	95	171

Module 1.0 / b = 8 mm, Brass Ms58 (2.0401)

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
263 430 00	30	8	30	28	55	108
263 436 00	36	8	36	34	60	116
263 440 00	40	8	40	38	65	137
263 445 00	45	8	45	43	70	151
263 448 00	48	8	48	46	75	172
263 450 00	50	8	50	48	75	159
263 455 00	55	8	55	53	80	174
263 460 00	60	8	60	58	85	182
263 465 00	65	8	65	63	90	204
263 470 00	70	8	70	68	95	218
263 480 00	80	8	80	78	105	246
263 490 00	90	8	90	88	115	265
263 410 00	100	8	100	98	125	293
263 412 00	120	8	120	118	145	332

Straight-Toothed Internal Gears Made from Steel



Tooth quality: 8, Teeth generated.

Pressure angle 20°.
Outside-diameter tolerance in accordance with DIN ISO 2768 middle.

Ordering Details: e.g.: Product No. 224 425 00, Internal Gear, Steel, Module 1, Width 10, 25 Teeth

Module 1.0 / b = 10 mm, Steel C45

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
224 425 00	25	10	25	23	50	113
224 430 00	30	10	30	28	55	128
224 436 00	36	10	36	34	60	141
224 440 00	40	10	40	38	65	156
224 445 00	45	10	45	43	70	180
224 448 00	48	10	48	46	75	198
224 450 00	50	10	50	48	75	185
224 460 00	60	10	60	58	85	213
224 470 00	70	10	70	68	95	249
224 472 00	72	10	72	70	100	294
224 480 00	80	10	80	78	105	275
224 490 00	90	10	90	88	115	306
224 410 00	100	10	100	98	125	342
224 412 00	120	10	120	118	150	488

Module 1.5 / b = 15 mm, Steel C45

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
228 425 00	25	15	37,5	34,5	70	320
228 430 00	30	15	45	42	75	328
228 436 00	36	15	54	51	85	392
228 440 00	40	15	60	57	90	413
228 445 00	45	15	67,5	64,5	100	497
228 448 00	48	15	72	69	100	465
228 450 00	50	15	75	72	105	489
228 460 00	60	15	90	87	120	558
228 470 00	70	15	105	102	135	653
228 472 00	72	15	108	105	140	716
228 480 00	80	15	120	117	150	738
228 490 00	90	15	135	132	170	975
228 410 00	100	15	150	147	190	1241
228 412 00	120	15	180	177	220	1441

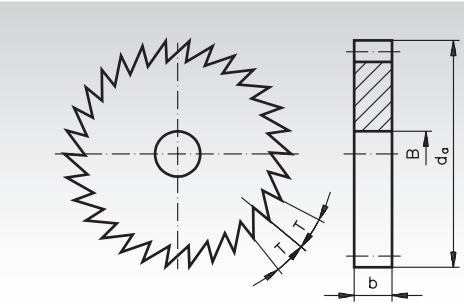
Module 2.0 / b = 16 mm, Steel C45

Product No.	Number of teeth	b mm	d mm	d_i mm	DA mm	Weight g
241 430 00	30	16	60	56	95	530
241 436 00	36	16	72	68	107	599
241 440 00	40	16	80	76	115	662
241 445 00	45	16	90	86	125	729
241 448 00	48	16	96	92	131	761
241 450 00	50	16	100	96	135	783
241 455 00	55	16	110	106	145	865
241 460 00	60	16	120	116	155	930
241 465 00	65	16	130	126	165	999
241 470 00	70	16	140	136	175	1070
241 472 00	72	16	144	140	185	1313
241 480 00	80	16	160	156	195	1202
241 490 00	90	16	180	176	220	1538
241 410 00	100	16	200	196	240	1711
241 412 00	120	16	240	236	280	2014

Ratchet Wheels Made from Steel

Material: C45Pb up to 80 mm diameter, above C45. Unhardened.

Without Hub. Tip angle 60°.



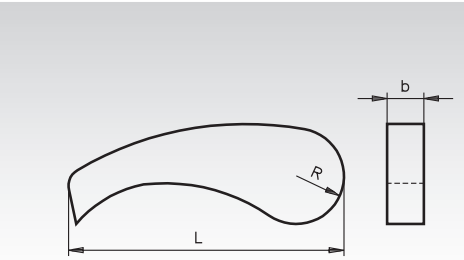
Ordering Details:
e.g.: Product No. 223 720 00, Ratchet Wheel, pitch 3.14, 20 Teeth

Product No.	Number of teeth	Tooth Width b mm	Pitch mm	Tip Ø d_a mm	B mm	Weight g
223 720 00	20	4	3,14	20	6	7
223 730 00	30	9	3,14	30	6	45
223 740 00	40	4	3,14	40	10	33
223 760 00	60	4	3,14	60	15	78
223 780 00	80	4	3,14	80	15	145
227 720 00	20	6	4,71	30	8	55
227 740 00	40	6	4,71	60	12	116
227 760 00	60	6	4,71	90	15	274
227 780 00	80	6	4,71	120	20	494
227 710 00	100	6	4,71	150	20	781
227 712 00	120	9	4,71	180	20	1723

Ratchet Braces Made from Steel

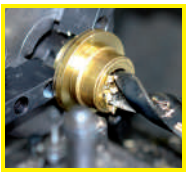
Material: Steel St37, unhardened, without bore.

Tip angle 60°.



Ordering Details:
e.g.: Product No. 223 701 00, Ratchet Brace, Steel

Product No.	Length L approx. in mm	Radius R approx. in mm	Width b approx. in mm	Weight g
223 701 00	49,5	9	4	20
227 701 00	49,5	9	6	28
227 702 00	75	13	9	127



Reworking within 24h-service possible. Custom made parts on request.

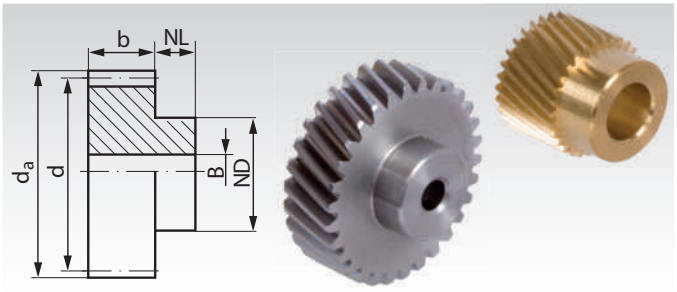
Spur Gears Made from Brass and Steel with One-Sided Hub, Helical Tooth System

Material: Module 0,3/0,5: Brass Ms58 (2.0401).
Module 1,0: Steel 11SMnPb30.

20° helical tooth system. Pressure angle 20°. Milled teeth.

These gears are designed to be used in combination with the helical-toothed gear racks page 257. If this gear is used to drive a mating gear instead, this mating gear must have the same lead angle and the opposite tooth direction (left hand).

Ordering Details: e.g.:
Product No. 269 012 00, Spur Gear, Helical Tooth System, Module 0.3, 12 Teeth Right Hand



Photos: right hand

Module 0.3 from Ms58 (2.0401) Tooth Width b = 5 mm

Product No. Right Hand	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
269 012 00	12	5	4,4	3,83	4	3	2,0	0,7	0,5
269 015 00	15	5	5,4	4,79	4	4	2,5	1,0	0,7
269 018 00	18	5	6,4	5,75	4	5	3	1,6	1,2
269 020 00	20	5	7,0	6,39	4	6	3,5	2,0	1,4
269 024 00	24	5	8,3	7,66	4	7	4,5	3,0	1,9
269 030 00	30	5	10,2	9,58	5	9	5	5,0	4,0

Module 0.5 from Ms58 (2.0401) Tooth Width b = 10 mm

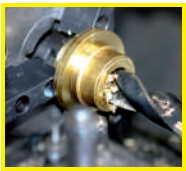
Product No. Right Hand	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
269 218 00	18	10	10,6	9,58	6	8	4	9,6	6,7
269 222 00	22	10	12,7	11,71	6	10	6	15,0	9,6
269 225 00	25	10	14,3	13,30	6	12	6	20,5	17,6
269 230 00	30	10	17,0	15,96	6	14	8	31,0	24,3
269 234 00	34	10	19,1	18,09	6	16	8	42,0	27,0
269 240 00	40	10	22,3	21,28	8	18	8	60,0	38,0

Module 1.0 from Steel 11SMnPb30 Tooth Width b = 10 mm

Product No. Right Hand	Product No. Left Hand	Number of teeth	b mm	d_a mm	d mm	NL mm	ND mm	B^{H7} mm	perm. MT* Ncm	Weight g
214 210 00	**214 310 00**	10	10	12,6	10,64	6	8	4	11	7,3
214 215 00	**214 315 00**	15	10	18,0	15,96	6	12	5	26	17,9
214 218 00	**214 318 00**	18	10	21,2	19,16	6	12	5	39	24,4
214 220 00	**214 320 00**	20	10	23,3	21,28	6	15	5	50	32,5
214 224 00	**214 324 00**	24	10	27,5	25,54	6	15	5	78	44,4
214 225 00	**214 325 00**	25	10	28,6	26,60	6	15	5	85	47,8
214 230 00	**214 330 00**	30	10	33,9	31,93	6	15	5	131	66,9
214 236 00	**214 336 00**	36	10	40,3	38,31	6	18	6	201	96,9
214 240 00	**214 340 00**	40	10	44,6	42,57	6	18	6	258	118,3
214 250 00	**214 350 00**	50	10	55,2	53,21	8	18	6	436	184,4

*Basis of calculations see page 197.

Helical Tooth Gear racks Page 257



Reworking within 24h-service possible. Custom made parts on request.

Precision Spur Gears, Helical Tooth System, Case Hardened, with Ground Teeth Flanks

Material: Steel 16MnCr5.

Tooth quality 7e25.
Helical tooth system, left hand 19° 31′ 42″.
Case hardened, approx. 60 HRC.
Keyways in accordance with DIN 6885/1, tolerance P9.
Teeth, bores and faces ground. Matching helical-toothed gear racks page 264.

Ordering Details: e.g.: Product No. 251 020 20, Spur gear, Steel 16 MnCr5, Module 2.0, 20 Teeth, ground

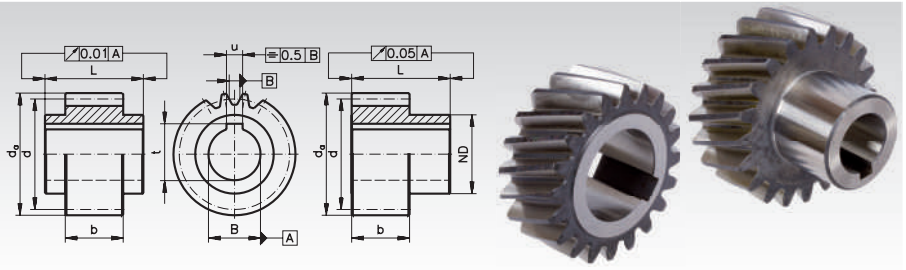


Figure 1 | Figure 1+2 Middle of tooth gap | Figure 2 | Figure 1 | Figure 2

Module 2.0 (Pitch 6.667mm), Tooth Width b = 28 mm

Product No.	Number of teeth	b mm	Figure	d_a mm	d mm	d x π mm	B^{H6} mm	ND mm	L mm	u mm	t mm	perm. MT* Nm	Weight kg
251 020 20	20	28	1	46,4	42,44	133,33	20	30	30	6	22,8	115	0,3
251 020 22	20	28	1	46,4	42,44	133,33	22	30	30	6	24,8	115	0,3
251 021 16	21	28	1	48,6	44,56	140,00	16	25	30	5	18,3	130	0,3
251 021 22	21	28	2	48,6	44,56	140,00	22	36	56	6	24,8	130	0,2
251 025 20	25	28	1	57,1	53,05	166,67	20	30	30	6	22,8	195	0,4
251 025 25	25	28	1	57,1	53,05	166,67	25	36	30	8	28,3	195	0,4
251 028 35	28	28	1	63,4	59,42	186,67	35	48	30	10	38,3	220	0,4
251 030 16	30	28	1	67,7	63,66	200,00	16	25	30	5	18,3	235	0,7
251 030 20	30	28	1	67,7	63,66	200,00	20	30	30	6	22,8	235	0,6
251 030 22	30	28	2	67,7	63,66	200,00	22	36	56	6	24,8	235	0,6
251 030 25	30	28	1	67,7	63,66	200,00	25	36	30	8	28,3	235	0,8
251 030 30	30	28	2	67,7	63,66	200,00	30	50	60	8	33,3	235	0,8
251 030 32	30	28	2	67,7	63,66	200,00	32	55	65	10	35,3	235	0,8
251 032 20	32	28	1	71,9	67,91	213,33	20	30	30	6	22,8	275	0,8
251 032 25	32	28	1	71,9	67,91	213,33	25	36	30	8	28,3	275	0,7
251 032 35	32	28	1	71,9	67,91	213,33	35	48	30	10	38,3	275	0,6
251 036 35	36	28	1	80,4	76,39	240,00	35	48	30	10	38,3	290	0,8
251 039 32	39	28	2	86,8	82,76	260,00	32	55	65	10	35,3	310	1,3
251 040 35	40	28	1	88,9	84,88	266,67	35	48	30	10	38,3	330	1,1

Module 3.0 (Pitch 10.00mm), Tooth Width b = 28 mm

Product No.	Number of teeth	b mm	Figure	d_a mm	d mm	d x π mm	B^{H6} mm	ND mm	L mm	u mm	t mm	perm. MT* Nm	Weight kg
253 020 22	20	28	2	69,7	63,66	200,00	22	36	56	6	24,8	275	0,6
253 020 25	20	28	2	69,7	63,66	200,00	25	44	60	8	28,3	275	0,7
253 020 30	20	28	1	69,7	63,66	200,00	30	45	30	8	33,3	275	0,8
253 020 32	20	28	2	69,7	63,66	200,00	32	55	65	10	35,3	275	0,8
253 020 35	20	28	1	69,7	63,66	200,00	35	48	30	10	38,3	275	0,7
253 022 25	22	28	1	76,0	70,03	220,00	25	36	30	8	28,3	345	0,8
253 022 30	22	28	1	76,0	70,03	220,00	30	45	30	8	33,3	345	0,7
253 022 35	22	28	1	76,0	70,03	220,00	35	48	30	10	38,3	345	0,7
253 025 22	25	28	2	85,6	79,58	250,00	22	36	56	6	24,8	440	1,0
253 025 25	25	28	1	85,6	79,58	250,00	25	36	30	8	28,3	440	1,0
253 025 30	25	28	1	85,6	79,58	250,00	30	45	30	8	33,3	440	1,0
253 025 32	25	28	2	85,6	79,58	250,00	32	55	65	10	35,3	440	1,2
253 025 35	25	28	1	85,6	79,58	250,00	35	48	30	10	38,3	440	0,9
253 025 40	25	28	1	85,6	79,58	250,00	40	70	50	12	43,3	440	1,1

Note

These gears are designed to be used in combination with the helical-toothed gear racks page 264. If this gear is used to drive a mating gear instead, this mating gear must have the same lead angle and the opposite tooth direction (right hand).

Spur Gears Metric Pitch, Straight Teeth Page 248

Helical Tooth Gear racks Page 264

Precision Spur Gears, Helical Tooth System, Case Hardened with Ground Teeth Flanks

Material: Steel 16MnCr5.

Tooth quality 7e25.
Helical tooth system, left hand 19° 31′ 42″.
Case hardened, approx. 60 HRC.
Keyways in accordance with DIN 6885/1, tolerance P9.
Teeth, bores and faces ground. Matching helical-toothed gear racks page 264.

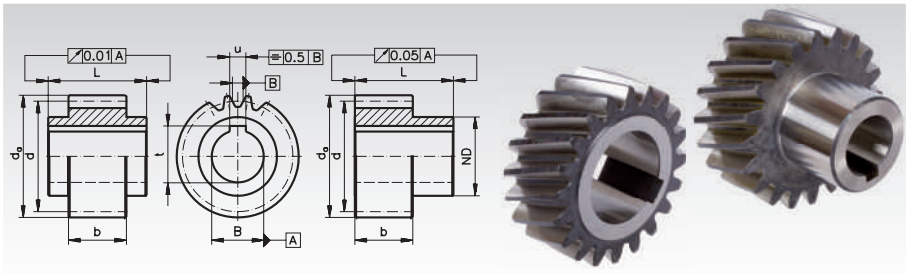


Figure 1 | Figure 1+2 Middle of tooth gap | Figure 2 | Figure 1 | Figure 2

Ordering Details: e.g.: Product No. 254 015 35, Spur gear, Steel 16 MnCr5, Module 4.0, 15 Teeth, Ground

Module 4.0 (Pitch 13.333mm), Tooth Width b = 40 mm

Product No.	Number of teeth	b mm	Figure	d_a mm	d mm	d x π mm	B^{H6} mm	ND mm	L mm	u mm	t mm	perm. MT* Nm	Weight kg
254 015 35	15	40	1	71,7	63,66	200,00	35	52	50	10	38,3	670	1,4
254 018 32	18	40	2	84,4	76,39	240,00	32	55	75	10	35,3	900	1,5
254 020 35	20	40	1	92,9	84,88	266,67	35	52	50	10	38,3	975	1,9
254 020 45	20	40	1	92,9	84,88	266,67	45	65	50	14	48,8	975	1,6
254 021 32	21	40	2	97,1	89,13	280,00	32	55	75	10	35,3	1050	2,0
254 021 35	21	40	2	97,1	89,13	280,00	35	55	75	10	38,3	1050	1,9
254 021 40	21	40	2	97,1	89,13	280,00	40	62	75	12	43,3	1050	1,9
254 021 45	21	40	2	97,1	89,13	280,00	45	68	75	14	48,8	1050	1,7
254 022 35	22	40	1	101,4	93,37	293,33	35	52	50	10	38,3	1100	2,3
254 022 45	22	40	1	101,4	93,37	293,33	45	65	50	14	48,8	1100	2,0
254 024 32	24	40	2	109,9	101,86	320,00	32	55	75	10	35,3	1150	2,6
254 024 35	24	40	2	109,9	101,86	320,00	35	55	75	10	38,3	1150	2,5
254 024 40	24	40	2	109,9	101,86	320,00	40	62	75	12	43,3	1150	2,5
254 024 45	24	40	2	109,9	101,86	320,00	45	68	75	14	48,8	1150	2,3
254 024 55	24	40	2	109,9	101,86	320,00	55	80	80	16	59,3	1150	2,4
254 025 35	25	40	1	114,1	106,10	333,33	35	52	50	10	38,3	1200	3,1
254 025 45	25	40	1	114,1	106,10	333,33	45	65	50	14	48,8	1200	2,8

Module 5.0 (Pitch 16.666mm), Tooth Width b = 50 mm

Product No.	Number of teeth	b mm	Figure	d_a mm	d mm	d x π mm	B^{H6} mm	ND mm	L mm	u mm	t mm	perm. MT* Nm	Weight kg
255 018 45	18	50	2	105,5	95,49	300,00	45	68	85	14	48,8	1575	2,7
255 024 45	24	50	2	137,3	127,32	400,00	45	68	85	14	48,8	2085	4,9
255 024 55	24	50	2	137,3	127,32	400,00	55	80	90	16	59,3	2085	4,9
255 024 75	24	50	2	137,3	127,32	400,00	75	110	110	20	79,9	2085	5,6

Note

These gears are designed to be used in combination with the helical-toothed gear racks page 264. If this gear is used to drive a mating gear instead, this mating gear must have the same lead angle and the opposite tooth direction (right hand).

Helical Tooth Gear racks Page 264

Rolling bearings at MÄDLER®:

Ball bearings, open

Ball bearings, 2Z

Ball bearings, 2RS

The premium brand
- for the sophisiticated application

The reliable brand
- the inexpensive option

Angular contact ball bearings

Self aligning ball bearings

Cylindrical roller bearings

Spherical roller bearings

Tapered roller bearings

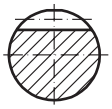
The rolling bearings are to find:

- in this catalog page 416
- on the internet at www.maedler.de

Square gear racks with straight teeth

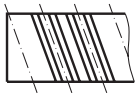
Material/Version	Module	Page
Acetal resin, die cast	0,5-3,0	256
POM, milled	0,5-3,0	256
Brass, milled	0,3-1,0	257
Steel, milled quality 8	0,5-8,0	258
Steel, milled quality 9	1,0-6,0	259
Steel, teeth hardened	2,0-5,0	259
Steel, hardened and ground	1,0-3,0	260
Stainless steel, milled	1,0-4,0	261
Steel and stainless steel, metric pitch	1,59/3,18 (5mm/10mm)	262

Round gear racks with straight teeth



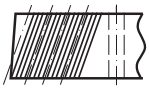
Material/Version	Module	Page
Steel, milled	1,0-6,0	263
High strength steel, milled	1,0-6,0	263
Stainless steel, milled	1,0-4,0	263
Steel and stainless steel, metric pitch	1,59/3,18 (5mm/10mm)	262

Helical tooth gear racks, square, left hand



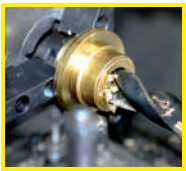
Material/Version	Module	Page
Brass, milled	0,3-0,5	257
Steel, milled	1,0	257

Helical tooth gear racks, square, right hand



Material/Version	Module	Page
Steel, milled, tempered	2,0-5,0	264
Steel, hardened and ground	2,0-5,0	265

Spur gears
Page 194

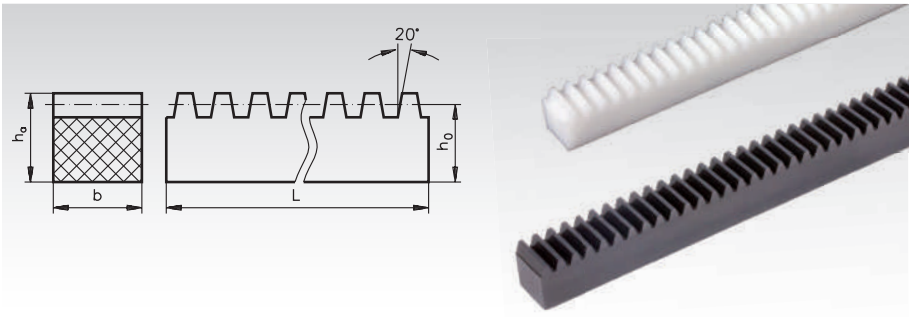


Reworking within 24h-service possible. Custom made parts on request.

Gear Racks Made from Plastic, Straight Tooth System

Because of the material used, plastic gear racks are not straightened.

Material reference values page 821.



Ordering Details: e.g.: Product No. 281 601 00, Gear Rack Polyketone, Module 0.5, 4x4.5x250 mm

Gear Racks Made from Acetal Resin (white) / Polyketone Resin (ivory), Die-Cast Version

Material Acetal: Standard quality with high hardness.

Material Polyketone: Lower friction leads to much larger lifespan, even without lubrication. Much higher safety against tooth braking, specially at longterm usage.

Temperature Range: -40°C to +140°C due to the load.

Pressure angle 20°.

	Product No. Acetal	Product No. Polyketone	b mm	h_a mm	h_0 mm	Nom. Length L* mm	Weight Azet. g	Weight PK g
Module 0.5	281 601 00	281 601 01	4	4,5	4	250	5,2	4,6
	281 602 00	281 602 01	4	6	5,5	250	7,5	6,8
Module 0.7	282 601 00	282 601 01	6	6,7	6	250	12,0	10,6
Module 1.0	283 601 00	283 601 01	9	9	8	250	24,8	21,8
Module 1.25	284 601 00	284 601 01	10	11	9,75	250	35,0	30,8
Module 1.5	285 601 00	285 601 01	12	12	10,5	250	42,3	37,2
Module 2.0	286 601 00	286 601 01	15,4	11	9	250	44,8	39,3
Module 2.5	287 601 00	287 601 01	17	13	10,5	250	58,2	51,1
Module 3.0	288 601 00	288 601 01	19,4	15	12	250	75,8	66,6

Gear Racks Made from POM, White, Milled Teeth, Slim Version

Material: POM, white (nature)

Pressure angle 20°.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances. Dimensions h_a and h_0 up to Module 2: -0.2 mm from Module 2.5: -0.3 mm.

From Module 2, except for nominal length 500 mm, cut for continuous linking.

** Material PET.

	Product No.	b mm	h_a mm	h_0 mm	Nominal Length L* mm	Weight g
Module 0.5**	291 601 00**	4	6	5,5	250	8
Module 0.7	292 601 00	5	7	6,3	250	11
Module 1.0	293 601 00	10	10	9,0	250	32
	293 603 00	10	10	9,0	500	63
Module 1.25	294 601 00	10	10	8,75	250	31
	294 603 00	10	10	8,75	500	61
Module 1.5	295 601 00	15	15	13,5	250	72
	295 603 00	15	15	13,5	500	140
	295 605 00	15	15	13,5	1000	285
Module 2.0	296 603 00	16	16	14,0	500	157
	296 605 00	16	16	14,0	1000	312
	296 607 00	16	16	14,0	1500	466
Module 2.5	297 603 00	20	20	17,5	500	243
	297 605 00	20	20	17,5	1000	489
	297 607 00	20	20	17,5	1500	735
Module 3.0	298 603 00	25	25	22,0	500	385
	298 605 00	25	25	22,0	1000	772
	298 607 00	25	25	22,0	1500	1146

Gear Racks Made from POM, White or Black, Milled Teeth

Material: POM, on choice white (nature) or black.

Pressure angle 20°.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances. Dimensions h_a and h_0 up to Module 2: -0.2 mm from Module 2.5 to 3: -0.3 mm.

Module 2, nominal length 1000 mm, and from module 3, the racks are cut for continuous linking.

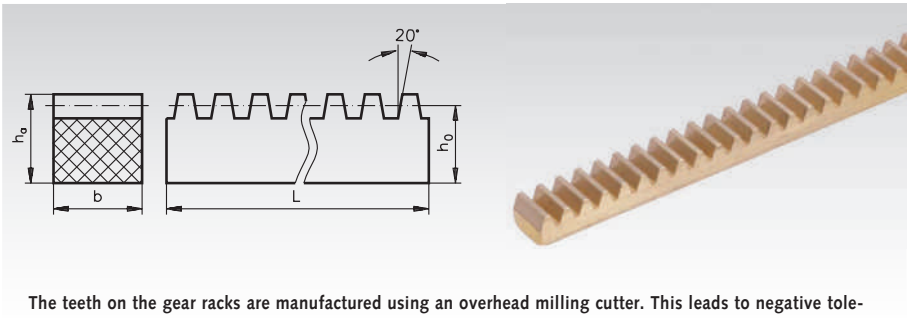
	Product No. White	Product No. Black	b mm	h_a mm	h_0 mm	Nominal Length L* mm	Weight g
Module 1.0	293 116 01	293 117 01	15	15	14,0	250	75
	293 116 03	293 117 03	15	15	14,0	500	149
	293 116 05	293 117 05	15	15	14,0	1000	300
Module 1.5	295 116 01	295 117 01	17	17	15,5	250	92
	295 116 03	295 117 03	17	17	15,5	500	186
	295 116 05	295 117 05	17	17	15,5	1000	400
Module 2.0	296 116 01	296 117 01	20	20	18,0	250	127
	296 116 03	296 117 03	20	20	18,0	500	254
	296 116 05	296 117 05	20	20	18,0	1000	500
Module 2.5	297 116 01	297 117 01	25	25	22,5	250	198
	297 116 03	297 117 03	25	25	22,5	500	397
	297 116 05	297 117 05	25	25	22,5	1000	800
Module 3.0	298 116 01	298 117 01	30	30	27,0	250	400
	298 116 03	298 117 03	30	30	27,0	500	800
	298 116 05	298 117 05	30	30	27,0	1000	1600

* The real length is roughly one multiple of the pitch.

Gear Racks Made from Brass (Ms58), Straight Tooth System, Precisely Straightened

Pressure angle 20°.
The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances

Dimension h_a and h_0 = -0.2 mm



The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances. Dimension ha and h0 up to Module 2 -0.2 mm.

Ordering Details: e.g.: Product No. 260 601 00, Straight-Toothed Gear Rack, Module 0.3, 250 mm

Teeth cut with reference profile (RP) II in accordance with DIN 867/DIN 3972.

	Product No.	b mm	h_a mm	h_0 mm	Nominal Length L* mm	Weight g
Module 0.3	**260 601 00**	2	4	3,7	250	14
Module 0.5	**261 601 00**	2	4	3,5	250	14
Module 0.7	**262 601 00**	4	6	5,3	250	42
Module 1.0	**263 600 00**	7	5	4,0	250	56
	263 601 00	10	8	7,0	230**	131
	263 603 00	10	10	9,0	250	184
	263 605 00	10	10	9,0	500	371

* The real length is roughly one multiple of the pitch.
** Special length.

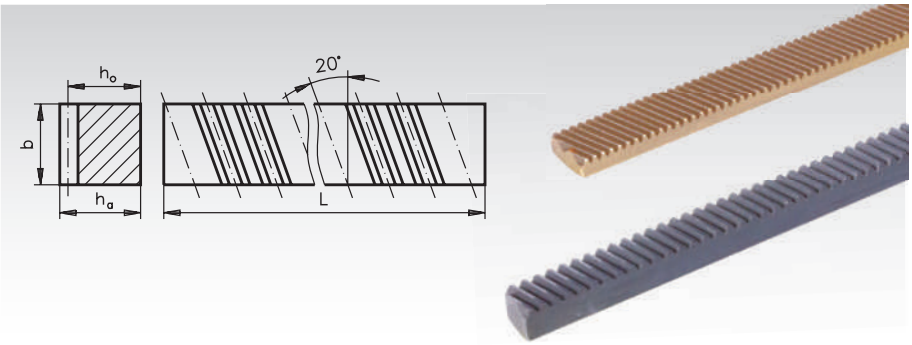
Gear Racks Made from Brass (Ms58) and Steel (C45KG), Helical Toothed, Precisely Straightened

20° helical tooth system, left-toothed.
Pressure angle 20°.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances.

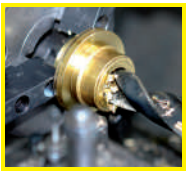
Dimensions h and h_0 = -0.2 mm.
The standardised left-toothed gear racks always need to be matched with a right-toothed pinion.

Ordering Details: e.g.: Product No. 269 601 00, Helical Toothed Gear Rack, Module 0.3, 250 mm



	Product No.	Material	b mm	h_a mm	h_0 mm	L mm	Weight g
Module 0.3	**269 601 00**	Ms58	5	3	2,7	250	29
Module 0.5	**269 605 00**	Ms58	10	4	3,5	250	70
	269 606 00	Ms58	10	4	3,5	500	139
Module 1.0	**224 655 00**	C45KG	10	10	9,0	500	344
	224 658 00	C45KG	10	10	9,0	1000	685

Matching helical-toothed spur gears see page 251.



Reworking within 24h-service possible. Custom made parts on request.

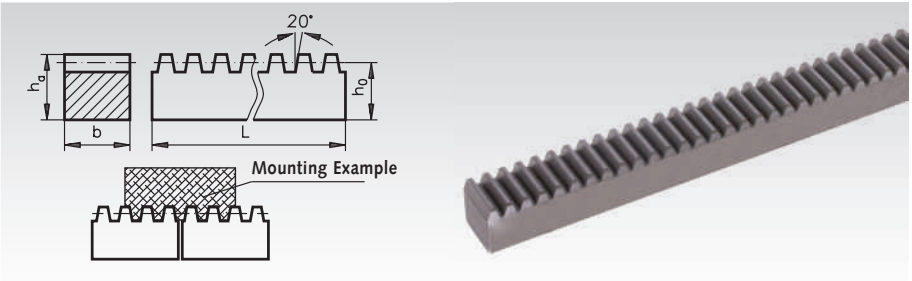
Gear Racks Made from Specially Treated Bright Steel C45KG, Milled Teeth, Straight Tooth System

Tooth quality 8d25
modelled on DIN 3962, 3967, 3968.
Pressure angle 20°. Precisely Straightened.
Cross-section tolerance h11 = -1/10 to 2/10 depending on size.

All gear racks from **Module 2**, except for **nominal length 500 mm**, are cut of for **continuous linking**.
The teeth of the gear racks are not cut to join edge-to-edge, which leads to minor gaps when mounting. These gaps do, however, not cause any problems for the gears rolling across.

Total pitch error page 261.

Ordering Details: e.g.: Product No. 224 603 00, Gear Rack, C45KG, Module 1.0, 250 mm.



The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances. Dimensions ha and h0 up to Module 2 -0.2 mm, Module 2.5-4 -0.3 mm, Module 5-8 -0.4 mm

Teeth cut with reference profile (RP) II in accordance with DIN 867/DIN 3972.
Rounded edge at square bar of 15 up to 60 mm.
Chamfered edge at square bar of 80 mm

* Key Steel.
** St37K.

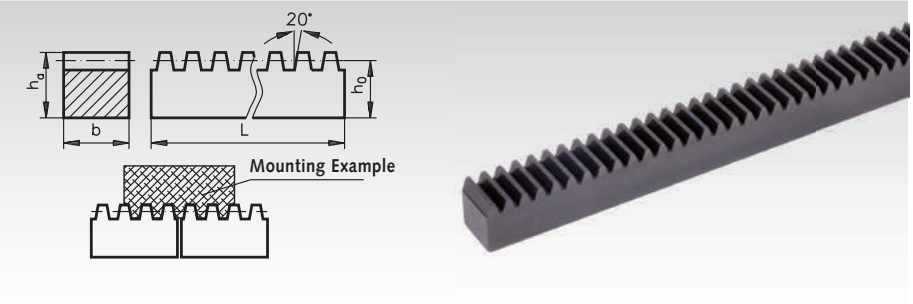
	Product No.	Tooth Width b mm	Overall Height h_a mm	h_0 mm	Nominal Length L mm	Effective Length mm	Weight kg
Module 0.5*	221 601 00	4	6	5,5	250	-	0,04
Module 0.7**	222 601 00	5	7	6,3	250	-	0,06
Module 1.0**	223 601 00	7	5	4,0	250	-	0,05
Module 1.0	224 603 00	10	10	9,0	250	-	0,17
	224 605 00	10	10	9,0	500	-	0,34
	224 608 00	10	10	9,0	1000	-	0,68
	224 610 00	15	15	14,0	500	-	0,81
	224 612 00	15	15	14,0	1000	-	1,61
Module 1.25	226 601 00	10	10	8,75	250	-	0,16
	226 603 00	10	10	8,75	500	-	0,33
	226 605 00	10	10	8,75	1000	-	0,66
Module 1.5	227 601 00	10	10	8,5	500	-	0,32
	227 605 00	10	10	8,5	1000	-	0,63
	228 601 00	15	10	8,5	1000	-	0,95
	228 603 00	15	15	13,5	500	-	0,77
	228 605 00	15	15	13,5	1000	-	1,54
	228 607 00	15	15	13,5	1500	-	2,33
Module 2.0	241 601 00	16	20	18,0	1000	1005,0 – 1	2,22
	241 603 00	20	20	18,0	500		1,38
	241 605 00	20	20	18,0	1000	1005,0 – 1	2,77
	241 607 00	20	20	18,0	1500	1501,0 – 1	4,12
	241 609 00	20	20	18,0	2000	2004,0 – 1,5	5,50
Module 2.5	242 601 00	20	25	22,5	1000	1005,0 – 1	3,47
	242 603 00	25	25	22,5	500		2,17
	242 605 00	25	25	22,5	1000	1005,0 – 1	4,31
	242 607 00	25	25	22,5	1500	1507,5 – 1	6,46
	242 609 00	25	25	22,5	2000	2002,5 – 1,5	8,61
Module 3.0	243 601 00	25	30	27,0	1000	1008,0 – 1,5	5,24
	243 603 00	30	30	27,0	500		3,17
	243 605 00	30	30	27,0	1000	1008,0 – 1,5	6,27
	243 607 00	30	30	27,0	1500	1507,5 – 1,5	9,33
	243 609 00	30	30	27,0	2000	2007,0 – 1,5	12,43
Module 4.0	244 601 00	30	40	36,0	1000	1005,0 – 1,5	8,43
	244 603 00	40	40	36,0	500		5,55
	244 605 00	40	40	36,0	1000	1005,0 – 1,5	11,14
	244 607 00	40	40	36,0	1500	1507,5 – 1	16,50
	244 609 00	40	40	36,0	2000	2010,0 – 1,5	22,50
Module 5.0	245 601 00	40	50	45,0	1000	1005,0 – 1,5	14,00
	245 603 00	50	50	45,0	500		8,50
	245 605 00	50	50	45,0	1000	1005,0 – 1,5	17,50
	245 607 00	50	50	45,0	1500	1507,5 – 1,5	26,00
	245 609 00	50	50	45,0	2000	2010,0 – 1,5	35,00
Module 6.0	246 601 00	60	60	54,0	500		12,50
	246 603 00	60	60	54,0	1000	998,5 – 1,5	25,00
	246 605 00	60	60	54,0	1500	1507,5 – 1,5	37,50
	246 607 00	60	60	54,0	2000	1997,5 – 1,5	50,00
Module 8.0	248 601 00	80	80	72,0	1000	1005,0 – 1,5	44,00
	248 603 00	80	80	72,0	1500	1507,0 – 1,5	66,00

Gear Racks Made from Steel C45, Milled Teeth, Straight Tooth System, Economy-Line

Material: Steel C45, burnished.

Tooth quality 9.
Pressure angle 20°.

From Module 2.5 cut for continuous linking.

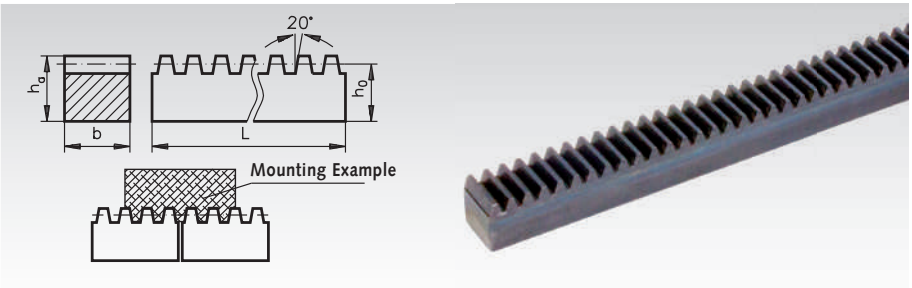


Ordering Details: e.g.: Product No. 224 116 08, Gear Rack, C45 , Module 1, 1000 mm

	Product No.	Tooth Width b mm	Overall Height h_a mm	h_0 mm	Nominal Length L mm	Effective Length mm	Weight kg
Module 1.0	**224 116 08**	10	10	9,0	1000	1002 -1	0,68
	224 116 09	10	10	9,0	2000	2001 -1,5	1,36
	224 116 12	15	15	14,0	1000	1002 -1	1,61
	224 116 19	15	15	14,0	2000	2001 -1,5	3,32
Module 1.5	**228 116 05**	15	15	13,5	1000	1003,5 -1	1,54
	228 116 09	15	15	13,5	2000	2002,5 -1,5	3,09
	228 116 12	17	17	15,5	1000	1003,5 -1	2,05
	228 116 19	17	17	15,5	2000	2002,5 -1,5	4,10
Module 2.0	**241 116 05**	20	20	18,0	1000	1005 -1	2,77
	241 116 09	20	20	18,0	2000	2004 -1,5	5,54
Module 2.5	**242 116 05**	25	25	22,5	1000	1005 -1	4,35
	242 116 09	25	25	22,5	2000	2002,5 -1,5	8,70
Module 3.0	**243 116 05**	30	30	27,0	1000	1008 -1,5	6,27
	243 116 09	30	30	27,0	2000	2007 -1,5	12,54
Module 4.0	**244 116 05**	40	40	36,0	1000	1005 -1,5	11,10
	244 116 09	40	40	36,0	2000	2010 -1,5	22,20
Module 5.0	**245 116 05**	50	50	45,0	1000	1005 -1,5	17,50
	245 116 09	50	50	45,0	2000	2010 -1,5	35,00
Module 6.0	**246 116 05**	60	60	54,0	1000	998 -1,5	24,60
	246 116 09	60	60	54,0	2000	1997 -1,5	49,20

Gear Racks Made from Bright Steel C45KG, Teeth Milled and Induction Hardened

Milled, quality 8.
Tooth area induction hardened, 54 + 4 HRC.
The hardening sets the tooth quality to 10-11.
Pressure angle 20°.
The gear racks are **cut for continuous linking**. The teeth of the gear racks are not cut to join edge-to-edge, which leads to minor gaps when mounting. These gaps do, however, not cause any problems for the gears rolling across.



The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative toleances. Dimensions ha and h0 up to Module 2 -0.2 mm, Module 3-4 -0.3 mm, Module 5 -0.4 mm

Ordering Details: e.g.: Product No. 241 886 05, Gear Rack, Module 2.0, 1000mm, hardened

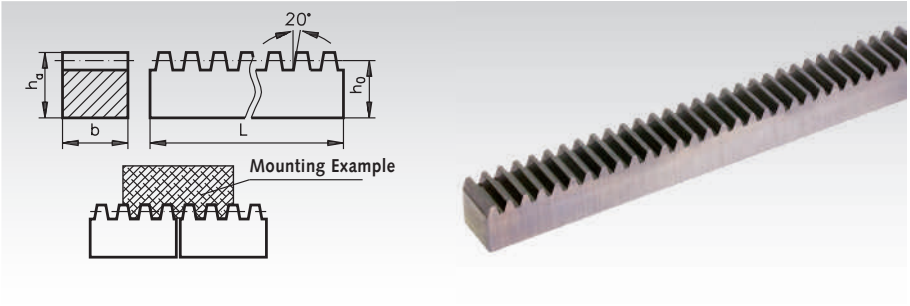
Teeth cut with reference profile (RP) II in accordance with DIN 867/DIN 3972.
Rounded edge.

	Product No.	Tooth Width b mm	Overall Height h_a mm	h_0 mm	Nominal Length L mm	Effective Length mm	Weight kg
Module 2.0	**241 886 05**	20	20	18,0	1000	1005,0 – 1	2,77
	241 886 09	20	20	18,0	2000	2004,0 – 1,5	5,50
Module 2.5	**242 886 05**	25	25	22,5	1000	1005,0 – 1,	4,31
	242 886 09	25	25	22,5	2000	2002,5 – 1,5	8,61
Module 3.0	**243 886 05**	30	30	27,0	1000	1008,0 – 1,5	6,27
	243 886 09	30	30	27,0	2000	2007,0 – 1,5	12,43
Module 4.0	**244 886 05**	40	40	36,0	1000	1005,0 – 1,5	11,14
	244 886 09	40	40	36,0	2000	2010,0 – 1,5	22,50
Module 5.0	**245 886 05**	50	50	45,0	1000	1005,0 – 1,5	17,50
	245 886 09	50	50	45,0	2000	2010,0 – 1,5	35,00

Precision Gear Racks Made from Steel 16MnCr5, Tooth Area Induction Hardened, Teeth Ground

Tooth quality 7h25.
Pressure angle 20°.
Tooth area induction hardened,
HRC 58±2.
Ground all around including teeth.

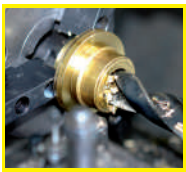
From Module 1.5 cut for continuous linking.
Angle accuracy 0.02 mm,
Parallelism on 500 mm = 0.03 mm,
on 1000 mm = 0.05 mm,
Tolerance to h_0 line
on 500 mm = 0.03 mm,
on 1000 mm = 0.05 mm.
The width is machined with a tolerance of 0.05.



Ordering Details: e.g.: Product No. 224 683 00, Gear Rack, Steel 16MnCr5, Module 1.0, 500 mm long, Teeth Ground

	Product No.	Tooth Width b mm	Overall Height $h_a^{-0.1}$ mm	Height to Line h_0 mm	Nom. Length L mm	Eff. Length mm	Weight kg
Module 1.0	**224 683 00**	15	15	14	500	$500,0^{+1}$	0,81
Module 1.5	**228 683 00**	15	15	13,5	500	$499,1^{\pm 0,3}$	0,78
Module 2.0	**241 683 00**	20	20	18	500	$502,1^{\pm 0,3}$	1,40
	241 685 00	20	20	18	1000	$998,5^{\pm 0,3}$	2,53
Module 3.0	**243 683 00**	25	25	22	500	$498,9^{\pm 0,3}$	2,12
	243 685 00	25	25	22	1000	$998,4^{\pm 0,3}$	4,22

Matching Precision Spur Gears Page 242



Reworking within 24h-service possible. Custom made parts on request.

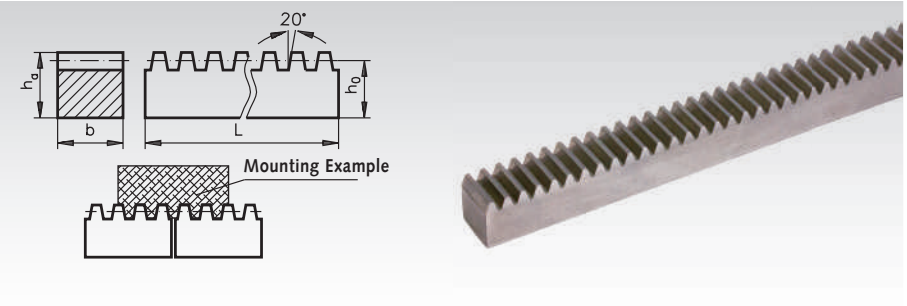
Gear Racks Made from Stainless Steel (Stainless), Milled Teeth, Straight Tooth System

Material: Stainless steel 1.4305
Tooth quality
8d25 modelled on DIN 3967.
Pressure angle 20°. Precisely Straightened.

From Module 2, except for nominal length 500 mm, cut for continuous linking.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances.

Dimensions h_a and h_o:
up to Module 2 -0.2 mm
Module 2.5 - 4 -0.3 mm



Ordering Details: e.g.: Product No. 224 996 05, Gear Rack, Module 1, 10 x 10x 500, Stainless

	Product No.	Tooth Width b mm	Overall Height h_a mm	h_0 mm	Nominal Length L mm	Effective Length mm	Weight kg
Module 1.0	**224 996 05**	10	10	9,0	500	-	0,34
	224 996 08	10	10	9,0	1000	-	0,68
Module 1.5	**228 996 03**	15	15	13,5	500	-	0,77
	228 996 05	15	15	13,5	1000	-	1,55
	228 996 07	15	15	13,5	1500	-	2,33
Module 2.0	**241 996 03**	20	20	18,0	500	-	1,38
	241 996 05	20	20	18,0	1000	1005,0 – 1	2,77
	241 996 07	20	20	18,0	1500	1501,0 – 1	4,12
	241 996 09	20	20	18,0	2000	2004,0 – 1,5	5,50
Module 2.5	**242 996 03**	25	25	22,5	500		2,17
	242 996 05	25	25	22,5	1000	1005,1 – 1	4,31
	242 996 07	25	25	22,5	1500	1507,5 – 1	6,46
	242 996 09	25	25	22,5	2000	2002,5 – 1,5	8,61
Module 3.0	**243 996 03**	30	30	27,0	500	-	3,17
	243 996 05	30	30	27,0	1000	1008,0 – 1,5	6,27
	243 996 07	30	30	27,0	1500	1507,5 – 1,5	9,33
	243 996 09	30	30	27,0	2000	2007,0 – 1,5	12,43
Module 4.0	**244 996 03**	40	40	36,0	500	-	5,55
	244 996 05	40	40	36,0	1000	1005,0 – 1,5	11,14
	244 996 07	40	40	36,0	1500	1507,5 – 1	16,50
	244 996 09	40	40	36,0	2000	2010,0 – 1,5	22,50

Total pitch error for steel racks in tooth quality 8

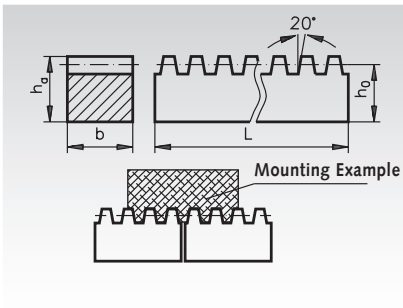
Total Pitch Error Fp along the lines of DIN 3962 quality 8 tolerance for teeth on spur gears, analogously applied on gear racks.
Value in µ = 1/1000 mm

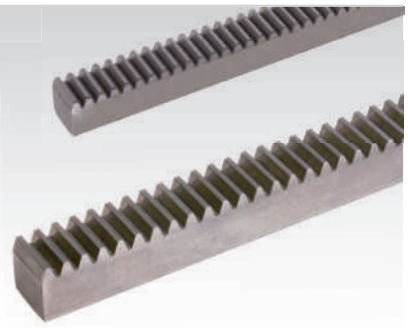
Module	Permissible Pitch Error for Length in mm 250	500	1000	1500	2000
1.00 - 2.00	50	56	63	63	71
over 2.00 up to 3.55	50	63	71	71	80
over 3.55 up to 6.00	56	71	80	80	90
over 6.00 up to 10.00	63	71	80	80	90

Reworking within 24h-service possible. Custom made parts on request.

Gear racks with metric pitch, straight teeth, square

Material: Steel C45KG.
Stainless steel 1.4305. STAINLESS





Tooth quality 8d25 modelled on DIN 3967.
Pressure angle 20°.

Pitch 10 mm, can be assembled together except for 500 mm nominal length.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances.

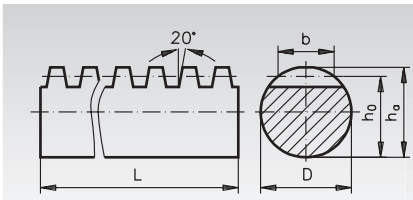
Dim. h_a and h_0: Pitch 5 mm: -0.2 mm
Pitch 10 mm: -0.3 mm

Ordering Details: e.g.: Product No. 205 601 00, gear rack pitch 5mm, 250 mm long

	Product No. Steel	Product No. Stainless Steel	Tooth Width b mm	Overall Height h_a mm	h_0 mm	Nominal Length L mm	Weight kg
Pitch 5mm (Module 1.59)	**205 601 00**	**205 996 01**	15	15	13,4	250	0,39
	205 603 00	**205 996 03**	15	15	13,4	500	0,78
	205 605 00	**205 996 05**	15	15	13,4	1000	1,55
	205 609 00	**205 996 09**	15	15	13,4	2000	3,10
Pitch 10mm (Module 3.18)	**210 601 00**	**210 996 01**	30	30	26,8	250	1,59
	210 603 00	**210 996 03**	30	30	26,8	500	3,17
	210 605 00	**210 996 05**	30	30	26,8	1000	6,27
	210 609 00	**210 996 09**	30	30	26,8	2000	12,43

Round Gear racks with metric pitch, straight teeth

Material: Steel St50K (length 2000mm:C45K), diameter tolerance **h6, ground.**
Stainless steel 1.4305.
Diameter tolerance **h9.** STAINLESS



Tooth quality 8d25 modelled on DIN 3967.
Pressure angle 20°.

The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances.

Dim. h_a and h_0: Pitch 5 mm: -0.2 mm
Pitch 10 mm: -0.3 mm

Ordering Details: e.g.: Product No. 205 631 00, round gear rack, pitch 5mm, 500mm long

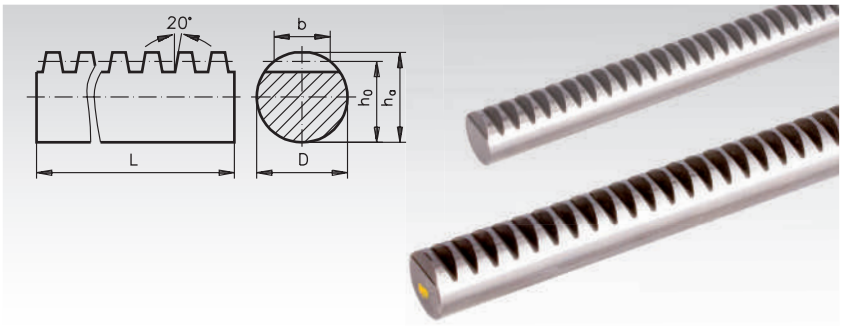
	Product No. Steel	Product No. Stainless Steel	Nom. length L mm	D mm	h_0 mm	h_a mm	b mm	Weight kg
Pitch 5mm (Module 1.59)	**205 631 00**	**205 996 31**	500	15	13,4	15,0	9,4	0,64
	205 632 00	**205 996 32**	1000	15	13,4	15,0	9,4	1,28
	205 634 00	**205 996 34**	2000	15	13,4	15,0	9,4	2,56
Pitch 10mm (Module 3.18)	**210 631 00**	**210 996 31**	500	30	26,8	30,0	18,8	2,59
	210 632 00	**210 996 32**	1000	30	26,8	30,0	18,8	5,14
	210 634 00	**210 996 34**	2000	30	26,8	30,0	8,8	10,28

Matching Spur Gears Page 248

Reworking within 24h-service possible. Custom made parts on request.

Round Gear Racks Made From Steel

Tooth quality 8d25 modelled on DIN 3967.
Pressure angle 20°.
The teeth on the gear racks are manufactured using an overhead milling cutter. This leads to negative tolerances.
Dim. h_a and h_0: to module 2 -0.2 mm
module 2.5 - 4 -0.3 mm
module 5 - 6 -0.4 mm



Ordering Details: e.g.: Product No. 224 631 00, Round gear rack St. , module 1, D 10 x 500 mm

Round Gear Racks Made From Steel, Milled Teeth, Straight Tooth System, Precisely Straightened

On choice: High Strength Steel!

Material standard:
St50K

Material High Strength:

Special steel with strength 1,000N/mm²

Diameter tolerance h6 ground.
Prod. No. 224 666 31 and 224 666 32
Ø tolerance h9.

Tooth flanks not ground.
Other dimensions, also from drawing, can be supplied at short notice.

	Product No. Standard	Product No. High Strength	Nom. length L mm	h_0 mm	h_a mm	b mm	Weight kg
Module 1.0 D = 10 mm	224 631 00	224 666 31**	500	9,0	10,0	6,0	0,28
	224 632 00	224 666 32**	1000	9,0	10,0	6,0	0,56
Module 1.0 D = 15 mm	225 631 00	-	500	14,0	15,0	7,5	0,66
	225 632 00	-	1000	14,0	15,0	7,5	1,35
Module 1.5 D = 15 mm	228 631 00	228 666 31	500	13,5	15,0	9,0	0,64
	228 632 00	228 666 32	1000	13,5	15,0	9,0	1,28
Module 1.5 D = 17 mm	229 631 00	-	500	15,5	17,0	9,6	0,84
	229 632 00	-	1000	15,5	17,0	9,6	1,70
Module 2.0 D = 20 mm	241 631 00	241 666 31	500	18,0	20,0	12,0	1,14
	241 632 00	241 666 32	1000	18,0	20,0	12,0	2,28
	241 634 00*	241 666 34	2000	18,0	20,0	12,0	4,52
Module 2.5 D = 25 mm	242 631 00	242 666 31	500	22,5	25,0	15,0	1,78
	242 632 00	242 666 32	1000	22,5	25,0	15,0	3,56
	242 634 00*	242 666 34	2000	22,5	25,0	15,0	7,20
Module 3.0 D = 30 mm	243 631 00	243 666 31	500	27,0	30,0	18,0	2,59
	243 632 00	243 666 32	1000	27,0	30,0	18,0	5,14
	243 634 00*	243 666 34	2000	27,0	30,0	18,0	10,28
Module 4.0 D = 40 mm	244 631 00	244 666 31	500	36,0	40,0	24,0	4,56
	244 632 00	244 666 32	1000	36,0	40,0	24,0	9,12
	244 634 00*	244 666 34	2000	36,0	40,0	24,0	18,24
Module 5.0 D = 50 mm	245 631 00	245 666 31	500	45,0	50,0	30,0	7,10
	245 632 00	245 666 32	1000	45,0	50,0	30,0	14,20
	245 634 00*	245 666 34	2000	45,0	50,0	30,0	28,40
Module 6.0 D = 60 mm	246 631 00	246 666 31	500	54,0	60,0	36,0	10,28
	246 632 00	246 666 32	1000	54,0	60,0	36,0	20,56
	246 634 00*	246 666 34	2000	54,0	60,0	36,0	41,12

* Material: C45K. ** Ø tolerance h9.

Racks length 250 mm from C45 (up to module 5) at www.maedler.de

Round Gear Racks Made From Stainless Steel, Milled Teeth, Straight Tooth System, Precisely Straightened

Material:
Stainless steel 1.4305.
Diameter tolerance h9 drawn.

STAINLESS

	Product No.	Nom. length L mm	h_0 mm	h_a mm	b mm	Weight kg
Module 1.0 D = 10 mm	224 996 31	500	9,0	10,0	6,0	0,28
	224 996 32	1000	9,0	10,0	6,0	0,56
Module 1.5 D = 15 mm	228 996 31	500	13,5	15,0	9,0	0,64
	228 996 32	1000	13,5	15,0	9,0	1,28
Module 2.0 D = 20 mm	241 996 31	500	18,0	20,0	12,0	1,14
	241 996 32	1000	18,0	20,0	12,0	2,28
	241 996 34	2000	18,0	20,0	12,0	4,56
Module 2.5 D = 25 mm	242 996 31	500	22,5	25,0	15,0	1,78
	242 996 32	1000	22,5	25,0	15,0	3,56
	242 996 34	2000	22,5	25,0	15,0	7,12
Module 3.0 D = 30 mm	243 996 31	500	27,0	30,0	18,0	2,59
	243 996 32	1000	27,0	30,0	18,0	5,14
	243 996 34	2000	27,5	30,0	18,0	10,28
Module 4.0 D = 40 mm	244 996 31	500	36,0	40,0	24,0	4,56
	244 996 32	1000	36,0	40,0	24,0	9,12
	244 996 34	2000	36,0	40,0	24,0	18,24

Gear Racks Made from Steel, Helical Toothed, Tempered, Teeth Milled

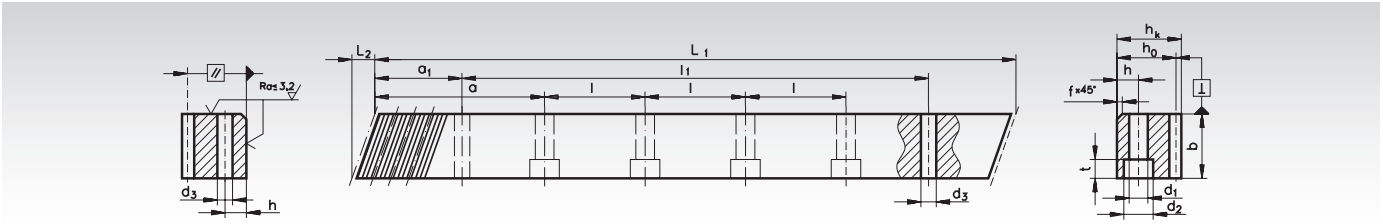
Material: high-quality, specially treated bright steel with approx. 900 N/mm² tensile strength.

Tooth quality 8e27.
Helical tooth system, right hand 19° 31′ 42″.
For continuous linking.

Matching left hand-toothed counterparts, to simplify the mounting, are available at cost.

Matching helical-toothed spur gears page 252.

Ordering Details: e.g.: Product No. 251 603 11, Gear Rack, Helical Toothed, Tempered, Module 2.0, 500 mm



Module 2.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
251 603 11	500,00	8,9	75	25	24	22	2	62,50	125	4	8	7	11	7	31,7	436,6	5,7	0,044	2100	2,10
251 605 11	1000,00	8,9	150	25	24	22	2	62,50	125	8	8	7	11	7	31,7	936,6	5,7	0,044	2100	4,30
without Bores																				
251 603 10	500,00	8,9	75	25	24	22	2											0,044	2100	2,10
251 605 10	1000,00	8,9	150	25	24	22	2											0,044	2100	4,30
Counterpart for mounting																				
251 600 00	200,00	8,8	30	25	24	22														0,85

Module 3.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
253 603 11	500,00	10,6	50	30	29	26	2	62,50	125	4	9	10	15	9	35,0	430,0	7,7	0,046	4500	3,00
253 605 11	1000,00	10,6	100	30	29	26	2	62,50	125	8	9	10	15	9	35,0	930,0	7,7	0,046	4500	6,10
without Bores																				
253 603 10	500,00	10,6	50	30	29	26	2											0,046	4500	3,00
253 605 10	1000,00	10,6	100	30	29	26	2											0,046	4500	6,10
Counterpart for mounting																				
253 600 00	200,00	10,6	20	30	29	26														2,70

Module 4.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
254 603 11	506,67	14,2	38	40	39	35	2	62,50	125	4	12	10	15	9	33,3	433,0	7,7	0,048	8700	5,50
254 605 11	1000,00	14,2	75	40	39	35	2	62,50	125	8	12	10	15	9	33,3	933,4	7,7	0,048	8700	10,90
without Bores																				
254 603 10	506,67	14,2	38	40	39	35	2											0,048	8700	5,50
254 605 10	1000,00	14,2	75	40	39	35	2											0,048	8700	10,90
Counterpart for mounting																				
254 600 00	200,00	14,2	15	40	39	35														2,70

Module 5.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
255 603 11	500,00	17,4	30	50	39	34	3	62,50	125	4	12	14	20	13	37,5	425,0	11,7	0,050	15000	6,50
255 605 11	1000,00	17,4	60	50	39	34	3	62,50	125	8	12	14	20	13	37,5	925,0	11,7	0,050	15000	13,00
without Bores																				
255 603 10	500,00	17,4	30	50	39	34	3											0,050	15000	6,50
255 605 10	1000,00	17,4	60	50	39	34	3											0,050	15000	13,00
Counterpart for mounting																				
255 600 00	200,00	17,4	12	49	39	34														3,00

[1)] GTf /300 = total pitch error, i.e. the max. permissible deviation (per 300 mm) of the measured length of the rack compared to the theoretical length L300, with L300 = (m / cos ß) • π • z_{300}).

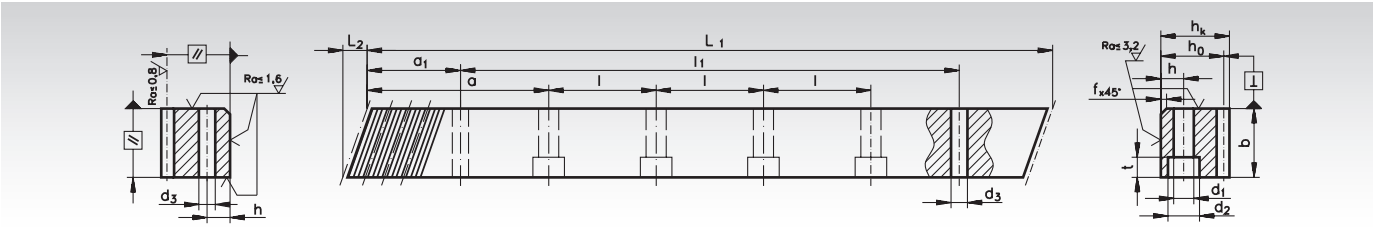
* Tangential force at tooth, calculated for z Ž 20. With a smaller number of teeth, the tangential force has to be reduced by 10%.

Precision Gear Racks Made from Steel, Helical Tooth System, Teeth Hardened and Ground

Material: 16MnCr5, Material-No. 1.7131, teeth induction hardened to about 60 HRC after hardening ground all around. As only the teeth are hardened subsequent drilling and pinning is easily possible.
As only the teeth are hardened subsequent drilling and pinning is easily possible. Tooth quality 6h25.
Helical tooth system, right hand 19° 31′ 42″.
For continuous linking.

Matching helical-toothed spur gears page 252.

Ordering Details: e.g.: Product No. 251 603 01, Gear Rack, Helical Tooth System, hardened, Teeth Ground, Module 2.0, 500 mm



Module 2.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
251 603 01	500,00	8,5	75	24	24	22	2	62,50	125	4	8	7	11	7	31,7	436,6	5,7	0,022	8500	2,10
251 605 01	1000,00	8,5	150	24	24	22	2	62,50	125	8	8	7	11	7	31,7	936,6	5,7	0,022	8500	4,10
without Bores																				
251 603 00	500,00	8,5	75	24	24	22	2											0,022	8500	2,10
251 605 00	1000,00	8,5	150	24	24	22	2											0,022	8500	4,10
Counterpart for mounting																				
251 600 00	200,00	8,5	30	24	24	22														0,85

Module 3.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
253 603 01	500,00	10,3	50	29	29	26	2	62,50	125	4	9	10	15	9	35	430,0	7,7	0,024	15000	2,90
253 605 01	1000,00	10,3	100	29	29	26	2	62,50	125	8	9	10	15	9	35	930,0	7,7	0,024	15000	5,90
without Bores																				
253 603 00	500,00	10,3	50	29	29	26	2											0,024	15000	2,90
253 605 00	1000,00	10,3	100	29	29	26	2											0,024	15000	5,90
Counterpart for mounting																				
253 600 00	200,00	10,3	20	29	29	26														1,20

Module 4.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
254 603 01	506,67	13,8	38	39	39	35	3	62,50	125	4	12	10	15	9	33,3	433,0	7,7	0,024	25000	5,40
254 605 01	1000,00	13,8	75	39	39	35	3	62,50	125	8	12	10	15	9	33,3	933,4	7,7	0,024	25000	10,70
without Bores																				
254 603 00	506,67	13,8	38	39	39	35	3											0,024	25000	5,40
254 605 00	1000,00	13,8	75	39	39	35	3											0,024	25000	10,70
Counterpart for mounting																				
254 600 00	200,00	13,8	15	39	39	35														2,70

[1)] GTf /300 = total pitch error, i.e. the max. permissible deviation (per 300 mm) of the measured length of the rack compared to the theoretical length L300, with L300 = (m / cos ß) • π • z_{300}).

* Tangential force at tooth, calculated for z Ž 20. With a smaller number of teeth, the tangential force has to be reduced by 10%.

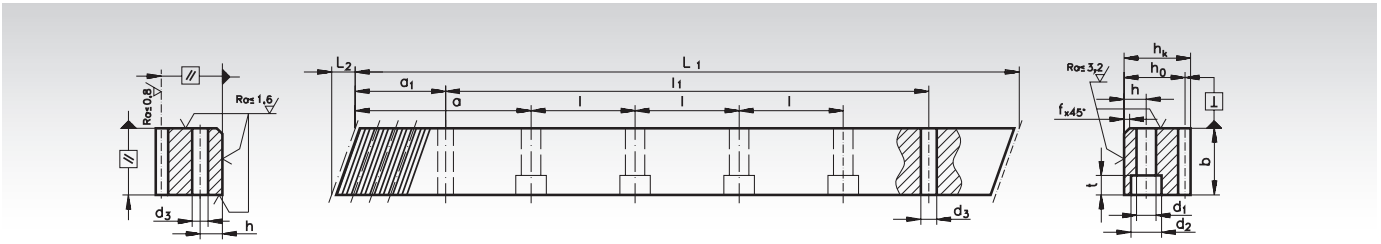
Reworking within 24h-service possible. Custom made parts on request.

Precision Gear Racks Made from Steel, Helical Toothed, Teeth Hardened and Ground

Material: C45K, Material-No. 1.0503, made from specially treated bright steel with approx. 650 N/mm² tensile strength. Teeth induction hardened to 50 to 55 HRC, after hardening ground all around. As only the teeth are hardened subsequent drilling and pinning is easily possible. Tooth quality 6h25.
Helical tooth system, right hand 19° 31′ 42″.
For continuous linking.

Matching helical-toothed spur gears page 252.

Ordering Details: e.g.: Product No. 255 603 01, Gear Rack, Helical Toothed, Hardened, Teeth Ground, Module 5.0, 500 mm



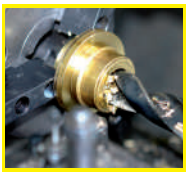
Module 5.0

Product No. with Bores	L_1	L_2	Number of teeth	b	h_k	h_0	f	a	l	No. of bores	h	d_1	d_2	t	a_1	l_1	d_3	GT_f /300[1)]	Fu*	Weight
	mm	mm		mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	N	kg
255 603 01	500,00	17,4	30	49	39	34	3	62,50	125	4	12	14	20	13	37,5	425,0	11,7	0,025	32000	6,50
255 605 01	1000,00	17,4	60	49	39	34	3	62,50	125	8	12	14	20	13	37,5	925,0	11,7	0,025	32000	13,00
without Bores																				
255 603 00	500,00	17,4	30	49	39	34	3											0,025	32000	6,50
255 605 00	1000,00	17,4	60	49	39	34	3											0,025	32000	13,00
Counterpart for mounting																				
255 600 00	200,00	17,4	12	49	39	34												0,025	32000	3,00

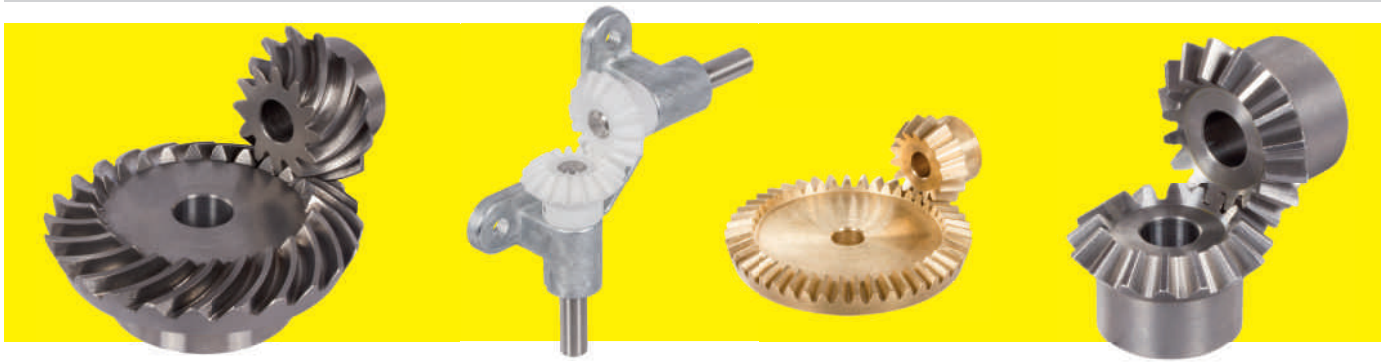
[1)] GTf /300 = total pitch error, i.e. the max. permissible deviation (per 300 mm) of the measured length of the rack compared to the theoretical length L300, with L300 = (m / cos ß) • π • z_{300}).

* Tangential force at tooth, calculated for z Ž 20. With a smaller number of teeth, the tangential force has to be reduced by 10%.

Helical Tooth Spur Gears Page 252



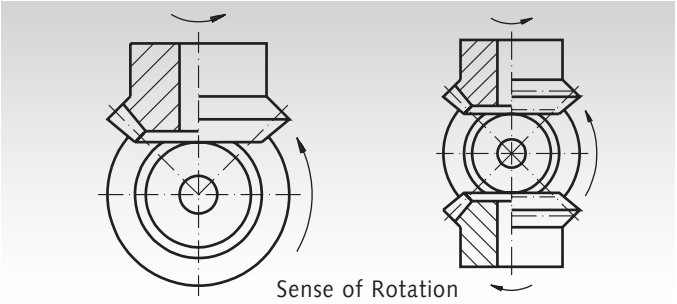
Reworking within 24h-service possible. Custom made parts on request.



Contents

General Basics about Bevel Gears

Bevel gears enable a non-slip power transmission between two shafts mounted at 90 degrees.
Available from stock are transmission ratios of 1:1 up to max. 1:5 (depending on the material used). Other than for spur gears, the module is not standardized, but is chosen with view to technical considerations. The module of the bevel gear is not a constant value, but it changes with the diameter.



Bevel Gears with Straight-Tooth System

to be calculated	given unit	formula
Module = m	Pitch	$\frac{t}{\pi}$
	Pitch Ø and No. of Teeth	$\frac{d}{z}$
Pitch Ø = d	No. of Teeth and Module	$z \cdot m$
Pitch (Cone) Angle Gear 1 = δ_{01}	No. of Teeth Gear 1 and Gear 2	$\frac{z\,1}{z\,2} = \tan\ \delta\,01$
Pitch (Cone) Angle Gear 2 = δ_{02}	Angle of Axles and Pitch (Cone) Angle, Gear 1	$\delta a - \delta\,01$
Addendum Angle = χ_k	Pitch (Cone) Angle and No. of Teeth	$\frac{2 \cdot \sin\ \delta 0}{z} = \tan\ \chi_k$
	Module and Outer Cone Distance R_a	$\frac{m}{R_a} = \tan\ \chi_k$
Tip Ø = d_a	Pitch Ø, Pitch (Cone) Angle and Module	$d + (2m \cdot \cos\ \delta 0)$
	No. of Teeth, Pitch (Cone) Angle and Module	$z \cdot m + (2m \cdot \cos\ \delta 0)$
Tip (Cone) Angle = δ_k	Pitch (Cone) Angle and Addendum Angle	$\delta 0 + \chi_k$
Outer Cone Distance Cone Distance = R_a	Pitch (Cone) Diameter Ø and Pitch (Cone) Angle	$\frac{d}{2 \cdot \sin\ \delta 0}$
Gear 1 = big gear, Gear 2 = small gear		
Torque = Md in Nm	Power and Speed	Gear 1: $9550\,\frac{P}{n_1}$ Gear 2: $9550\,\frac{P}{n_2}$

Tooth Width maximum 0.4 x Outer Cone Distance R_a .
For Bevel Gears with a Shaft Angle larger or smaller than 90°, the following formula applies for the calculation of the Pitch (Cone) Angle

$$\frac{z\,2}{Z_1 \cdot \sin\ \delta_a} + \cot\ \delta_a = \cot\ \delta 01$$

Note: if δ_{01} is given, then $\delta_{k2} = \delta_a - (\delta_{01} - \chi_k)$
Addendum Angle is the same for both gears: $\chi_k = \chi_{k1} = \chi_{k2}$
Tangent = tan, Cotangent = cot

Material quality: information about the material quality can be found at each individual group of bevel gears.

Recommendations for the Lubrication of Bevel-Gear Sets

Peripheral speed	Lubrication	Lubricant
up to 1 m/s	Application of Lubricant	Adhesive Lubricant
up to 4 m/s	Splash Lubrication/Spray Lubrication	Grease or Adh. Lubricant
up to 15 m/s	Splash Lubrication	Oil
over 15 m/s	Pressure-Circulation or Spray Lubrication	Oil

Notes Regarding the Torque Values Stated

The load bearing capacity calculations for the bevel gears are based on the basic principles regarding the pitting resistance of the tooth flanks and the occurring tooth root stress. The calculations are based on the DIN 3991. For the calculation, the following assumptions were made:

If the transmission ratio is not 1 : 1 the stated max. torque applies to the smaller gear.

Calc. Factor/Determining Factor	Abbreviation	Value	Note
Calculation Method	-	-	DIN 3991
Normal Pressure Angle	-	20° (17.5° for spiral tooth system module 0.6 to 1.5)	
Spiral Angle	-	o° (38° for spiral tooth system)	
DIN Quality	-	8	-
Flank Safety	S_H	1.0 (apart from zinc)	Endurance strength 10.000 h (for steel)
Tooth-Root Safety	S_F	1.5	Endurance strength 10.000 h (for steel)
Application Factor	K_A	1.25	Industrial gear mechanisms, uniform, light shocks
Dynamics Factor	K_V	1.0	Usually without great influence
Load Distribution over Width	K_{Hbeta}	1.5 (1 for Acetal Resin, Ms58 and ZnAl 4 Cu1)	Double-sided support
Lubricant/Surface Structure Speed Factor	$Z_L * Z_V * Z_R$	1	• sufficient oil lubrication • relative surface roughness $R_{Z100} = 10$ • peripheral speed 8 m/s
Lifetime Factor	Z_N	1	Endurance strength 10.000 h (for steel)
Operating temperature for plastic gears	T_{Betr}	up to 60°C	The material parametres of plastic gears highly depend on the temperature

The load bearing capacity of a bevel gear depends on various different factors. The torques stated are only reference values serving to facilitate the selection process. If necessary a specific calculation of strength and load bearing capacity must be carried out for each application.

Depending on the operating conditions the wear lifespan may be influenced by adequate grease/oil lubrication. Please also note that insufficient lubrication may lead to scuffing of the gear flanks.

IMPORTANT

Please make sure you always check the permissible torque separately for the pinion and the gear side!
Plastic gears are, due to the higher elasticity, calculated with a K_{Hbeta} of 1. Gears made from brass and zinc-die-cast are also calculated with a K_{Hbeta} of 1, as a good running-in characteristic is assumed for these materials.

In the torque calculation of zinc-die-cast bevel gears only the root strength was considered. Due to the material properties these gears are only to a limited extend suitable for continuous operation.

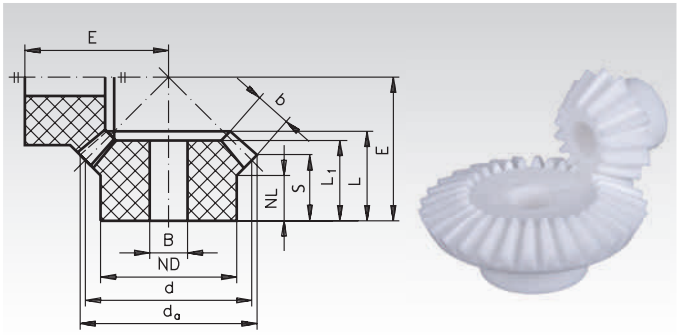
For the materials used, the following characteristic values were taken as basis:

Material	Perm. Pulsating Fatigue Strength under Bending Stress s_{bW} in N/mm²	Perm. Flank Pressure U_{Hlim} in N/mm²
Acetal Resin	28 (VDI-2545)	40 (VDI-2545)
ZnAl4Cu1	60	150
Ms58 (2.0401)	100	250
11SMnPb30 (alt: 9SMn28K)	150	350
C45 normalized	200	590
42CrMo4 hardened	350	1360
16MnCr5 case hardened	400	1630
X10CrNiS18 9 (1.4305, stainless, austenitic)	200	400

Bevel Gears Made from Acetal Resin, Straight-Tooth System, Ratio 1:1 to 5:1

Shaft angle 90°. Version: injection-moulded.
Bores from Module 1.5 machined.
Material properties see page 821.
Thermoplastic materials have a far larger thermal expansion than metals. This fact must be considered with view to the crown and flank clearance when mounting the gear. Crown clearance S_k ~ 0.25 · m, flank clearance S_c ~ 0.05 · m.
Thermal expansion coefficient = 1.1 · 10^{-4} 1/°C.
The bevel gears are also available with smaller bores, or with feather key groove. Additional charge worked out on time basis.

Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1:1 Mod. 0.5 16 Teeth = 2 Piece Product No. 355 207 00.
1 Pair of Bevel Gears Ratio 2:1 Mod. 1 15/30 Teeth = 1 Piece Product No. 355 556 00 and 1 Piece 355 557 00.



Drawing: Ratio 1:1, photo: ratio 2:1

Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B mm	E mm	S mm	Torque* Ncm	Weight g
355 207 00	0,5	16	8,7	8	7	6	8	8	2	3	10,5	6,6	0,9	0,3
355 507 00	1	16	17,6	16	12	8	13,6	13,6	4,7	5	18,4	10,6	8,3	1,9
355 520 00	1	30	31,4	30	15	7,4	12,9	15,3	7,4	6	24,8	10,8	58,0	5,9
355 707 00	1,5	16	26,4	24	18,5	10	16,2	18,4	7	8	25,8	14,4	29,0	5,9
356 007 00	2	16	34,9	32	21,9	9,6	18,3	21,2	10	10	30,4	14,9	73,0	10,4
356 107 00	2,5	16	43,5	40	25,2	11,5	22,9	25,5	12,3	12	37	18,2	145,0	20,0
356 407 00	3	16	52,3	48	28,8	13,2	25,8	29,2	13,8	14	43	20,6	250,0	32,0
356 507 00	3,5	16	61,4	56	33,3	14,4	28,1	33,1	15,8	18	49,5	22,8	440,0	50,0

Ratio 2:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B mm	E mm	S mm	Torque* Ncm	Weight g
355 556 00	1	15	16,8	15	12,2	10,6	17	17	6,6	5	26,4	11,5	12	2,4
355 557 00	1	30	31,1	30	18	9,1	14,8	16,2	6,6	8	20,9	13,6	24	6,3
355 756 00	1,5	15	25,4	22,5	17	11,5	22,8	22,8	10,5	8	35,8	13,8	43	7,5
355 757 00	1,5	30	46,4	45	23,4	9,6	17,5	19,5	10,5	10	26,2	15,0	86	17,0
356 056 00	2	15	33,6	30	22,5	11,8	26	27	14,6	10	44,2	14,5	107	13,3
356 057 00	2	30	62,2	60	30,2	11,8	22,6	24,2	14,6	12	32,6	18,5	214	41,0
356 156 00	2,5	15	42	37,5	26,5	13	29,6	31,2	17,3	12	53,3	16,4	209	23,6
356 157 00	2,5	30	77,3	75	36,1	15	27,5	29,5	17,3	16	40,5	22,8	418	69,0
356 456 00	3	15	50,3	45	31,2	14,8	35	36,3	20,5	14	63,3	19,0	370	38,0
356 457 00	3	30	93	90	45	19	34,2	37	20,5	18	49,5	29,2	740	129,0

Ratio 3:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B mm	E mm	S mm	Torque* Ncm	Weight g
355 576 00	1	15	16,6	15	12,3	11	20,4	20,4	9,2	5	34,3	12,1	16	2,7
355 577 00	1	45	46,1	45	23,4	9,6	16,5	18,2	9,2	10	22,7	15,7	48	16,0
355 776 00	1,5	15	25,1	22,5	17,2	12,5	26,8	26,8	14	8	47,9	13,5	64	8,5
355 777 00	1,5	45	68,8	67,5	30,4	11,5	21,5	23	14	12	29,4	19,2	192	49,0
356 074 00	2	10	24,0	20	15,6	12	25,0	25	12,5	6	43,7	13,2	30	6,1
356 075 00	2	30	61,7	60	30,3	11,5	20,2	22,5	12,5	12	28	19,0	90	38,0
356 174 00	2,5	10	29,7	25	18,8	13	28,8	28,8	15,7	8	52,4	14,1	60	10,2
356 175 00	2,5	30	77,2	75	36,1	15,5	25,2	29	15,7	18	35,7	24,1	180	68,0

Ratio 4:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B mm	E mm	S mm	Torque* Ncm	Weight g
355 588 00	1	10	12	10	7,8	9,3	17,7	17,7	8,2	4	30,1	10,1	4,5	0,9
355 589 00	1	40	40,8	40	23,4	10,8	15,7	17	8,2	10	20,1	15,1	18	12,6
355 788 00	1,5	10	18	15	11,3	10,9	23,5	23,5	12,3	5	41,7	11,7	17	3,0
355 789 00	1,5	40	61,2	60	30,4	12,8	20	21,7	12,3	12	26,2	18,6	68	32,0
356 088 00	2	10	23,8	20	14,3	12,8	28,9	28,9	16,3	6	54	13,2	40	6,4
356 089 00	2	40	81,5	80	36	16,6	24,7	27	16,3	18	32,5	23,1	160	65,0

Ratio 5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B mm	E mm	S mm	Torque* Ncm	Weight g
355 598 00	1	12	13,7	12	9,5	10	20,3	20,3	9,5	4	40,5	10,5	12	2
355 599 00	1	60	60,4	60	20,5	11	15,5	17,4	9,5	10	21	15,4	60	17

Note Regarding the Gears Made from Acetal Resin

Inside these injection-moulded parts are some cavities caused by production. These parts should therefore not be drilled too deep. With larger bores or when grooving the cavities might become visible. This often does not affect the functionality.

* Basis for calculations see page 269.

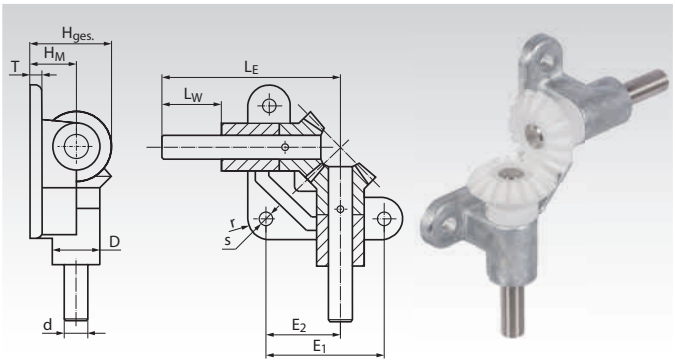
Angular Drive with Acetal Bevel Gears, Ratio 1:1

Material: Housing made from zinc die-cast ZnAl4Cu1.
Shafts made from stainless steel 1.4301, dismountable.
Bevel gears from acetal resin, injection-moulded.

STAINLESS

- Low cost angular gear drive, ratio 1:1, 6 sizes.
- Suitable for lower torques and intermittend use.
- Shafts running directly in the self-lubricating housing material.
- Easy to mount and maintenance-free.

Shaft angle = 90°. Temperature range - 20°C to +100° C.



Ordering details: e.g.:
Art.-Nr. 410 355 10, Angular drive with acetal bevel gears, shaft-Ø d=5mm

Ratio 1:1

Product No.	d^{h6} mm	D mm	E_1 mm	E_2 mm	H_{Ges} mm	H_M mm	L_E mm	L_W mm	r mm	s mm	T mm	Module mm	Number of teeth	$T_{max.}$ Ncm	Weight g
410 355 10	5	12	32	19,4	18,8	10	50	15	6	4,8	4	1,0	16/16	8,3	60
410 355 15	8	18	45	28,4	28,2	15	70	20	9	5,8	5	1,5	16/16	29	180
410 355 20	10	22	55	35,0	37,5	20	90	30	11	7,0	6	2,0	16/16	73	320
410 355 25	12	25	65	41,0	46,8	25	105	35	12,5	9,0	7	2,5	16/16	145	480
410 355 30	15	30	75	47,5	56,2	30	120	40	15	9,0	8	3,0	16/16	250	760
410 355 35	18	33	85	54,0	65,7	35	135	45	16	11,0	9	3,5	16/16	440	1080

*asis for calculations see page 269.

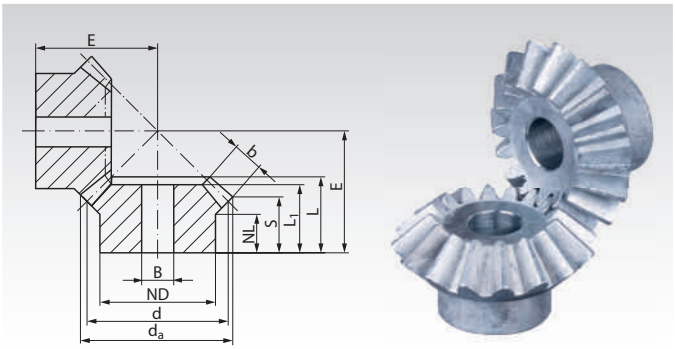
Bevel gears Made from Zinc Die-Cast, Straight-Tooth System, Ratio 1:1

Material: ZnAl4Cu1.

Shaft angle = 90°.
Bores machined.

Zinc-die-cast gears under load should not be used at operating temperatures higher than 100°C.

The bevel gears only run as a pair at same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1:1 Mod. 1 16 Teeth = 2 Pieces Product No. 358 507 00

Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	b mm	B^{H9} mm	E mm	S mm	Torque* Ncm	Weight g
358 507 00	1	16	17,3	16	12	7,5	13,1	13,1	4,5	6	17,7	10,5	14	8
358 707 00	1,5	16	26,0	24	19	10,8	17,0	18,6	6,7	8	25,7	14,5	46	27
359 007 00	2	16	34,6	32	23	10	19,2	21,3	9,6	10	30	15,1	110	51
359 107 00	2,5	16	43,3	40	26	12	22,9	25,5	12,3	12	36	17,6	230	87
359 407 00	3	16	52,3	48	30	13	26,0	29,3	14	14	42,5	20,6	380	145
359 507 00	3,5	16	61,5	56	34	14	29,1	33,2	15,5	16	49,4	23,2	580	227

* In the torque calculation of zinc-die-cast bevel gears only the root strength was considered.
Due to the material properties these gears are only to a limited extend suitable for continuous operation.

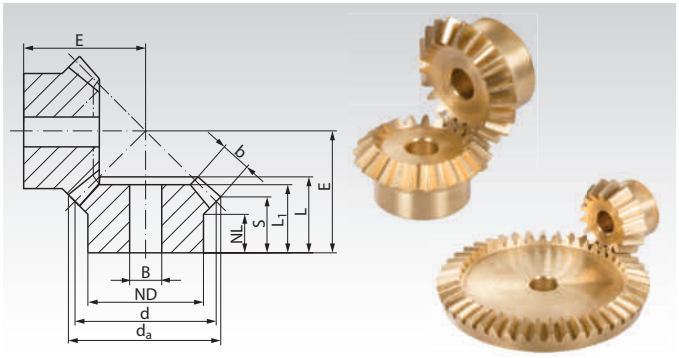
Reworking within 24h-service possible. Custom made parts on request.

Bevel Gears Made from Brass, Straight-Tooth System, Ratio 1:1 to 4:1

Material: Ms58 (2.0401).

Milled teeth. Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1:1 Mod. 0.5 15 teeth = 2 pieces Product No. 350 206 00.
1 Pair of Bevel Gears Ratio 1.5:1 Mod. 0.5 20/30 Teeth = 1 Piece Product No. 350 252 00 and 1 Piece 350 253 00.

Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 206 00	0,5	15	8,2	7,5	6	5	6,3	7,3	6,1	2	3	9,5	0,9	1
350 211 00	0,5	20	10,7	10	8	4	-	7	5	3	4	9,7	1,9	1
350 215 00	0,5	24	12,7	12	8	4	6,4	7	5	3	4	10,7	3,0	3
350 220 00	0,5	30	15,7	15	10	4	7,5	8,5	6,6	3	4	13,7	5,3	4
350 223 00	0,5	36	18,7	18	12	5	9	10,1	8	3	4	16,7	8,2	10
350 226 00	0,5	40	20,7	20	12	5	8,5	9,5	7,5	3	4	17,1	10,6	10
350 232 00	0,5	50	25,7	25	14	5	8,5	9,5	7,5	3	4	19,6	18,0	16
350 503 00	1	12	13,0	12	8	5	8,5	9,6	7,7	3	5	13,2	5,0	3
350 507 00	1	16	17,4	16	12	5	9	10,3	7,8	4	5	15,1	6,0	9
350 511 00	1	20	21,4	20	15	5	9	10,4	7,8	4	5	17,1	13,0	15
350 516 00	1	25	26,4	25	16	6,7	11,5	13	9,7	5	5	21,5	26,0	26
350 520 00	1	30	31,4	30	16	7	11,5	13,1	9,7	5	5	24,0	40,0	33
350 523 00	1	36	37,4	36	16	7	11,5	13	9,6	5	5	26,9	62,0	43
350 526 00	1	40	41,4	40	16	8	12,5	14	10,6	5	5	29,9	79,0	53
350 532 00	1	50	51,4	50	16	8	12,5	14	10,6	5	6	34,9	130,0	76
350 535 00	1	60	61,4	60	16	8	12,5	14,1	10,6	5	6	39,9	197,0	110

Ratio 1.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 252 00	0,5	20	11,0	10	8	3,5	6,5	7,1	4,7	3	4	11,9	2,4	2
350 253 00	0,5	30	15,4	15	10	4	6	7	5,4	3	4	10,1	3,6	4
350 552 00	1	20	22,1	20	15	5	10	11,1	7,2	5	5	21,5	18,0	16
350 553 00	1	30	30,8	30	16	5	9	10,9	8,3	5	5	17,7	27,0	28

Ratio 2:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 260 00	0,5	20	11,2	10	8	4	7	7,5	5,0	3	4	14,65	2,7	2
350 261 00	0,5	40	20,3	20	12	5	7,5	8,4	7,1	3	4	11,83	5,4	8
350 556 00	1	15	17,4	15	12,5	4,5	9	10,1	5,8	5	5	20,2	9,4	9
350 557 00	1	30	30,6	30	16	5	9	10,8	8,8	5	5	15,7	18,8	27
350 560 00	1	20	22,4	20	15	5	10	11,1	6,8	5	5	26,2	20,6	17
350 561 00	1	40	40,6	40	16	8	12	13,8	11,7	5	6	21,1	41,2	50

Ratio 2.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 272 00	0,5	20	11,3	10	8	4	7	7,6	4,9	3	4	17,1	3,0	3
350 273 00	0,5	50	25,2	25	14	5	7	7,8	6,8	3	4	11,5	7,5	12

Ratio 3:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 276 00	0,5	15	8,8	7,5	6	3,7	6,5	7	4,3	3	3	15,3	1,5	1
350 277 00	0,5	45	22,7	22,5	12	5	7,5	8,4	7,5	3	4	11,0	4,5	11
350 576 00	1	15	17,7	15	13	5	10	11,1	6,5	5	5	28,5	11,0	10
350 577 00	1	45	45,4	45	16	8	12,5	14,7	13,2	5	6	20,2	33,0	68

Ratio 4:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Ncm	Weight g
350 592 00	1	15	17,8	15	13	5,5	10	11	6,3	5	5	35,9	12,2	10
350 593 00	1	60	60,3	60	16	8	12,5	14,6	13,6	5	6	20,5	48,8	110

* Basis for calculations see page 269.

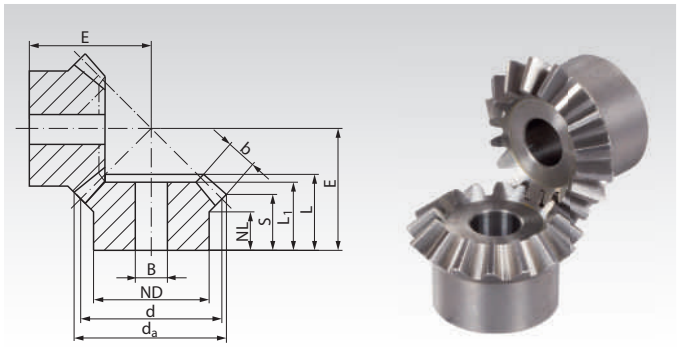
Bevel gears Made from Steel, Straight-Tooth System, Ratio 1:1

Material: up to module 2: 11SMnPb30.
from module 2.5: C45.

Tooth quality 8 modelled on DIN 3967 (from module 2).
Up to module 5 with crowned, milled teeth.
From module 6 with planed teeth. Not hardened – not lapped.

Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1:1 Mod. 0.5 20 Teeth = 2 Pieces Product No. 360 211 00

Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 211 00	0,5	20	10,7	10	8	4	-	7,0	5,0	3	4	9,7	0,011	1
360 215 00	0,5	24	12,7	12	8	4	6,4	7,0	5,0	3	4	10,7	0,018	3
360 220 00	0,5	30	15,7	15	10	4	7,5	8,5	6,6	3	4	13,7	0,032	4
360 223 00	0,5	36	18,7	18	12	5	9,0	10,1	8,0	3	4	16,7	0,050	10
360 226 00	0,5	40	20,7	20	12	5	8,5	9,5	7,5	3	4	17,1	0,064	10
360 232 00	0,5	50	25,7	25	14	5	8,5	9,5	7,5	3	4	19,6	0,108	16
360 507 00	1	16	17,4	16	14	7	10	11,2	8,7	4	5	16	0,052	9
360 510 00	1	19	20,4	19	15	6,5	10	11,8	9,2	4	5	18	0,085	14
360 513 00	1	22	23,4	22	18	7	11	12,8	9,7	4,7	5	20	0,158	22
360 518 00	1	26	27,4	26	22	7	12	13,4	9,7	5,5	5	22	0,193	35
360 520 00	1	30	31,4	30	22	7	14	16,0	11,7	6,4	5	26	0,29	50
360 526 00	1	40	41,4	40	30	10	18	19,8	15,7	6,0	8	35	0,55	111
360 707 00	1,5	16	26,1	24	20	11	15	17,3	14,1	5,1	8	25	0,18	32
360 711 00	1,5	20	32,1	30	22	9	15	17,2	13,1	6,4	8	27	0,34	47
360 713 00	1,5	22	35,1	33	20	8	15	17,1	12,6	7,0	8	28	0,44	50
360 716 00	1,5	25	39,6	37,5	25	8	15	17,6	12,3	8,0	10	30	0,62	70
360 720 00	1,5	30	47,1	45	30	12	20	21,9	15,6	9,6	10	37	1,01	135
360 726 00	1,5	40	62,1	60	40	12	25	27,7	19,1	12,7	15	48	2,46	310
361 007 00	2	16	34,8	32	25	11,5	18	20,7	16,4	6,8	10	31	0,45	66
361 011 00	2	20	42,8	40	30	10	17	19,9	14,4	8,5	10	33	0,84	104
361 013 00	2	22	46,8	44	30	10	19	21,0	15,4	9,3	10	36	1,08	130
361 016 00	2	25	52,8	50	35	8	19	21,4	14,4	10,6	10	38	1,50	182
361 020 00	2	30	62,8	60	40	12	25	26,9	18,4	12,7	15	47	2,45	306
361 026 00	2	40	82,8	80	50	15	31	33,7	23,4	15,2	20	62	16,3	660
361 107 00	2,5	16	43,7	40	30	10	21	23,8	16,8	11	10	35	2,6	120
361 109 00	2,5	18	48,7	45	30	10	22	25,0	17,4	12	10	38	3,6	150
361 111 00	2,5	20	53,7	50	35	10	22	25,9	16,9	14	10	40	4,9	210
361 113 00	2,5	22	58,7	55	30	10	24	27,1	17,3	15	10	43	6,3	240
361 116 00	2,5	25	66,2	62,5	45	10	25	28,8	17,6	17	15	47	9,3	370
361 120 00	2,5	30	78,7	75	50	12	29	32,7	19,3	20	15	55	16,3	560
361 126 00	2,5	40	103,6	100	60	14	31	35,4	21,8	20	25	70	33,6	1100
361 407 00	3	16	52,4	48	40	12	24	27,7	18,2	15	10	40	4,6	240
361 409 00	3	18	58,4	54	40	10	25	28,1	17,2	17	10	42	6,4	280
361 411 00	3	20	64,4	60	40	10	26	29,5	17,2	19	15	45	8,7	320
361 413 00	3	22	70,4	66	40	8	27	30,2	17,2	20	15	48	11,6	410
361 416 00	3	25	79,4	75	50	10	28	31,9	16,7	23	15	52	17,3	490
361 420 00	3	30	94,4	90	50	12	35	38,8	22,2	25	20	65	29,2	950
361 426 00	3	40	124,4	120	60	15	35	39,1	22,2	25	25	80	60,7	1600
361 807 00	4	16	70,0	64	50	11	29	32,9	21,0	19	20	50	11,1	420
361 809 00	4	18	78,0	72	50	16	36	41,0	27,0	22	20	60	15,6	640
361 811 00	4	20	85,9	80	50	16	39	43,5	28,0	24	20	65	20,8	810
361 813 00	4	22	93,9	88	50	12	37	40,9	24,0	26	20	65	27,9	940
361 816 00	4	25	105,9	100	60	12	38	42,7	23,0	30	20	70	41,9	1400
361 820 00	4	30	125,9	120	60	18	42	47,9	27,9	30	25	85	67,5	2000
361 826 00	4	40	165,8	160	80	20	48	53,2	32,9	30	30	110	138,0	4200
362 107 00	5	16	87,4	80	60	12	36	41,5	25,7	25	20	62	22,2	860
362 109 00	5	18	97,4	90	60	12	37	42,2	23,7	29	20	65	30,7	1050
362 111 00	5	20	107,4	100	60	12	39	44,4	23,7	32	25	70	42,7	1300
362 113 00	5	22	117,5	110	70	12	43	48,5	25,7	35	25	77	57,5	1840
362 116 00	5	25	132,4	125	70	12	42	47,5	21,2	40	30	80	85,8	2140
362 120 00	5	30	157,4	150	70	12	44	51,3	24,7	40	30	96	139,5	3520
362 126 00	5	40	207,3	200	90	20	52	60	32,9	40	35	128,1	288,0	7060
367 309 00	6	18	116,5	108	60	15	44	54	31,3	35	25	81,0	54,8	1770
367 311 00	6	20	128,5	120	70	15	44	54	27,8	40	30	83,4	76,3	2190
367 316 00	6	25	158,5	150	75	15	51	60	26,7	50	30	97,3	153,4	3790
367 320 00	6	30	188,5	180	90	15	51	60	26,4	50	35	112,1	250,6	5810
367 326 00	6	40	248,5	240	100	20	58	67	32,9	50	40	148,6	555,0	11600
367 711 00	8	20	171,3	160	90	15	52	62	29,20	50	40	103,3	181,6	4560

* Basis for calculations see page 269.

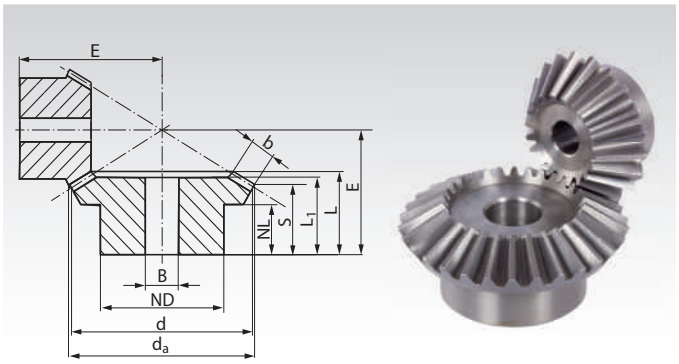
Bevel Gears Made from Steel, Straight-Tooth System, Ratio 1.25:1 and 1.5:1

Material: up to module 2: 11SMnPb30.
from module 2.5: C45.

Tooth quality 8 modelled on DIN 3967 (from module 2).
With crowned, milled teeth. Not hardened – not lapped.

Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1.25:1 Mod. 3 16/20 Teeth =
1 Piece Product No. 361 444 00 and
1 Piece Product No. 361 445 00

Ratio 1.25:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
361 444 00	3	16	52,9	48	40	11,7	27	29,2	16,9	17	15	45	5,2	220
361 445 00	3	20	63,9	60	40	10,0	25	27,8	18,4	17	15	40	6,5	300
361 844 00	4	16	70,6	64	50	12,5	32	36,5	20,6	22	20	58	12,7	470
361 845 00	4	20	85,2	80	50	15,0	33	38,4	26,3	22	20	55	15,9	700
362 144 00	5	16	88,2	80	60	12,0	40	44,2	23,3	29	20	70	25,4	910
362 145 00	5	20	106,6	100	60	15,0	39	45,0	29,1	29	25	65	31,8	1300

Ratio 1.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 252 00	0,5	20	11,0	10	8	3,5	6,5	7,1	4,7	3	4	11,9	0,014	2
360 253 00	0,5	30	15,4	15	10	4,0	6,0	7,0	5,4	3	4	10,1	0,021	4
360 548 00	1	16	18,1	16	13	6,9	11	12,0	8,7	4,3	5	20	0,066	10
360 549 00	1	24	24,8	24	20	8,8	13	14,8	12,6	4,3	5	20	0,099	32
360 748 00	1,5	16	27,1	24	20	8,7	14	16,1	11,0	6,5	8	28	0,023	34
360 749 00	1,5	24	37,2	36	20	12,0	17	20,2	16,9	6,5	10	28	0,035	55
360 752 00	1,5	20	33,1	30	20	9,0	17	18,9	12,5	8,1	8	34	0,43	52
360 753 00	1,5	30	46,2	45	30	12,0	20	22,1	17,9	8,1	10	32	0,65	133
361 048 00	2	16	35,5	32	20	8,0	21	22,6	13,1	12	10	36	0,57	60
361 049 00	2	24	50,3	48	30	8,0	18	21,5	15,7	12	10	30	0,86	151
361 052 00	2	20	43,5	40	30	7,5	20	22,3	11,2	14	10	40	1,15	119
361 053 00	2	30	62,3	60	40	15,0	25	28,7	21,7	14	15	40	1,73	301
361 148 00	2,5	16	44,3	40	30	11,6	26	28,2	16,4	14	10	45	3,3	150
361 149 00	2,5	24	62,9	60	30	12,0	26	29,4	22,1	14	10	40	5,0	300
361 152 00	2,5	20	54,3	50	30	10,0	27	30,2	16,0	18	10	52	6,8	230
361 153 00	2,5	30	77,9	75	50	14,0	27	31,1	22,2	18	15	45	10,2	550
361 448 00	3	16	53,2	48	40	13,2	30	32,7	17,7	19	15	52	5,9	250
361 449 00	3	24	75,5	72	50	8,0	24	27,8	18,6	19	15	40	8,9	490
361 452 00	3	20	65,2	60	40	10,0	33	35,8	16,8	24	15	60	12,4	390
361 453 00	3	30	93,5	90	50	15,0	33	37,6	25,7	24	20	53	18,6	860
361 848 00	4	16	71,0	64	50	12,5	36	38,9	19,3	25	20	65	14,3	500
361 849 00	4	24	100,7	96	60	12,0	31	35,6	23,5	25	20	52	21,5	1010
361 852 00	4	20	87,0	80	50	18,0	48	51,1	27,3	30	20	85	29,5	950
361 853 00	4	30	124,6	120	60	18,0	40	46,4	31,5	30	25	68	44,3	1900
362 152 00	5	20	108,7	100	60	12,0	50	54,7	22,9	40	25	95	60,6	1630
362 153 00	5	30	155,8	150	70	12,0	40	46,3	26,4	40	30	72	90,9	3070

* Basis for calculations see page 269.

Reworking within 24h-service possible. Custom made parts on request.

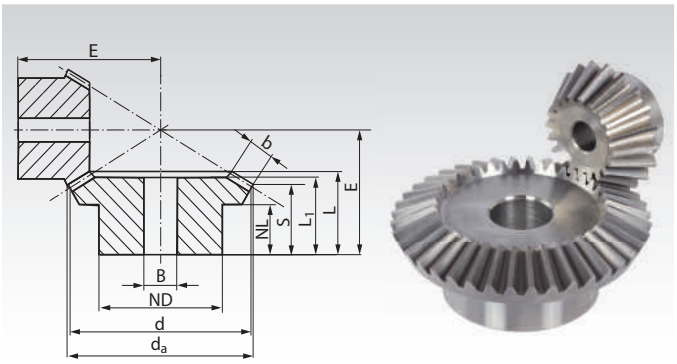
Bevel gears Made from Steel, Straight-Tooth System, Ratio 2:1

Material: up to product no. 36105700: 11SMnPb30.
from product no. 36106000: C45.

Tooth quality 8 modelled on DIN 3967 (from module 2).
Up to module 5 with crowned, milled teeth.
From module 6 with planed teeth. Not hardened – not lapped.

Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 2:1 Mod. 0.5 20/40 Teeth =
1 Piece Product No. 360 260 00 and
1 Piece Product No. 360 261 00

Ratio 2:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 260 00	0,5	20	11,2	10	8	4,0	7,0	7,5	5,0	3	4	14,65	0,017	2
360 261 00	0,5	40	20,3	20	12	5,0	7,5	8,4	7,1	3	4	11,83	0,034	8
360 556 00	1	15	17,4	15	13	6,5	11	11,9	7,6	5	5	22	0,063	10
360 557 00	1	30	30,6	30	20	9,0	13	15,1	13,1	5	5	20	0,126	40
360 756 00	1,5	15	26,1	22,5	18	6,5	13	14,8	8,4	7,6	8	30	0,22	26
360 757 00	1,5	30	45,9	45	30	12,0	18	20,7	17,6	7,6	10	28	0,44	124
360 760 00	1,5	20	33,6	30	20	9,5	19	21,6	12,9	10,1	8	42	0,54	59
360 761 00	1,5	40	60,9	60	40	12,0	19	22,0	17,9	10,1	15	32	1,08	234
361 056 00	2	15	33,7	30	20	7,5	22	23,0	10,9	14	10	40	0,59	58
361 057 00	2	30	61,8	60	40	12,0	24	27,2	21,9	14	15	35	1,18	312
361 060 00	2	20	43,7	40	30	7,5	22	24,0	10,9	15	10	50	1,4	132
361 061 00	2	40	81,8	80	50	18,0	29	32,8	26,9	15	20	45	2,8	593
361 156 00	2,5	15	42,2	37,5	30	15,4	31	33,3	18,6	17	10	55	3,4	160
361 157 00	2,5	30	77,3	75	50	10,0	24	28,1	21,6	17	15	38	6,8	530
361 160 00	2,5	20	54,6	50	30	14,0	34	36,6	19,2	20	10	68	4,3	280
361 161 00	2,5	40	102,3	100	60	15,0	29	33,3	25,3	20	25	48	8,6	970
361 456 00	3	15	50,6	45	30	11,5	33	35,4	16,4	22	10	60	6,1	270
361 457 00	3	30	92,8	90	50	10	26	30,7	22,3	22	20	42	12,2	750
361 460 00	3	20	65,6	60	40	10	33	36,1	14,4	25	15	73	15,2	450
361 461 00	3	40	122,8	120	60	18	34	38,7	28,8	25	25	56	30,4	1400
361 856 00	4	15	67,5	60	40	10	38	41,0	16,9	28	20	75	14,6	410
361 857 00	4	30	123,8	120	60	15	33	39,4	28,8	28	25	55	29,2	1600
361 860 00	4	20	87,4	80	50	13	45	48,0	21,9	30	20	100	35,0	970
361 861 00	4	40	163,7	160	80	20	40	45,7	33,7	30	30	70	70,0	3300
362 156 00	5	15	84,4	75	60	15	50	54,1	21,4	38	20	94	30,2	980
362 157 00	5	30	154,7	150	70	15	40	46,7	32,2	38	30	65	60,4	3030
362 160 00	5	20	109,3	100	60	18	58	62,1	27,3	40	25	125	72,4	1890
362 161 00	5	40	204,7	200	90	20	48	55,6	39,7	40	35	85	144,8	6480
367 360 00	6	20	130,7	120	70	15	58	67	23,6	50	30	139,9	130,0	2960
367 361 00	6	40	245,3	240	100	20	50	58	37,7	50	40	92,3	260,0	9610

* Basis for calculations see page 269.

Reworking within 24h-service possible. Custom made parts on request.

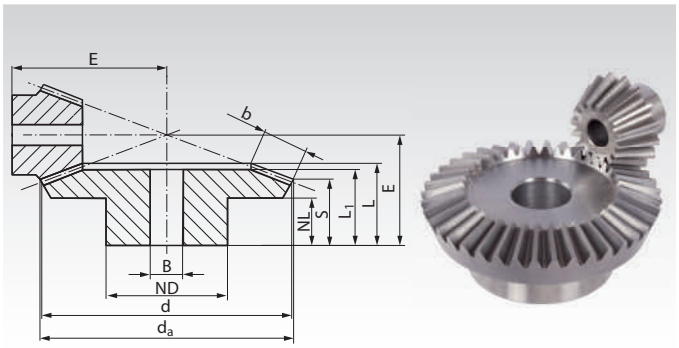
Bevel Gears Made from Steel, Straight-Tooth System, Ratio 2.5:1 and 3:1

Material: up to module 2: 11SMnPb30.
from module 2.5: C45.

Tooth quality 8 modelled on DIN 3967 (from module 2).
Up to module 5 with crowned, milled teeth.
From module 6 with planed teeth. Not hardened – not lapped.

Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 2.5:1 Mod. 0.5 20/50 Teeth =
1 Piece Product No. 360 272 00 and
1 Piece Product No. 360 273 00

Ratio 2.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 272 00	0,5	20	11,3	10	8	4,0	7	7,6	4,9	3	4	17,1	0,018	3
360 273 00	0,5	50	25,2	25	14	5,0	7	7,8	6,8	3	4	11,5	0,045	10
360 564 00	1	16	18,6	16	13	7,4	13	14,4	8,5	6,5	5	28	0,090	13
360 565 00	1	40	40,5	40	25	9,0	13	14,8	12,6	6,5	8	20	0,225	65
360 764 00	1,5	16	27,9	24	18	8,8	18	19,5	10,8	9,7	8	40	0,32	36
360 765 00	1,5	40	60,7	60	40	10,0	17	20,1	16,9	9,7	15	28	0,80	220
360 768 00	1,5	18	30,9	27	20	10,8	21	22,9	13,0	10,9	8	46	0,47	54
360 769 00	1,5	45	68,2	67,5	50	12,0	20	24,1	20,4	10,9	15	33	1,18	370
361 064 00	2	16	35,8	32	20	9,0	25	26,4	12,7	15	10	52	0,84	76
361 065 00	2	40	81,5	80	50	15,0	29	32,7	27,9	15	20	42	2,10	650
361 068 00	2	18	39,8	36	30	11,8	26	27,4	13,8	15	10	58	1,18	133
361 069 00	2	45	91,5	90	60	18,0	30	33,8	28,9	15	25	45	2,95	830
361 164 00	2,5	16	44,8	40	30	13,0	32	34,1	15,9	20	10	65	5,0	180
361 165 00	2,5	40	101,9	100	60	15,0	29	33,8	27,4	20	25	45	12,5	1000
361 168 00	2,5	18	49,8	45	30	15,6	36	37,9	19,7	20	10	75	7,1	240
361 169 00	2,5	45	114,4	112,5	70	15,0	28	33,4	26,9	20	25	47	17,8	1200
361 464 00	3	16	53,8	48	40	13,6	37	38,8	16,1	25	15	75	9,0	310
361 465 00	3	40	122,3	120	60	16,0	32	36,8	28,9	25	25	50	22,5	1400
361 468 00	3	18	59,8	54	40	11,7	36	38,4	15,7	25	15	82	12,8	380
361 469 00	3	45	137,3	135	70	18,0	34	39,0	30,9	25	30	55	32,0	1900
361 864 00	4	16	71,8	64	50	12,0	41	43,8	16,5	30	20	95	20,9	600
361 865 00	4	40	163,1	160	80	20,0	40	46,4	36,9	30	30	65	52,3	3400
361 868 00	4	18	79,7	72	50	13,8	44	46,8	19,5	30	20	108	29,3	800
361 869 00	4	45	183,0	180	90	20,0	43	49,6	39,9	30	30	72	73,3	4900
362 168 00	5	18	99,6	90	60	16,5	57	60,8	24,4	40	25	135	61,0	1560
362 169 00	5	45	228,8	225	100	20,0	50	57,8	44,8	40	40	85	152,5	9080

Ratio 3:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 276 00	0,5	15	8,0	7,5	6	3,7	6,5	7,0	4,3	3	3	15,3	0,009	1
360 277 00	0,5	45	22,7	22,5	12	5,0	7,5	8,4	7,5	3	4	11,0	0,027	10
360 576 00	1	15	17,7	15	13	9,2	16	16,5	10,0	7,1	5	32	0,086	14
360 577 00	1	45	45,4	45	25	10	15	17,0	15,1	7,1	8	22	0,258	92
360 780 00	1,5	16	28	24	18	11	22	23,2	12,7	11,4	8	48	0,38	42
360 781 00	1,5	48	72,6	72	50	12	20	24,1	20,8	11,4	15	32	1,14	405
361 080 00	2	16	35,9	32	20	10	25	26,6	12,6	15	10	60	0,92	80
361 081 00	2	48	97,3	96	60	18	30	35,0	31,0	15	25	45	2,76	950
361 180 00	2,5	16	44,9	40	30	15	34	36,5	17,8	20	10	77	5,6	200
361 181 00	2,5	48	121,6	120	80	15	29	33,9	28,5	20	25	46	16,8	1600
361 480 00	3	16	53,9	48	40	12,5	36	38,3	15,0	25	15	86	10,0	310
361 481 00	3	48	145,9	144	70	18	34	38,7	32,0	25	30	53	30,0	2300
361 880 00	4	16	71,8	64	50	17	46	48,3	20,3	30	20	115	22,9	680
361 881 00	4	48	194,6	192	90	20	43	50,0	41,9	30	30	70	68,7	5700
362 176 00	5	15	84,9	75	60	15	53	56,4	19,1	40	20	130	39,3	1110
362 177 00	5	45	228,3	225	100	20	45	53,1	42,4	40	40	75	117,9	7920
362 180 00	5	16	89,8	80	60	16,5	55	59,0	21,6	40	20	140	47,7	1310
362 181 00	5	48	243,2	240	100	20	47	55,7	44,9	40	40	80	143,1	9640
367 376 00	6	15	101,4	90	70	20	67	73	26,2	50	30	159,2	70,7	1880
367 377 00	6	45	273,8	270	100	30	60	69	55,0	50	45	94,3	212,1	13170

* Basis for calculations see page 269.

Reworking within 24h-service possible. Custom made parts on request.

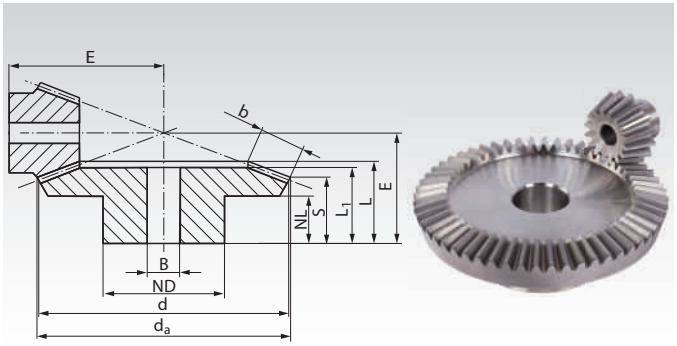
Bevel gears Made from Steel, Straight-Tooth System, Ratio 3.5:1 and 4:1

Material: up to module 2: 11SMnPb30.
from module 2.5: C45.

Tooth quality 8 modelled on DIN 3967 (from module 2). With crowned, milled teeth. Not hardened – not lapped.

Shaft angle = 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 3.5:1 Mod. 1 16/56 Teeth =
1 Piece Product No. 360 584 00 and
1 Piece Product No. 360 585 00

Ratio 3.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 584 00	1	16	18,7	16	13	7,6	16	16,6	8,4	8,7	5	36	0,127	16
360 585 00	1	56	56,3	56	30	10,0	14	16,7	14,6	8,7	8	22	0,445	130
360 784 00	1,5	16	28,1	24	18	12,2	24	26	13,6	13,1	8	55	0,45	48
360 785 00	1,5	56	84,5	84	50	12	24	27,1	23,8	13,1	15	35	1,58	634
361 084 00	2	16	35,9	32	20	10	25	26,8	12,5	15	10	68	0,99	82
361 085 00	2	56	113,1	112	60	18	31	35,5	31,9	15	25	46	3,47	1200
361 184 00	2,5	16	44,9	40	30	16,5	36	37,7	18,7	20	10	88	6,0	220
361 185 00	2,5	56	141,4	140	80	18	32	37,2	32,4	20	25	50	21,0	2300
361 484 00	3	16	53,9	48	40	15	39	40,6	16,8	25	15	100	10,9	340
361 485 00	3	56	169,7	168	80	18	33	39,8	34,0	25	30	55	38,2	3100
361 884 00	4	16	71,9	64	50	13	42	44,6	16,1	30	20	127	24,7	660
361 885 00	4	56	226,3	224	90	20	40	49,0	42,0	30	30	70	86,5	6900

Ratio 4:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 592 00	1	15	17,8	15	13	7,7	16	17,3	8,4	9,3	5	38	0,117	15
360 593 00	1	60	60,3	60	30	10,0	15	17,1	15,1	9,3	8	22	0,468	160
360 792 00	1,5	15	26,7	22,5	18	14,4	28	28,9	15,5	13,9	8	60	0,41	42
360 793 00	1,5	60	90,4	90	50	12,0	25	27,6	24,6	13,9	15	35	1,64	745
361 092 00	2	15	34,0	30	20	13,5	29	29,9	15,5	15	10	75	1,02	80
361 093 00	2	60	120,9	120	60	20,0	35	40,1	37,0	15	25	50	4,08	1600
361 192 00	2,5	15	42,5	37,5	30	16,0	35	36,8	17,6	20	10	92	5,3	190
361 193 00	2,5	60	151,2	150	80	18,0	33	37,8	33,8	20	25	50	21,2	2600
361 492 00	3	15	51,0	45	30	13,0	38	39,7	15,7	25	10	105	9,6	270
361 493 00	3	60	181,5	180	80	18,0	35	40,6	35,5	25	30	55	38,4	3800
361 892 00	4	15	68,0	60	40	12,5	43	44,8	16,0	30	20	135	21,7	520
361 893 00	4	60	242,0	240	90	20,0	41	50,1	44,0	30	30	70	86,8	8300

* Basis for calculations see page 269.

Reworking within 24h-service possible. Custom made parts on request.

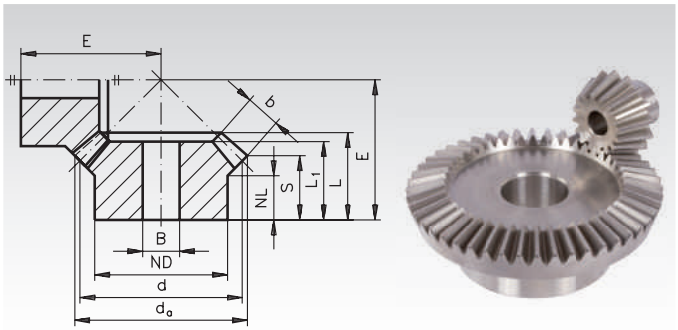
Bevel Gears Made from Stainless Steel, Straight-Tooth System, Ratio 1:1 to 4:1

Material: Stainless steel 1.4305.

Tooth quality 8 modelled on DIN 3967 (from module 2). Crowned, milled teeth.

Shaft angle 90°.

The bevel gears only run as a pair at the stated ratio and at the same module.



Drawing: Ratio 1:1, photo: ratio 3:1

Ordering Details: e.g.:
1 Pair of Bevel Gears Ratio 1:1 Mod. 1 16 teeth = 2 pieces Product No. 360 995 07.
1 Pair of Bevel Gears Ratio 2:1 Mod. 1 15/30 Teeth = 1 Piece Product No. 360 995 56 and 1 Piece 360 995 57.

Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 995 07	1	16	17,4	16	14	7	10	11,2	8,7	4,0	5	16	0,06	9
360 997 07	1,5	16	26,1	24	20	11	15	17,3	14,1	5,1	8	25	0,19	32
361 990 07	2	16	34,8	32	25	11,5	18	20,7	16,4	6,8	10	31	0,46	66
361 991 07	2,5	16	43,7	40	30	10	21	23,8	16,8	11	10	35	1,1	120
361 994 07	3	16	52,4	48	40	12	24	27,7	18,2	15	10	40	2,0	240
361 998 07	4	16	70,0	64	50	11	29	32,9	21,0	19	20	50	4,8	420

Ratio 2:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 995 56	1	15	17,4	15	13	6,5	11	11,9	7,6	5,0	5	22	0,08	10
360 995 57	1	30	30,6	30	20	9,0	13	15,1	13,1	5,0	5	20	0,16	40
360 997 56	1,5	15	26,1	22,5	18	6,5	13	14,8	8,4	7,6	8	30	0,27	26
360 997 57	1,5	30	45,9	45	30	12,0	18	20,7	17,6	7,6	10	28	0,54	124
361 990 56	2	15	33,7	30	20	7,5	22	23,0	10,9	14	10	40	0,78	58
361 990 57	2	30	61,8	60	40	12,0	24	27,2	21,9	14	15	35	1,56	312
361 991 56	2,5	15	42,2	37,5	30	15,4	31	33,3	18,6	17	10	55	1,6	160
361 991 57	2,5	30	77,3	75	50	10,0	24	28,1	21,6	17	15	38	3,2	530
361 994 56	3	15	50,6	45	30	11,5	33	35,4	16,4	22	10	60	2,8	270
361 994 57	3	30	92,8	90	50	10,0	26	30,7	22,3	22	20	42	5,6	750
361 998 56	4	15	67,5	60	40	10,0	38	41,0	16,9	28	20	75	6,0	410
361 998 57	4	30	123,8	120	60	15,0	33	39,4	28,8	28	25	55	12,0	1600

Ratio 3:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 995 76	1	15	17,7	15	13	9,2	16	16,5	10,0	7,1	5	32	0,10	14
360 995 77	1	45	45,4	45	25	10	15	17,0	15,1	7,1	8	22	0,30	92
360 997 80	1,5	16	28,0	24	18	11	21	23,2	12,7	11,4	8	48	0,45	42
360 997 81	1,5	48	72,6	72	50	12	20	24,1	20,8	11,4	15	32	1,35	405
361 990 80	2	16	35,9	32	20	10	25	26,6	12,6	15	10	60	1,21	80
361 990 81	2	48	97,3	96	60	18	30	35,0	31,0	15	25	45	3,63	95
361 991 80	2,5	16	44,9	40	30	15	34	36,5	17,8	20	10	77	2,6	200
361 991 81	2,5	48	121,6	120	80	15	29	33,9	28,5	20	25	46	7,8	1600
361 994 80	3	16	53,9	48	40	12,5	36	38,3	15,0	25	15	86	4,6	310
361 994 81	3	48	145,9	144	70	18	34	38,7	32,0	25	30	53	13,8	2300
361 998 80	4	16	71,8	64	50	17	46	48,3	20,3	30	20	115	9,4	680
361 998 81	4	48	194,6	192	90	20	43	50,0	41,9	30	30	70	28,2	5700

Ratio 4:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g
360 995 92	1	15	17,8	15	13	7,7	16	17,3	8,4	9,3	5	38	0,14	15
360 995 93	1	60	60,3	60	30	10,0	15	17,1	15,1	9,3	8	22	0,56	160
360 997 92	1,5	15	26,7	22,5	18	14,4	28	28,9	15,5	13,9	8	60	0,48	42
360 997 93	1,5	60	90,4	90	50	12,0	25	27,6	24,6	13,9	15	35	1,92	745
361 990 92	2	15	34,0	30	20	13,5	29	29,9	15,5	15	10	75	1,34	80
361 990 93	2	60	120,9	120	60	20,0	35	40,1	37,0	15	25	50	5,36	1600
361 991 92	2,5	15	42,5	37,5	30	16,0	35	36,8	17,6	20	10	92	2,5	190
361 991 93	2,5	60	151,2	150	80	18,0	33	37,8	33,8	20	25	50	10,0	2600
361 994 92	3	15	51,0	45	30	13,0	38	39,7	15,7	25	10	105	4,4	270
361 994 93	3	60	181,5	180	80	18,0	35	40,6	35,5	25	30	55	17,6	3800
361 998 92	4	15	68,0	60	40	12,5	43	44,8	16,0	30	20	135	8,9	520
361 998 93	4	60	242,0	240	90	20,0	41	50,1	44,0	30	30	70	35,6	8300

* Basis for calculations see page 269.

Bevel Gears Made from Steel, Spiral Tooth System, Ratio 1:1

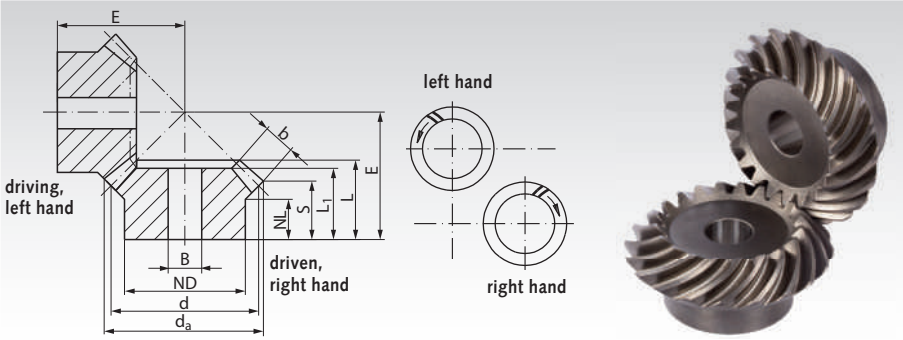
Material up to module 1.5: 42CrMo4, with cyclo-palloid spiral tooth system, teeth induction hardened.

Material from module 2.0: 16MnCr5, with palloid spiral tooth system, teeth case hardened.

Hubs and bores soft.
Products marked with * are not hardened.**

Tooth quality 8 modelled on DIN 3967.
Sold in pairs only.

Ordering Details: e.g.:
Product No. 385 316 00 = 1 Pair of Bevel Gears Ratio 1:1
Mod. 0.6 25/25 Teeth



Ratio 1:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S[1)] mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 316 00	0,6	25	23,3	22,5	19	7,2	12	13,4	9,2	6	6	20	2,1	50
385 320 00	0,6	30	27,8	27	22	7	13	14,9	9,9	7	8	23	3,0	75
385 322 00	0,6	35	32,3	31,5	25	7,2	15	16,3	10,6	8	8	26	3,5	116
385 511 00	1	20	31,4	30	25	8,4	15	17,3	11,7	8	8	26	6,3	112
385 516 00	1	25	38,9	37,5	25	8	16	19,0	11,9	10	10	30	10,0	155
385 520 00	1	30	46,4	45	30	8	19	21,7	13,2	12	10	35	14,3	278
385 611 00	1,3	20	41,8	40	30	7,3	19	20,7	12,9	11	10	32	14,8	222
385 616 00	1,3	25	51,8	50	30	8	19	21,8	11,9	14	10	36	18,5	326
385 620 00	1,3	30	61,8	60	35	8	21	24,2	12,9	16	12	42	31,5	530
385 709 00	1,5	18	41,7	39,6	30	8	17	20,3	13,2	10	10	32	15,9	209
385 715 00	1,5	24	54,9	52,8	35	8	20	22,6	12,7	14	10	38	21,2	408
385 719 00	1,5	28	63,7	61,6	40	8	20	23,2	13,3	14	12	43	34,5	576
386 011 00**	2	20	72,8	70	45	15	28	32,7	21,4	16	16	55	66,7	973
386 016 00**	2	25	80,3	78	45	15	29	32,3	22,4	14	16	60	72,8	1200
381 018 00***	2	26	82,8	80	55	20	35	37,7	26,4	16	16	65	42,0	1581
386 111 00**	2,5	20	91,5	88	56	18	34	36,9	22,8	20	20	65	130,5	1700
386 116 00**	2,5	25	99,5	96	54	16	32	37,2	23,8	19	20	70	154,7	2000
381 119 00***	2,5	28	109,9	106,4	70	25	44	47,7	33,6	20	20	85	98,6	3400
386 411 00**	3	20	104,2	100	68	17	36	43,4	27,1	23	25	75	216	2600
386 416 00**	3	25	116,2	112	64	18	34	41,7	26,1	22	25	80	257	2800
386 516 00**	3,5	25	132,9	128	72	20	38	46,2	28,5	25	30	90	396	4200
381 518 00***	3,5	26	144,9	140	85	30	57	62,3	42,5	28	30	110	238	7300

[1)] Theoretical dimensions, from module 2, tips of teeth levelled.
* Basis for calculations see page 269.
** Gears with ground hub contact surfaces and bores.
*** Not hardened.

Description of spiral toothed bevel gears

Distinctive features of bevel gears with spiral tooth system (spiral bevel gears):
Klingelnberg Cyclo-Palloid Tooth System: These gears are produced using the continuous generating method with a two-part cutter head.The tooth curvature follows the path of a extended epicycloid.
Klingelnberg Palloid Tooth System: These gears are produced using the continuous indexing method with a cone shaped gear hob. The tooth curvature follows the path of an extended involute.
Gleason-Circarc Gearing: These gears are produced using the continuous indexing method with a disk-shaped cutting head. The tooth curvature follows the path of a circular arc.
Cyclo-Palloid-, Palloid- and Gleason Tooth Systems are not interchangeable.

Available from stock: Cyclo-Palloid Tooth System Mod. 0.6 up to 1.5. Palloid Tooth System Mod. 2.0 up to 3.5.
Gleason Tooth System not in stock, supplied on demand.

The spiral tooth system offers very quiet running as there are always several teeth in mesh. Without load, the contact profile zone should be in the middle of the tooth, lengthwise. Under load the contact profile zone evenly expands towards the inside and outside diameter. The ground contact surfaces of the hubs and bores guarantee an exact adjustment of the assembly dimension E.

Sense of rotation:
If the transmission ratio is not 1:1, the rotational direction marked on the drawing above should be preferred (more favourable direction of the axial forces).

Reworking within 24h-service possible. Custom made parts on request.

Bevel Gears Made from Steel, Spiral Tooth System, Ratio 1.214:1 to 1.615:1

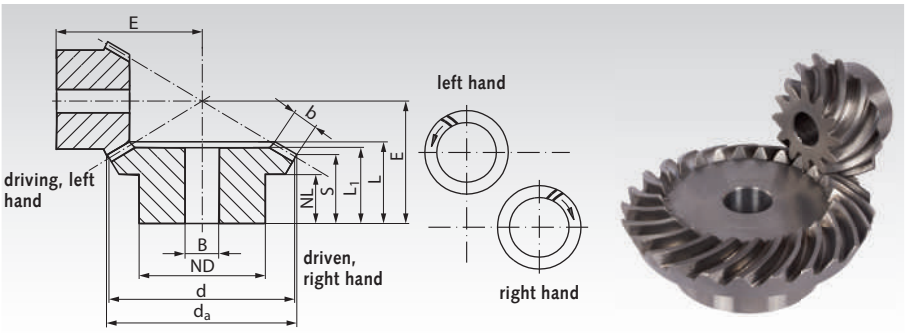
Material up to module 1.5: 42CrMo4, with cyclo-palloid spiral tooth system, teeth induction hardened.

Material from module 2.0: 16MnCr5, with palloid spiral tooth system, teeth case hardened.

Hubs and bores soft.
Tooth quality 8 modelled on DIN 3967.

Sold in pairs only.

Ordering Details: e.g.:
Product No. 385 740 00 = 1 Pair of Bevel Gears
Ratio 1.214:1 Mod. 1.5 14/17 Teeth



Ratio 1.214:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 740 00	1,5	14	41,0	38,7	22	11	21,1	24,2	15,4	11,5	12	38,0	14,1	236
		17	48,9	47,0	30	11	20,9	23,9	16,6	11,5	15	34,8	17,1	

Ratio 1.385:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 744 00	1,5	13	36,7	33,9	22	11	21,6	24,0	15,9	10	12	38,5	11,3	216
		18	48,5	47,0	30	11	20,9	24,9	19,1	10	15	34,8	15,7	

Ratio 1.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S[1] mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 354 00	0,6	22	20,8	19,8	17	7	13	14,3	8,5	7	6	23	2,2	116
		33	30,3	29,7	20	8	14	15,5	11,6	7	8	21	3,3	
385 552 00	1	20	31,6	30	25	8	17	18,3	10,0	10	8	32	8,1	166
		30	46,3	45	30	8	17	19,5	14,0	10	10	28	12,2	
385 648 00	1,3	16	34,3	32	25	8	18	19,9	10,7	11	8	34	11,9	220
		24	49,4	48	30	8	18	21,1	15,0	11	10	30	17,9	
385 748 00	1,5	16	37,8	35,8	30	8	17	18,8	10,5	10	10	36	14,3	273
		24	54,4	52,8	35	8	17	21,1	15,6	10	10	32	21,5	
386 048 00**	2	16	53,3	50	35	6	18	21,2	13,6	11	10	48,45	40,3	561
		24	77,2	75	39	15	24	27,7	21,7	11	16	45	60,5	
386 148 00**	2,5	16	68,2	64	40	14	25	31,7	18,4	16	16	65	83,8	1300
		24	98,8	96	54	14	23	28,9	20,1	16	20	50	125,7	
386 448 00**	3	16	81,0	76	50	15	28	35,5	19,7	19	20	75	143	1682
		24	117,3	114	64	18	28	35,0	24,5	19	25	60	215	

Ratio 1.615:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 550 00	1	13	20,3	18,6	16	8,2	12	13,8	9,5	5	8	24	2,4	45
		21	31,1	30,0	20	6	10,5	12,2	9,6	5	10	18	3,9	

[1] Theoretical dimensions, from module 2, tips of teeth levelled.
* Basis for calculations see page 269.
** Gears with ground hub contact surfaces and bores.

Reworking within 24h-service possible. Custom made parts on request.

Bevel Gears Made from Steel, Spiral Tooth System, Ratio 2:1 to 2.5:1

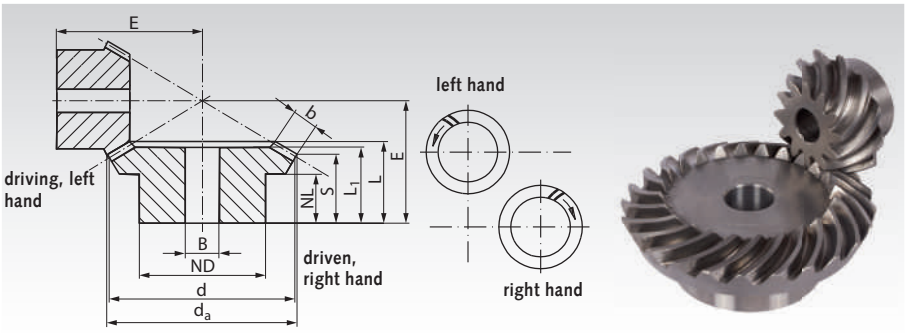
Material up to module 1.5: 42CrMo4, with cyclo-palloid spiral tooth system, teeth induction hardened.

Material from module 2.0: 16MnCr5, with palloid spiral tooth system, teeth case hardened.

Hubs and bores soft.
Products marked with * are not hardened.**

Tooth quality 8 modelled on DIN 3967.
Sold in pairs only.

Ordering Details: e.g.:
Product No. 385 362 00 = 1 Pair of Bevel Gears Ratio 2:1
Mod. 0.6 22/44 Teeth



Ratio 2:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	$S^{1)}$ mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 362 00	0,6	22	20,8	19,8	16	7,4	15	15,6	8,5	8	6	28	2,3	116
		44	40,1	39,6	25	8	15	17,2	13,6	8	10	23	4,6	
385 560 00	1	20	31,8	30	25	8	19	20,2	9,4	12	8	39	9,8	323
		40	60,9	60	40	8	18	21,2	15,9	12	12	30	19,6	
385 658 00	1,3	16	34,4	32	25	7	20	22,1	9,6	14	8	41	12,0	397
		32	65,1	64	40	8	20	23,3	17,1	14	12	32	24,0	
385 756 00	1,5	16	38,0	35,2	30	8,4	19	21,2	10,5	12	10	45	14,4	435
		32	71,7	70,4	45	8	17	21,0	15,7	12	12	32	28,8	
381 054 00* **	2	12	45,1	41,5	30	12	27,8	27,8	14,4	15	12	54,94	10,1	846
		24	84,5	83	50	15	29	32,6	26,0	15	16	44,97	20,2	
386 054 00 **	2	13	48,6	45	30	15	30	33,0	20,9	15	10	63,65	40,2	818
		26	91,8	90	40	22	30	35,9	29,3	15	16	50	80,4	
381 154 00* **	2,5	11	57,2	52,5	40	15	36,6	36,6	18,7	20	16	69,97	17,8	2000
		22	107,1	105	70	20	39	44,6	35,9	20	20	59,95	35,6	
386 154 00 **	2,5	13	60,5	56	39	15	34	38,2	20,1	20	16	75,13	84	1400
		26	114,2	112	54	21	30	38,0	29,3	20	25	55	168	
386 454 00 **	3	13	69,4	64	45	16	37	41,7	22,3	22	20	84,62	133	2000
		26	130,6	128	54	20	32	40,3	30,7	22	25	60	266	
381 456 00* **	3	15	77,9	72,5	55	25	51,3	51,3	28,8	25	20	100	64	4800
		30	147,6	145	90	25	50	57,4	46,5	25	30	80	128	
386 554 00 **	3,5	13	78,3	72	54	12	34	39,5	19,5	24	20	88,38	197	2800
		26	147,1	144	64	25	38	47,7	37,2	24	30	70	394	

Ratio 2.066:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 556 00	1	15	23,6	21,8	19	6	13,2	13,2	6,9	7	8	29,0	3,6	112
		31	45,9	45,0	24	8	14,1	16,6	13,5	7	10	23,5	7,4	

Ratio 2.5:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	$S^{1)}$ mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 374 00	0,6	22	20,9	19,8	16	6,8	16	16,7	7,5	10	6	32	2,6	172
		55	49,9	49,5	30	8	16	19,3	15,6	10	10	25	6,5	
385 572 00	1,0	20	31,8	30	25	8,4	21	22,8	9,8	14	8	47	9,9	355
		50	75,7	75	50	8	18	21,1	15,9	14	12	30	24,8	
385 666 00	1,3	14	30,5	28	22	8,7	20	21,6	10,5	12	8	45	11,3	420
		35	70,9	70	45	8	18	21,6	17,1	12	12	30	28,2	
385 764 00	1,5	16	38,0	35,2	30	7,5	20	21,6	9,6	13	10	53	14,5	624
		40	89,1	88	60	8	16	20,6	15,8	13	15	32	36,3	
386 162 00 **	2,5	10	45,4	40	33	11	24,5	27,4	16,1	15	12	62,33	45,8	1200
		25	101,5	100	54	22	30	37,3	32,0	15	25	50	114,5	
386 462 00 **	3,0	10	54,5	48	39	11	28	30,8	16,3	18	16	72,71	79	1700
		25	121,8	120	64	28	38	44,8	38,4	18	25	60	198	
386 562 00 **	3,5	10	63,6	56	40	14	34	38,1	21,5	21	16	87,06	126	2400
		25	142,1	140	70	35	45	52,3	44,8	21	30	70	315	

[1)] Theoretical dimensions, from module 2, tips of teeth levelled.
* Basis for calculations see page 269.
** Gears with ground hub contact surfaces and bores.
*** Not hardened.

Reworking within 24h-service possible. Custom made parts on request.

Bevel Gears Made from Steel, Spiral Tooth System, Ratio 3:1 and 4:1

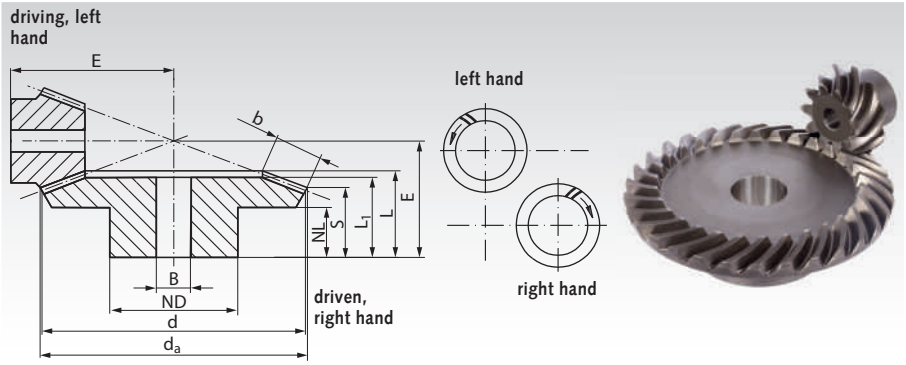
Material up to module 1.5: 42CrMo4, with cyclo-palloid spiral tooth system, teeth induction hardened.

Material from module 2.0: 16MnCr5, with palloid spiral tooth system, teeth case hardened.

Hubs and bores soft.
Tooth quality 8 modelled on DIN 3967.

Sold in pairs only.

Ordering Details: e.g.:
Product No. 385 580 00 = 1 Pair of Bevel Gears
Ratio 2.882:1 Mod. 1 17/49 Teeth



Ratio 3:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S[1)] mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 378 00	0,6	20	19,1	18	15	7,5	17	17,0	8,2	10	6	35	2,1	175
		60	54,3	54	45	8	16	19,7	16,6	10	10	25	6,3	
385 584 00	1	16	26,1	24	20	8,3	22	22,6	9,3	14	8	45	5,8	380
		48	72,5	72	50	8	18	21,3	16,8	14	12	28	17,4	
385 678 00	1,3	11	25,1	22	19	6	17	17,9	7,5	11	8	40	7,7	320
		33	66,6	60	40	8	17	20,4	16,9	11	12	27	23,1	
385 774 00	1,5	10	26,0	22	17	8	19	20,1	9,6	11	8	42	9,1	380
		30	66,6	66	40	8	17	21,3	17,8	11	12	28	27,3	
386 074 00**	2	10	36,5	32	22	11	24	25,6	17,7	13	8	60,52	25,4	638
		30	99,0	96	48	19	25	29,4	25,6	13	20	40	76,2	
386 174 00**	2,5	10	43,1	37,5	27	12	26,5	28,8	19,6	15	12	69,84	45,8	1100
		30	113,7	112,5	54	24	32	37,6	33,2	15	25	50	137,4	
386 574 00**	3,5	10	60,3	52,5	40	12	33	36,1	22,5	22	16	92,64	132	2700
		30	159,2	157,5	70	29	40	48,0	41,5	22	30	65	396	

Ratio 4:1

Product No.	Module	Number of teeth	d_a mm	d mm	ND mm	NL mm	L_1 mm	L mm	S mm	b mm	B^{H7} mm	E mm	Torque* Nm	Weight g/Pair
385 594 00	1	16	25,9	24	20	7,3	21	21,8	8,2	14	8	56	7,8	842
		64	96,5	96	70	8	19	22,4	19	14	20	30	31,2	
385 784 00	1,5	11	27,8	24,2	20	8	19	20,7	9	12	8	57	11,3	775
		44	97,3	96,8	70	8	17	21,9	19	12	20	30	45,2	

[1)] Theoretical dimensions, from module 2, tips of teeth levelled.
* Basis for calculations see page 269.
** Gears with ground hub contact surfaces and bores.

Reworking within 24h-service possible. Custom made parts on request.

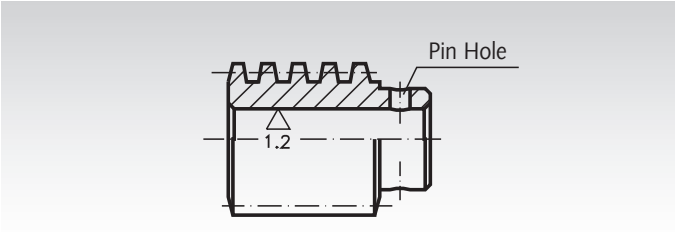
Mounting Options for Drive Wheels

There are several possibilities for mounting driving wheels (sprockets, V-Belt Pulleys, pulleys, spur gears etc.) or hubs on shafts. Most wheels are stocked with a rather small bore to allow for further machining. Machining works as drilling out, keywaying a.s.o. can be done at extra charge.

Please note: for several shaft diameters a number of sprockets, V-belt pulleys, spur gears and worm-gear sets are in stock "ready-to-install", i.e. with custom bore and keyway or prepared for Taper clamping bushes.

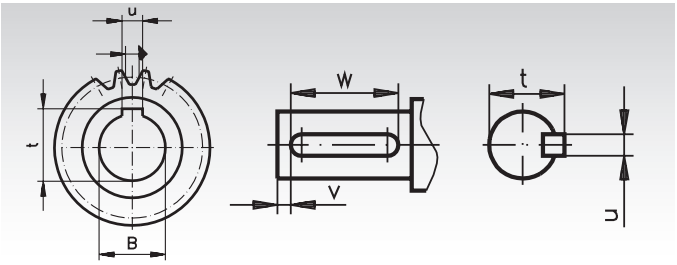
Fixing Pins

A hole is drilled through hub and shaft and both parts are then connected with a fixing pin. Usually only one side of the hub is pre-drilled, then the wheel is pushed onto the shaft and the hole is drilled through both shaft and the other side of the hub. Then the pin is driven in. This mounting method is suitable for low torques.



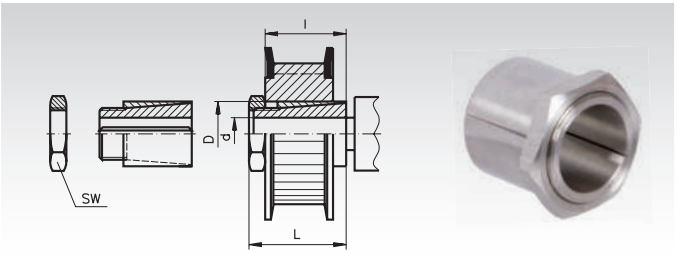
Feather Key Connection

Shaft and hub both receive a keyway, a key is pushed into the keyway of the hub. The wheel is pushed onto the shaft and secured against axial movement (with a set screw or with a stepped shaft and axial screw and washer at the end of the shaft). The most common kind of keyway is DIN 6885/1. Key connections are suitable for medium torques. Keys DIN 6885 see page 578. Boxes with an assortment of keys DIN 6885 see page 577.



Clamping Sets, Clamping Bushes and Shrink Disks

Clamping sets and thin-walled clamping bushes are available for various diameters. They allow fast and easy mounting on round shafts. A keyway is not required. Shrink disks are special clamping sets which press a thin-walled hub onto a shaft. Clamping connections are suitable for rather high torques. **Clamping sets and bushes, and shrink disks** see page 330.

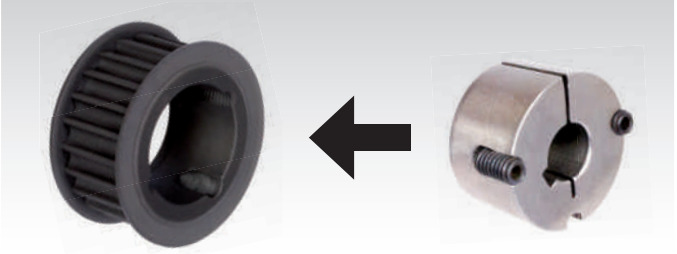


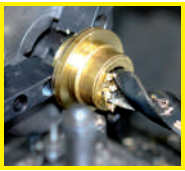
Taper Clamping Bushes

These customary conical bushes are used for easy and fast mounting of driving elements in Taper version. They can be used with and without key.

The bushes are available with various outer dimensions. For every outside measure there are bushes with many different bores available. This mounting method is cost-efficient and fast, and suitable for rather high torques. A large selection of cost-efficient driving elements in Taper version are available ex stock.

Taper clamping bushes see page 360.
Welding hubs for taper bushes see page 362.
Taper sprockets see page 74, 92, 101.
Taper V-belt pulleys see page 183.
Taper pulleys see page 154.
Taper couplings see page 388.





Reworking within 24h-service possible. Custom made parts on request.

Worms and Worm Gears, General Basics and Overview

General descriptions:

- For right angled power transmission with simultaneous vertical offset (centre distance of the crossed axles).
- The movement usually takes places via the worm (the movement can be made via the gear wheel if necessary in the case of low transmissions up to 3:1).
- The selection/dimensioning is made as function of the torque (required torque on the worm gears).
- High transmissions up to approx. 100:1 are possible in just one stage.
- Several transmissions and centre distances on stock.
- Silent and low vibration.
- Power loss is greater than in spur and bevel gears, depending on the efficiency or transmission.
- Power loss is converted to frictional heat.
- Low transmission = higher efficiency and lower self-locking.
- High transmission = low efficiency and high self-locking.

Standard Worm Gears and Worm shafts page 286 - 293

For simple applications, e.g. manual operation or occasional motorised operation. Continuous operation is possible at medium torques. Reworking (custom bore, feather keyway, fixed thread) is an optional extra.
Single thread: For high to medium transmissions.
Double thread: For medium to low transmissions.

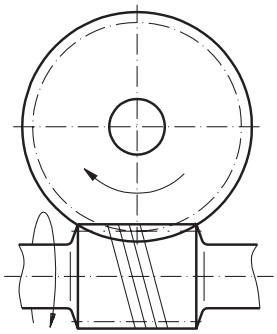
Sorted by number of threads and module. The gear wheels can be combined with worms having the same module and the same number of threads to make different transmissions. This results in the different centre distances.

Precision worm gear sets page 295 - 304

Ideal for continuous operation at high speeds and torques. Mostly ready-to install without needing reworking. Hence they are also economical for simple applications.

Sorted by centre distance. The gear wheels can only be used with worms having the same centre distance and the same transmission. Several transmissions are available per centre distance.

Gear Set, Right Hand



The catalogue parts are right handed.

Left hand sets have to be custom made on request.

Recommendation regarding the Lubrication

Peripheral Speed	Lubrication	Lubricant
up to 1 m/s (gear submerged)	Dip-Feed Lubrication	Grease
up to 4 m/s (gear submerged)	Dip-Feed Lubrication	Oil
over 4 m/s (gear submerged)	Spray lubrication	Oil
up to 4 m/s (worm submerged)	Dip-Feed Lubrication	Grease
up to 10 m/s (worm submerged)	Dip-Feed Lubrication	Oil
over 10 m/s (worm submerged)	Spray lubrication	Oil

Efficiency and self-locking

The calculated efficiency depends on the friction conditions in the contact zone and where the bearings and seal are mounted. These conditions may vary depending on the environmental conditions or lubrication. This leads to a large array, where no exact statement regarding the self-locking capacity can be made. This array is marked with "limited".

A calculated self-locking capacity can be negatively influenced by various factors. For this reason we cannot grant any guarantee regarding the self-locking capacity.

Maximum Torque

The torque values are to be taken as Maximum Values that should under no circumstances be exceeded!
Depending on the power of the gear unit , the prevailing temperature and lubrication conditions in the worm gear unit (depending on the cooling , lubricant, mounting etc.) operating set ups with increasing wear may occur - having a negative influence on the wear lifespan of the unit - although the permissible torques were not exceeded. In order to go to the upper limit of the maximum torques, the whole construction must have a rigid design (housing, bearing, bearing distance), to avoid negative influences due to deformation.

The stated torques were calculated presuming an alternating load. They are output torques (of the worm gear, not the worm shaft).

Torque Conversion

Output torque = Input Torque x Efficiency x Transmission

$$\text{Input torque} = \frac{\text{Output torque}}{\text{Efficiency x Ratio}}$$

Worm dimensions

to be calculated	given unit	formula
Reference Circle Pitch = t_s	Lead and Number of Gears	$\frac{H}{z}$
Standard pitch = t_{no}	Pitch and Lead Angle	$t_s \cdot \cos \gamma_m$
Real module = m_s	Reference Circle Pitch	$\frac{t_s}{\pi}$
Standard module = m_n	Standard pitch	$\frac{t_n}{\pi}$
med. lead angle = $^\circ_m$	Lead and Pitch Ø	$\tan \gamma_m = \frac{H}{d \cdot \pi}$
Pitch Ø = d	Lead and Lead Angle	$\frac{H}{\pi \cdot \tan \gamma_m}$
Tip Ø = d_a	Pitch Ø and Standard Module	$d + 2m_n$
Lead = H	Number of Gears and Real Module	$z \cdot m_s \cdot \pi$

Worm Gear - Dimensions and Torque

to be calculated	given unit	formula
Pitch Ø = d		$z \cdot m_s$
Tip Ø = d_a in Median Plane of Gear		$\approx d + 2\ m_s$
Output torque = Md in Nm		$9550 \cdot \frac{P_2}{n_2}$

Material quality:
Information about the material quality can be found at each worm and worm gear.

Note Regarding the Torque-Values Stated in the Catalogue page 286 bis 293

The worm gear sets are calculated in accordance with DIN 3976 or Niemann/Winter (Niemann/Winter "Maschinenelemente Band III, 2. Auflage, Nachdruck 1986", Machine Components Volume III, 2nd Edition, Reprint 1986 , Publisher: Springer-Verlag).
The decisive strength criterion for small modules is the pitting resistance of the worm gear flanks and for larger modules usually the tooth-root strength of the worm gear.

Calcul. Factor/Determining Factor	Value	Note
Tooth root safety S_F	min. 2.0	–
Flank safety S_H	min. 1.3	Endurance strength 10,000 h
Application factor K_A	1.25	Industrial gear mechanisms, uniform, light shocks

The following permissible Hertzian stress was assumed for the materials used:

Material	permissible flank pressure s_{Hlim} in N/mm²	Maximum Limit Stress before Tooth Fracture U_{lim} in N/mm²
G-CuSn12	265	115
GG25	350	150

The load bearing capacity of a worm gear depends on various different factors. The stated torques are only reference values, serving to facilitate the selection process. If necessary a specific calculation of strength and load bearing capacity must be carried out for each application.

Depending on the operating conditions, the wear lifespan may be influenced by grease/oil lubrication. Please also note that insufficient lubrication may lead to scuffing of the gear flanks.

IMPORTANT: The torque values stated refer to the permissible output torques (of the worm gear).

Worm Gears Made from Bronze (G-CuSn12) with Hollow Teeth, Single-Thread, Right Hand

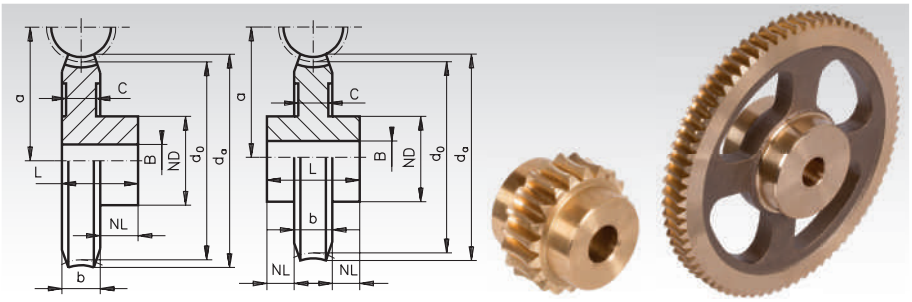
Single-thread worm gears to be paired with single-thread worms page 287. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

With one-sided hub up to Module 1.
With double-sided hub from Module 1.5.

Pressure angle 20°.

Efficiency: Module 0.5: approx. 0.53.
Module 0.75: approx. 0.58.
Module 1: approx. 0.53.
Module 1.5: approx. 0.49.
Module 2: approx. 0.50.

Self-locking capacity:
Module 0.5 and 0.75 limited self-locking capacity. Other versions not self-locking.

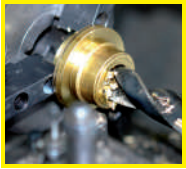


Ordering Details: e.g.: Product No. 300 007 00, Worm Gear Bronze, Module 0.5, 20 Teeth, Single-Thread, Right Hand

	Product No.	Number of Teeth	Transm. Ratio	d_0 mm	d_a mm	ND mm	NL mm	b mm	L mm	C* mm	a mm	B^{H7} mm	perm. MT** Nm	Weight g
Module 0.5	**300 007 00**	20	20 : 1	10,0	11,2	8	5	3	8	-	8,5	3	0,13	3
	300 010 00	25	25 : 1	12,5	13,7	10	5	3	8	-	9,75	4	0,24	6
	300 020 00	50	50 : 1	25	26,2	10	5	3	8	-	16	4	0,87	16
	300 030 00	75	75 : 1	37,5	38,7	15	5	3	8	-	22,25	4	1,30	36
	300 032 00	100	100 : 1	50	51,2	15	5	3	8	-	28,5	5	1,73	60
Module 0.75	**300 307 00**	20	20 : 1	15	16,7	10	6	3	9	-	11,75	4	0,35	8
	300 310 00	25	25 : 1	18,75	20,4	12	6	3	9	-	13,62	4	0,59	13
	300 320 00	50	50 : 1	37,5	39,2	12	6	3	9	-	23	4	2,70	35
	300 330 00	75	75 : 1	56,25	57,9	15	6	3	9	-	32,37	4	4,10	73
	300 332 00	100	100 : 1	75	76,7	15	6	3	9	-	41,75	5	5,40	123
Module 1.0	**300 605 00**	16	16 : 1	16	18,8	12	8	6,5	14,5	-	15	5	0,29	16
	300 606 00	18	18 : 1	18	20,8	12	8	6,5	14,5	-	16	5	0,40	20
	300 607 00	20	20 : 1	20	22,8	16	8	6,5	14,5	-	17	5	0,52	30
	300 610 00	25	25 : 1	25	27,8	16	8	6,5	14,5	-	19,5	5	0,94	40
	300 615 00	35	35 : 1	35	37,8	16	10	6,5	16,5	-	24,5	6	2,40	70
	300 620 00	50	50 : 1	50	52,8	20	10	6,5	16,5	-	32	6	6,90	140
	300 630 00	75	75 : 1	75	77,8	30	10	6,5	16,5	4,5	44,5	6	14,60	200
	300 632 00	100	100 : 1	100	102,8	30	12	6,5	18,5	4,5	57	6	19,40	480
	300 635 00	125	125 : 1	125	127,8	40	12	6,5	18,5	4,5	69,5	8	24,10	580
	300 640 00	150	150 : 1	150	152,8	40	12	6,5	18,5	4,5	82	8	28,90	590
Module 1.5	**301 005 00**	16	16 : 1	24	28,4	18	6/6	12	24	-	24,5	8	1,33	60
	301 006 00	18	18 : 1	27	31,7	20	8/8	12	28	-	26	8	1,80	80
	301 007 00	20	20 : 1	30	34,7	25	8/8	12	28	-	27,5	10	2,30	130
	301 013 00	30	30 : 1	45	49,7	30	8/8	12	28	-	35	10	6,60	260
	301 018 00	40	40 : 1	60	64,7	30	10/10	12	32	-	42,5	10	14,80	400
	301 020 00	50	50 : 1	75	79,7	30	10/10	12	32	10	50	10	25,00	440
	301 030 00	75	75 : 1	112,5	117,2	40	10/10	12	32	10	68,75	12	37,00	860
	301 032 00	100	100 : 1	150	154,7	45	10/10	12	32	10	87,5	12	49,00	1300
Module 2.0	**301 305 00**	16	16 : 1	32	37,6	20	8/8	14	30	-	32	8	5,20	140
	301 306 00	18	18 : 1	36	41,6	25	8/8	14	30	-	34	10	7,00	250
	301 307 00	20	20 : 1	40	45,6	30	10/10	14	34	-	36	12	9,10	260
	301 313 00	30	30 : 1	60	65,6	40	10/10	14	34	-	46	12	26,40	600
	301 318 00	40	40 : 1	80	85,6	40	10/10	14	34	11	56	12	47,00	650
	301 320 00	50	50 : 1	100	105,6	40	10/10	14	34	11	66	12	58,30	760
	301 324 00	60	60 : 1	120	125,6	50	10/10	14	34	11	76	12	69,50	1200

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.



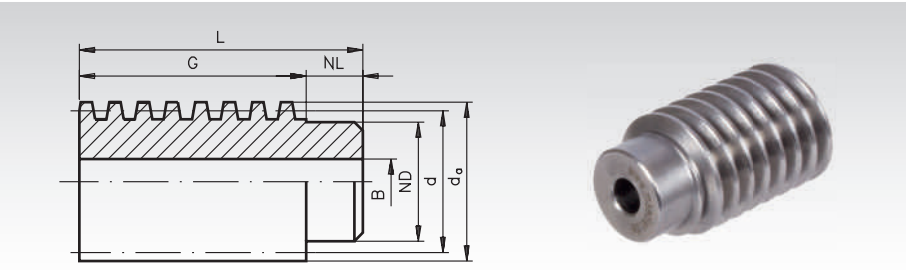
Reworking within 24h-service possible. Custom made parts on request.

Hollow Worms and Worm Shafts Single-Thread, Right Hand

Single-thread worms to be paired with single-thread worm gears page 286. If the module (and number of threads) are matching, various ratios at various axle distances can be realized. (see table page 286).

Hollow Worms, Milled, Made from Steel (11SMnPb30), Single-Thread, Right Hand

Pressure angle 20°.

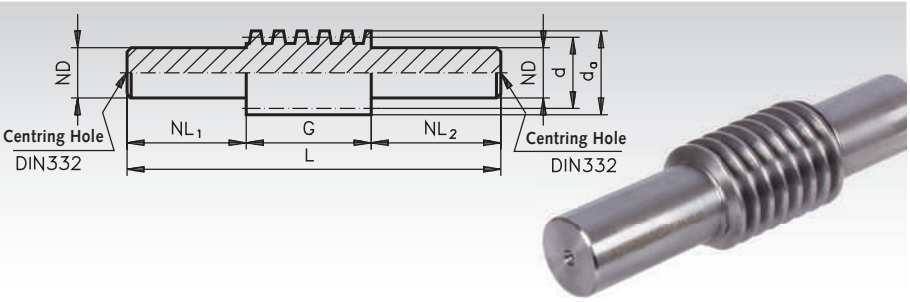


Ordering Details: e.g.: Product No. 300 000 00, Worm, 11SMnPb30, Module 0.5, Single Thread, Right Hand

	Product No.	d mm	d_a mm	ND mm	NL mm	G mm	L mm	B^{H7} mm	Weight g
Module 0.5	300 000 00	7	8	5,5	4	12	16	3	4
Module 0.75	300 300 00	8,5	10	6	4	16	20	4	6
Module 1.0	300 600 00	14	16	11	6	24	30	6	26
Module 1.5	301 000 00	25	28	21	10	40	50	8	160
Module 2.0	301 300 00	32	36	25	10	45	55	8	300

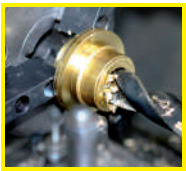
Worm Shafts Milled, with Centring Hole, Made from Steel (11SMnPb30), Single-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 300 001 00, Worm Shaft, 11SMnPb30, Module 0.5, Single Thread, Right Hand

	Product No.	d mm	d_a mm	ND $^{+0,2}_{+0,4}$ mm	NL_1 mm	G mm	NL_2 mm	L mm	Weight g
Module 0.5	300 001 00	7	8	5,5	18	12	10	40	9
Module 0.75	300 301 00	8,5	10	6	20	16	15	51	15
Module 1.0	300 601 00	14	16	10	30	24	20	74	60
Module 1.5	301 001 00	25	28	20	40	40	30	110	300
Module 2.0	301 301 00	32	36	25	50	45	36	131	620



Reworking within 24h-service possible. Custom made parts on request.

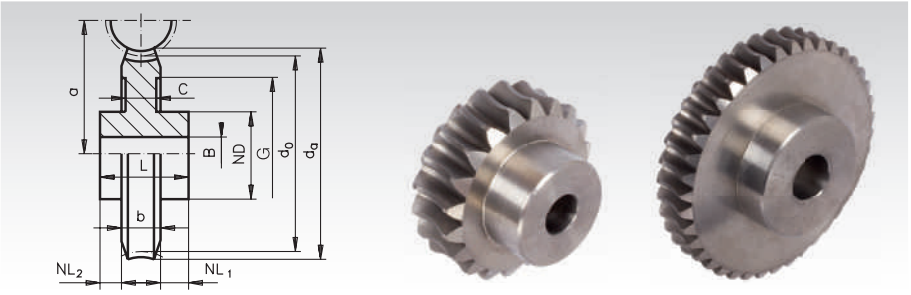
Worm Gears Made from Cast Iron (GG25) with Hollow Teeth, Single-Thread, Right Hand

Single-thread worm gears to be paired with single-thread worms page 289. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

Pressure angle 20°.

Efficiency: Module 3: approx. 0.46.
Module 4: approx. 0.48.
Module 5: approx. 0.49.
Module 6: approx. 0.46.

Self-locking capacity: not self-locking.



Ordering Details: e.g.: Product No. 310 005 00, worm gear, GG25, Module 3, 16 Teeth, Single Thread, Right Hand

	Prouct No.	Number of teeth	Transm. Ratio	d_0 mm	d_a mm	ND mm	NL_1/NL_2 mm	b mm	L mm	G mm	C* mm	a mm	B^{H7} mm	perm. MT** Nm	Weight kg
Module 3.0	**310 005 00**	16	16 : 1	48	57	40	18/4	24	46	-	-	43	15	22	0,46
	310 006 00	18	18 : 1	54	63	40	18/4	24	46	-	-	46	15	27	0,55
	310 007 00	20	20 : 1	60	69	40	18/4	24	46	-	-	49	15	36	0,64
	310 011 00	26	26 : 1	78	87	45	18/4	24	46	60	12	58	18	73	1,20
	310 014 00	32	32 : 1	96	105	50	18/4	24	46	70	12	67	20	132	1,40
	310 018 00	40	40 : 1	120	129	65	18/4	24	46	90	12	79	25	189	2,20
	310 021 00	52	52 : 1	156	165	75	23/4	24	51	116	12	97	30	242	3,40
	310 026 00	65	65 : 1	195	204	85	23/4	24	51	150	12	116,5	35	305	4,90
Module 4.0	**310 305 00**	16	16 : 1	64	76	50	21/5	34	60	-	-	57	20	30	1,00
	310 306 00	18	18 : 1	72	84	50	21/5	34	60	-	-	61	20	42	1,50
	310 307 00	20	20 : 1	80	92	50	21/5	34	60	-	-	65	20	50	1,60
	310 311 00	26	26 : 1	104	116	55	21/5	34	60	80	14	77	22	102	2,10
	310 314 00	32	32 : 1	128	140	65	21/5	34	60	90	14	89	25	185	3,40
	310 318 00	40	40 : 1	160	172	75	21/5	34	60	125	14	105	30	355	4,50
	310 321 00	52	52 : 1	208	220	85	26/5	34	65	175	14	129	35	585	6,70
	310 326 00	65	65 : 1	260	272	100	26/5	34	65	225	14	155	40	735	9,50
Module 5.0	**310 605 00**	16	16 : 1	80	95	70	27/5	40	72	-	-	71	20	93	2,30
	310 611 00	26	26 : 1	130	145	70	27/5	40	72	99	16	96	28	343	4,20
	310 614 00	32	32 : 1	160	175	75	27/5	40	72	125	16	111	30	620	5,30
	310 618 00	40	40 : 1	200	215	85	27/5	40	72	160	16	131	35	874	7,40
	310 621 00	52	52 : 1	260	275	100	32/5	40	77	220	16	161	40	1135	11,80
	310 626 00	65	65 : 1	325	340	115	32/5	40	77	280	16	193,5	45	1420	17,00

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.

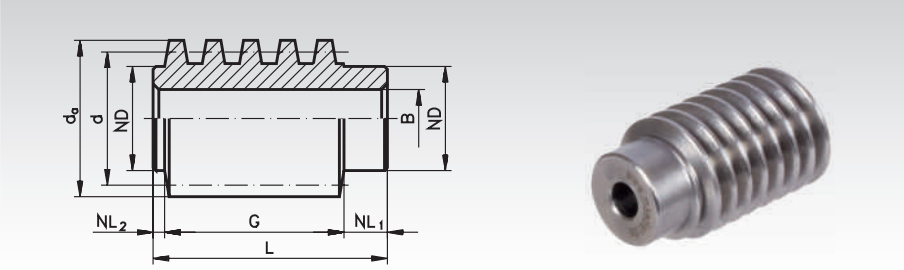
Reworking within 24h-service possible. Custom made parts on request.

Hollow Worms and Worm Shafts Single-Thread, Right Hand

Single-thread worms to be paired with single-thread worm gears page 288. If the module (and number of threads) are matching, various ratios at various axle distances can be realized (see table page 288).

Hollow Worms, Whirled, Made from Steel (C45), Single-Thread, Right Hand

Pressure angle 20°.

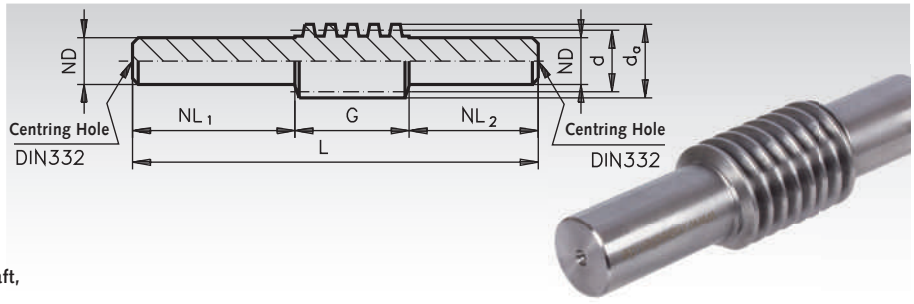


Ordering Details: e.g.: Product No. 310 000 00, Worm, Steel, Module 3, Single Thread, Right Hand

	Product No.	d mm	d_a mm	ND mm	NL_1 mm	G mm	NL_2 mm	L mm	B^{H7} mm	Weight kg
Module 3.0	310 000 00	38	44	30	12	46	3	61	15	0,4
Module 4.0	310 300 00	50	58	40	15	62	4	81	20	1,2
Module 5.0	310 600 00	62	72	50	18	80	5	103	25	1,8

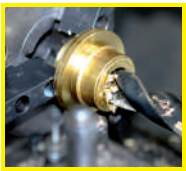
Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Single-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 310 001 00, Worm Shaft, 11 SMnPb30, Module 3, Single Thread, Right Hand

	Product No.	d mm	d_a mm	ND $^{+0,2}_{+0,4}$ mm	NL_1 mm	G mm	NL_2 mm	L mm	Weight kg
Module 3.0	310 001 00	38	44	30	130	46	90	266	1,6
Module 4.0	310 301 00	50	58	40	175	62	120	357	3,8
Module 5.0	310 601 00	62	72	50	220	80	150	450	7,6



Reworking within 24h-service possible. Custom made parts on request.

Worm Gears Made from Bronze (G-CuSn12), with Hollow Teeth, Double-Thread, Right Hand

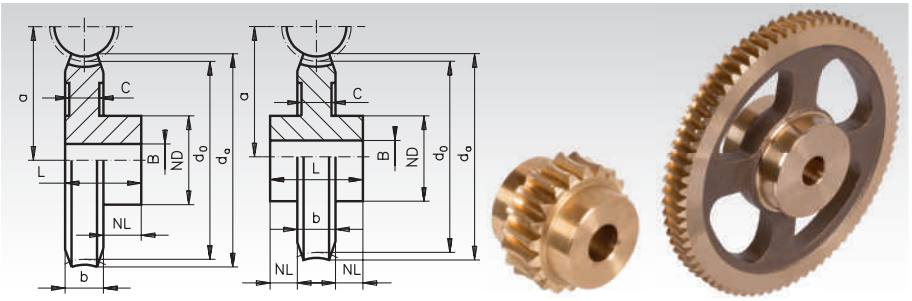
Worm gears with double thread matching the double-thread worms page 291. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

With one-sided hub up to Module 1.
With double-sided hub from Module 1.5.

Pressure angle 20°.

Efficiency:
Module 0.5: approx. 0.69.
Module 0.75: approx. 0.73.
Module 1: approx. 0.69.
Module 1.5: approx. 0.49/0.65.
Module 2: approx. 0.66.

Self-locking capacity: Module 0.5 and 0.75 limited self-locking capacity.
Other versions not self-locking.



Ordering Details: e.g.: Product No. 300 207 00, Worm Gear, Bronze, Module 0.5, 20 Teeth, Double Thread, Right Hand

	Product No.	Number of Teeth	Transm. Ratio	d_0 mm	d_a mm	ND mm	NL mm	b mm	L mm	C* mm	a mm	B^{H7} mm	perm. MT** Nm	Weight g
Module 0.5	**300 207 00**	20	10,0 : 1	10,0	11,2	8	5	3	8	-	8,5	3	0,06	3
	300 210 00	25	12,5 : 1	12,5	13,7	10	5	3	8	-	9,75	4	0,10	6
	300 220 00	50	25 : 1	25	26,2	10	5	3	8	-	16	4	0,75	16
	300 230 00	75	37,5 : 1	37,5	38,7	15	5	3	8	-	22,25	4	11,30	36
Module 0.75	**300 507 00**	20	10 : 1	15	16,7	10	6	3	9	-	11,75	4	0,14	8
	300 510 00	25	12,5 : 1	18,75	20,4	12	6	3	9	-	13,62	4	0,25	13
	300 520 00	50	25 : 1	37,5	39,2	12	6	3	9	-	23	4	2,00	35
	300 530 00	75	37,5 : 1	56,25	57,9	15	6	3	9	-	32,37	4	4,10	73
Module 1.0	**300 805 00**	16	8 : 1	16	18,8	12	8	6,5	14,5	-	15	5	0,14	16
	300 806 00	18	9 : 1	18	20,8	12	8	6,5	14,5	-	16	5	0,17	20
	300 807 00	20	10 : 1	20	22,8	16	8	6,5	14,5	-	17	5	0,24	30
	300 810 00	25	12,5 : 1	25	27,8	16	8	6,5	14,5	-	19,5	5	0,40	40
	300 815 00	35	17,5 : 1	35	37,8	16	10	6,5	16,5	-	24,5	6	1,10	70
	300 820 00	50	25 : 1	50	52,8	20	10	6,5	16,5	-	32	6	2,90	140
	300 830 00	75	37,5 : 1	75	77,8	30	10	6,5	16,5	4,5	44,5	6	10,50	200
	300 832 00	100	50 : 1	100	102,8	30	12	6,5	18,5	4,5	57	6	19,40	480
Module 1.5	**301 205 00**	16	8 : 1	24	28,4	18	6/6	12	24	-	24,5	8	0,60	60
	301 206 00	18	9 : 1	27	31,7	20	8/8	12	28	-	26	8	0,70	80
	301 207 00	20	10 : 1	30	34,7	25	8/8	12	28	-	27,5	10	1,10	130
	301 213 00	30	15 : 1	45	49,7	30	8/8	12	28	-	35	10	2,80	260
	301 218 00	40	20 : 1	60	64,7	30	10/10	12	32	-	42,5	10	6,90	400
	301 220 00	50	25 : 1	75	79,7	30	10/10	12	32	10	50	10	12,10	440
	301 232 00	100	50 : 1	150	154,7	45	10/10	12	32	10	87,5	12	49,00	1300
Module 2.0	**301 505 00**	16	8 : 1	32	37,6	20	8/8	14	30	-	32	8	2,40	140
	301 506 00	18	9 : 1	36	41,6	25	8/8	14	30	-	34	10	3,00	250
	301 507 00	20	10 : 1	40	45,6	30	10/10	14	34	-	36	12	4,10	260
	301 513 00	30	15 : 1	60	65,6	40	10/10	14	34	-	46	12	11,20	600
	301 518 00	40	20 : 1	80	85,6	40	10/10	14	34	11	56	12	26,80	650
	301 520 00	50	25 : 1	100	105,6	40	10/10	14	34	11	66	12	48,90	760
	301 524 00	60	30 : 1	120	125,6	50	10/10	14	34	11	76	12	69,50	1200

* Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.

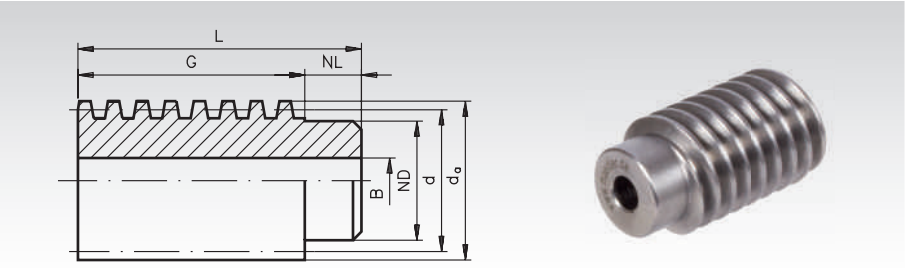
Reworking within 24h-service possible. Custom made parts on request.

Hollow Worms and Worm Shafts, Double-Thread, Right Hand

Double-thread worms to be paired with single-thread worm gears page 290. If the module (and number of threads) are matching, various ratios at various axle distances can be realized (see table page 290).

Hollow Worms, Whirled, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.

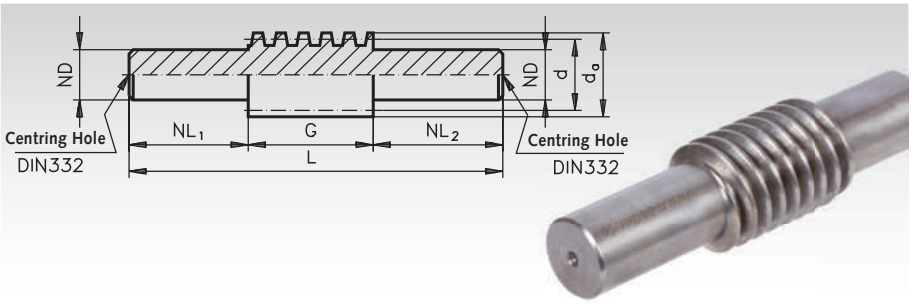


Ordering Details: e.g.: Product No. 300 200 00, Worm, 11SMnPb30, Module 0.5, Double-Thread, Right Hand

	Product No.	d mm	d_a mm	ND mm	NL mm	G mm	L mm	B^{H7} mm	Weight g
Module 0.5	300 200 00	7	8	5,5	4	12	16	3	4
Module 0.75	300 500 00	8,5	10	6	4	16	20	4	6
Module 1.0	300 800 00	14	16	11	6	24	30	6	26
Module 1.5	301 200 00	25	28	21	10	40	50	8	160
Module 2.0	301 500 00	32	36	25	10	45	55	8	300

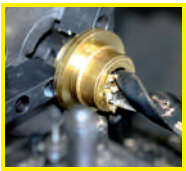
Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 300 201 00, Worm Shaft, 11SMnPb30, Module 0.5, Double-Thread, Right Hand

	Product No.	d mm	d_a mm	$ND^{+0,2}_{+0,4}$ mm	NL_1 mm	G mm	NL_2 mm	L mm	Weight g
Module 0.5	300 201 00	7	8	5,5	18	12	10	40	9
Module 0.75	300 501 00	8,5	10	6	20	16	15	51	15
Module 1.0	300 801 00	14	16	10	30	24	20	74	60
Module 1.5	301 201 00	25	28	20	40	40	30	110	300
Module 2.0	301 501 00	32	36	25	50	45	36	131	620



Reworking within 24h-service possible. Custom made parts on request.

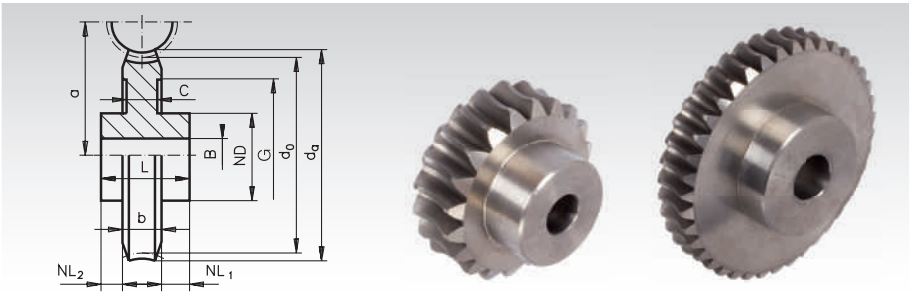
Worm Gears Made from Cast Iron (GG25), with Hollow Teeth, Double Thread, Right Hand

Double-threaded worm gears to be paired with double-threaded worms page 293. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

Pressure angle 20°.

Efficiency: Module 3 approx. 0.66.
Module 4 approx. 0.67.
Module 5 approx. 0.68.
Module 6 approx. 0.65.

Self-locking capacity: not self-locking.



Ordering Details: e.g.: Product No. 310 205 00, Worm gear, GG25, Module 3, 16 Teeth, Double-Thread, Right Hand

	Product No.	Number of Teeth	Transm. Ratio	d_0 mm	d_a mm	ND mm	NL_1/NL_2 mm	b mm	L mm	G mm	C* mm	a mm	B^{H7} mm	perm. MT** Nm	Weight kg
Module 3.0	**310 205 00**	16	8 : 1	48	57	40	18/4	24	46	-	-	43	15	9	0,46
	310 207 00	20	10 : 1	60	69	40	18/4	24	46	-	-	49	15	16	0,64
	310 211 00	26	13 : 1	78	87	45	18/4	24	46	60	12	58	18	31	1,20
	310 214 00	32	16 : 1	96	105	50	18/4	24	46	70	12	67	20	60	1,40
	310 221 00	52	26 : 1	156	165	75	23/4	24	51	116	12	97	30	242	3,40
	310 226 00	65	32,5 : 1	195	204	85	23/4	24	51	150	12	116,5	35	305	4,90
Module 4.0	**310 505 00**	16	8 : 1	64	76	50	21/5	34	60	-	-	57	20	13	1,00
	310 507 00	20	10 : 1	80	92	50	21/5	34	60	-	-	65	20	21	1,60
	310 511 00	26	13 : 1	104	116	55	21/5	34	60	80	14	77	22	48	2,10

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.

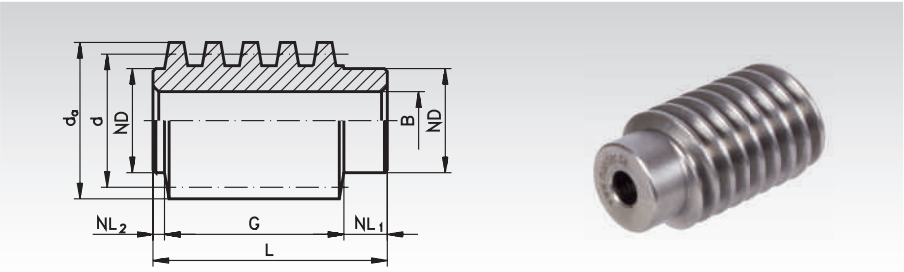
Reworking within 24h-service possible. Custom made parts on request.

Hollow Worms and Worm Shafts Double-Thread, Right Hand

Double-threaded worms to be paired with double-threaded worm gears page 292. If the module (and number of threads) are match various ratios at various axle distances can be realized (see table page 292).

Hollow Worms, Whirled, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.

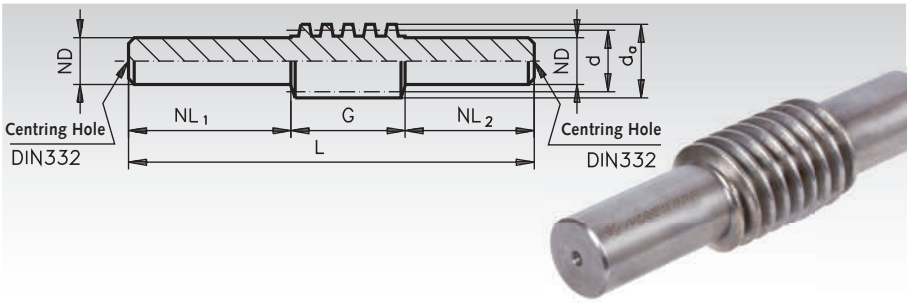


Ordering Details: e.g.: Product No. 310 200 00, Worm, Steel, Module 3, Double-Thread, Right Hand

	Product No.	d mm	d_a mm	ND mm	NL_1 mm	G mm	NL_2 mm	L mm	B^{H7} mm	Weight kg
Module 3.0	**310 200 00**	38	44	30	12	46	3	61	15	0,4
Module 4.0	**310 500 00**	50	58	40	15	62	4	81	20	1,2

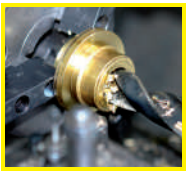
Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 310 201 00, Worm Shaft, 11SMnPb30, Module 3, Double-Thread, Right Hand

	Product No.	d mm	d_a mm	ND $^{+0,2}_{+0,4}$ mm	NL_1 mm	G mm	NL_2 mm	L mm	Weight kg
Module 3.0	**310 201 00**	38	44	30	130	46	90	266	1,6
Module 4.0	**310 501 00**	50	58	40	175	62	120	357	3,8



Reworking within 24h-service possible. Custom made parts on request.

Note regarding the Precision Worm-Gear Sets page 295 to 302

Worm gears up to a centre distance of 65 mm are made from special brass CuZn40Al2/So, above made from bronze G-CuSn12 Ni.

Worms made from 11SMnPb30, inspected for fissures, case hardened or C45 induction hardened, hardness HV620-700, shafts (if used), bore and flanks ground.

Pressure angle 15° (to reduce the radial force at the worm shaft). Especially designed for use with high torques, ready bored and some with keyway.

IMPORTANT:
Some of the keyways are not in accordance with the DIN. Please take good note of the keywidth stated.

The stated torques are permissible driving torques for the worm gear, permissible at a speed of 2800 min^{-1} at the worm shaft. The calculations are based on an expected service life of 3,000 h. With lower torques, or a shorter expected service life, the driving torque can be increased. The factor of security against rapture is 3.

The given torques are valid for shock-free drive, 10 starts per hour, operating time up to 40% and sufficient lubrication with mineral low-viscosity grease. Viscous synthetic oil should, however be preferred. The figures for efficiency stated in the table are theoretical values that can be negatively influenced by various factors.

For that reason we do not offer any guarantee regarding the efficiency and the self-locking capacity.

Precision Worm Gear Sets, Flank Clearance at Centre Distance a = 17 - 100 mm

Flank-clearance tolerances for worm gears are only valid for gears with a pressure angle of 15°.

Reference Diameter of the Worm Gear d_{m2}	Module m_n	Clearance at Centre Distance S_{a2}		Tolerance	Engagement Backlash S_{e2}		Circumferential Backlash at Pitch Ø with γ_o up to 24°		with γ_o above 25°	
		min.	max.		min.	max.	min.	max.	min.	max.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
over 12 up to 25	0,4 - 0,6	0,13	0,172	0,042	0,067	0,089	0,07	0,092	0,077	0,102
	>0,6 - 1,3	0,14	0,185	0,045	0,072	0,096	0,075	0,099	0,083	0,109
	>1,3 - 2,0	0,15	0,198	0,048	0,078	0,102	0,08	0,106	0,089	0,117
over 25 up to 50	0,4 - 0,6	0,14	0,185	0,045			0,075	0,099	0,083	0,108
	>0,6 - 1,3	0,15	0,198	0,048			0,08	0,106	0,089	0,117
	>1,3 - 2,0	0,16	0,212	0,052	0,083	0,11	0,086	0,114	0,095	0,125
	>2,0 - 4,0	0,17	0,231	0,056	0,091	0,12	0,094	0,124	0,103	0,137
over 50 up to 100	0,4 - 0,6	0,15	0,198	0,048			0,08	0,106	0,089	0,117
	>0,6 - 1,3	0,16	0,212	0,052			0,086	0,114	0,095	0,125
	>1,3 - 2,0	0,175	0,231	0,056			0,094	0,124	0,103	0,137
	>2,0 - 4,0	0,19	0,25	0,06	0,098	0,129	0,102	0,134	0,112	0,148

γ_o is the lead angle of the worm.

Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating. Dynamic and static self-locking capacity must be distinguished.

Dynamic self-locking capacity: up to 3° lead angle lubricated with grease; up to 2.5° lead angle lubricated with synthetic oils.
Static self-locking capacity: from 3° up to 5° lead angle lubricated with grease; from 2.5° up to 4.5° lead angle lubricated with synthetic oils.
With lead angles of 4.5° or 5° there is no self-locking capacity.

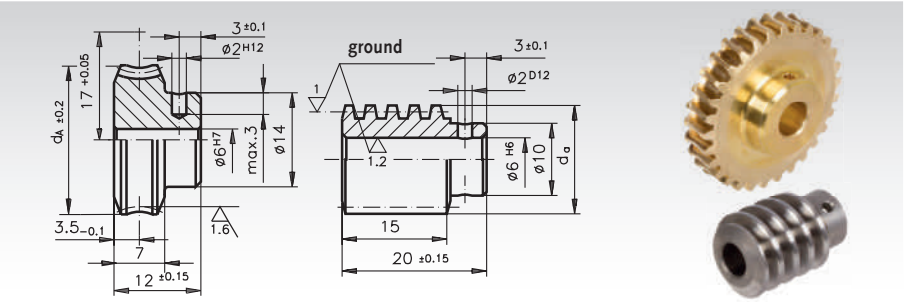
Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:
Product No. 320 002 00, Prec. Worm Gear A 17
Product No. 320 102 00, Prec. Worm A 17



Centre Distance in Casing 17 mm + 0.05

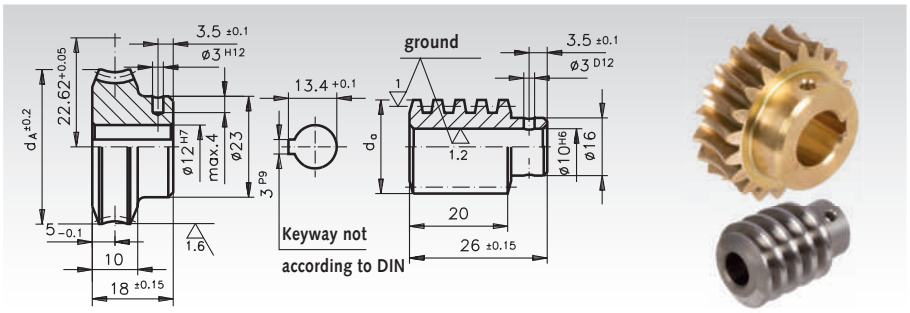
Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	*** η	Weight Worm Gear g	Weight Worm g
320 002 00	**320 102 00**	*2,25 : 1	0,9	18	8	48° 15′	25,63	11,95	1,1	0,80	25	7
320 004 00	**320 104 00**	4,5 : 1	0,75	27	6	21° 50′	24,60	13,60	1,7	0,75	25	11
320 005 00	**320 105 00**	5 : 1	0,7	30	6	21° 37′	24,60	12,80	1,8	0,74	26	12
320 007 00	**320 107 00**	7 : 1	1,0	21	3	14° 4′	24,60	14,34	1,6	0,68	25	12
320 009 00	**320 109 00**	9 : 1	0,75	27	3	9° 40′	22,70	14,90	1,5	0,61	23	14
320 010 00	**320 110 00**	10 : 1	0,75	30	3	11° 48′	24,60	12,50	1,9	0,64	27	9
320 015 00	**320 115 00**	15 : 1	0,75	30	2	7° 38′	24,60	12,80	1,9	0,54	26	10
320 025 00	**320 125 00**	25 : 1	0,9	25	1	4° 32′	24,60	13,20	1,8	0,42	26	10
320 030 00	**320 130 00**	30 : 1	0,75	30	1	3° 45′	24,60	12,95	1,9	0,37	26	10
320 040 00	**320 140 00**	40 : 1	0,5	40	1	2° 3′	21,60	14,98	1,4	0,26	22	16
320 050 00	**320 150 00**	**50 : 1	0,5	50	1	3° 12′	27,20	9,95	1,0	0,33	32	5
320 060 00	**320 160 00**	60 : 1	0,4	60	1	2° 18′	26,00	10,75	1,6	0,26	30	8
320 075 00	**320 175 00**	75 : 1	0,3	75	1	1° 28′	24,00	12,34	1,3	0,19	26	10
320 080 00	**320 180 00**	80 : 1	0,3	80	1	1° 43′	26,00	10,60	1,4	0,21	30	10

* Worm only polished, worm gear with helical gearing.
** Worm with 9 mm hub diameter only.
*** The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



Ordering Details: e.g.:
Product No. 320 303 00, Prec. Worm Gear A 22.62
Product No. 320 403 00, Prec. Worm A 22.62

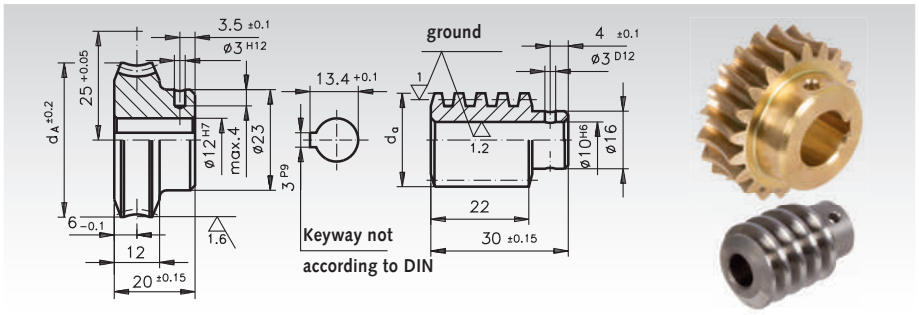
Centre Distance in Casing 22.62 mm + 0.05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	** η	Weight Worm Gear g	Weight Worm g
320 303 00	**320 403 00**	3 : 1*	1,0	21	7	17° 36′	24,8	25,15	2,2	0,74	40	60
320 304 00	**320 404 00**	4 : 1	1,25	20	5	19° 32′	29,8	21,20	3,6	0,75	54	35
320 307 00	**320 407 00**	7 : 1	1,25	21	3	11° 46′	29,8	20,90	3,6	0,66	54	34
320 310 00	**320 410 00**	10,5 : 1	1,25	21	2	7° 41′	29,8	21,20	3,4	0,57	54	34
320 321 00	**320 421 00**	21 : 1	1,25	21	1	3° 48′	29,8	21,40	3,4	0,40	53	35
320 330 00	**320 430 00**	30 : 1	0,9	30	1	2° 50′	29,8	20,00	3,6	0,34	55	33
320 340 00	**320 440 00**	40 : 1	0,7	40	1	2° 20′	29,8	18,60	3,9	0,29	60	28

* Worm only polished.
** The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



Ordering Details: e.g.:
Product No. 320 604 00, Prec. Worm Gear A 25
Product No. 320 704 00, Prec. Worm A 25

Centre Distance in Casing 25 mm + 0.05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	** η	Weight Worm Gear g	Weight Worm g
320 604 00	**320 704 00**	4 : 1	1,4	20	5	20° 29′	33,5	22,80	5,1	0,76	80	46
320 605 00	**320 705 00**	5 : 1	1,5	20	4	19° 15′	34,8	21,20	6,5	0,75	84	37
320 606 00	**320 706 00**	6,5 : 1	1,15	26	4	13° 52′	34,8	21,50	6,0	0,70	80	42
320 610 00	**320 710 00**	10 : 1	1,5	20	2	8° 48′	34,8	22,60	5,9	0,61	80	44
320 615 00	**320 715 00**	15 : 1	1,0	30	2	6° 29′	34,8	19,70	5,7	0,53	86	35
320 620 00	**320 720 00**	20 : 1	1,5	20	1	4° 19′	34,8	22,90	5,8	0,44	77	46
320 625 00	**320 725 00**	25 : 1	1,0	25	1	2° 18′	27,8	26,96	4,1	0,30	56	77
320 630 00	**320 730 00**	30 : 1	1,0	30	1	2° 53′	33,5	21,90	5,9	0,34	78	46
320 640 00	**320 740 00**	40 : 1	0,8	40	1	2° 33′	34,8	19,56	6,2	0,31	87	37
320 650 00	**320 750 00**	50 : 1	0,6	50	1	1° 43′	33,5	21,16	5,1	0,24	78	47

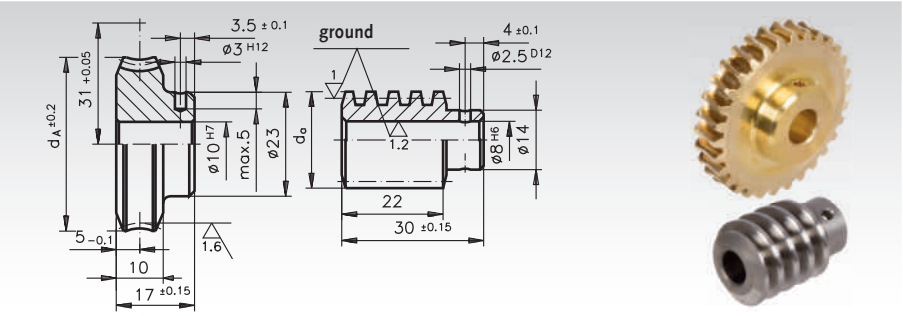
** The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30,
inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:
Product No. 321 002 00, Prec. Worm Gear A 31
Product No. 321 102 00, Prec. Worm A 31



Centre Distance in Casing 31 mm + 0.05

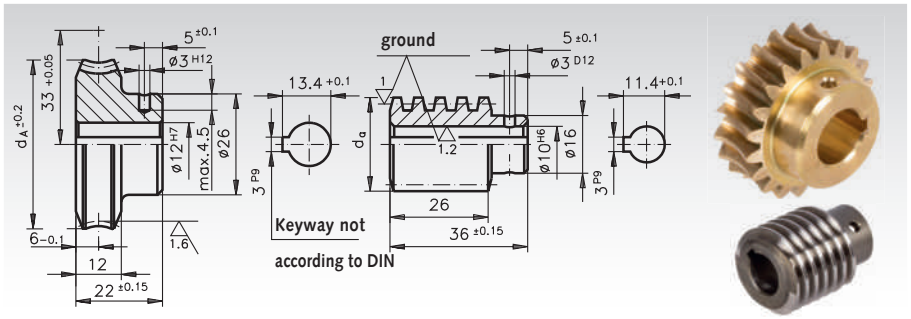
Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	** η	Weight Worm Gear g	Weight Worm g
321 002 00	**321 102 00**	*2,5 : 1	1,25	25	10	45° 15′	46,9	20,10	4,4	0,82	132	39
321 004 00	**321 104 00**	4,28 : 1	1,25	30	7	25° 24′	45,0	22,90	9	0,79	122	38
321 005 00	**321 105 00**	5 : 1	1,3	30	6	23° 46′	46,5	21,95	9,5	0,78	150	52
321 006 00	**321 106 00**	6 : 1	1,3	30	5	18° 13′	45,0	23,40	7,6	0,74	120	52
321 007 00	**321 107 00**	7 : 1	1,5	28	4	20° 32′	48,8	20,10	9,7	0,75	128	47
321 008 00	**321 108 00**	8,33 : 1	1,75	25	3	19° 49′	51,0	19,00	10	0,74	150	29
321 010 00	**321 110 00**	10 : 1	1,4	30	3	12° 50′	47,0	21,70	9,5	0,68	130	44
321 012 00	**321 112 00**	12 : 1	1,25	36	3	13° 55′	50,0	18,10	12,1	0,69	150	40
321 015 00	**321 115 00**	15 : 1	1,5	30	2	10° 40′	50,0	19,20	10,7	0,64	145	32
321 018 00	**321 118 00**	18 : 1	1,25	36	2	8° 44′	48,8	18,96	10,3	0,59	145	33
321 020 00	**321 120 00**	20 : 1	0,75	60	3	7° 49′	48,0	18,04	8,3	0,57	145	34
321 022 00	**321 122 00**	22 : 1	1,0	44	2	6° 29′	48,0	19,70	9,6	0,53	138	39
321 023 00	**321 123 00**	23 : 1	2,0	23	1	7° 29′	52,0	19,35	10,5	0,56	148	28
321 024 00	**321 124 00**	24 : 1	1,75	24	1	5° 4′	47,0	23,30	9,2	0,48	125	49
321 025 00	**321 125 00**	25 : 1	1,75	25	1	5° 35′	48,5	21,50	9,6	0,49	132	40
321 028 00	**321 128 00**	28 : 1	1,5	28	1	4° 20′	46,5	22,85	9,1	0,44	125	49
321 030 00	**321 130 00**	30 : 1	1,5	30	1	5° 7′	48,8	19,80	10,3	0,47	142	54
321 032 00	**321 132 00**	32 : 1	1,4	32	1	4° 45′	48,8	19,70	10,2	0,45	142	35
321 038 00	**321 138 00**	38 : 1	1,25	38	1	5° 1′	51,2	16,80	11,4	0,46	158	24
321 045 00	**321 145 00**	45 : 1	1,0	45	1	3° 23′	48,0	18,93	9,5	0,37	142	36
321 050 00	**321 150 00**	50 : 1	0,9	50	1	3° 3′	48,0	18,70	9	0,35	143	35
321 055 00	**321 155 00**	55 : 1	0,9	55	1	4° 12′	52,0	14,10	10,4	0,40	172	17
321 060 00	**321 160 00**	60 : 1	0,75	60	1	2° 33′	48,0	18,40	8,2	0,31	144	35
321 070 00	**321 170 00**	70 : 1	0,7	70	1	3° 7′	52,0	14,30	9	0,34	170	19
321 075 00	**321 175 00**	75 : 1	0,6	75	1	2° 2′	47,0	18,10	7,3	0,26	143	35
321 090 00	**321 190 00**	90 : 1	0,5	90	1	1° 41′	48,0	18,00	6,4	0,23	143	35
321 100 00	**321 200 00**	100 : 1	0,5	100	1	2° 24′	52,7	12,96	7,4	0,28	175	16

* Worm only polished - worm gear with helical gearing.
** The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



Ordering Details: e.g.:
Product No. 321 303 00, Prec. Worm Gear A 33
Product No. 321 403 00, Prec. Worm A 33

Centre Distance in Casing 33 mm + 0.05

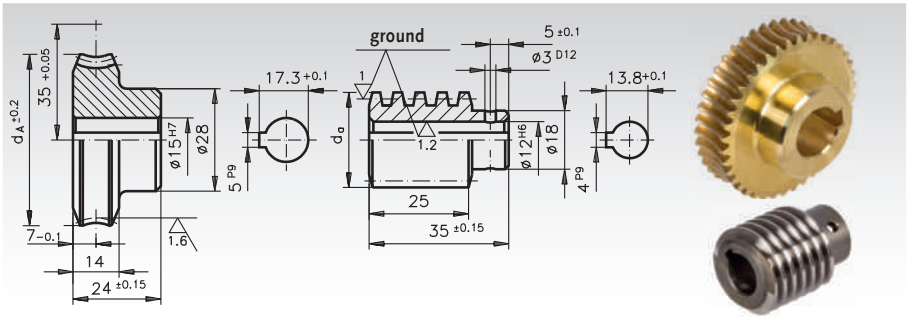
Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
321 303 00	**321 403 00**	3,5 : 1	1,75	21	6	25° 57′	47,0	27,50	10,1	0,79	155	80
321 305 00	**321 405 00**	5 : 1	2,0	20	4	20° 50′	49,0	26,50	10,6	0,77	164	70
321 307 00	**321 407 00**	7 : 1	1,5	28	4	15° 32′	48,0	25,40	12,2	0,72	164	69
321 310 00	**321 410 00**	10 : 1	1,5	30	3	13° 10′	51,0	22,75	13,3	0,69	186	53
321 311 00	**321 411 00**	11,3 : 1	1,3	34	3	10° 42′	49,2	23,60	13,3	0,65	178	60
321 312 00	**321 412 00**	12 : 1	1,9	24	2	11° 14′	52,0	23,30	13,5	0,66	186	50
321 314 00	**321 414 00**	14 : 1	1,5	28	2	7° 20′	47,0	26,50	11,4	0,57	159	77
321 315 00	**321 415 00**	15 : 1	1,5	30	2	8° 25′	50,0	23,50	13,0	0,60	180	57
321 316 00	**321 416 00**	16 : 1	1,5	32	2	10° 1′	53,0	20,24	14,0	0,63	203	38
321 317 00	**321 417 00**	17 : 1	1,4	34	2	9° 3′	52,5	20,60	14,2	0,61	202	41
321 318 00	**321 418 00**	18 : 1	1,25	36	2	6° 57′	49,2	23,15	12,6	0,55	180	58
321 320 00	**321 420 00**	20 : 1	1,15	40	2	6° 43′	50,5	21,96	12,7	0,54	188	52
321 324 00	**321 424 00**	24 : 1	1,9	24	1	5° 27′	51,0	23,80	13,2	0,49	183	54
321 328 00	**321 428 00**	28 : 1	1,5	28	1	3° 36′	46,6	26,90	11,2	0,40	156	80
321 330 00	**321 430 00**	30 : 1	1,5	30	1	4° 8′	50,0	23,85	12,7	0,43	178	60
321 332 00	**321 432 00**	32 : 1	1,5	32	1	4° 50′	52,5	20,80	13,5	0,46	200	40
321 338 00	**321 438 00**	38 : 1	1,25	38	1	3° 55′	51,6	20,76	13,9	0,41	200	44
321 350 00	**321 450 00**	50 : 1	0,9	50	1	2° 27′	48,0	22,80	10,0	0,31	178	60
321 356 00	**321 456 00**	56 : 1	0,8	56	1	2° 10′	48,0	22,75	10,1	0,29	180	62
321 375 00	**321 475 00**	75 : 1	0,6	75	1	1° 41′	48,0	21,70	9,0	0,24	183	56

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



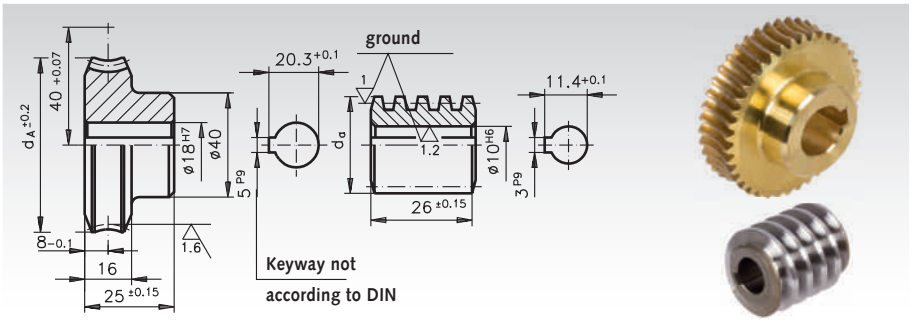
Ordering Details:e.g.:
Product No. 322 002 00, Prec. Worm Gear A 35
Product No. 322 102 00, Prec. Worm A 35

Centre Distance in Casing 35 mm + 0.05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	** η	Weight Worm Gear g	Weight Worm g
322 002 00	**322 102 00**	*2,78 : 1	1,5	25	9	31° 55′	46,76	29,20	6,6	0,81	178	88
322 005 00	**322 105 00**	5 : 1	1,75	25	5	22° 52′	53,00	26,02	15,3	0,78	220	62
322 007 00	**322 107 00**	7,25 : 1	1,5	29	4	13° 47′	50,00	28,18	14,7	0,71	195	80
322 008 00	**322 108 00**	8 : 1	1,9	24	3	14° 25′	53,00	26,69	16,7	0,71	210	65
322 010 00	**322 110 00**	10 : 1	1,5	30	3	10° 43′	51,00	27,20	16,0	0,66	200	73
322 012 00	**322 112 00**	12 : 1	1,9	24	2	9° 11′	52,00	27,60	16,1	0,63	210	70
322 015 00	**322 115 00**	15 : 1	1,5	30	2	7°	50,00	27,62	15,3	0,57	198	76
322 020 00	**322 120 00**	20 : 1	1,15	40	2	5° 33′	50,50	26,08	14,8	0,51	210	70
322 025 00	**322 125 00**	25 : 1	0,9	50	2	4° 9′	49,00	26,67	12,9	0,44	210	80
322 030 00	**322 130 00**	30 : 1	1,5	30	1	3° 27′	50,00	27,92	15,0	0,40	196	80
322 040 00	**322 140 00**	40 : 1	1,15	40	1	2° 45′	50,50	26,21	14,7	0,34	200	70
322 050 00	**322 150 00**	50 : 1	0,9	50	1	2° 4′	49,00	26,73	12,9	0,28	188	78
322 058 00	**322 158 00**	58 : 1	0,85	58	1	2° 21′	53,00	22,35	14,5	0,30	200	50
322 090 00	**322 190 00**	90 : 1	0,5	90	1	1° 9′	49,00	26,00	9,1	0,18	198	79

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



Ordering Details:e.g.:
Product No. 322 306 00, Prec. Worm Gear A 40
Product No. 322 406 00, Prec. Worm A 40

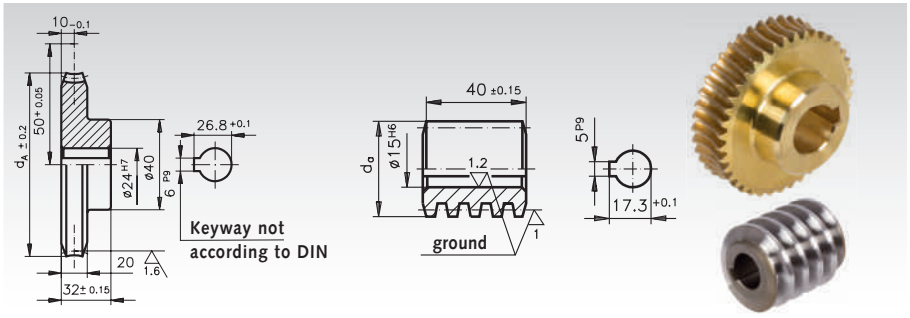
Centre Distance in Casing 40 mm + 0.07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	** η	Weight Worm Gear g	Weight Worm g
322 306 00	**322 406 00**	6,75 : 1	2,0	27	4	21° 19′	64,0	26,00	29,5	0,77	386	58
322 308 00	**322 408 00**	8 : 1	2,25	24	3	16° 35′	62,5	28,14	27,5	0,74	390	58
322 310 00	**322 410 00**	10 : 1	1,9	30	3	16° 1′	65,0	24,46	29,5	0,72	402	49
322 312 00	**322 412 00**	12 : 1	1,5	36	3	10° 21′	60,0	28,05	25,2	0,65	352	81
322 315 00	**322 415 00**	15 : 1	1,9	30	2	9° 53′	64,0	25,94	28,0	0,64	380	60
322 320 00	**322 420 00**	20 : 1	1,5	40	2	8° 59′	66,0	22,20	28,9	0,61	428	40
322 325 00	**322 425 00**	25 : 1	1,15	50	2	5° 58′	62,0	24,45	24,4	0,52	370	60
322 328 00	**322 428 00**	28 : 1	2,0	28	1	4° 47′	61,5	28,00	28,4	0,47	360	72
322 330 00	**322 430 00**	30 : 1	2,0	30	1	5° 50′	66,0	23,68	30,1	0,51	480	42
322 335 00	**322 435 00**	35 : 1	1,75	35	1	5° 26′	67,0	21,98	31,0	0,49	430	36
322 340 00	**322 440 00**	40 : 1	1,5	40	1	4° 20′	65,0	22,83	28,3	0,44	420	44
322 350 00	**322 450 00**	50 : 1	1,25	50	1	4° 8′	68,0	19,80	27,0	0,42	450	30
322 356 00	**322 456 00**	56 : 1	1,0	56	1	2° 23′	59,0	26,00	21,9	0,31	370	40
322 360 00	**322 460 00**	60 : 1	0,9	60	1	1° 59′	57,5	27,72	19,3	0,28	340	87
322 370 00	**322 470 00**	70 : 1	0,9	70	1	3° 3′	67,0	18,71	24,1	0,35	460	28
322 375 00	**322 475 00**	75 : 1	0,75	75	1	1° 48′	60,0	25,25	18,8	0,25	370	72
322 380 00	**322 480 00**	80 : 1	0,75	80	1	2° 10′	64,0	21,40	20,1	0,28	420	45

* Worm only polished - worm gear with helical gearing.
** The figures stated for the efficiency are only reference values.

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required , thus short assembly times.



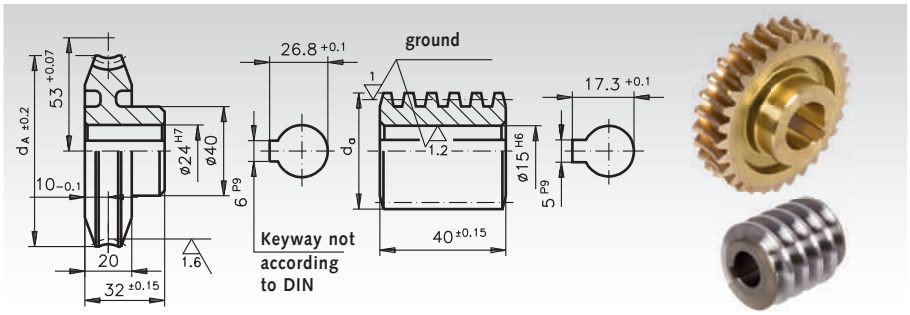
Ordering Details: e.g.:
Product No. 330 004 00, Prec. Worm Gear A 50.
Product No. 323 104 00, Prec. Worm A 50.

Centre distance in Housing 50 mm + 0,05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
330 004 00	**323 104 00**	4,25 : 1	3,5	17	4	25°51′	77	39,10	34	0,80	580	200
330 006 00	**323 106 00**	6 : 1	3,5	18	3	19°17′	77	38,80	52	0,77	580	180
330 008 00	**323 109 00**	8,66 : 1	2,5	26	3	13°52′	77	36,29	64	0,72	600	176
330 012 00	**323 113 00**	12 : 1	2,75	24	2	10°23′	77	36,00	66	0,66	620	156
330 014 00	**323 115 00**	13,5 : 1	2,5	27	2	9°38′	77	34,90	63	0,65	630	160
330 019 00	**323 121 00**	19 : 1	3,5	19	1	6°17′	77	39,00	78	0,55	590	190
330 023 00	**323 125 00**	23 : 1	3,0	23	1	5°38′	77	36,58	71	0,52	600	170
330 027 00	**323 130 00**	27 : 1	2,5	27	1	3°40′	77	35,73	65	0,48	620	170
330 035 00	**323 138 00**	35 : 1	2,0	35	1	3°51′	77	33,78	57	0,43	630	150
330 046 00	**323 150 00**	46 : 1	1,5	46	1	2°47′	74	33,85	51	0,36	620	170
330 055 00	**323 160 00**	55 : 1	1,25	55	1	2°19′	74	33,40	46	0,31	620	170
330 069 00	**323 175 00**	69 : 1	1,0	69	1	1°51′	74	32,90	41	0,27	620	170

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required , thus short assembly times.



Ordering Details: e.g.:
Product No. 323 004 00, Prec. Worm Gear A 53.
Product No. 323 104 00, Prec. Worm A 53.

Centre distance in Housing 53 mm + 0,07

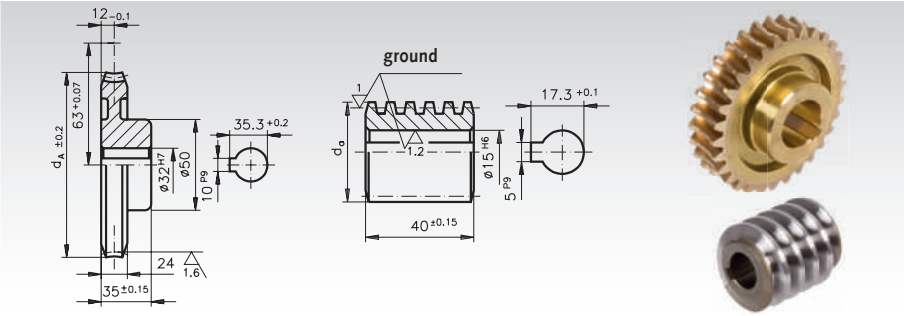
Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
323 004 00	**323 104 00**	4,75 : 1	3,5	19	4	25° 51′	83,0	39,10	45	0,80	590	200
323 006 00	**323 106 00**	6,67 : 1	3,5	20	3	19° 17′	84,0	38,80	67	0,77	600	180
323 009 00	**323 109 00**	9,67 : 1	2,5	29	3	13° 52′	82,0	36,29	77	0,72	620	176
323 013 00	**323 113 00**	13,5 : 1	2,75	27	2	10° 23′	84,0	36,00	80	0,66	630	156
323 015 00	**323 115 00**	15 : 1	2,5	30	2	9° 38′	83,0	34,90	75	0,65	650	160
323 021 00	**323 121 00**	21 : 1	3,5	21	1	6° 17′	83,0	39,00	94	0,55	600	190
323 025 00	**323 125 00**	25 : 1	3,0	25	1	5° 38′	84,0	36,58	84	0,52	630	170
323 028 00	**323 128 00**	28 : 1	2,5	28	1	3° 59′	77,5	41,00	87	0,44	500	250
323 030 00	**323 130 00**	30 : 1	2,5	30	1	4° 40′	83,0	35,73	77	0,48	640	170
323 038 00	**323 138 00**	38 : 1	2,0	38	1	3° 51′	83,0	33,78	68	0,43	660	150
323 050 00	**323 150 00**	50 : 1	1,5	50	1	2° 47′	81,0	33,85	60	0,36	640	170
323 060 00	**323 160 00**	60 : 1	1,25	60	1	2° 19′	80,0	33,40	55	0,31	650	170
323 075 00	**323 175 00**	75 : 1	1,0	75	1	1° 51′	78,0	32,90	49	0,27	640	170

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required , thus short assembly times.

Ordering Details: e.g.:
Product No. 330 306 00, Prec. Worm Gear A 63.
Product No. 323 104 00, Prec. Worm A 63.



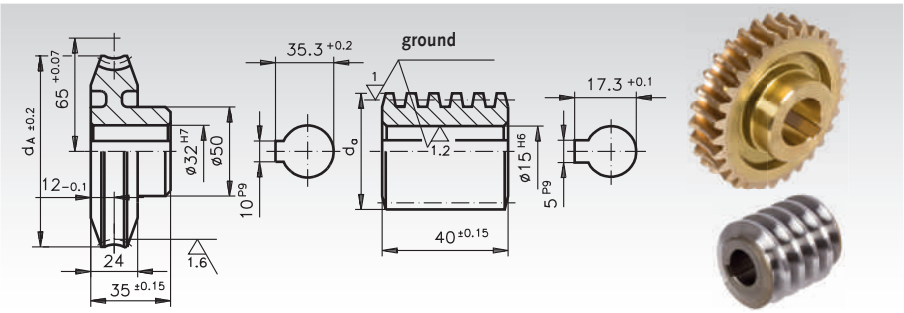
Centre distance in Housing 63 mm + 0,07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
330 306 00	**323 104 00**	6 : 1	3,5	24	4	25° 51′	104	39,10	89	0,80	1200	200
330 312 00	**323 109 00**	12 : 1	2,5	36	3	13° 52′	104	36,29	141	0,72	1100	180
330 319 00	**330 419 00**	19 : 1	2,5	38	2	10° 8′	104	33,40	133	0,65	1200	136
330 326 00	**323 121 00**	26 : 1	3,5	26	1	6° 17′	104	39,00	172	0,55	1065	190
330 334 00	**330 434 00**	34 : 1	2,75	34	1	5° 9′	104	36,10	148	0,50	1200	170
330 348 00	**323 138 00**	48 : 1	2,0	48	1	3° 51′	104	33,78	125	0,43	1200	150
330 363 00	**323 150 00**	63 : 1	1,5	63	1	2° 47′	101	33,85	111	0,36	1200	170
330 370 00	**323 475 00**	70 : 1	1,25	70	1	1° 59′	97	38,60	112	0,29	980	250

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required , thus short assembly times.

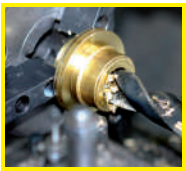
Ordering Details: e.g.:
Product No. 323 306 00, Prec. Worm Gear A 65.
Product No. 323 104 00, Prec. Worm A 65.



Centre distance in Housing 65 mm + 0,07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
323 306 00	**323 104 00**	6,25 : 1	3,5	25	4	25° 51′	108,0	39,10	101	0,80	1200	200
323 312 00	**323 109 00**	12,66 : 1	2,5	38	3	13° 52′	108,0	36,29	156	0,72	1300	176
323 328 00	**323 121 00**	28 : 1	3,5	28	1	6° 17′	108,0	39,00	192	0,55	1200	190
323 350 00	**323 138 00**	50 : 1	2,0	50	1	3° 51′	108,0	33,78	137	0,43	1200	150
323 366 00	**323 150 00**	66 : 1	1,5	66	1	2° 47′	107,0	33,85	122	0,36	1200	170
323 375 00	**323 475 00**	75 : 1	1,25	75	1	1° 59′	100,0	38,60	125	0,29	1100	250

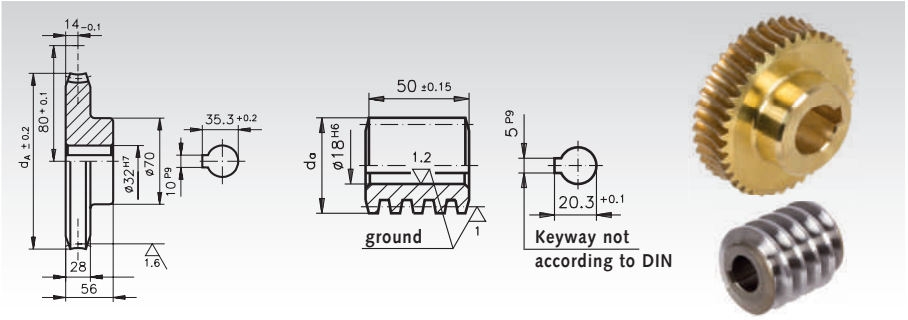
* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.
Material:
Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required , thus short assembly times.



Ordering Details: e.g.:
Product No. 330 607 00, Prec. Worm Gear A 80.
Product No. 330 707 00, Prec. Worm A 80.

Centre distance in Housing 80 mm + 0,1

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear d_A ± 0.2 mm	Worm d_a mm	Maximum Torque at 2800min^{-1} Nm	* η	Weight Worm Gear g	Weight Worm g
330 607 00	**330 707 00**	6,75 : 1	4,0	27	4	23°35′	132	48,0	150	0,79	2900	280
330 612 00	**330 712 00**	12 : 1	2,5	48	4	16°36′	132,5	40,0	243	0,75	3200	270
330 620 00	**330 720 00**	20 : 1	3,0	40	2	8°58′	130,5	44,5	296	0,63	3033	340
330 630 00	**330 730 00**	30 : 1	4,0	30	1	5°44′	132,5	48,0	348	0,53	2900	380
330 650 00	**330 750 00**	50 : 1	2,5	50	1	4° 6′	132,5	40,0	248	0,45	3200	266
330 680 00	**330 780 00**	80 : 1	1,5	80	1	2° 9′	124,5	43,0	213	0,30	2900	380

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Worm Shafts)

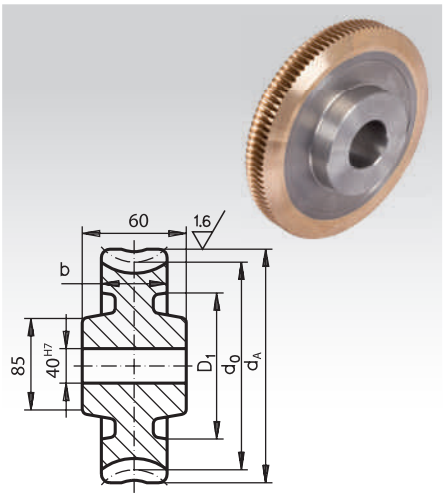
Pressure angle: 20°.

Material: Worm gears with cast iron hub made from grey cast iron GG20 and toothed ring made from special worm-gear bronze (G-CuSn12Ni).
Worm shafts made from steel C45 hardened. Shaft ends soft. Tooth flanks ground.

Worm Gears, Centre Distance in Casing a = 100 mm ± 0.03

Ordering Details: e.g.: Product No. 332 014 01, Prec.-Worm Gear, a = 100, i = 14.5

Product No.	Trans-mission	Module	Number of teeth	d_A	d_0	D_1	b	Md_2 at 2800min^{-1}	η*	Weight
				mm	mm	mm	mm	Nm		kg
332 014 01	14,5	5	29	165	150	-	38	485	0,87	5,95
332 026 01	26	3,15	52	176	166,5	115	26	430	0,84	5,15
332 029 01	29	5	29	165	150	-	38	550	0,75	5,8
332 039 01	39	4	39	172	160	-	32	470	0,76	5,7
332 062 01	62	2,5	62	165	157,5	112	28	510	0,66	4,9
332 082 01	82	2	82	170,5	164,5	118	26	450	0,62	4,7
332 107 01	107	1,6	107	177	172	128	26**	300	0,59	4,5



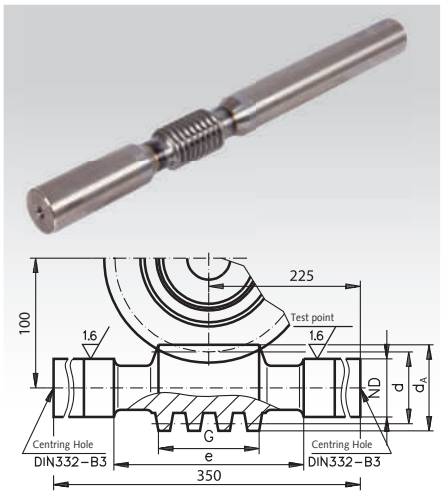
* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

** Width of the main body: 26 mm, tapered, to be paired with Tooth Width 20 mm.

Worm Shafts, Centre Distance in Casing a = 100 mm ± 0.03

Ordering Details: e.g.: Product No. 332 014 02, Pr.-Worm Shaft, a = 100, i = 14.5

Product No.	Trans-mission	Module	Number of Threads	d_A	d	ND	G	e	η*	Weight
				mm	mm	mm	mm	mm		kg
332 014 02	14,5	5	2	60	50	40,5	70	110	0,87	3,85
332 026 02	26	3,15	2	39,8	33,5	40,5	58	110	0,84	3,05
332 029 02	29	5	1	60	50	40,5	70	110	0,75	3,86
332 039 02	39	4	1	48	40	40,5	64	110	0,76	3,3
332 062 02	62	2,5	1	47,5	42,5	40,5	50	90	0,66	3,5
332 082 02	82	2	1	39,5	35,5	40,5	46	90	0,62	3,2
332 107 02	107	1,6	1	31,2	28	30,5	42	90	0,59	1,85



* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating.

For worm gears with centre distance a=100mm and 125mm:

Up to ratio 39:1 not self-locking.

From ratio 62:1 Static self-locking.

Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.

Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Worm Shafts)

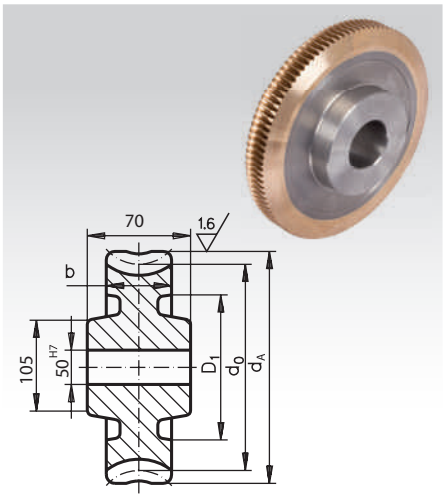
Pressure angle: 20°.

Material: Worm gears with cast iron hub made from grey cast iron GG20 and toothed ring made from special worm-gear bronze (G-CuSn12Ni).
Worm shafts made from Steel C45 hardened. Shaft ends not tempered. Tooth flanks ground.

Worm Gears, Centre Distance in Casing a = 125 mm ± 0.03

Ordering Details: e.g.: Product No. 332 214 01, Pr.-Worm Gear, a = 125, i = 14.5

Product No.	Trans-mission	Module	Number of teeth	d_A	d_0	D_1	b	Md_2 at 1500min^{-1}	η*	Weight
				mm	mm	mm	mm	Nm		kg
332 214 01	14,5	6,3	29	206	187	-	50	950	0,88	11,4
332 226 01	25,5	4	51	222	210	155	32	810	0,86	10,3
332 229 01	29	6,3	29	206	187	-	50	1110	0,79	11,45
332 239 01	39	5	39	215	200	136	38	1060	0,78	10,1
332 262 01	62	3,15	62	206,5	197	145	34	1160	0,68	8,5
332 282 01	82	2,5	82	215	207,5	160	34	860	0,66	7,97
332 307 01	107	2	107	221	214,5	168	34	580	0,62	7,9

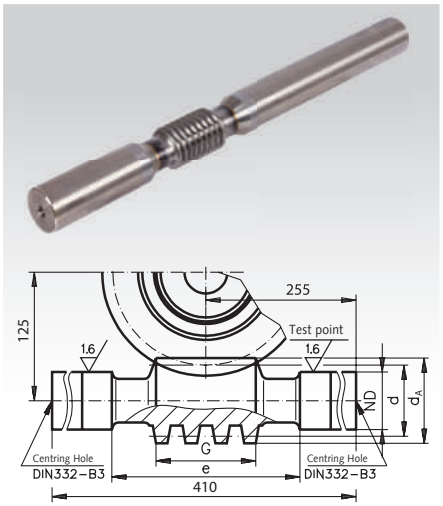


* The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Worm Shafts, Centre Distance in Casing a = 125 mm ± 0.03

Ordering Details: e.g.: Product No. 332 214 02, Pr.-Worm Shaft, a = 125, i = 14.5

Product No.	Trans-mission	Module	Number of Threads	d_A	d	ND	G	e	η*	Weight
				mm	mm	mm	mm	mm		kg
332 214 02	14,5	6,3	2	75,6	63	50,5	85	135	0,88	7,05
332 226 02	25,5	4	2	48	40	50,5	75	135	0,86	5,42
332 229 02	29	6,3	1	75,6	63	50,5	85	135	0,79	7,05
332 239 02	39	5	1	60	50	50,5	82	135	0,78	6,06
332 262 02	62	3,15	1	59,3	53	50,5	64	105	0,68	6,35
332 282 02	82	2,5	1	47,5	42,5	45,5	58	105	0,66	4,9
332 307 02	107	2	1	39,5	35,5	40,5	52	105	0,62	3,75



* The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating.

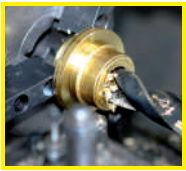
For worm gears with centre distance a=100mm and 125mm:

Up to ratio 39:1 not self-locking.

From ratio 62:1 Static self-locking.

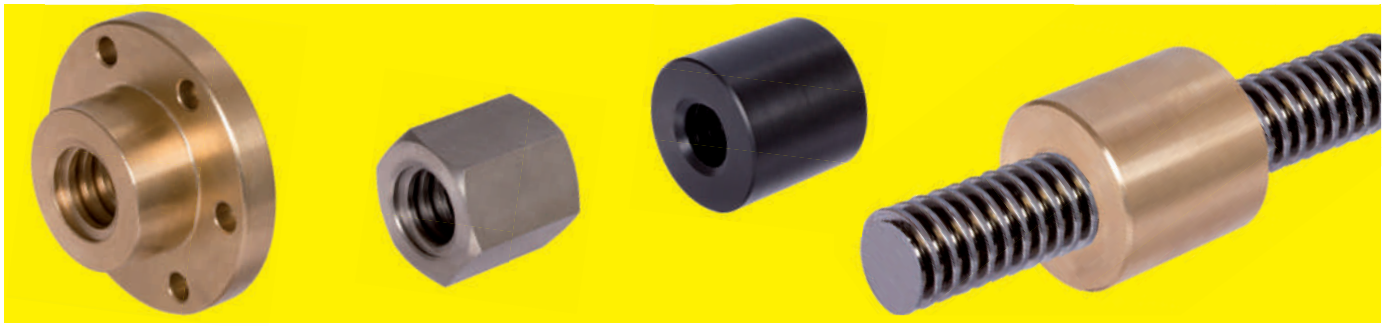
Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.



Reworking within 24h-service possible. Custom made parts on request.

Trapezoidal Thread Spindles and Nuts DIN 103 – Description



General description
Trapezoidal threads are ideal for movement due to their flank profile. Application: Conversion of a rotary movement into a linear one. Sometimes: Conversion of a linear movement into a rotary one. Trapezoidal threads can also be used as easy-to-loosen fastener.

Thread profile of the catalogue products
Metric DIN-ISO thread according to DIN 103, with 15° flank angle.

Designation of a Trapezoidal thread spindle DIN 103
DIN-number, abbreviation for trapezoidal thread, outside diameter x lead x length
For example: Spindle DIN 103 Tr. 12 x 3 x 1000mm.

Production method
Practically all of the spindles in the catalogue models are rolled. Thread rolling is the most economical production method for series production. Due to the chipless shaping, rolled threaded spindles feature a number of positive characteristics: Higher tensile strength, higher resistance to wear, higher fatigue strength under reversed bending, burnished thread flanks, precise profile, unsevered grain structure and higher resistance to corrosion. During thread rolling a groove forms at the outside diameter. This groove guarantees accuracy and cylindricity of the thread. It has no influence on the functioning of the threaded spindle, as the thread bears its load at the flanks. The threads of the nuts are cut.

Catalogue Spindles page 310 - 312

Single thread right and left	Steel C15	Tr. 10 x 3 to Tr. 70 x 10	**Page 310**
	Stainless 1.4305 STAINLESS	Tr. 10 x 3 to Tr. 50 x 8	**Page 311**
Double thread, right hand	Steel C15	Tr. 12 x 6P3 to Tr. 40 x 14P7	**Page 312**
	Stainless 1.4305 STAINLESS	Tr. 12 x 6P3 to Tr. 40 x 14P7	**Page 312**

Stock lengths: 1000mm, 1500mm, 2000mm, 3000mm.
Other lengths and materials as well as customised models on request.

Stock Spindles page 313 - 315

- **Round nuts or hexagon nuts made from steel C35Pb and stainless steel 1.4305.**
  For clamping, manual adjustment and as a fastening nut. Not suitable for drive systems.
- **Round nuts or round flange nuts made from red brass Rg 7.**
  For drive systems at low and medium speed and operating times under 20%. Good dry running properties in situations with insufficient lubrication. In combination with a stainless spindle the drive becomes corrosion resistant.
- **Round flange nuts made from cast iron GG25.**
  As for round flange nut made from red brass but only limited dry-running capabilities and not corrosion proof.
- **Round nuts made from plastic PA6.6 with MoS2.**
  For low-noise drive systems. Maximum permissible peripheral speed $V_{max.}$ = 0.5 m/sec. at low load. Good dry-running properties.

Spindle and nut components are manufactured in accordance with DIN 103. Zero backlash (adjustable) can only be achieved with a two-part nut or two counteracting nuts. **Spindles and spindle nuts available from drawing on request.**

Chain Tensioners page 322

Reworking within 24h-service possible. Custom made parts on request.

Basis for Calculation of Trapezoidal-Threaded Spindle Drives

Required Driving Torque for a Threaded Spindle Drive

The required output torque at the spindle can be derived from the axial load, the lead of the spindle and the efficiency of threaded spindle drive and mounting. At short acceleration times and high speeds, the acceleration torque, and with sliding guide the breakaway torque also have to be considered.

Calculation method:

1) Determining the lead angle using α book of tables or DIN sheet or through calculation.

2) Determining the friction coefficient μ using a table.

3) Calculating the effective angle of friction *p'*.

4) Calculating the degree of efficiency η.

5) Calculating the torque M_d.

Important: About 10% should be added to the end result to make up for losses due to bearing situation. Additional friction due to linear guides and possible rotational forces have to considered by adding a respective allowance. This can also be done when calculating the input power.

Calculation:

1) Lead angle α calculated from:

$$\tan \alpha = \frac{P}{d_2 \cdot \pi}$$

2) Selecting the friction coefficient μ from the table.
See table page 295 bottom.

3) Calculating the effective angle of friction *p'* from:

$$\tan p' \approx \mu \cdot 1{,}07$$

4) Calculating the efficiency degree η:

$$\eta = \frac{\tan \alpha}{\tan (\alpha + p')}$$

5) Calculating the torque M_d in Nm:

$$M_d = \frac{F \cdot P}{2000 \cdot \pi \cdot \eta}$$

Torque due to an axial load

Due to their degree of efficiency, many spindle drives with trapezoidal thread are not self-locking, i. e. an applied axial load causes a spindle torque. In this case the efficiency is lower than with a conversion of rotary into linear motion.

Calculation method: as with the conversion of rotary into linear motion, but with $M_d`$ and η'.

Calculating the efficiency degree η':

$$\eta' = \frac{\tan (\alpha - p')}{\tan \alpha}$$

Calculating the torque $M_d`$ in Nm:

$$M_d` = \frac{F \cdot P \cdot \eta'}{2000 \cdot \pi}$$

Legend

- α (alpha) is the lead angle of the thread.
- η (eta) is the degree of efficiency regarding the conversion of rotary into linear motion.
- η' is the degree of efficiency regarding the conversion of linear into rotary motion.
- μ (mü) is the friction coefficient.
- π (pi) is ≈ 3.14.
- d_2 is the medium effective diameter.
- F is the overall axial load in N.
- M_d is the driving torque at the spindle end in Nm.
- $M_d`$ is the torque generated by the axial load in Nm.
- n is the speed in min^{-1}.
- P is the spindle lead in mm.
- *p'* is the effective angle of friction.

Required Driving Power of a Spindle Drive

The power (in kW) can be derived from the driving torque M_d and the spindle speed n (in min^{-1}):

Important: In order to allow for losses caused by the bearing and other frictional losses and the power required for rotatory acceleration, the power selected for the drive should be 60 to 100% above the calculated figure.

Self-locking Capacity of Trapezoidal Spindle Drives

The self-locking capacity is linked to the friction coefficient (determined by the material match spindle/nut, surface quality, lubrication) and to the lead angle. If the lead angle is smaller than the angle of friction, the spindle drive is self-locking.

We need to distinguish between static and dynamic self-locking capacity. With static self-locking capacity a motionless nut remains steadfast, as long as it is not set in motion by other influences.
With dynamic self-locking capacity a moving nut comes to a stop, when it is no longer driven.

In theory all listed single-thread spindle drives - except for plastic nuts - are self locking, as the lead angle is smaller than the angle of friction. A small vibration may, however be enough to set the nut moving. The only dynamic self-locking drive is size 70 x 10, as only here the lead angle is small enough (friction coefficient 0.05 = 2.86°).

Attention: the above statements are only valid under the assumption that the friction coefficients listed in the catalogue are really fitting. In practice surface properties and the type of lubrication and lubricant used may cause derivation from the original value. To be on the safe side, a locking device (clamping device) should be fitted. In connection with plastic nuts, **none** of the spindle drives listed are self-locking.

Due to their large lead, double-threaded spindle drives are generally not self-locking.

Critical Speed of Trapezoidal-Thread Spindles

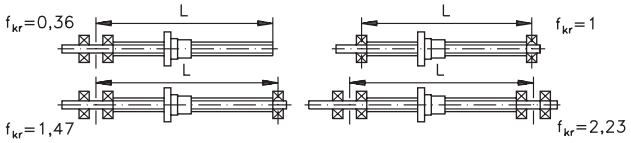
With thin, fast running spindles there is a danger that resonant bending vibration occurs. The method described below helps to determine the resonant frequency provided a rigid enough installation. Speeds close to the critical speed also immensely increase the risk of lateral buckling - the critical speed must therefore always be considered when calculating the critical buckling length. (see following chapter "critical buckling force")

$n_{perm.} = n_{kr} \cdot f_{kr} \cdot c_{kr}$

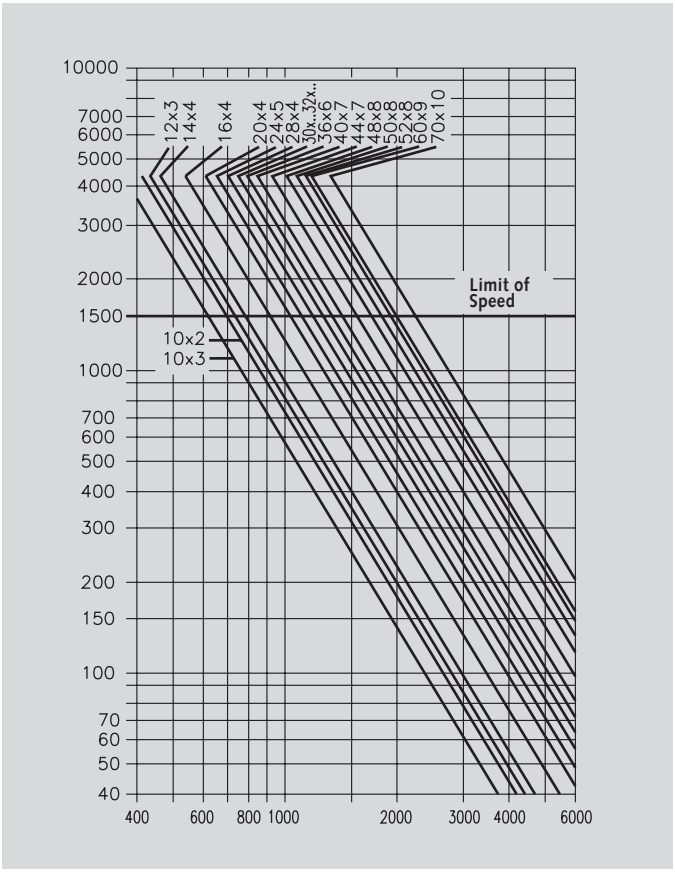
$n_{perm.}$ is the fastest permissible spindle speed in min^{-1}.

n_{kr} is the critical spindle speed in min^{-1} - corresponds to the natural bending vibrations of the spindle and leads to resonance occurrences.

f_{kr} is a corrective factor, considering the spindle bearing. Precondition is a rigid enough installation of the spindle and a fixed bearing.
The following drawing shows 4 classic installation methods of f_{kr} for standard spindle bearings:



c_{kr} is a corrective factor, considering the influence of the critical buckling force. We would advise to first determine $n_{kr} \cdot f_{kr}$ and to then to equate $n_{perm.}$ with the actual speed n. This then leads to c_{kr} for $n/(n_{kr} \cdot f_{kr})$, and with these figures the diagramme then renders c_k (c_{kr}) the related maximum axial pressure load.



Critical Buckling Force of Trapezoidal-Threaded Spindles

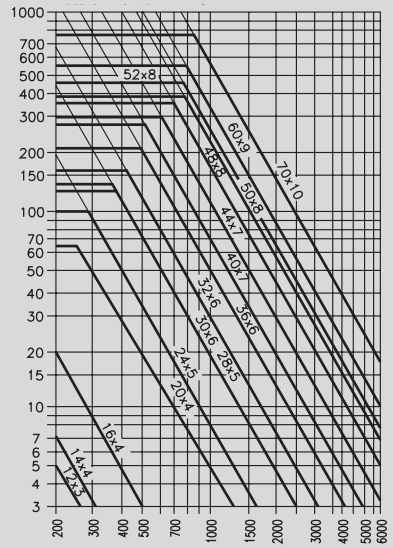
With thin spindles under pressure load there is a risk that lateral buckling occurs. Before the permissible pressure load is determined, the safety factors of the mechanism have to be considered .

$F_{zul.} = F_k \cdot f_k \cdot c_k$

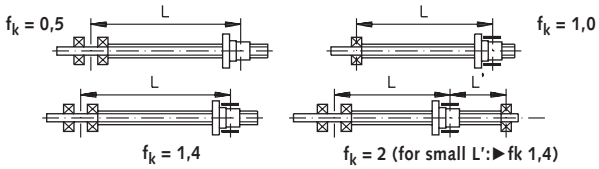
$F_{perm.}$ is the strongest permissible axial force (pressure load) on the spindle in kN.

F_k is the critical buckling force in kN in connection with the free length L.

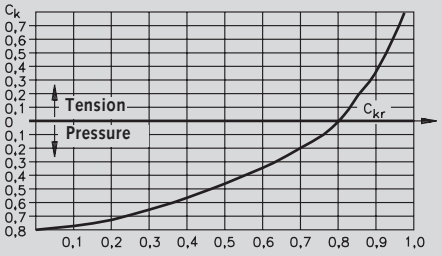
Critical Buckling Force F_k in kN



f_k is a corrective factor, considering the spindle bearing Precondition is a rigid enough installation of the spindle and a fixed bearing. The following table shows classic installation methods of f_k for standard spindle ends.



c_k is a corrective factor, considering the influence of the critical speed.



c_{kr} is here calculated as follows: $c_{kr} = \frac{n}{n_{kr} \cdot f_k}$

n is effective spindle speed in min^{-1}

n_{kr} is the critical spindle speed in min^{-1} according to the diagramme above.

f_k is the corrective factor of the critical spindle speed, under of the spindle bearing method. Values for f_k see above.

Basis for the Calculation of Trapezoidal-Threaded Spindles

Load Capacity

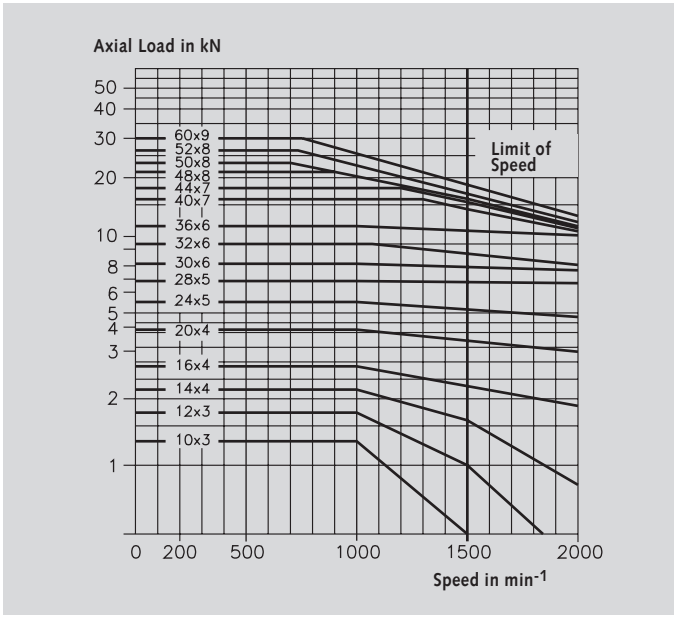
The load capacity for slide pairings usually depends on the material used, the surface properties, intake condition, lubrication conditions and gliding speed, on the temperature and thus on the duty cycle and possibilities for heat dissipation as well as the type of load (constant, fluctuating, alternating, shocks...).
The diagrammes below allow an assessment of the permissible axial load in connection with the speed of trapezoidal-threaded nuts on rolled trapezoidal-threaded spindles at normal operating conditions.

Load table for nuts made from steel C35 see page 309.

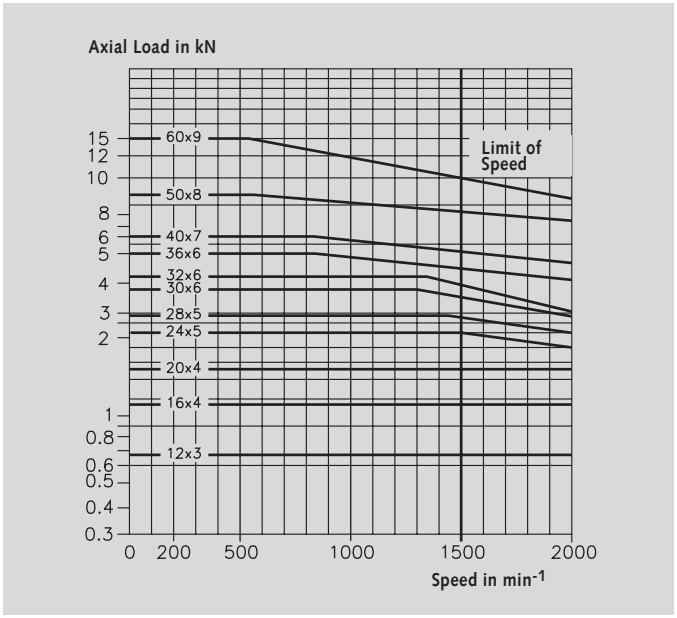
Regarding the Operating Times

Especially single-thread, trapezoidal-threaded spindle drives, due to their low degree of efficiency, convert most of the input power of the shaft into heat, which is first absorbed by spindle and then has to be dissipated. At low power and short operating times the natural dissipation and radiation of heat is usually sufficient. With continuous operation quite substantial cooling capacities might be required. As a thermodynamic calculation of these difficulties is usually to complex or even impossible, already existing comparative calculations are often the only source of information.

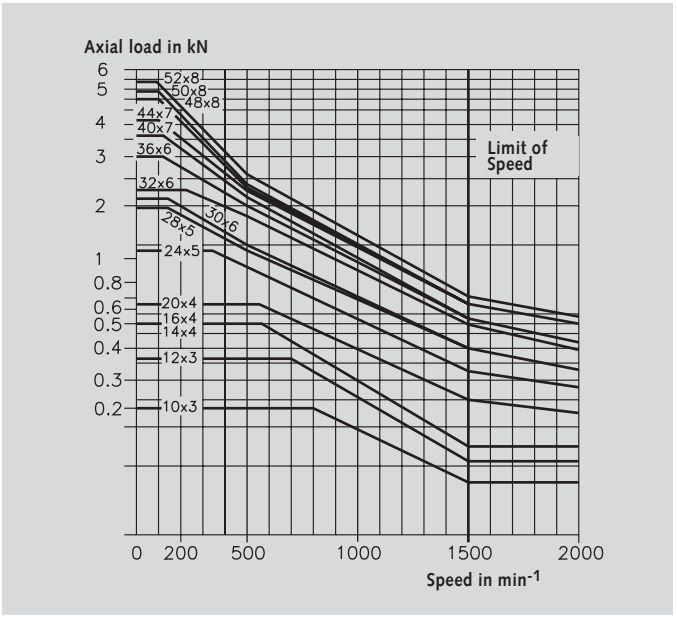
Round nuts made from red brass Rg7



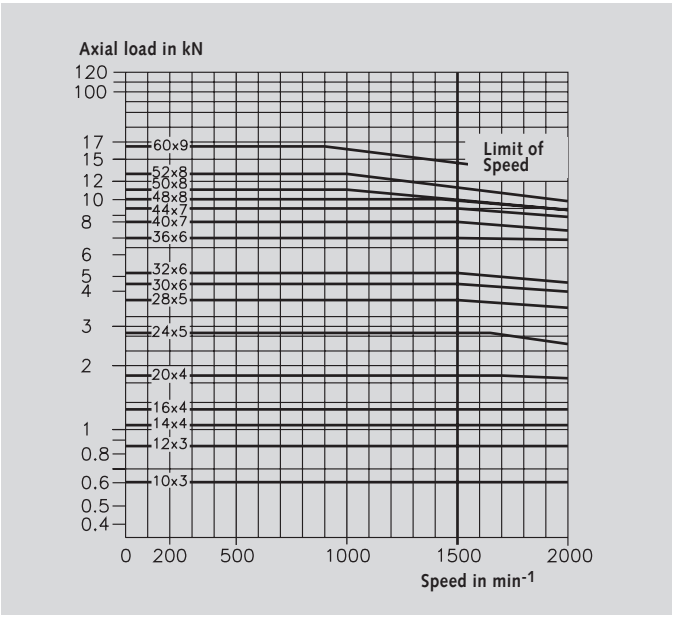
Round nuts made from plastic



Round flange nuts made from cast iron GG25



Round flange nuts made from red brass Rg7



Approx. 80% of the axial force in kN are permissible for double-threaded nuts .

Load Table for Single-Thread Steel Nuts in kN Static (without Safety Margin)

Maximum static load capacity in kN for single-thread, trapezoidal-threaded nuts made from steel C35 at a surface pressure of 25 N/mm².

The figures do not include any safety margin. Depending on the application a safety of 1.5 to 6 might be required (this means the figures in the table have to be divided by 1.5 to 6).

In addition the spindle has to be checked for buckling. The decisive factor in this calculation is the free spindle length and the bearing of the spindle, see page 307.

With dynamic load, the surface pressure must be no larger than 10 N/mm².

With double-threaded nuts about 80% of the axial load in kN is permissible.

Trapezoidal Thread Ø x Lead mm	Length at h= 1.5 x d mm	Load Capacity at h= 1.5 x d kN	Length at h= 2 x d mm	Load Capacity at h= 2 x d kN
10 x 3	15	3,6	20	4,8
12 x 3	18	5,3	24	7,0
14 x 4	21	6,9	28	9,3
16 x 4	24	9,2	32	12,3
18 x 4	27	11,8	36	15,8
20 x 4	30	14,8	40	19,8
24 x 5	36	21,2	48	28,3
28 x 5	42	29,2	56	38,9
30 x 6	45	33,4	60	44,5
32 x 6	48	35,8	64	47,8
36 x 6	54	48,9	72	65,3
40 x 7	60	60,2	80	80,3
44 x 7	66	73,1	88	97,5
48 x 8	72	87,2	96	116,3
50 x 8	75	94,9	100	126,5
52 x 8	78	102,9	104	137,3
60 x 9	90	137,3	120	183,0
70 x 10	105	211,3	-	-

PA6.6 with MoS2, a Special Polyamide, Suitable for Nuts with Trapezoidal Thread

Material Properties

This plastic is a low-maintenance material for bearings. Compared to other plastics it has a much higher wear resistance. The spec. surface pressure is 35 N/mm² at 23°C/ 50% RH. Threaded nuts made from plastic are more resistant against loads caused by impacts or shocks then red brass and grey cast iron-nuts. The material is also quieter than red brass and grey cast iron and increases the service life.

Properties	Unit of Measurement	Plastic PA6.6 with MoS2
Tensile Strength	N/mm²	90 (82)
Elongation at Break	%	20 (70)
Flexural Modus	N/mm²	3600 (1500)
Compressive Strength at 1% Deformation	N/mm²	37
Izod Impact, Notched	kJ/m²	3.35 (>10)
Shore Hardness D	D	80 - 90
Coefficient of Linear Thermal Expansion	10^{-6}/°C	63
Thermal Conductivity	W/mk	0.21
Thermal Compr. Strength 0.46 N/mm² °C		204 - 254
Melting Point	°C	260
Resistivity	Ω cm	$>10^{13}$ (10^{12})
Dielelectric Constant	-	3.6 (5.1)
Dissipation Factor	-	0.03 (0.2)
Water Absorption 24 hours	%	0.5 - 1.3
Water Absorption max.	%	6 - 8

Figures are valid for a water content below 0.2%, Figures in ( ) at standard climate 23°C/50% RF. Chemically resistant against all solutions, lubricants, hydrocarbons, ketones, aqueous solutions and alkaline solutions pH5-pH11. Chemically unstable against phenols, cresols, formic acid, concentrated mineral acids and alkali, oxidisers including halogens.

Wear Properties

Common constructions (threaded spindle made from steel, nut made from grey cast iron or bronze) lead to wear of the threaded spindle and the nut. A threaded nut made from plastic does not affect the spindle, i.e. if unexpected wear occurs, only the nut has to be changed. In the pairing steel/plastic there is generally no hardening of the spindle required.

Fixing Plastic Nuts

The plastic nut can be pressed into the housing with a slight over-size of 0.1 - 0.2 mm. It can be secured against turning and displacement with any of the common locking elements used in machine building, or with a flange attached to the face side.

Attention: The over-size used for pressing the nut in passes on 1 : 1 to the inner diameter which reduces the clearance.

Note

For systems with relatively high loads or extreme operating conditions we would advise you to contact us.

Maintenance

The nuts only need to be lubricated on the first mounting, after that they are maintenance free. In order to prolong the service life of the nuts, they can be relubricated, if required. Any fat not containing molybdenum sulphide (Molykote) can be used.

Tolerances

Other than for the rest of the trapezoidal-threaded nuts, the flank clearance is kept at the upper tolerance limit, as the plastic expands when heating up.

Comparison of Friction Coefficients

Spindle / Nut	Static		Dynamic		Dry-Running
	Dry	Oil Lubricated	Dry	Oil Lubricated	Characteristics
Steel / Steel	0.33	0.10	0.15	0.05	none
Steel / Cast iron	0.20	0.10	0.10	0.05	limited
Steel / Red brass	0.20	0.10	0.10	0.05	good
Steel / plastic	0.10	0.04	0.10	0.01-0.04	excellent
Stainl. steel / Stainl. steel	0.33	0.1	0.15	0.05	none
Steel / Stainless steel	0.33	0.1	0.15	0.05	none

Reworking within 24h-service possible. Custom made parts on request.

Metric ISO-Trapezoidal-Threaded Spindles DIN 103, Single-Thread, Right Hand and Left Hand

Material: C15

Tolerance zone 7e, version rolled.

Nuts with trapezoidal thread made from plastic, steel, stainless steel, grey cast iron and red brass page 313.

Ordering Details: e.g.: Product No. 640 010 00, Spindle Tr.10x3 Right Hand, 1000 mm

Product No. Single Thread Right Hand	Product No. Single Thread Left Hand	Trapez. Thread Outside Ø x Lead mm	Length mm	Flanks Ø min. mm	Flanks Ø max. mm	Core Ø min. mm	Weight kg
640 010 00	640 410 00	Tr. 10 x 3*	1000	8,191	8,415	5,84	0,6
640 110 00	640 510 00		1500				0,9
640 210 00	640 610 00		2000				1,2
640 310 00	640 810 00		3000				1,8
640 012 00	640 412 00	Tr. 12 x 3	1000	10,191	10,415	7,84	0,8
640 112 00	640 512 00		1500				1,2
640 212 00	640 612 00		2000				1,6
640 312 00	640 812 00		3000				2,4
640 014 00	640 414 00	Tr. 14 x 4*	1000	11,640	12,415	8,80	0,9
640 114 00	640 514 00		1500				1,35
640 214 00	640 614 00		2000				1,8
640 314 00	640 814 00		3000				2,7
640 016 00	640 416 00	Tr. 16 x 4	1000	13,640	13,905	10,80	1,4
640 116 00	640 516 00		1500				2,1
640 216 00	640 616 00		2000				2,8
640 316 00	640 816 00		3000				4,2
640 018 00	640 418 00	Tr. 18 x 4	1000	15,640	15,905	12,80	1,6
640 118 00	640 518 00		1500				2,4
640 218 00	640 618 00		2000				3,2
640 318 00	640 818 00		3000				4,8
640 020 00	640 420 00	Tr. 20 x 4	1000	17,640	17,905	14,80	2,1
640 120 00	640 520 00		1500				3,15
640 220 00	640 620 00		2000				4,2
640 320 00	640 820 00		3000				6,3
640 024 00	640 424 00	Tr. 24 x 5	1000	21,094	21,394	17,50	2,9
640 124 00	640 524 00		1500				4,35
640 224 00	640 624 00		2000				5,8
640 324 00	640 824 00		3000				8,7
640 028 00	640 428 00	Tr. 28 x 5	1000	25,049	25,390	21,50	3,9
640 128 00	640 528 00		1500				5,85
640 228 00	640 628 00		2000				7,8
640 328 00	640 828 00		3000				11,7
640 030 00	640 430 00	Tr. 30 x 6	1000	26,547	26,882	21,90	4,7
640 130 00	640 530 00		1500				7,05
640 230 00	640 630 00		2000				9,4
640 330 00	640 830 00		3000				14,1
640 032 00	640 432 00	Tr. 32 x 6	1000	28,547	28,882	23,90	5,1
640 132 00	640 532 00		1500				7,65
640 232 00	640 632 00		2000				10,2
640 332 00	640 832 00		3000				15,3
640 036 00	640 436 00	Tr. 36 x 6	1000	32,547	32,882	27,90	6,7
640 136 00	640 536 00		1500				10,05
640 236 00	640 636 00		2000				13,4
640 336 00	640 836 00		3000				20,1
640 040 00	640 440 00	Tr. 40 x 7	1000	36,020	36,375	30,50	9,4
640 140 00	640 540 00		1500				14,1
640 240 00	640 640 00		2000				18,8
640 340 00	640 840 00		3000				28,2
640 044 00	640 444 00	Tr. 44 x 7	1000	40,020	40,375	34,50	9,7
640 144 00	640 544 00		1500				14,55
640 244 00	640 644 00		2000				19,40
640 344 00	640 844 00		3000				29,1
640 048 00	640 448 00	Tr. 48 x 8	1000	43,468	43,868	37,80	11,7
640 148 00	640 548 00		1500				17,55
640 248 00	640 648 00		2000				23,4
640 348 00	640 848 00		3000				35,1
640 050 00	640 450 00	Tr. 50 x 8	1000	45,468	45,868	39,30	12,6
640 150 00	640 550 00		1500				18,9
640 250 00	640 650 00		2000				25,2
640 350 00	640 850 00		3000				37,8
640 052 00	640 452 00	Tr. 52 x 8	1000	47,468	47,868	41,17	14,4
640 152 00	640 552 00		1500				21,6
640 252 00	640 652 00		2000				28,8
640 352 00	640 852 00		3000				43,2
640 060 00	640 460 00	Tr. 60 x 9	1000	54,935	55,3000	48,15	18,9
640 160 00	640 560 00		1500				28,35
640 260 00	640 660 00		2000				37,8
640 360 00	640 860 00		3000				56,7
640 070 00	640 470 00	Tr. 70 x 10	1000	64,425	64,850	57,00	25,7
640 170 00	640 570 00		1500				38,55
640 270 00	640 670 00		2000				51,4
640 370 00	640 870 00		3000				77,1

Rolled Spindles

High grade raw material C15, heat treated by the manufacturer and without exception delivered by German smelting works, and a complex machine and tool technology lead to our excellent quality in the spindle production.

The strong densification causes frictional heat which has to be dissipated using a re-cooling or filtering system. If the compressed oil is changed continuously, press-polished flanks without any leaf-shaped marks can be achieved.

To master the rolling process, in order to achieve exact leads and profiles up to ±0.03 mm/300 mm (standard ±0.15/300, material 1.4305 ±0.3/300) and high surface quality, has only become possible by means of complex measuring and controlling systems in combination with a new generation of machines with swiveling toolholders.

Straightness:
Trapezoid 10 - 24 mm max. 0.8 mm/m,
Trapezoid 28 - 70 mm max. 1.2 mm/m

Straightness on request:
Up to size Tr. 16: 0.10 mm/m.
From size Tr. 20: 0.05 mm/m.

* Lead angle is not in accordance with DIN 103.

Reworking within 24h-service possible. Custom made parts on request.

Metric ISO-Trapezoidal-Threaded Spindles DIN 103, Stainless, Single-Thread, Right and Left Hand

Material: Stainless steel 1.4305.

STAINLESS

Tolerance zone 7e. Version: up to Tr 40x7 rolled, above this size whirled.

Nuts with trapezoidal thread made from plastic, Steel, Stainless steel, grey cast iron and red brass page 313.

Ordering Details: e.g.: Product No. 640 990 10, Stainless Threaded Spindle, Tr. 10x3 Right Hand, 1000 mm

Product No. Single Thread Right Hand	Product No. Single Thread Left Hand	Trapez. Thread Outside Ø x Lead mm	Length mm	Flanks Ø min. mm	Flanks Ø max. mm	Core Ø min. mm	Weight kg
640 990 10	640 994 10	Tr. 10 x 3*	1000	8,191	8,415	5,84	0,6
640 991 10	640 995 10		1500				0,9
640 992 10	640 996 10		2000				1,2
640 993 10	640 998 10		3000				1,8
640 990 12	640 994 12	Tr. 12 x 3	1000	10,191	10,415	7,84	0,8
640 991 12	640 995 12		1500				1,2
640 992 12	640 996 12		2000				1,6
640 993 12	640 998 12		3000				2,4
640 990 14	640 994 14	Tr. 14 x 4*	1000	11,640	12,415	8,80	0,9
640 991 14	640 995 14		1500				1,35
640 992 14	640 996 14		2000				1,8
640 993 14	640 998 14		3000				2,7
640 990 16	640 994 16	Tr. 16 x 4	1000	13,640	13,905	10,80	1,4
640 991 16	640 995 16		1500				2,1
640 992 16	640 996 16		2000				2,8
640 993 16	640 998 16		3000				4,2
640 990 18	640 994 18	Tr. 18 x 4	1000	15,640	15,905	12,80	1,6
640 991 18	640 995 18		1500				2,4
640 992 18	640 996 18		2000				3,2
640 993 18	640 998 18		3000				4,8
640 990 20	640 994 20	Tr. 20 x 4	1000	17,640	17,905	14,80	2,1
640 991 20	640 995 20		1500				3,15
640 992 20	640 996 20		2000				4,2
640 993 20	640 998 20		3000				6,3
640 990 24	640 994 24	Tr. 24 x 5	1000	21,094	21,394	17,50	2,9
640 991 24	640 995 24		1500				4,35
640 992 24	640 996 24		2000				5,8
640 993 24	640 998 24		3000				8,7
640 990 28	640 994 28	Tr. 28 x 5	1000	25,049	25,390	21,50	3,9
640 991 28	640 995 28		1500				5,85
640 992 28	640 996 28		2000				7,8
640 993 28	640 998 28		3000				11,7
640 990 30	640 994 30	Tr. 30 x 6	1000	26,547	26,882	21,90	4,7
640 991 30	640 995 30		1500				7,05
640 992 30	640 996 30		2000				9,4
640 993 30	640 998 30		3000				14,1
640 990 36	640 994 36	Tr. 36 x 6	1000	32,547	32,882	27,90	6,7
640 991 36	640 995 36		1500				10,05
640 992 36	640 996 36		2000				13,4
640 993 36	640 998 36		3000				20,1
640 990 40	640 994 40	Tr. 40 x 7	1000	36,020	36,375	30,50	9,4
640 991 40	640 995 40		1500				14,1
640 992 40	640 996 40		2000				18,8
640 993 40	640 998 40		3000				28,2
640 990 50	640 994 50	Tr. 50 x 8	1000	45,468	45,868	40,37	12,6
640 991 50	640 995 50		1500				18,9
640 992 50	640 996 50		2000				25,2
640 993 50	640 998 50		3000				37,8

Rolled Spindles (up to Tr. 40x7)

High grade raw material and complex machine and tool technology lead to our excellent quality in production of threaded spindles.

The strong densification causes frictional heat which has to be dissipated using a re-cooling or filtering system. If the compressed oil is changed continuously, press-polished flanks without any leaf-shaped marks can be achieved.

To master the rolling process, in order to achieve exact leads and profiles up to ±0.03 mm/300 mm (standard ±0.15/300, material 1.4305 ±0.3/300) and high surface quality, has only become possible by means of complex measuring and controlling systems in combination with a new generation of machines with swiveling toolholders.

Straightness:
Trapezoid 10 - 24 mm max. 0.8 mm/m,
Trapezoid 28 - 70 mm max. 1.2 mm/m

Straightness on request:
Up to size Tr. 16: 0.10 mm/m.
From size Tr. 20: 0.05 mm/m.

* Lead not in accordance with DIN 103.

Chain Tensioners page 322

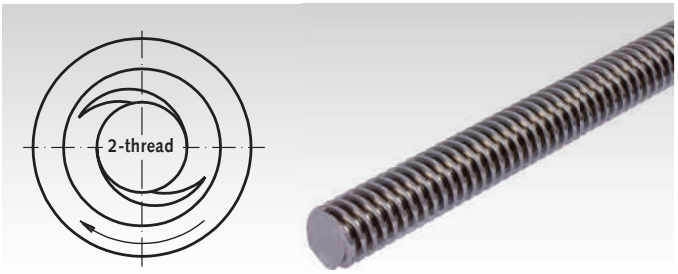
Metric ISO-Trapezoidal-Thread Spindles DIN 103, Double-Thread, Right Hand

Material: C15.
Stainless Steel 1.4305.

STAINLESS

Tolerance zone 7 e. Right Hand.

Double-threaded nuts made from plastic, steel and red brass page 316.



Ordering Details: e.g.: Product No. 645 012 00, Threaded Spindle C15, Double-Thread, Right Hand, Tr. 12 x 6 P3 x 1000 mm

Product No. Steel C15	Product No. Stainles St. 1.4305	Trapezoidal Thread Outside Ø x Lead mm	Length mm	Flanks Ø min. mm	Flanks Ø max. mm	Core Ø min. mm	Weight kg
645 012 00	645 990 12	Tr. 12 x 6 P3	1000	10,191	10,415	7,84	0,8
645 112 00	645 991 12		1500				1,2
645 212 00	645 992 12		2000				1,6
645 312 00	645 993 12		3000				2,4
645 016 00	645 990 16	Tr. 16 x 8 P4	1000	13,640	13,905	10,80	1,4
645 116 00	645 991 16		1500				2,1
645 216 00	645 992 16		2000				2,8
645 316 00	645 993 16		3000				4,2
645 020 00	645 990 20	Tr. 20 x 8 P4	1000	17,640	17,905	14,80	2,1
645 120 00	645 991 20		1500				3,15
645 220 00	645 992 20		2000				4,2
645 320 00	645 993 20		3000				6,3
645 024 00	645 990 24	Tr. 24 x 10 P5	1000	21,094	21,394	17,50	2,9
645 124 00	645 991 24		1500				4,35
645 224 00	645 992 24		2000				5,8
645 324 00	645 993 24		3000				8,7
645 030 00	645 990 30	Tr. 30 x 12 P6	1000	26,547	26,882	21,90	4,7
645 130 00	645 991 30		1500				7,05
645 230 00	645 992 30		2000				9,4
645 330 00	645 993 30		3000				14,1
645 040 00	645 990 40	Tr. 40 x 14 P7	1000	36,020	36,375	30,50	9,4
645 140 00	645 991 40		1500				14,1
645 240 00	645 992 40		2000				18,8
645 340 00	645 993 40		3000				28,2

Rolled Spindles

High grade raw material and complex machine and tool technology lead to our excellent quality in production of threaded spindles.

The strong densification causes frictional heat which has to be dissipated using a re-cooling or filtering system. If the compressed oil is changed continuously, press-polished flanks without any leaf-shaped marks can be achieved.

To master the rolling process, in order to achieve exact leads and profiles up to ±0.03 mm/300 mm (standard ±0.15/300, material 1.4305 ±0.3/300) and high surface quality, has only become possible by means of complex measuring and controlling systems in combination with a new generation of machines with swiveling toolholders.

Straightness:
Trapezoid 10 - 24 mm max. 0.8 mm/m,
Trapezoid 28 - 70 mm max. 1.2 mm/m

Straightness on request:
Up to size Tr. 16: 0.10 mm/m.
From size Tr. 20: 0.05 mm/m.

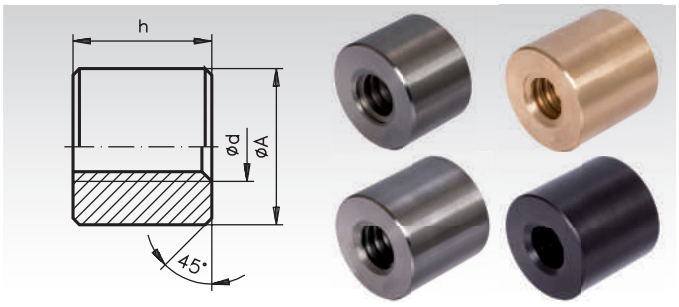
Chain Tensioners page 322

Reworking within 24h-service possible. Custom made parts on request.

Round Nuts with Metric ISO-Trapezoidal Thread DIN 103, Single-Thread

Material: Steel C35Pb.
Stainless steel 1.4305.
Red brass Rg7 (GC-CuSn7ZnPb).
Plastic (PA6.6 with MoS2).

Tolerance zone 7H.



Ordering Details: e.g.: Product No. 643 010 00, Round Nut, Steel, Tr. 10 x 3, Single Thread Right Hand

Single-Thread, Right Hand

Product No. Steel h = 1,5 x d	Product No. Steel h = 2 x d	Product No. Stainless Steel h = 1,5 x d	Product No. Res Brass h = 2 x d	Product No. Plastic h = 2 x d	Trapezoidal Thread Ø d mm	DIN ISO 2768m h=1,5xd mm	DIN ISO 2768m h=2xd mm	DIN 668 ØA^{h11}* mm	Weight Steel 1,5 x d kg	Weight Steel 2 x d kg	Weight Brass 2 x d kg	Weight Plastic 2 x d kg
643 010 00	643 210 00	-	643 310 00	-	10 x 3**	15	20	22	0,04	0,06	0,06	-
643 012 00	643 212 00	643 990 12	643 312 00	643 412 00	12 x 3	18	24	26	0,06	0,08	0,1	0,02
643 014 00	643 214 00	-	643 314 00	-	14 x 4**	21	28	30	0,1	0,12	0,14	-
643 016 00	643 216 00	643 990 16	643 316 00	643 416 00	16 x 4	24	32	36	0,16	0,22	0,24	0,04
643 018 00	643 218 00	-	643 318 00	643 418 00	18 x 4	27	36	40	0,22	0,32	0,37	0,05
643 020 00	643 220 00	643 990 20	643 320 00	643 420 00	20 x 4	30	40	45	0,32	0,42	0,5	0,06
643 024 00	643 224 00	643 990 24	643 324 00	643 424 00	24 x 5	36	48	50	0,44	0,6	0,7	0,08
643 028 00	643 228 00	643 990 28	643 328 00	643 428 00	28 x 5	42	56	60	0,76	1,0	1,12	0,14
643 030 00	643 230 00	643 990 30	643 330 00	643 430 00	30 x 6	45	60	60	0,78	1,06	1,2	0,16
643 032 00	643 232 00	-	643 332 00	643 432 00	32 x 6	48	64	60	0,8	1,08	1,2	0,16
643 036 00	643 236 00	643 990 36	643 336 00	643 436 00	36 x 6	54	72	75	1,48	1,98	2,3	0,28
643 040 00	643 240 00	643 990 40	643 340 00	643 440 00	40 x 7	60	80	80	1,8	2,44	2,8	0,36
643 044 00	643 244 00	-	643 344 00	-	44 x 7	66	88	80	1,9	2,52	2,86	-
643 048 00	643 248 00	-	643 348 00	-	48 x 8	72	96	90	2,68	3,58	4,08	-
643 050 00	643 250 00	-	643 350 00	643 450 00	50 x 8	75	100	90	2,72	3,64	4,12	0,54
643 052 00	643 252 00	-	643 352 00	-	52 x 8	78	104	90	2,72	3,64	4,2	-
643 060 00	643 260 00	-	643 360 00	643 460 00	60 x 9	90	120	100	3,76	4,96	5,7	0,74
643 070 00	-	-	-	-	70 x 10	105	-	110	4,96	- -	-	

Single-Thread, Left Hand

Product No. Steel h = 1,5 x d	Product No. Steel h = 2 x d	Product No. Stainless Steel h = 1,5 x d	Product No. Res Brass h = 2 x d	Product No. Plastic h = 2 x d	Trapezoidal Thread Ø d mm	DIN ISO 2768m h=1,5xd mm	DIN ISO 2768m h=2xd mm	DIN 668 ØA^{h11}* mm	Weight Steel 1,5 x d kg	Weight Steel 2 x d kg	Weight Brass 2 x d kg	Weight Plastic 2 x d kg
643 510 00	643 710 00	-	643 810 00	-	10 x 3**	15	20	22	0,04	0,06	0,06	-
643 512 00	643 712 00	643 995 12	643 812 00	643 912 00	12 x 3	18	24	26	0,06	0,08	0,1	0,02
643 514 00	643 714 00	-	643 814 00	-	14 x 4**	21	28	30	0,1	0,12	0,14	-
643 516 00	643 716 00	643 995 16	643 816 00	643 916 00	16 x 4	24	32	36	0,16	0,22	0,24	0,04
643 518 00	643 718 00	-	643 818 00	643 918 00	18 x 4	27	36	40	0,24	0,32	0,37	0,05
643 520 00	643 720 00	643 995 20	643 820 00	643 920 00	20 x 4	30	40	45	0,32	0,42	0,5	0,06
643 524 00	643 724 00	643 995 24	643 824 00	643 924 00	24 x 5	36	48	50	0,44	0,6	0,7	0,08
643 528 00	643 728 00	-	643 828 00	643 928 00	28 x 5	42	56	60	0,76	1,0	1,12	0,14
643 530 00	643 730 00	643 995 30	643 830 00	643 930 00	30 x 6	45	60	60	0,78	1,06	1,2	0,16
643 532 00	643 732 00	-	643 832 00	643 932 00	32 x 6	48	64	60	0,8	1,08	1,2	0,16
643 536 00	643 736 00	-	643 836 00	643 936 00	36 x 6	54	72	75	1,48	1,98	2,3	0,28
643 540 00	643 740 00	643 995 40	643 840 00	643 940 00	40 x 7	60	80	80	1,8	2,44	2,8	0,36
643 544 00	643 744 00	-	643 844 00	-	44 x 7	66	88	80	1,9	2,52	2,86	-
643 548 00	643 748 00	-	643 848 00	-	48 x 8	72	96	90	2,68	3,58	4,08	-
643 550 00	643 750 00	-	643 850 00	643 950 00	50 x 8	75	100	90	2,72	3,64	4,12	0,54
643 552 00	643 752 00	-	643 852 00	-	52 x 8	78	104	90	2,72	3,64	4,2	-
643 560 00	643 760 00	-	643 860 00	643 960 00	60 x 9	90	120	100	3,76	4,96	5,7	0,74
643 570 00	-	-	-	-	70 x 10	105	-	110	4,96	-	-	-

Comparison of friction coefficients see page 309 bottom.

* Tolerance h11 does not apply to plastic nuts.

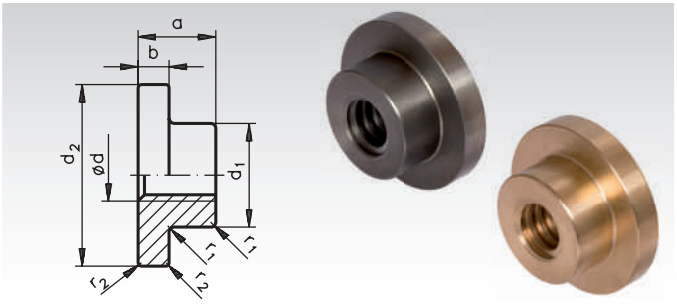
** Lead angle is not in accordance with DIN 103.

Reworking within 24h-service possible. Custom made parts on request.

Round Flange Nuts with Metric ISO-Trapezoidal Thread DIN 103, Single-Thread

Material: Grey cast iron GG25
Red brass Rg7 (GC-CuSn 7ZnPb).

Tolerance zone 7H.



Ordering Details: e.g.: Product No. 644 010 00, round flange nut made from GG25, Tr. 10 x 3, single thread, right hand

Single thread, right hand **Single thread, left hand**

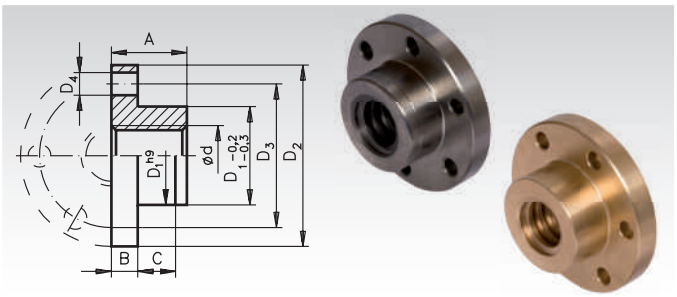
Single thread, right hand Product No. Grey Cast Iron	Single thread, right hand Product No. Red Brass	Single thread, left hand Product No. Grey Cast Iron	Single thread, left hand Product No. Red Brass	Trapez. thread Ø d mm	DIN ISO 2768 m a mm	b mm	Ø h11 d_1 mm	d_2 mm	r_1 mm	r_2 mm	Weight Iron kg	Brass kg
644 010 00	644 110 00	644 310 00	644 410 00	10 x 3*	14	5	20	33	0,5	0,3	0,04	0,05
644 012 00	644 112 00	644 312 00	644 412 00	12 x 3	18	6	22	40	0,5	0,3	0,08	0,09
644 014 00	644 114 00	644 314 00	644 414 00	14 x 4*	22	10	30	50	1,0	0,5	0,19	0,23
644 016 00	644 116 00	644 316 00	644 416 00	16 x 4	22	10	30	50	1,0	0,5	0,18	0,22
-	644 118 00	-	644 418 00	18 x 4	24	10	36	60	1,0	0,5	-	0,30
644 020 00	644 120 00	644 320 00	644 420 00	20 x 4	24	10	36	60	1,0	0,5	0,26	0,32
644 024 00	644 124 00	644 324 00	644 424 00	24 x 5	30	11	45	70	1,0	0,5	0,45	0,54
644 028 00	644 128 00	644 328 00	644 428 00	28 x 5	47	14	58	88	1,0	0,5	1,06	1,29
644 030 00	644 130 00	644 330 00	644 430 00	30 x 6	47	14	58	88	1,0	0,5	1,04	1,26
644 032 00	644 132 00	644 332 00	644 432 00	32 x 6	47	14	58	88	1,0	0,5	1,00	1,20
644 036 00	644 136 00	644 336 00	644 436 00	36 x 6	58	18	80	112	2,0	1,0	2,35	2,84
644 040 00	644 140 00	644 340 00	644 440 00	40 x 7	63	18	80	137	2,0	1,0	3,04	3,67
644 044 00	644 144 00	644 344 00	644 444 00	44 x 7	63	18	80	137	2,0	1,0	2,93	3,53
644 048 00	644 148 00	644 348 00	644 448 00	48 x 8	68	18	90	167	2,0	1,0	4,35	5,25
644 050 00	644 150 00	644 350 00	644 450 00	50 x 8	68	18	90	167	2,0	1,0	4,22	5,10
644 052 00	644 152 00	644 352 00	644 452 00	52 x 8	68	18	90	167	2,0	1,0	4,22	5,10
644 060 00	644 160 00	644 360 00	644 460 00	60 x 9	68	18	90	167	2,0	1,0	3,85	4,65

* Lead not according to DIN 103.

Ready-to-Install Flange Nuts with Metric ISO-Trapezoidal Thread DIN 103, Single-Thread

Material: Grey cast iron GG25
Red brass Rg7 (GC-CuSn7ZnPb).

Tolerance zone 7H.

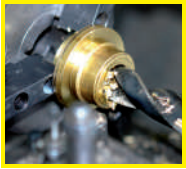


Ordering Details: e.g.: Product No. 644 770 16, flange nut made from GG25, Tr. 16 x 4, single thread, right hand

Single thread, right hand **Single thread, left hand**

Artikel-No. single thread right hand Grey Cast Iron	Artikel-No. single thread right hand Red Brass	Artikel-No. single thread left hand Grey Cast Iron	Artikel-No. single thread left hand Red Brass	Thread Ød mm	D_1 mm	DIN ISO 2768 m D_2 mm	D_3 mm	6 x D_4 mm	A mm	B mm	C mm	Weight Grey Cast kg	Rg kg
644 770 16	644 771 16	644 773 16	644 774 16	16 x 4	26	48	38	6	20	7	10	0,12	0,13
-	644 771 18	-	644 774 18	18 x 4	30	58	45	7	22	8	12	-	0,22
644 770 20	644 771 20	644 773 20	644 774 20	20 x 4	30	58	45	7	22	8	12	0,17	0,20
644 770 24	644 771 24	644 773 24	644 774 24	24 x 5	40	72	58	7	28	10	12	0,36	0,42
-	644 771 28	-	644 774 28	28 x 5	45	78	65	7	35	10	15	-	0,59
644 770 30	644 771 30	644 773 30	644 774 30	30 x 6	50	82	68	7	44	12	15	0,85	0,95
644 770 36	644 771 36	644 773 36	644 774 36	36 x 6	55	110	85	7	55	15	15	1,45	1,60
644 770 40	644 771 40	644 773 40	644 774 40	40 x 7	60	130	95	9	60	15	20	2,00	2,18
644 770 50	644 771 50	644 773 50	644 774 50	50 x 8	80	160	120	11	65	15	20	3,25	3,68
644 770 60	644 771 60	644 773 60	644 774 60	60 x 9	80	160	120	11	65	15	20	2,95	3,26

Comparison of friction coefficients see page 309.

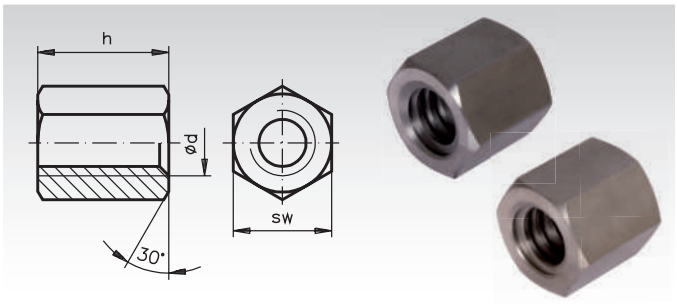


Reworking within 24h-service possible. Custom made parts on request.

Hexagonal Nuts with Metric ISO-Trapezoidal Thread DIN 103, Single-Thread

Material: Steel C35Pb.
Stainless steel 1.4305, Stainless.

Tolerance zone 7H.



Ordering Details: e.g.: Product No. 643 110 00, Hexagonal Nut, Steel, Tr. 10 x 3, Single-Thread, Right Hand

Single-Thread, Right Hand

Product No. Steel	Product No. Stainless Steel	Trapezoidal Thread Ø d mm	DIN ISO 2768 m h = 1,5 x d mm	DIN 176 sw mm	Weight kg
643 110 00	-	10 x 3*	15	17	0,02
643 112 00	**643 991 12**	12 x 3	18	19	0,03
643 114 00	-	14 x 4*	21	22	0,04
643 116 00	**643 991 16**	16 x 4	24	27	0,08
643 118 00	-	18 x 4	27	27	0,10
643 120 00	**643 991 20**	20 x 4	30	30	0,12
643 124 00	**643 991 24**	24 x 5	36	36	0,20
643 128 00	**643 991 28**	28 x 5	42	46	0,42
643 130 00	**643 991 30**	30 x 6	45	46	0,42
643 132 00	-	32 x 6	48	46	0,42
643 136 00	**643 991 36**	36 x 6	54	55	0,72
643 140 00	**643 991 40**	40 x 7	60	65	1,20
643 144 00	-	44 x 7	66	65	1,18
643 148 00	-	48 x 8	72	75	1,82
643 150 00	-	50 x 8	75	75	1,80
643 152 00	-	52 x 8	78	75	1,80
643 160 00	-	60 x 9	90	90	3,18
643 170 00	-	70 x 10	105	90	2,86

Single-Thread, Left Hand

Product No. Steel	Product No. Stainless Steel	Trapezoidal Thread Ø d mm	DIN ISO 2768 m h = 1,5 x d mm	DIN 176 sw mm	Weight kg
643 610 00	-	10 x 3*	15	17	0,02
643 612 00	**643 996 12**	12 x 3	18	19	0,03
643 614 00	-	14 x 4*	21	22	0,04
643 616 00	**643 996 16**	16 x 4	24	27	0,08
643 618 00	-	18 x 4	27	27	0,10
643 620 00	**643 996 20**	20 x 4	30	30	0,12
643 624 00	**643 996 24**	24 x 5	36	36	0,20
643 628 00	-	28 x 5	42	46	0,42
643 630 00	-	30 x 6	45	46	0,42
643 632 00	-	32 x 6	48	46	0,42
643 636 00	-	36 x 6	54	55	0,72
643 640 00	-	40 x 7	60	65	1,20
643 644 00	-	44 x 7	66	65	1,18
643 648 00	-	48 x 8	72	75	1,82
643 650 00	-	50 x 8	75	75	1,80
643 652 00	-	52 x 8	78	75	1,80
643 660 00	-	60 x 9	90	90	3,18
643 670 00	-	70 x 10	105	90	2,86

Comparison of friction coefficients see page 309 bottom.

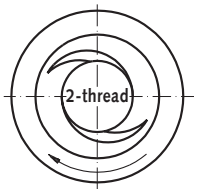
* Lead angle is not in accordance with DIN 103.

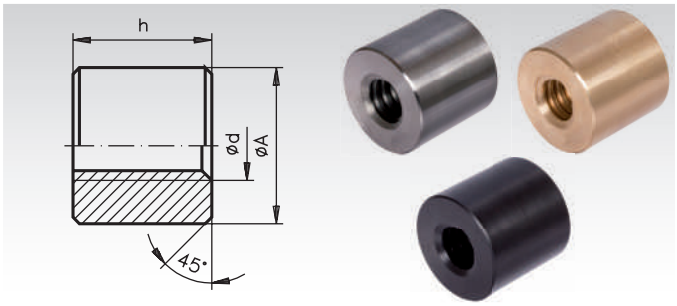
Reworking within 24h-service possible. Custom made parts on request.

Round Nuts with Metric ISO-Trapezoidal Thread DIN 103, Double-Thread

Material: Steel C35Pb.
Red brass Rg7 (GC-CuSn7ZnPb).
Plastic (PA6.6 with MoS2).

Tolerance zone 7H.





Ordering Details: e.g.: Product No. 645 612 00, Round Nut, Steel, Tr. 12 x 6 P3

Double-thread, Right Hand

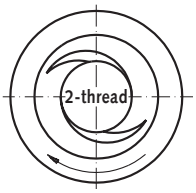
Product No. Steel h = 1,5 x d	Product No. Red Brass h = 2 x d	Product No. Plastic h = 2 x d	Trapez. Thread Ø d mm	DIN ISO 2768m h=1,5xd mm	h=2xd mm	DIN 668 ØA^{h11}* mm	Weight Steel kg	Weight Red Brass kg	Weight Plastic kg
645 612 00	**645 812 00**	**645 912 00**	12 x 6 P3	18	24	26	0,06	0,1	0,02
645 616 00	**645 816 00**	**645 916 00**	16 x 8 P4	24	32	36	0,16	0,24	0,04
645 620 00	**645 820 00**	**645 920 00**	20 x 8 P4	30	40	45	0,3	0,5	0,06
645 624 00	**645 824 00**	**645 924 00**	24 x 10 P5	36	48	50	0,44	0,7	0,08
645 630 00	**645 830 00**	**645 930 00**	30 x 12 P6	45	60	60	0,8	1,2	0,16
645 640 00	**645 840 00**	**645 940 00**	40 x 14 P7	60	80	80	1,8	2,8	0,36

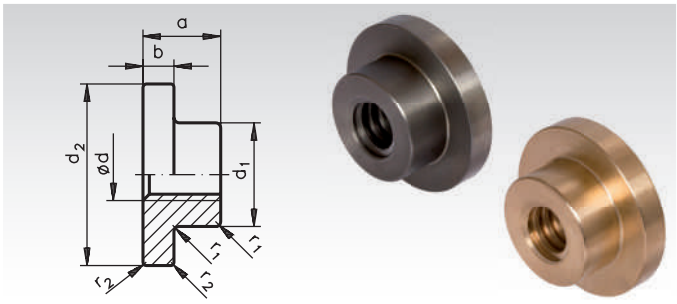
* Tolerance h11 does not apply to plastic nuts.

Round Flange Nuts with Metric ISO-Trapezoidal Thread DIN 103, Double-thread

Material: Grey cast iron GG25
Red brass Rg7 (GC-CuSn 7ZnPb).

Tolerance zone 7H.





Ordering Details: e.g.: Product No. 645 440 12, round flange nut GG25, Tr. 12 x 6 P3

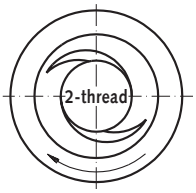
Double-thread, Right Hand

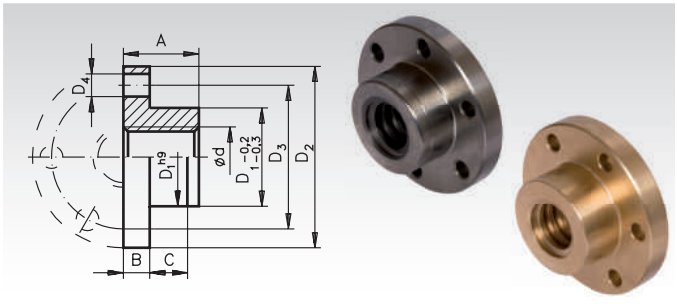
Product No. Grey Cast Iron	Product No. Red Brass	Tr. Thread Ød mm	DIN ISO 2768m a mm	b mm	Ø^{h11} d_1 mm	d_2 mm	r_1 mm	r_2 mm	Weight Grey Cast Iron kg	Weight Red Brass kg
645 440 12	**645 441 12**	12 x 6 P3	18	6	22	40	0,5	0,3	0,08	0,09
645 440 16	**645 441 16**	16 x 8 P4	22	10	30	50	1,0	0,5	0,18	0,22
645 440 20	**645 441 20**	20 x 8 P4	24	10	36	60	1,0	0,5	0,26	0,32
645 440 24	**645 441 24**	24 x 10 P5	30	11	45	70	1,0	0,5	0,45	0,54
645 440 30	**645 441 30**	30 x 12 P6	47	14	58	88	1,0	0,5	1,04	1,26
645 440 40	**645 441 40**	40 x 14 P7	63	18	80	137	2,0	1,0	3,04	3,67

Ready-to-Install Flange Nuts with Metric ISO-Trapezoidal Thread DIN 103, Double-thread

Material: Grey cast iron GG25
Red brass Rg7 (GC-CuSn7ZnPb).

Tolerance zone 7H.





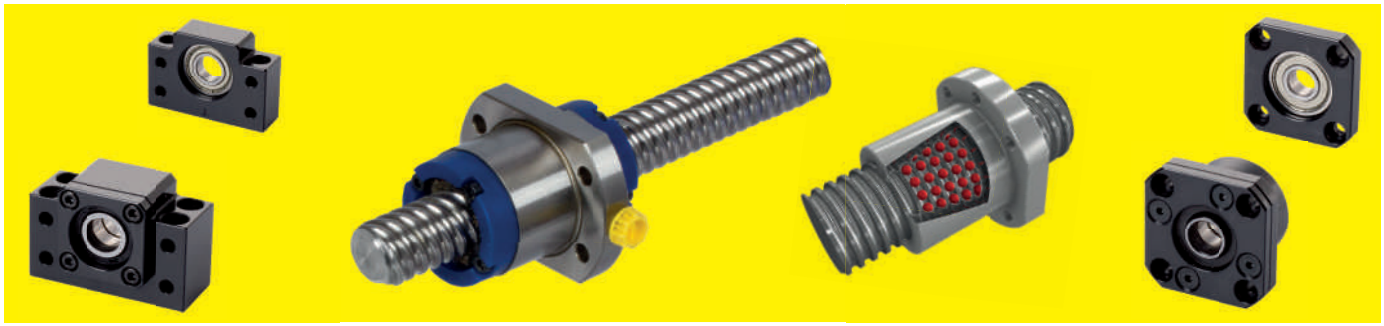
Ordering Details: e.g.: Product No. 645 770 16, flange nut GG25, Tr. 16 x 8 P4

Double-thread, Right Hand

Product No. Grey Cast Iron	Product No. Red Brass	Tr. Thread Ød mm	D_1 mm	DIN ISO 2768 m D_2 mm	D_3 mm	6 x D_4 mm	A mm	B mm	C mm	Weight Grey Cast kg	Weight Red Brass kg
645 770 16	**645 771 16**	16 x 8 P4	26	48	38	6	20	7	10	0,12	0,13
645 770 20	**645 771 20**	20 x 8 P4	30	58	45	7	22	8	12	0,17	0,20
645 770 24	**645 771 24**	24 x 10 P5	40	72	58	7	28	10	12	0,36	0,42
645 770 30	**645 771 30**	30 x 12 P6	50	82	68	7	44	12	15	0,85	0,95
645 770 40	**645 771 40**	40 x 14 P7	60	130	95	9	60	15	20	2,00	2,18

Comparison of friction coefficients see page 309.

Ball Screw Drives, Right Hand, Rolled Version



General Description
Because of the rolling friction, ball screw drives have a high efficiency up to 98% and require a relatively low drive power. Application: Conversion of a rotary movement into a linear one. Sometimes: Conversion of a linear movement into a rotary one (recommended only at high pitch, beginning from 1/3 of the nominal diameter).

No Self-Locking
Due to the low friction with high efficiency, ball screw drives require only a very low starting torque and are not no self-locking.

Designation according to DIN
According to DIN ISO 3408-1 and other standards, a ball screw drive consists of a spindle and, for minimum, one nut. The size has to be described by the nominal diameter and the pitch. Another essential dimension is the ball diameter. Further informations are required: The version (shape) of the nut, the pitch accuracy, the length and, if needed, the details of the spindle ends.

Conditions of Use and Lifespan
Ball screw drives are sensitive to dirt and high shock loads. Sufficiently protected, they reach a very long lifetime.

Catalog Spindles and Nuts

Catalog Version
Available from stock: Spindles right hand, rolled version in sizes from 8x2 to 63x10mm. Flanged nuts and cylindrical nuts. The production lengths are from 1,000mm up to 3,000mm, depending on the size. Partial lengths are also in the stock range. Other lengths and reworking of the spindle ends on request.

Rolled Spindles
Rolled from high quality bearing steel 100Cr6, hardened and straightened. Rolled spindles have a unsevered grain structure and high pitch accuracy. Rolling is the most economical method for serial production. The catalog spindles can get combined with the flanged nuts and cylindrical nuts on the following pages.

Axial Clearance
These ball screw drives are not backlash-free. Therefore the nuts run very easy with very low friction. The axial clearances are shown in the tables of the nuts. This play is only a disadvantage if a high positioning accuracy is required at alternating direction of force. To eleminate the axial play, two nuts can get braced against each other. Alternatively, the nuts could be equipped with better fitting ball sizes. This would be expensive.

Load Capacity
The static and dynamic load rates are shown in the tables of the nuts. These loads only apply to the use with axial play. At backlash-free preloaded nuts the load must be reduced, or the lifespan will get shorter. Additional to the axial load, the acceleration force and shock loads must be considered. Also the critical buckling force and critical spindle speed must be checked.

Maximum Speed
Ball screw drives allow very high speeds. But for sufficient lifespan, the speed should not exceed 3,000min^{-1} for longer time. And the length-depending, critical spindle speed must be considered.

Buckling Force and Critical Spindle Speed
At thin spindles under pressure load, there is a risk of buckling. At high speed, there is an additionally risk of resonant vibrations. For both, the calculation can be done like shown on page 307 for trapezoidal spindles.

Lubrication
Running without lubricant is not allowed. For grease lubrication, normal roller bearing grease is recommended. The lubricant consumption depends on the condition of use. Often a lubrication period of 200 hours is sufficient.

Bearing Units for Spindles Page 322

These ready-to-install bearing units for trapezoidal and ball-screw spindle drives are available from stock. The unit for the fixed side has two angular contact ball bearings, lightly preloaded, to withstand high axial and radial forces. The unit for the support side has a standard ball bearing to hold the spindle end in it´s position.

Shaft End Reworking for Spindles Page 325

The matching spindle reworking can be done by the customer or, at short time, by ***MÄDLER***®. The spindle reworking shown on page 325 is just a recommendation. For shaft processing, soft annealing (tempering) of the hardened spindle ends is necessary.

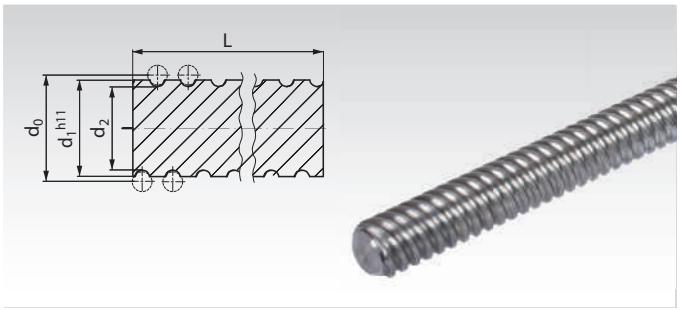
Ball Screw Spindles, Right Hand, Rolled

Material: Bearing steel 100Cr6, No. 1.3505, rolled.
Tensile strength 1570 N/mm², Brinell hardness 207 HB.

- Rolled ball screw spindle.
- To be combined with ***MÄDLER***® flanged ball screw nuts and cylindrical ball screw nuts.
- Pitch accuracy 52 µm/300 mm (T7).
- Straightness 0,1 mm/m.
- Special lengths and spindle end reworking against extra charge.

Temperature range: -20°C to +80°C (for short time to +110°C).

Ordering Details: e.g.: Product No. 640 080 21, Ball Screw Spindle 8x2, Length 245mm



Product No.	Size	Length L^{+5mm}	Pitch-Ø d_0	Outer Ø d_1	Core Ø d_2	Weight
	mm	mm	mm	mm	mm	kg
640 080 21	8x2	245	8,41	8,11	7	0,09
640 080 22		495	8,41	8,11	7	0,18
640 080 23		1000	8,41	8,11	7	0,37
640 100 21	10x2	245	10	9,7	8,5	0,13
640 100 22		495	10	9,7	8,5	0,26
640 100 23		1000	10	9,7	8,5	0,53
640 120 41	12x4	645	12,15	11,71	9,5	0,48
640 120 42		1295	12,15	11,71	9,5	0,96
640 120 43		1950	12,15	11,71	9,5	1,45
640 120 44		2600	12,15	11,71	9,5	1,93
640 160 51	16x5	995	16,6	16	13,1	1,39
640 160 52		1495	16,6	16	13,1	2,08
640 160 53		1995	16,6	16	13,1	2,78
640 160 54		3000	16,6	16	13,1	4,18
640 161 01	16x10	995	16,44	15,7	12,7	1,32
640 161 02		1495	16,44	15,7	12,7	1,99
640 161 03		1995	16,44	15,7	12,7	2,66
640 161 04		3000	16,44	15,7	12,7	3,99
640 161 61	16x16	995	16,6	16	13,5	1,41
640 161 62		1495	16,6	16	13,5	2,12
640 161 63		1995	16,6	16	13,5	2,83
640 161 64		3000	16,6	16	13,5	4,25
640 200 51	20x5	695	20,6	20	17,2	1,56
640 200 52		1395	20,6	20	17,2	3,13
640 200 53		2100	20,6	20	17,2	4,70
640 200 54		2800	20,6	20	17,2	6,27
640 201 01	20x10	995	20,6	20	17	2,21
640 201 02		1495	20,6	20	17	3,33
640 201 03		1995	20,6	20	17	4,44
640 201 04		3000	20,6	20	17	6,67
640 202 01	20x20	645	20,74	19,9	17,2	1,43
640 202 02		1295	20,74	19,9	17,2	2,88
640 202 03		1950	20,74	19,9	17,2	4,34
640 202 04		2600	20,74	19,9	17,2	5,78
640 250 51	25x5	695	25,6	25	22,2	2,48
640 250 52		1395	25,6	25	22,2	4,98
640 250 53		2100	25,6	25	22,2	7,50
640 250 54		2800	25,6	25	22,2	9,99
640 251 01	25x10	670	25,5	24,8	21,8	2,33
640 251 02		1345	25,5	24,8	21,8	4,69
640 251 03		2025	25,5	24,8	21,8	7,05
640 251 04		2700	25,5	24,8	21,8	9,41
640 252 51	25x25	695	25,7	24,5	21,4	2,39
640 252 52		1395	25,7	24,5	21,4	4,79
640 252 53		2100	25,7	24,5	21,4	7,21
640 252 54		2800	25,7	24,5	21,4	9,61

Product No.	Size	Length L^{+5mm}	Pitch-Ø d_0	Outer Ø d_1	Core Ø d_2	Weight
	mm	mm	mm	mm	mm	kg
640 320 51	32x5	695	32,6	32	29,2	4,13
640 320 52		1395	32,6	32	29,2	8,30
640 320 53		2100	32,6	32	29,2	12,49
640 320 54		2800	32,6	32	29,2	16,65
640 321 01	32x10	670	33,44	31,8	26,8	3,74
640 321 02		1345	33,44	31,8	26,8	7,51
640 321 03		2025	33,44	31,8	26,8	11,31
640 321 04		2700	33,44	31,8	26,8	15,07
640 322 01	32x20	670	32,4	31,2	28,2	3,80
640 322 02		1345	32,4	31,2	28,2	7,63
640 322 03		2025	32,4	31,2	28,2	11,48
640 322 04		2700	32,4	31,2	28,2	15,31
640 323 21	32x32	995	33,22	31,9	28,1	5,75
640 323 22		1495	33,22	31,9	28,1	8,65
640 323 23		1995	33,22	31,9	28,1	11,54
640 323 24		3000	33,22	31,9	28,1	17,35
640 400 51	40x5	695	40,6	40	37,2	6,54
640 400 52		1395	40,6	40	37,2	13,12
640 400 53		2100	40,6	40	37,2	19,75
640 400 54		2800	40,6	40	37,2	26,33
640 401 01	40x10	670	41,36	39,7	34,8	5,98
640 401 02		1345	41,36	39,7	34,8	12,00
640 401 03		2025	41,36	39,7	34,8	18,06
640 401 04		2700	41,36	39,7	34,8	24,08
640 501 01	50x10	995	51,34	49,9	44,7	14,21
640 501 02		1495	51,34	49,9	44,7	21,34
640 501 03		1995	51,34	49,9	44,7	28,48
640 501 04		3000	51,34	49,9	44,7	42,83
640 502 01	50x20	995	50,16	48,6	43,5	13,38
640 502 02		1495	50,16	48,6	43,5	20,10
640 502 03		1995	50,16	48,6	43,5	26,83
640 502 04		3000	50,16	48,6	43,5	40,34
640 631 01	63x10	995	64,4	62,9	57,7	20,04
640 631 02		1495	64,4	62,9	57,7	30,11
640 631 03		1995	64,4	62,9	57,7	40,18
640 631 04		3000	64,4	62,9	57,7	60,42

Bearing Units for Spindles Page 322

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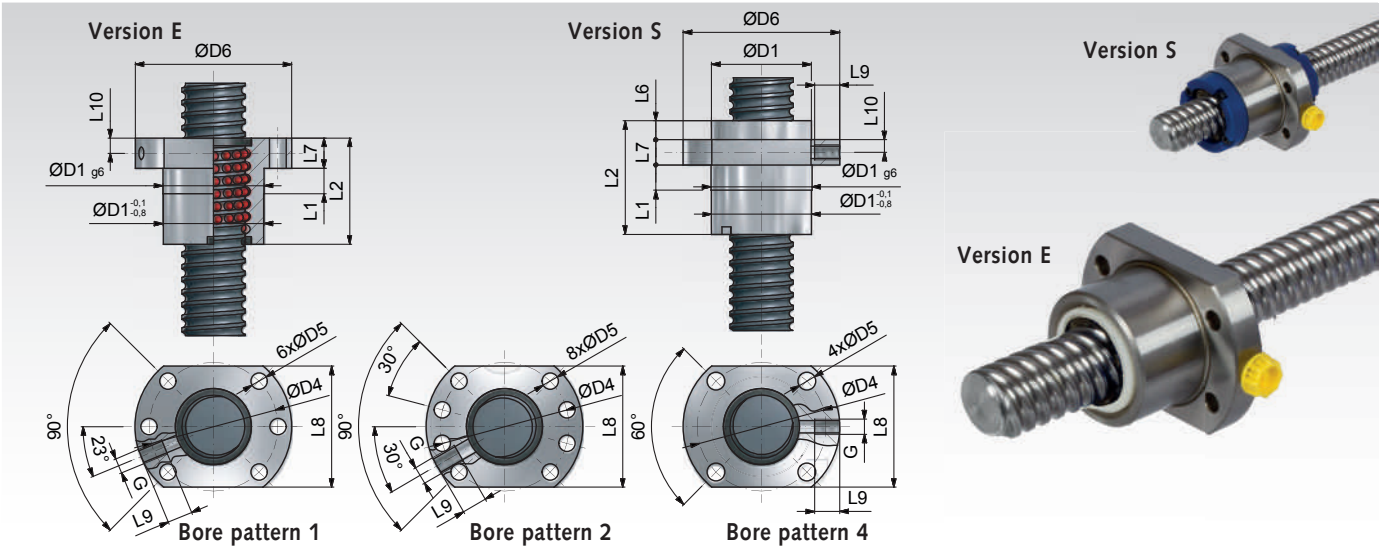
Shaft End Reworking for Spindles Page 325

The matching spindle reworking can be done by the customer or, at short time, by ***MÄDLER***®. The spindle reworking shown on page 325 is just a recommendation. For shaft processing, soft annealing (tempering) of the hardened spindle ends is necessary.



Material: Bearing steel 100Cr6, No. 1.3505.

To be combined with ***MÄDLER***® ball screw spindles.
The spindle has to be ordered separately.

Ordering Details: e.g.: Product No. 640 100 25, Flanged Ball Screw Nut 10x2mm

With axial clearance, for running with low friction.

Temperature range: -20°C to +80°C (for short time to +110°C).

Product No.	Size	Ball Ø	Turns per Circuit	Load rating $C_{dyn.}$	Load rating $C_{stat.}$	Axial Clearance	Weight
	mm	mm		kN	kN	mm	kg
640 080 25	8x2	1,2	3	1,39	2,52	0,06	0,05
640 100 25	10x2	1,2	3	1,51	3,02	0,06	0,08
640 120 45	12x4	2,381	3	4	6,7	0,07	0,1
640 160 55	16x5	3,175	3	7,65	13,2	0,07	0,16
640 161 05	16x10	3,5	3	6,8	12,6	0,1	0,16
640 161 65	16x16	2,778	1,7x2	6,5	12,8	0,07	0,2
640 200 55	20x5	3,175	3	8,6	17,1	0,07	0,2
640 201 05	20x10	3,175	3.8	8,5	18	0,07	0,2
640 202 05	20x20	3,175	1,7x2	9,8	21,4	0,07	0,15
640 250 55	25x5	3,175	3	9,8	23	0,07	0,25
640 251 05	25x10	3,5	3	8,7	20,5	0,1	0,32
640 252 55	25x25	3,969	1,7x2	12,7	35,2	0,1	0,6
640 320 55	32x5	3,175	5	16,9	51	0,07	0,6
640 321 05	32x10	6,35	3	26,1	53,1	0,15	0,64
640 322 05	32x20	3,969	1,8x2	13,8	34,6	0,1	0,8
640 323 25	32x32	4,762	1,7x2	21,4	52,6	0,12	0,9
640 400 55	40x5	3,175	5	19	66,2	0,07	0,8
640 401 05	40x10	6,35	3	30,1	71	0,15	0,92
640 501 05	50x10	6,35	5	53,1	155	0,15	1,61
640 502 05	50x20	6,35	3	48	137	0,15	2,7
640 631 05	63x10	6,35	5	60,7	206	0,15	2,4

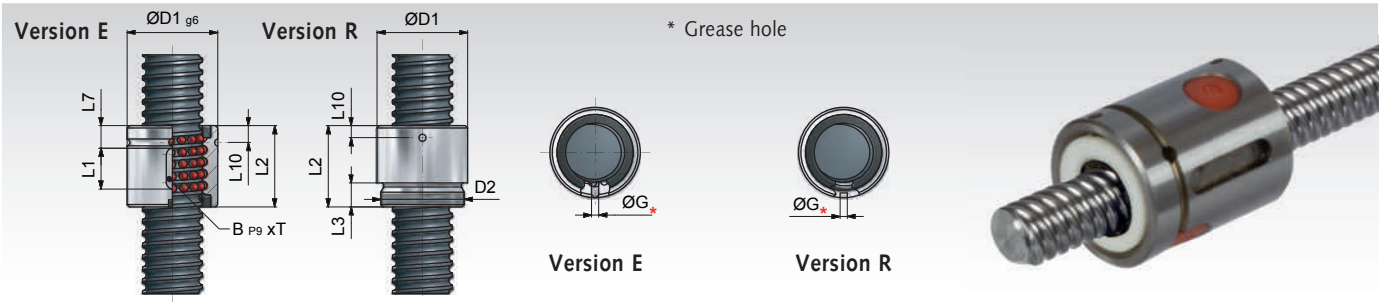
Mounting

The ball screw nuts will be delivered with a plastic tube inside. This tube is a transport protection against loosing the balls and is also a mounting aid. When the tube is hold against the spindle end, the nut can get screwed onto the spindle without loosing balls. Before use, the nut and the spindle have to be lubricated. For grease lubrication, normal roller bearing grease is recommended. The lubricant consumption depends on the condition of use.

Dimensions

Size mm	Version	Bore pattern	D_1 mm	D_4 mm	D_5 mm	D_6 mm	L_1 mm	L_2 mm	L_6 mm	L_7 mm	L_8 mm	L_9 mm	L_{10} mm	G mm
8x2	E	4*	16	23	3,4	31	17	26	-	8	20	-	-	-
10x2	E	4	19	28	4,6	36	23	28	-	5	23	-	-	-
12x4	E	1	22	32	4,8	42	10	35	-	8	36	10	4	M6
16x5	E	1	28	38	5,5	48	10	42	-	10	40	10	5	M6
16x10	E	1	28	38	5,5	48	10	45	-	10	40	10	5	M6
16x16	S	4	32	42	4,5	53	-	48	12	10	38	10	5	M6
20x5	E	1	36	47	6,6	58	10	42	-	10	44	10	5	M6
20x10	E	1	36	47	6,6	58	10	56	-	10	44	10	5	M6
20x20	S	4	39	50	5,5	62	-	58	15,5	10	46	10	5	M6
25x5	E	1	40	51	6,6	62	10	42	-	10	48	10	5	M6
25x10	E	1	40	51	6,6	62	16	45	-	10	48	10	5	M6
25x25	S	4	47	60	6,6	74	-	67	15,5	12	56	10	6	M6
32x5	E	1	50	65	9	80	10	55	-	12	62	10	6	M6
32x10	E	1	53	65	9	80	16	69	-	12	62	10	6	M8x1
32x20	E	1	50	65	9	80	25	64	-	15	62	9	8	M6
32x32	S	4	58	74	9	92	-	85	22	15	68	10	7,5	M6
40x5	E	2	63	78	9	93	10	55	-	14	70	10	7	M6
40x10	E	2	63	78	9	93	16	71	-	14	70	10	7	M8x1
50x10	E	2	75	93	11	110	16	95	-	16	85	10	8	M8x1
50x20	E	2	85	103	11	125	22	125	-	18	95	10	9	M8x1
63x10	E	2	90	108	11	125	16	97	-	18	95	10	9	M8x1

* With countersinking for cap screws DIN 912.



Material: Bearing steel 100Cr6, No. 1.3505.

To be combined with ***MÄDLER***® ball screw spindles.
The spindle has to be ordered separately.

With axial clearance, for running with low friction.

Temperature range: -20°C to +80°C (for short time to +110°C).

Ordering Details: e.g.: Product No. 640 100 26, Cylindrical Ball Screw Nut 10x2mm

Product No.	Size	Ball Ø	Turns per Circuit	Load Rating $C_{dyn.}$	Load Rating $C_{stat.}$	Axial Clearance	Weight
	mm	mm		kN	kN	mm	kg
640 100 26	10x2	1,2	3	1,51	3,02	0,06	0,028
640 120 46	12x4	2,381	3	4	6,7	0,07	0,05
640 160 56	16x5	3,175	3	6,3	11,5	0,07	0,07
640 161 06	16x10	3,5	3	6,8	12,6	0,1	0,11
640 200 56	20x5	3,175	3	7,5	14,68	0,07	0,15
640 250 56	25x5	3,175	3	8	18,68	0,07	0,15
640 251 06	25x10	3,5	3	8,7	20,5	0,1	0,22
640 320 56	32x5	3,175	5	8,96	24,27	0,07	0,3
640 321 06	32x10	6,35	3	25,52	55,3	0,15	0,4
640 323 26	32x32	4,762	1,75x2	21,4	52,6	0,12	0,6
640 400 56	40x5	3,175	5	19	66,2	0,07	0,5
640 401 06	40x10	6,35	3	30,1	71	0,15	0,5
640 501 06	50x10	6,35	5	53,1	155	0,15	1,05
640 502 06	50x20	6,35	3	48	137	0,15	1,1
640 631 06	63x10	6,35	5	60,7	206	0,15	1,6

Mounting

The ball screw nuts will be delivered with a plastic tube inside. This tube is a transport protection against loosing the balls and is also a mounting aid. When the tube is hold against the spindle end, the nut can get screwed onto the spindle without loosing balls. Before use, the nut and the spindle have to be lubricated. For grease lubrication, normal roller bearing grease is recommended. The lubricant consumption depends on the condition of use.

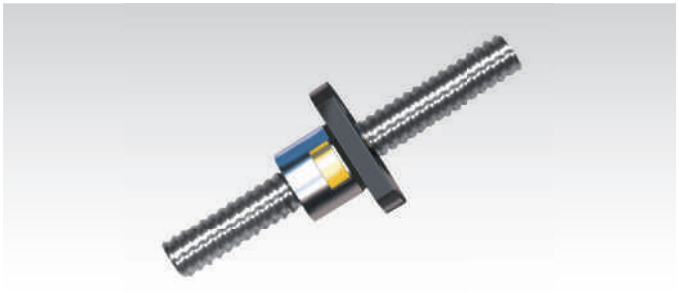
Dimensions

Size mm	Version	D_1 mm	D_2 mm	G mm	L_1 mm	L_2 mm	L_3 mm	L_7 mm	L_{10} mm	BxT mm
10x2	R	19,5	M17x1	-	-	25	7	-	-	-
12x4	E	22	-	2,5	15	30	-	10	6	3x1,8
16x5	E	28	-	3	20	34	-	8,5	7	5x2
16x10	E	28	-	3	20	40	-	15	7	5x2
20x5	E	36	-	3	20	34	-	8,5	7	5x2
25x5	E	40	-	3	20	34	-	8,5	7	5x2
25x10	E	40	-	3	20	50	-	15	7,5	5x2
32x5	E	50	-	3	30	45	-	8,5	7	6x2,5
32x10	E	53	-	4	30	60	-	15	10	6x2,5
32x32	E	56	-	4	20	88	-	34	9,5	5x3
40x5	E	63	-	3	30	45	-	8,5	7	6x2,5
40x10	E	63	-	4	30	60	-	15	10	6x2,5
50x10	E	75	-	4	36	82	-	23	11	6x2,5
50x20	E	85	-	4	36	96	-	23	11	6x2,5
63x10	E	90	-	4	36	82	-	23	11	6x2,5

Chain Tensioners page 322

Miniature Ballscrew Drives (on request)

These ballscrew drives with hardened and ground spindle are made to the customer's specifications. They can be optionally equipped with single nut, long nut with screw-in thread or with flange nut. (all hardened). The drawing below only serves as an example and shows the smallest size of each type. The other drawings can be sent if required. The lengths L_1, L_2 and L_3 can be altered. Price and delivery times on request.



Necessary specifications for your request:
Size, lead, thread length L_1 (if requires also L_2 and L_3). Version of the nut, version low axial backlash or zero axial backlash, amount.

Technical Data for Miniature Ballscrew Drives

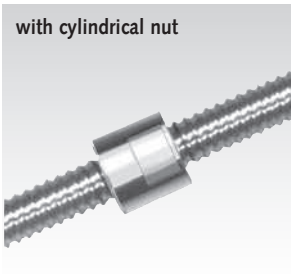
	Ø 6 mm*	Ø 8 mm*	Ø 8 mm*	Ø 10 mm*	Ø 12 mm*	Ø 12 mm**
Lead	1 mm	1 mm	2 mm	2 mm	1 mm	2 mm
Lead Angle	2°56′	2°13′	4°23′	3°32′	1°30′	2°58′
Lead Direction	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand
Ball Diameter	0.8 mm	0.8 mm	1.6 mm	1.6 mm	0.8 mm	1.6 mm
Number of Ball Rotations	1x2	1x3	1x2	1x3	1x3	1x3
Dynamic Load Rating	600 N	700 N	900 N	1500 N	700 N	1700 N
Static Load Rating	900 N	1300 N	1500 N	2900 N	1300 N	3700 N
Axial Play****	0/0.010 max.	0/0.010 max.	0/0.010 max.	0/0.010 max.	0/0.010 max.	0/0.010 max.

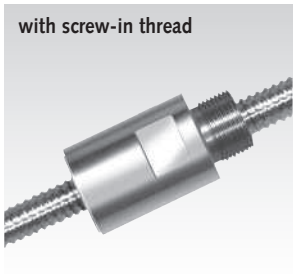
	Ø 12 mm**	Ø 12 mm**	Ø 12 mm**	Ø 16 mm**	Ø 16 mm**	Ø 16 mm**
Lead	2.5 mm***	4 mm***	5 mm***	2 mm	2.5 mm***	4 mm***
Lead angle	3°40′	6°4′	7°33′	2°13′	2°51′	4°33′
Lead Direction	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand	Right Hand
Ball Diameter	1.6 mm	2.5 mm	2.5 mm	1.6 mm	1.6 mm	2.5 mm
Number of Ball Rotations	1x3	1x3	1x3	1x3	1x3	1x3
Dynamic Load Rating	1700 N	2400 N	2400 N	2700 N	2700 N	7000 N
Static Load Rating	3700 N	4300 N	4300 N	6450 N	6450 N	8500 N
Axial Play****	0/0.010 max.	0/0.020 max.	0/0.020 max.	0/0.010 max.	0/0.010 max.	0/0.020 max.

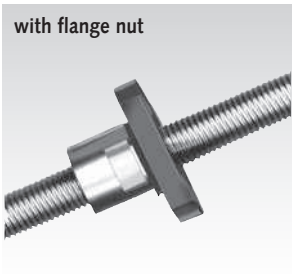
* Ball nuts without wiper.
** Ball nuts with wiper made from plastic PA6.
*** For this lead we can only supply single nuts or flange nuts (no screw-in thread available).
**** When ordering please state whether low backlash or zero backlash is required.

Miniature Ballscrew Drives, Standard Versions of Nuts

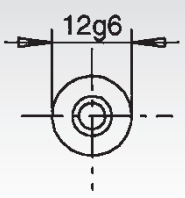
Materials:
Spindle: Cf53, induction hardened.
Nut: 100Cr6, hardened.
Other models available on request.

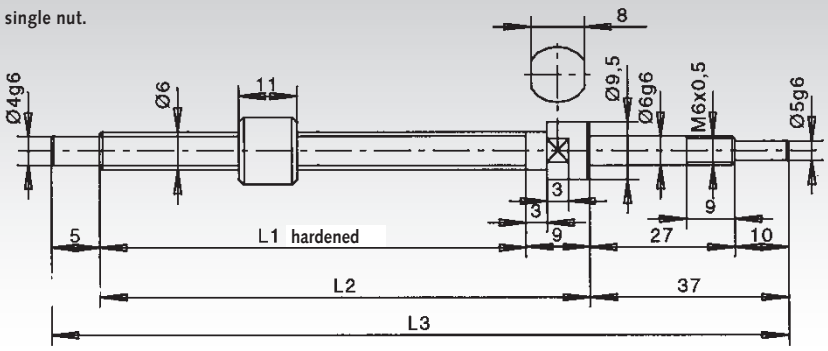




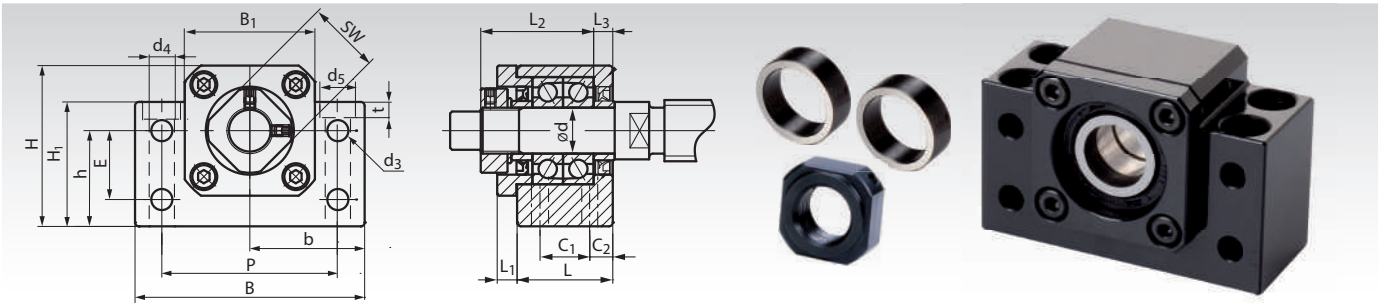


Example Drawing showing size Ø 6 with with cylindrical, single nut.





Pillow Block Bearing Units BK, for Fixed Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the fixed side. With two angular contact ball bearings, lightly preloaded, with seals. With 8 mounting holes.

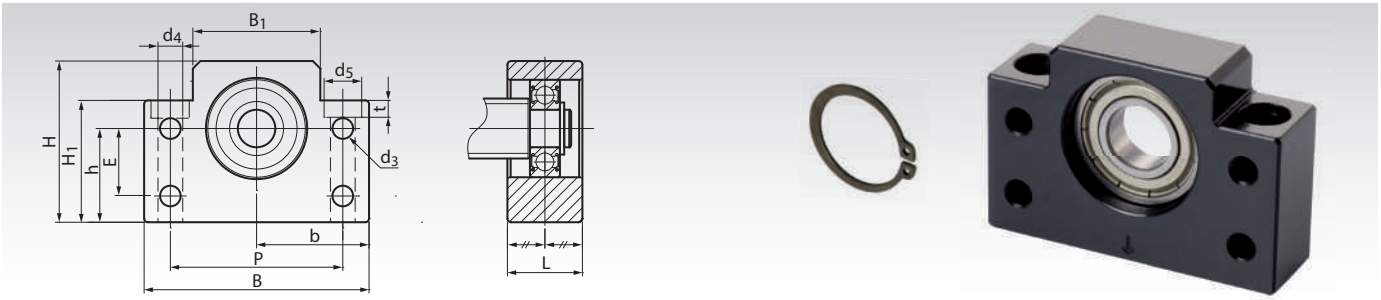
Locknut and distance bushes are included. Due to the standard dimensions, these units can also replace parts of other suppliers.

Spindle reworking on request (see page 325).
Matching counterpart for support side: Pillow Block Bearing BF.

Ordering Details: e.g.: Product No. 642 001 10, Ball Pillow Block Bearing Unit BK 10, Bore 10mm

Product No.	Type	d mm	L mm	L_1 mm	L_2 mm	L_3 mm	B mm	H mm	$b^{\pm0,02}$ mm	$h^{\pm0,02}$ mm	B_1 mm	H_1 mm	E mm	P mm	C_1 mm	C_2 mm	d_3 mm	d_4 mm	d_5 mm	t mm	SW mm	Weight kg
642 001 10	BK 10	10	25	5	29,5	5	60	39	30	22	34	32,5	15	46	13	6	5,5	6,3	10,5	6,5	16	0,39
642 001 12	BK 12	12	25	5	29,5	5	60	42	30	25	34	32,5	18	46	13	6	5,5	6,3	10,5	1,5	19	0,41
642 001 15	BK 15	15	27	6	32	6	70	47	35	28	38	38	18	54	15	6	5,5	6,3	10,5	6,5	22	0,57
642 001 17	BK 17	17	35	9	44	7	86	63	43	39	48	55	28	68	19	8	6,6	8,7	14,0	8,6	24	1,27
642 001 20	BK 20	20	35	8	43	8	88	59	44	34	50	50	22	70	19	8	6,6	8,7	14,0	8,5	30	1,19
642 001 25	BK 25	25	42	12	54	9	106	79	53	48	62	70	33	85	22	10	9	10,7	17,5	10,8	35	2,30
642 001 30	BK 30	30	45	14	61	9	128	88	64	51	74	78	33	102	23	11	11	13,7	20	13	40	3,32
642 001 35	BK 35	35	50	14	67	12	140	95	70	52	86	79	35	114	26	12	11	13,7	20	13	50	4,33
642 001 40	BK 40	40	61	18	76	15	160	109	80	60	98	90	37	130	33	14	14	17,7	26	17,5	50	6,50

Pillow Block Bearing Units BF, for Support Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the support side. With one movable single row deep groove ball bearing with shields (2Z). With 6 mounting holes.

Retaining ring for fixing on the spindle end is included. Due to the standard dimensions, these units can also replace parts of other suppliers.

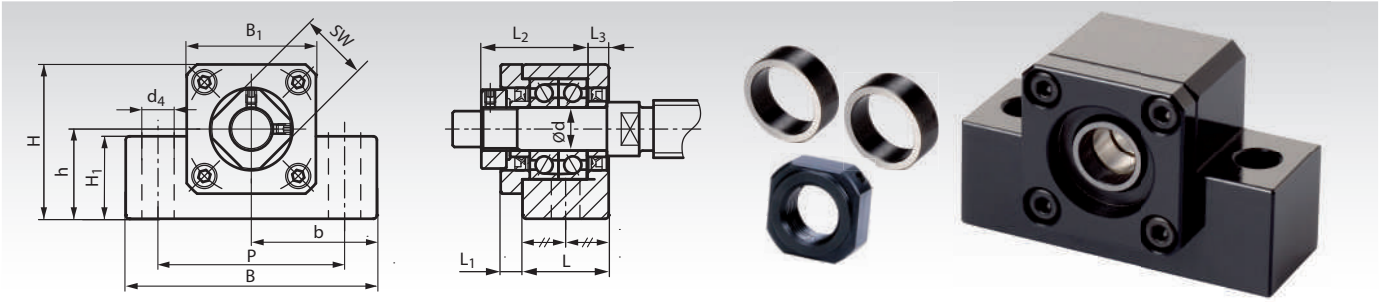
Spindle reworking on request (see page 325).
Matching counterpart for fixed side: Pillow Block Bearing BK.

Ordering Details: e.g.: Product No. 642 002 10, Ball Pillow Block Bearing Unit BF 10, Bore 8mm

Product No.	Type	d mm	L mm	B mm	H mm	$b^{\pm0,02}$ mm	$h^{\pm0,02}$ mm	B_1 mm	H_1 mm	E mm	P mm	d_3 mm	d_4 mm	d_5 mm	t mm	Weight kg
642 002 10	BF 10	8	20	60	39	30	22	34	32,5	15	46	5,5	6,3	10,8	5,0	0,29
642 002 12	BF 12	10	20	60	43	30	25	34	32,5	18	46	5,5	6,3	10,8	1,5	0,30
642 002 15	BF 15	15	20	70	48	35	28	40	38	18	54	5,5	6,3	11	6,5	0,38
642 002 17	BF 17	17	23	86	64	43	39	50	55	28	68	6,6	8,7	14	8,6	0,74
642 002 20	BF 20	20	26	88	60	44	34	52	50	22	70	6,6	8,7	14	8,6	0,76
642 002 25	BF 25	25	30	106	80	53	48	64	70	33	85	9	10,7	17,5	11	1,42
642 002 30	BF 30	30	32	128	89	64	51	76	78	33	102	11	13,7	20	13	1,97
642 002 35	BF 35	35	32	140	96	70	52	88	79	35	114	11	13,7	20	13	2,22
642 002 40	BF 40	40	37	160	110	80	60	100	90	37	130	14	17,7	26	17,5	3,27

Nickel plated on request.

Pillow Block Bearing Units EK, for Fixed Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the fixed side. With two angular contact ball bearings, lightly preloaded, with seals. With 2 mounting holes.

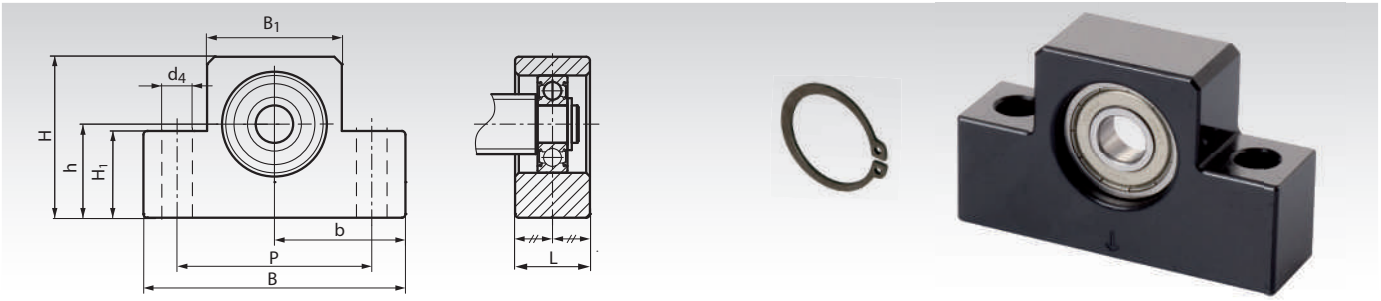
Locknut and distance bushes are included. Due to the standard dimensions, these units can also replace parts of other suppliers.

Spindle reworking on request (see page 325).
Matching counterpart for support side: Pillow Block Bearing EF.

Ordering Details: e.g.: Product No. 642 003 06, Ball Pillow Block Bearing Unit EK 6, Bore 6mm

Product No.	Type	d mm	L mm	L_1 mm	L_2 mm	L_3 mm	B mm	H mm	$b^{\pm 0,02}$ mm	$h^{\pm 0,02}$ mm	B_1 mm	H_1 mm	P mm	d_4 mm	SW mm	Weight kg
642 003 06	EK 06	6	20	5,5	22	3,5	42	25	21	13	20	12	30	5,2	12	0,14
642 003 08	EK 08	8	23	7	26	4	52	32	26	17	27	16	38	6,3	14	0,24
642 003 10	EK 10	10	24	6	29,5	6	70	43	35	25	36	24	52	9	16	0,46
642 003 12	EK 12	12	24	6	29,5	6	70	43	35	25	36	24	52	9	19	0,44
642 003 15	EK 15	15	25	6	32	5	80	50	40	30	40	25	60	11	22	0,55
642 003 20	EK 20	20	42	10	50	10	95	58	47,5	30	56	25	75	11	30	1,35

Pillow Block Bearing Units EF, for Support Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the support side. With one movable single row deep groove ball bearing with shields (2Z). With 2 mounting holes.

Retaining ring for fixing on the spindle end is included. Due to the standard dimensions, these units can also replace parts of other suppliers.

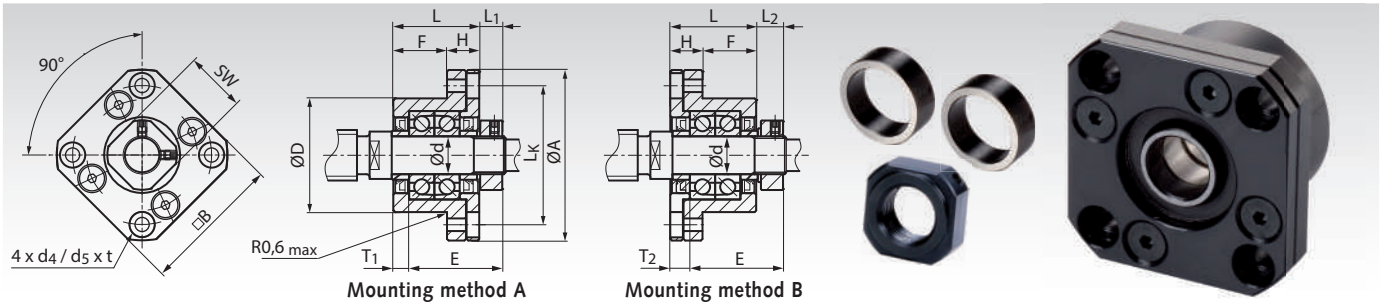
Spindle reworking on request (see page 325).
Matching counterpart for fixed side: Pillow Block Bearing EK.

Ordering Details: e.g.: Product No. 642 004 06, Ball Pillow Block Bearing Unit EF 6, Bore 6mm

Product No.	Type	d mm	L mm	B mm	H mm	$b^{\pm 0,02}$ mm	$h^{\pm 0,02}$ mm	B_1 mm	H_1 mm	P mm	d_4 mm	Weight kg
642 004 06	EF 06	6	12	42	25	21	13	20	12	30	5,2	0,07
642 004 08	EF 08	6	14	52	32	26	17	27	16	38	6,3	0,13
642 004 10	EF 10	8	20	70	43	35	25	36	24	52	9	0,33
642 004 12	EF 12	10	20	70	43	35	25	36	24	52	9	0,32
642 004 15	EF 15	15	20	80	49	40	30	41	25	60	9	0,38
642 004 20	EF 20	20	26	95	58	47,5	30	56	25	75	11	0,63

Nickel plated on request.

Flange Bearing Units FK, for Fixed Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the fixed side. With two angular contact ball bearings, lightly preloaded, with seals. With 4 mounting holes.

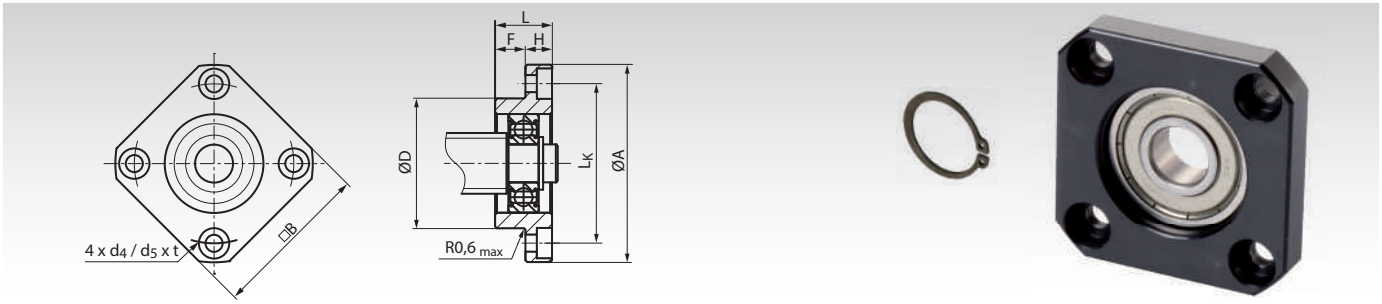
Locknut and distance bushes are included. Due to the standard dimensions, these units can also replace parts of other suppliers.

Spindle reworking on request (see page 325).
Matching counterpart for support side: Flange Bearing FF.

Ordering Details: e.g.: Product No. 642 005 06, Flange Bearing Unit FK 6, Bore 6mm

Product No.	Type	d mm	L mm	H mm	F mm	E mm	D^{g6} mm	A mm	L_k mm	B mm	L_1 mm	T_1 mm	L_2	T_2	d_4 mm	d_5 mm	t mm	SW mm	Weight kg
642 005 06	FK 06	6	20	7	13	22	22	36	28	28	5,5	3,5	6,5	4,5	3,4	6	3,3	12	0,08
642 005 08	FK 08	8	23	9	14	26	28	43	35	35	7,0	4	8	5	3,4	6	3,3	14	0,15
642 005 10	FK 10	10	27	10	17	29,5	34	52	42	42	7,3	5	8,5	6	4,5	8	4	16	0,21
642 005 12	FK 12	12	27	10	17	29,5	36	54	44	44	7,3	5	8,5	6	4,5	8	4	19	0,22
642 005 15	FK 15	15	32	15	17	36	40	63	50	52	9,8	6	12	8	5,5	9,5	6	22	0,39
642 005 17	FK 17	17	45	22	23	47	50	77	62	61	11,0	9	14	12	6,6	11	10	24	0,85
642 005 20	FK 20	20	52	22	30	50	57	85	70	68	7,8	10	12	14	6,5	11	10	30	1,09
642 005 25	FK 25	25	57	27	30	60	63	98	80	79	12,8	10	20	17	9	15	13	35	1,49
642 005 30	FK 30	30	62	30	32	61	75	117	95	93	10,8	12	17	18	11	17,5	15	40	2,32

Flange Bearing Units FF, for Support Side



Material: Housing from steel, all surfaces machined, burnished. On request: nickel plated. Rolling bearing from bearing steel.

Ready-to-install housing bearing unit for trapezoidal and ballscrew spindle drives, for the support side. With one movable single row deep groove ball bearing with shields (2Z). With 4 mounting holes.

Retaining ring for fixing on the spindle end is included. Due to the standard dimensions, these units can also replace parts of other suppliers.

Spindle reworking on request (see page 325).
Matching counterpart for fixed side: Flange Bearing FK.

Ordering Details: e.g.: Product No. 642 006 06, Flange Bearing Unit FF 6, Bore 6mm

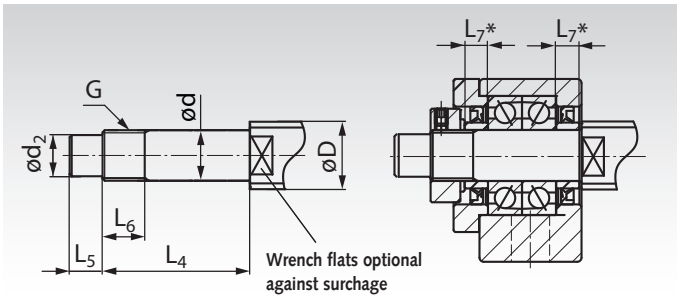
Product No.	Type	d mm	L mm	H mm	F mm	D^{g6} mm	A mm	L_k mm	B mm	d_4 mm	d_5 mm	t mm	Weight kg
642 006 06	FF 06	6	10	6	4	22	36	28	28	3,4	6,0	3,3	0,04
642 006 10	FF 10	8	12	7	5	28	43	35	35	3,4	6,0	3,3	0,07
642 006 12	FF 12	10	15	7	8	34	52	42	42	4,2	8	4,4	0,11
642 006 15	FF 15	15	17	9	8	40	63	50	52	5,2	9,5	5,4	0,20
642 006 17	FF 17	17	20	11	9	50	77	62	61	6,6	11	8,6	0,35
642 006 20	FF 20	20	20	11	9	57	85	70	68	6,3	11	6,5	0,27
642 006 25	FF 25	25	24	14	10	63	98	80	79	8,7	14	8,6	0,67
642 006 30	FF 30	30	27	18	9	75	117	95	93	10,7	17,5	10,8	1,07

Nickel plated on request.

Shaft Reworking and Bearing Load Data for Spindle Bearing Units BK, EK and FK (Fixed Side)

Shaft Reworking:
At ***MÄDLER®***, trapezoidal and ballscrew spindles can get reworked, fitting to the bearing units. The spindle reworking in the drawing is just a recommendation. Due to the customer´s request, the length L_5 could be shorter or longer and the shaft end could get a keyway DIN 6885.

Bearing Load Data:
The loading rates and speed limits shown in the table are the limits just for the bearings. The limits of the spindles are much lower, depending on the diameter, length and material.



Recommendated Shaft Reworking for Fixed Side Units

Bearing-Unit Type	Spindle-Ø D KGT mm	TR mm	dg6 mm	d2h7 mm	L4±0,2 mm	L5±0,2 mm	G mm	L6±0,2 mm	L7 1) mm
EK 06 / FK 06	8	10*	6	4	28	8	M6x0,75	8	5
EK 08 / FK 08	10/12	12*/14	8	6	32	9	M8x1	10	5,5
BK 10	12/14/15	16	10	8	36	15	M10x1	16	5,5
EK 10 / FK 10	12/14/15	16	10	8	36	15	M10x1	11	5,5
BK 12	14/15/16	18	12	10	36	15	M12x1	14	5,5
EK 12 / FK 12	14/15/16	18	12	10	36	15	M12x1	11	5,5
BK 15	18/20	20*/24	15	12	40	20	M15x1	12	6
EK 15	18/20	20*/24	15	12	47	20	M15x1	13	10
FK 15	18/20	20*/24	15	12	47	20	M15x1	13	10
BK 17 / FK 17	20/25	24/28	17	15	53	23	M17x1	17	7
BK 20	25/28/30	30/36	20	17	53	25	M20x1	15	8
EK 20 / FK 20	25/28/30	30/36	20	17	62	25	M20x1	17	11
BK 25	30/32/36	36	25	20	65	30	M25x1,5	18	9
FK 25	30/32/36	36	25	20	76	30	M25x1,5	20	15
BK 30 / FK 30	36/40	36*/40	30	25	72	38	M30x1,5	25	9
BK 35	45	36*/40	35	30	81	45	M35x1,5	28	12
BK 40	50	50	40	35	93	50	M40x1,5	35	15

Bearing Load Data

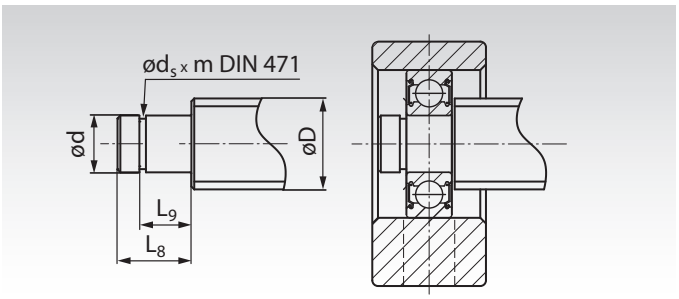
Bearing Type	Load rating axial dyn.C kN	stat.C0 kN	Speed limit min-1
706 A P5	2,03	0,80	46.400
708 A P5	3,35	1,45	35.200
7000 A P5	5,0	2,34	29.440
7000 A P5	5,0	2,34	29.440
7001 A P5	5,4	2,71	25.760
7001 A P5	5,4	2,71	25.760
7002 A P5	3,2	2,36	22.080
7002 A P5	3,2	2,36	22.080
7002 A P5	3,2	2,36	22.080
7203 A P5	10,1	5,45	18.400
7004 A P5	10,3	6,10	16.560
7204 A P5	13,6	7,55	15.640
7205 A P5	15,4	9,45	13.800
7205 A P5	15,4	9,45	13.800
7206 A P5	21,3	13,6	11.040
7207 A P5	28,2	18,5	9.660
7208 A P5	33,5	23,3	8.832

1) The matching distance bushes are included in the scope of delivery of bearing units BK, EK and FK.
* A rest of the thread grooves may remain visible.

Shaft Reworking and Bearing Load Data for Spindle Bearing Units BF, EF and FF (Support Side)

Shaft Reworking:
At ***MÄDLER®***, trapezoidal and ballscrew spindles can get reworked, fitting to the bearing units. The spindle reworking in the drawing is just a recommendation. Due to the customer´s request, the length L_8 could be shorter or longer and the shaft end could get a keyway DIN 6885.

Bearing Load Data:
The loading rates and speed limits shown in the table are the limits just for the bearings. The limits of the spindles are much lower, depending on the diameter, length and material.



Recommendated Shaft Reworking for Support Side Units

Bearing-Unit Type	Spindle-Ø D KGT mm	TR mm	dg6 mm	ds-0,15 mm	L8±0,2 mm	L9±0,2 mm	mH13 mm	DIN 471 1) mm
EF 06 / FF 06	8	10*	6	5,7	9	6,8	0,8	6
EF 08	10/12	10*/12	6	5,7	9	6,8	0,8	6
BF 10 / EF 10 / FF 10	12/14/15	12*/14	8	7,6	10	7,9	0,9	8
BF 12 / EF 12 / FF 12	14/15/16	16/18	10	9,6	11	9,15	1,15	10
BF 15 / EF 15 / FF 15	18/20	20*/24	15	14,3	13	10,15	1,15	15
BF 17 / FF 17	20/25	24/28	17	16,2	16	13,15	1,15	17
BF 20	25/28/30	30/36	20	19,0	16	13,15	1,15	20
EF 20 / FF 20	25/28/30	30/36	20	19,0	19	15,35	1,35	20
BF 25 / FF 25	30/32/36	36	25	23,9	20	16,35	1,35	25
BF 30 / FF 30	36/40	36*/40	30	28,6	21	17,75	1,75	30
BF 35	40/45	36/40	35	33	22	18,75	1,75	35
BF 40	50	50	40	38	23	19,95	1,95	40

Bearing Load Data

Bearing Type	Load rating axial dyn.C kN	stat.C0 kN	Speed limit min-1
606-2Z	2,3	0,8	37.000
606-2Z	2,3	0,8	37.000
608-2Z	3,3	1,4	34.000
6000-2Z	4,6	2,0	31.000
6002-2Z	5,6	2,8	23.000
6203-2Z	9,6	4,8	17.000
6004-2Z	9,4	5,0	15.000
6204-2Z	12,8	6,7	14.000
6205-2Z	14,0	7,9	12.000
6206-2Z	19,5	11,3	9.500
6207-2Z	16,0	10,4	9.000
6208-2Z	29,5	18,0	8.000

1) The retaining ring DIN 471 is included in the scope of delivery of bearing units BF, EF and FF.
* A rest of the thread grooves may remain visible.

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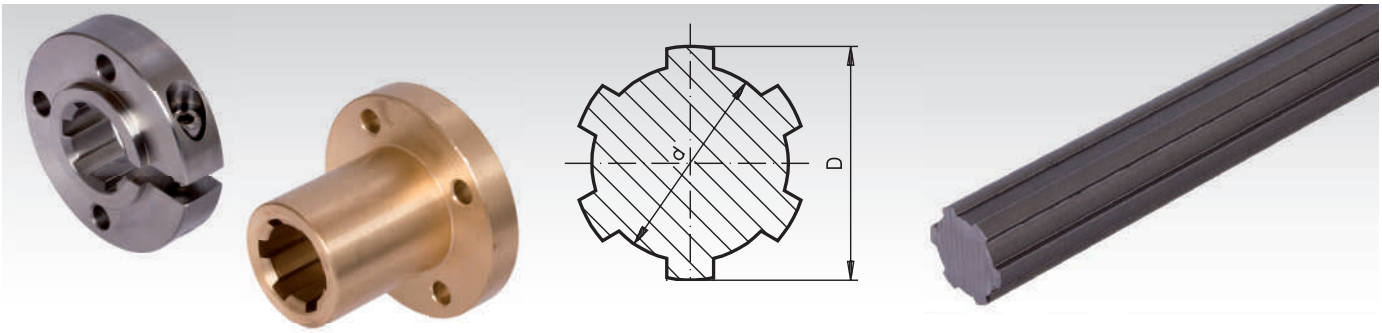
Splined Shafts and Splined Hubs DIN ISO 14 – Description



General Description
Splined shafts with splined hubs are used when torques have to be transmitted and the component to be driven needs to be movable in axial direction.

Common Profiles
DIN ISO 14 (used to be DIN 5463): Most common type, with straight, parallel flanks. This is the profile of catalogue goods. Other standards are less commonly used.

Profile Description DIN ISO 14:
Number of splines x small diameter x big diameter. Example for a component with 6 splines and outside diameter 14 mm: splined shaft (KW) or splined hub (KN) 6 x 11 x 14.

Production method:
Cold drawn: Economical production method. Due to the chipless shaping, the shafts have a unsevered grain structure and thus a high strength. This production method is perfectly suited for easy to shape materials as C45, 1.4301 or 42CrMo4.
Milled: for single-unit production, if special dimensional accuracy is required or for high strength materials. With this methods, shafts with diameters (steps) that are larger than the core diameter or outside diameter can be produced.

Splined Shafts in Catalogue Version, Page 328

Profiles
Main dimensions in accordance with DIN ISO 14. Shaft with splines with parallel, straight flanks. Up to size 28 x 34 with six splines, from size 32 x 38 with 8 splines.

Materials
The catalogue splined shafts are optionally available in steel C45 cold drawn or stainless steel 1.4301 cold drawn.
Other materials as e.g. 42CrMo4 on request.

Tolerances
Straightness 0.8 mm/m, Torsion max. 0.5 mm/m.
A straightness of 0.1mm/m can be produced on request.

Lengths
Splined shafts up to a length of 6 metres can be supplied from stock. Standard lengths sold are 1 metre, 1.5 metre, 2 metre and 3 metre. Price for bigger lengths up to 6 metre on request.

Splined Hubs in in Catalogue Version, Page 328

Profile
Main dimensions in accordance with DIN 14. Hub with splines with parallel, straight flanks. Up to size 28 x 34 with six splines, from size 32 x 38 with 8 splines.

Materials
The catalogue splined hubs are optionally available in steel C45, red brass or stainless steel 1.4301.
Other materials as e.g. 42CrMo4 on request.

Tolerances
Profile inner diameter: H7. Profile outside diameter: H11.
Outer dimensions: according to DIN 2768m.

Lengths
The standard lengths are equivalent to the maximum possible sweeping length. Longer splined hubs are available on request. Provide for at least one centred (or one-sided) relieve groove.

Torque- and Performance Figures of Splined Shafts and Hubs based on the Torsional Stress (with Safety Margin of 2.5)

Material C45

Profile	11 x 14	13 x 16	16 x 20	18 x 22	21 x 25	23 x 28	26 x 32	28 x 34	32 x 38	36 x 42	42 x 48	46 x 54
Nm* fluctuating	38,1	59,5	103	141	215	293	373	455	655	906	1106	1455
Nm* alternating	33,3	52,0	90	124	189	257	326	398	573	793	973	1280
kW** fluctuating	6,0	9,3	16	22	34	46	59	72	103	142	174	230
kW** alternating	5,2	8,2	14	20	30	40	51	62	90	124	153	200

Material 1.4301

Profile	11 x 14	13 x 16	16 x 20	18 x 22	21 x 25	23 x 28	26 x 32	28 x 34	32 x 38	36 x 42	42 x 48	46 x 54
Nm* fluctuating	16,4	25,5	49	67	102	139	204	249	359	496	763	1005
Nm* alternating	14,4	22,5	43	59	90	122	180	220	316	437	672	885
kW** fluctuating	2,6	4,0	8	10	16	22	32	39	56	78	120	160
kW** alternating	2,3	3,5	7	9	14	19	28	34	50	69	106	140

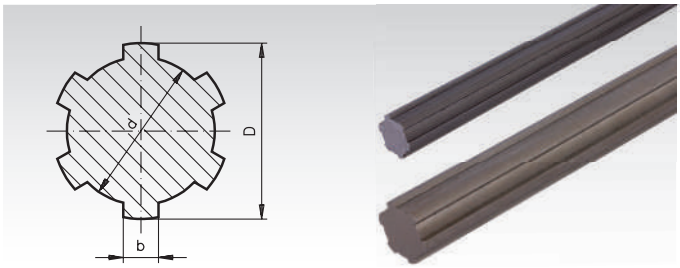
* Transmittable torque in Nm.
** Transmittable power in kW at 1500 min^{-1}.

Splined Shafts - Similar to DIN ISO 14 Cold Drawn C45 and Stainless Steel, Material-No. 1.4301

Lengths in stock: 1000, 1500, 2000 and 3000 mm.
Special lengths up to 6000 mm on request (some in stock).

Tolerances:
Straightness 0.8 mm/m, torsion max. 0.5 mm/m.

A straightness of 0.1 mm/m can be produced on request.



Ordering Details: e.g.: Product No. 648 402 00, Splined Shaft KW 11 x 14, 1000 mm long

Material C45

Product No. 1000 mm	Product No. 1500 mm	Product No. 2000 mm	Product No. 3000 mm	Profile Description mm	Number of splines	Ø D -0,07 -0,27 mm	Ø d -0,03 -0,08 mm	b +0 -0,08 mm	Weight kg/m
648 402 00	648 432 00	648 452 00	648 472 00	KW 11 x 14	6	14	11	3	0,949
648 404 00	648 434 00	648 454 00	648 474 00	KW 13 x 16	6	16	13	3,5	1,287
648 405 00	648 435 00	648 455 00	648 475 00	KW 16 x 20	6	20	16	4	1,911
648 401 00	648 431 00	648 451 00	648 471 00	KW 18 x 22	6	22	18	5	2,453
648 406 00	648 436 00	648 456 00	648 476 00	KW 21 x 25	6	25	21	5	3,139
648 403 00	648 433 00	648 453 00	648 473 00	KW 23 x 28	6	28	23	6	3,964
648 407 00	648 437 00	648 457 00	648 477 00	KW 26 x 32	6	32	26	6	5,008
648 409 00	648 439 00	648 459 00	648 479 00	KW 28 x 34	6	34	28	7	5,816
648 408 00	648 438 00	648 458 00	648 478 00	KW 32 x 38	8	38	32	6	7,433
648 412 00	648 442 00	648 462 00	648 482 00	KW 36 x 42	8	42	36	7	9,302
648 410 00	648 440 00	648 460 00	648 480 00	KW 42 x 48	8	48	42	8	12,371
648 414 00	648 444 00	648 464 00	648 484 00	KW 46 x 54	8	54	46	9	15,300

Material Stainless Steel

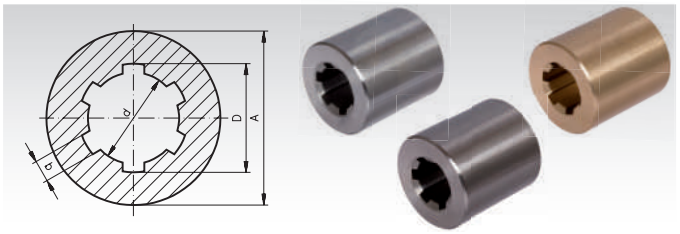
Product No. 1000 mm STAINLESS	Product No. 1500 mm STAINLESS	Product No. 2000 mm STAINLESS	Product No. 3000 mm STAINLESS	Profile Description mm	Number of splines	Ø D -0,07 -0,27 mm	Ø d -0,03 -0,08 mm	b +0 -0,08 mm	Weight kg/m
648 994 02	648 994 32	648 994 52	648 994 72	KW 11 x 14	6	14	11	3	0,949
648 994 04	648 994 34	648 994 54	648 994 74	KW 13 x 16	6	16	13	3,5	1,287
648 994 05	648 994 35	648 994 55	648 994 75	KW 16 x 20	6	20	16	4	1,911
648 994 01	648 994 31	648 994 51	648 994 71	KW 18 x 22	6	22	18	5	2,453
648 994 06	648 994 36	648 994 56	648 994 76	KW 21 x 25	6	25	21	5	3,139
648 994 03	648 994 33	648 994 53	648 994 73	KW 23 x 28	6	28	23	6	3,964
648 994 07	648 994 37	648 994 57	648 994 77	KW 26 x 32	6	32	26	6	5,008
648 994 09	648 994 39	648 994 59	648 994 79	KW 28 x 34	6	34	28	7	5,816
648 994 08	648 994 38	648 994 58	648 994 78	KW 32 x 38	8	38	32	6	7,433
648 994 12	648 994 42	648 994 62	648 994 82	KW 36 x 42	8	42	36	7	9,302
648 994 10	648 994 40	648 994 60	648 994 80	KW 42 x 48	8	48	42	8	12,371
648 994 14	648 994 44	648 994 64	648 994 84	KW 46 x 54	8	54	46	9	15,300

Splined Hubs - DIN ISO 14

Material: Steel C45Pb, from diameter 80 C45,
red brass (GC-CuSn7ZnPb).
Stainless steel, Material-No. 1.4305

STAINLESS

◎ A/d up to size 16 x 20 = 0.2 mm, above 0.3 mm



Ordering Details: e.g.: Product No. 648 302 00, Splined Hub DIN 14, KN 11 x 14

Product No. C45	Product No. Rg7	Product No. Stainless Steel	Profile Description mm	Number of keyways	Ø D^{H11} mm	Ø d^{H7} mm	b^{D9} mm	DIN ISO 2768 m Ø A mm	DIN ISO 2768 m Länge mm	Weight Steel kg	Weight Rg7 kg
648 302 00	648 352 00	648 993 02	KN 11 x 14	6	14	11	3	20	40	0,06	0,08
648 304 00	648 354 00	648 993 04	KN 13 x 16	6	16	13	3,5	28	45	0,16	0,18
648 305 00	648 355 00	648 993 05	KN 16 x 20	6	20	16	4	32	45	0,20	0,22
648 301 00	648 351 00	648 993 01	KN 18 x 22	6	22	18	5	40	50	0,27	0,3
648 306 00	648 356 00	648 993 06	KN 21 x 25	6	25	21	5	40	55	0,36	0,42
648 303 00	648 353 00	648 993 03	KN 23 x 28	6	28	23	6	50	55	0,47	0,54
648 307 00	648 357 00	648 993 07	KN 26 x 32	6	32	26	6	52	60	0,70	0,78
648 309 00	648 359 00	648 993 09	KN 28 x 34	6	34	28	7	60	60	0,76	0,87
648 308 00	648 358 00	648 993 08	KN 32 x 38	8	38	32	6	60	60	0,88	1,00
648 312 00	648 362 00	648 993 12	KN 36 x 42	8	42	36	7	70	65	1,08	1,23
648 310 00	648 360 00	648 993 10	KN 42 x 48	8	48	42	8	65	70	0,94	1,10
648 311 00	648 361 00	648 993 11	KN 42 x 48	8	48	42	8	80	70	1,88	2,16
648 314 00	648 364 00	648 993 14	KN 46 x 54	8	54	46	9	80	90	2,25	2,49

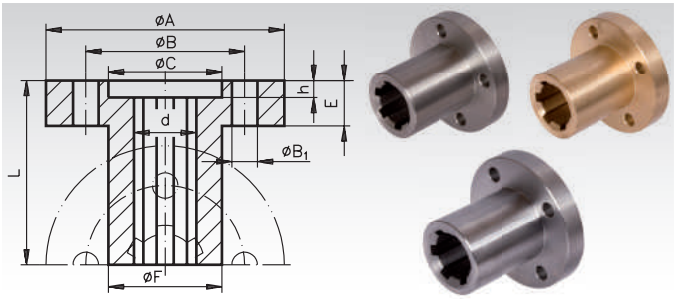
Splined Hubs with Flange - DIN ISO 14

Material: Steel C45Pb, from diameter 70 C45.
Red brass Rg7 (GC-CuSn7ZnPb).
Stainless steel, Material-No. 1.4305.

STAINLESS

◎ F/d and C/d = 0.03mm

Ready-to-install, with 4 mounting holes.



Ordering Details: e.g.: Product No. 648 502 00, Hub DIN 14 KN 11 x 14 with Flange

Product No. C45	Product No. Rg7	Product No. Stainless Steel	Profile Description	DIN ISO 2768 m Ø A	Ø B	DIN74m Ø B_1	Ø C^{H7}	Ø F^{h8}	Ø d^{H7}	DIN ISO 2768 m E	h	L	Weight Steel	Weight Rg7
			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
648 502 00	648 552 00	648 995 02	KN 11 x 14	42	28	4,5	20	20	11	8	3	35	0,10	0,12
648 504 00	648 554 00	648 995 04	KN 13 x 16	50	36	4,5	22	25	13	8	3	40	0,18	0,22
648 505 00	648 555 00	648 995 05	KN 16 x 20	52	38	5,5	25	28	16	10	3	40	0,22	0,26
648 501 00	648 551 00	648 995 01	KN 18 x 22	54	40	5,5	30	30	18	10	3,5	45	0,26	0,30
648 506 00	648 556 00	648 995 06	KN 21 x 25	62	48	6,6	35	34	21	10	3,5	50	0,34	0,38
648 503 00	648 553 00	648 995 03	KN 23 x 28	64	50	6,6	36	36	23	10	3,5	55	0,41	0,47
648 507 00	648 557 00	648 995 07	KN 26 x 32	70	56	6,6	40	42	26	10	3,5	60	0,50	0,58
648 509 00	648 559 00	648 995 09	KN 28 x 34	78	60	9,0	46	45	28	12	3,5	60	0,64	0,74
648 508 00	648 558 00	648 995 08	KN 32 x 38	82	65	9,0	50	50	32	12	3,5	60	0,72	0,84
648 512 00	648 562 00	648 995 12	KN 36 x 42	90	70	9,0	52	52	36	16	4	80	0,94	1,07
648 510 00	648 560 00	648 995 10	KN 42 x 48	95	75	11,0	60	60	42	16	4	80	1,22	1,38
648 514 00	648 564 00	648 995 14	KN 46 x 54	100	80	11,0	65	65	46	16	4	100	1,50	1,70

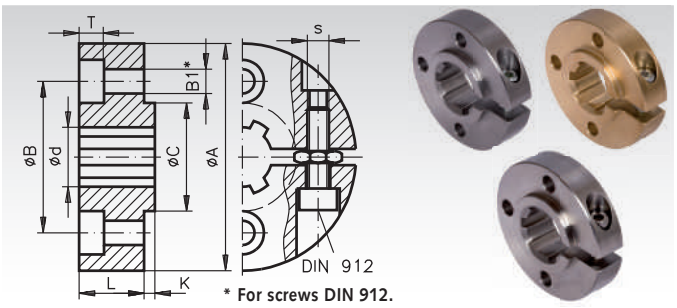
Clamp Collars for Splined Hubs - DIN ISO 14

Material: Steel C45Pb, from Ø 70 C45.
Red brass (GC-CuSn7ZnPb).
Stainless steel, Material-No. 1.4305.

STAINLESS

◎ C/d = 0.03mm

Ready-to-install, with 4 mounting holes,
match with spline hubs with flange.



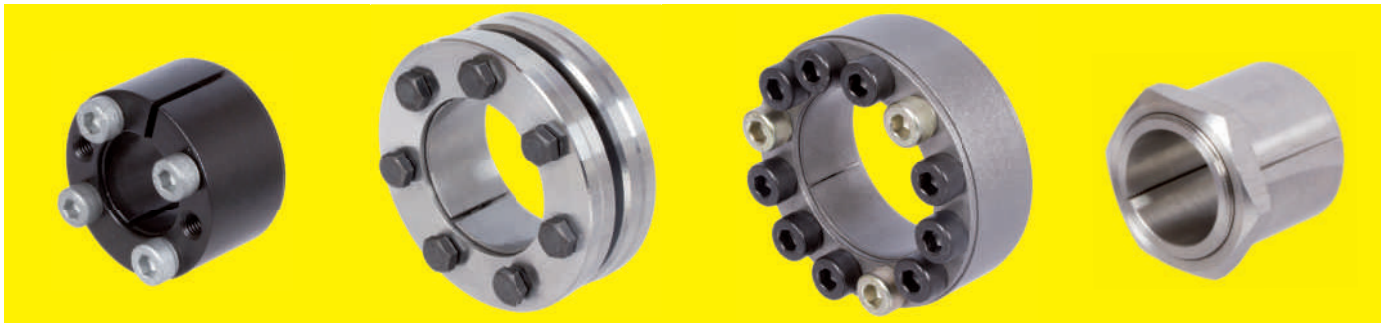
Ordering Details: e.g.: Product No. 648 602 00, Clamp Collar DIN 14 KN 11 x 14

* For screws DIN 912.

Product No. C45	Product No. Rg7	Product No. Stainless Steel	Profile Description	DIN ISO 2768 m Ø A	Ø B	DIN74m Ø B_1	[1] Ø C^{h8}*	[1] Ø d^{H7}*	DIN ISO 2768 m L	K	T	S	Weight Steel	Weight Rg7
			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
648 602 00	648 652 00	648 996 02	KN 11 x 14	42	28	4,5	20	11	12	2	4,6	M4	0,10	0,12
648 604 00	648 654 00	648 996 04	KN 13 x 16	50	36	4,5	22	13	12	2	4,6	M4	0,16	0,18
648 605 00	648 655 00	648 996 05	KN 16 x 20	52	38	5,5	25	16	14	2	5,7	M5	0,18	0,20
648 601 00	648 651 00	648 996 01	KN 18 x 22	54	40	5,5	30	18	14	3	5,7	M5	0,20	0,23
648 606 00	648 656 00	648 996 06	KN 21 x 25	62	48	6,6	35	21	14	3	6,8	M5	0,24	0,28
648 603 00	648 653 00	648 996 03	KN 23 x 28	64	50	6,6	36	23	15	3	6,8	M6	0,26	0,30
648 607 00	648 657 00	648 996 07	KN 26 x 32	70	56	6,6	40	26	15	3	6,8	M6	0,34	0,40
648 609 00	648 659 00	648 996 09	KN 28 x 34	78	60	9,0	46	28	18	3	9,0	M8	0,47	0,54
648 608 00	648 658 00	648 996 08	KN 32 x 38	82	65	9,0	50	32	18	3	9,0	M8	0,52	0,62
648 612 00	648 662 00	648 996 12	KN 36 x 42	90	70	9,0	52	36	18	3	9,0	M8	0,62	0,72
648 610 00	648 660 00	648 996 10	KN 42 x 48	95	75	11,0	60	42	22	3	11,0	M8	0,82	0,94
648 614 00	648 664 00	648 996 14	KN 46 x 54	100	80	11,0	65	46	24	3	11,0	M8	0,96	1,08

[1] Manufacturing tolerance before making the clamp slot.

Reworking within 24h-service possible. Custom made parts on request.



Selection Tool on the Internet at www.maedler.de in the section MÄDLER®-Tools

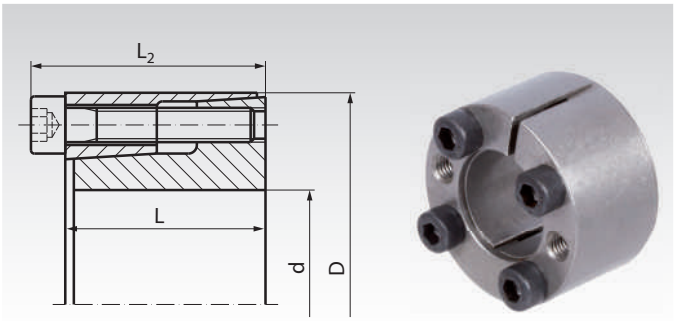
	Type	Smallest Product inner Ø and torque		Biggest Product inner Ø and torque		Assembly-time	Self-centering	Material	Page
	BAR	Ø 5mm	6Nm	Ø 100mm	11.790Nm	medium	yes	Steel	332
	BAR QPQ	Ø 5mm	6Nm	Ø 50mm	1900Nm	medium	yes	Steel QPQ	333
	BAR STAINLESS	Ø 6mm	3Nm	Ø 40mm	400Nm	medium	yes	Stainless Steel	334
	COM-A	Ø 19mm	270Nm	Ø 100mm	9.560Nm	long	no	Steel	335
	COM-A STAINLESS	Ø 20mm	110Nm	Ø 50mm	700Nm	long	no	Stainless Steel	336
	COM-AS	Ø 19mm	320Nm	Ø 100mm	11.300Nm	long	no	Steel	337
	COM-B	Ø 6mm	12Nm	Ø 100mm	14.300Nm	long	yes	Steel	338
	COM-B STAINLESS	Ø 10mm	22Nm	Ø 50mm	910Nm	long	yes	Stainless Steel	339
	COM-C	Ø 19mm	294Nm	Ø 100mm	9.400Nm	long	yes	Steel	340
	COM-CB1	Ø 18mm	310Nm	Ø 100mm	13.100Nm	long	yes	Steel	341
	COM-CB2	Ø 18mm	270Nm	Ø 100mm	9.800Nm	long	yes	Steel	342
	COM-CB3	Ø 14mm	120Nm	Ø 50mm	1.800Nm	long	yes	Steel	343
	COM-D	Ø 19mm	353Nm	Ø 100mm	15.000Nm	long	yes	Steel	344
	COM-L	Ø 25mm	810Nm	Ø 100mm	27.900Nm	long	yes	Steel	345

	Type	Smallest Product inner Ø and torque		Biggest Product inner Ø and torque		Assembly-time	Self-centering	Material	Page
	**COM-LL**	Ø 25mm	900Nm	Ø 100mm	32900Nm	long	yes	Steel	346
	**COM-LLH**	Ø 42mm	3290Nm	Ø 120mm	38400Nm	long	yes	Steel	347
	**COM-R**	Ø 6mm	2Nm	Ø 120mm	6170Nm	long	no	Steel	348
	**E**	Ø 15mm	46Nm	Ø 50mm	1900Nm	short	yes	Steel	349
	**E-N** STAINLESS	Ø 15mm	46Nm	Ø 50mm	1900Nm	short	yes	Stainless Steel	349
	**MSA**	Ø 19mm	170Nm	Ø 50mm	1625Nm	short	yes	Steel	350
	**MSD**	Ø 15mm	55Nm	Ø 50mm	1900Nm	short	yes	Steel	351
	**MSD-N** STAINLESS	Ø 15mm	45Nm	Ø 50mm	1550Nm	short	yes	Stainless Steel	352
	**MSM**	Ø 6mm	5Nm	Ø 14mm	48Nm	short	yes	Steel	352
	**MSM-N** STAINLESS	Ø 6mm	5Nm	Ø 14mm	48Nm	short	yes	Stainless Steel	352
	**SIG** STAINLESS	Ø 4mm	3Nm	Ø 40mm	105Nm	short	yes	Stainless Steel	353
	**SSG**	Ø 14mm	61Nm	Ø 60mm	1290Nm	short	yes	Steel	354
	**TT 5-16**	Ø 5mm	9Nm	Ø 16mm	149Nm	short	yes	Steel	355
	**TT 17-35**	Ø 17mm	174Nm	Ø 35mm	681Nm	short	yes	Steel	355
	**ST**	Ø 10mm	39Nm	Ø 65mm	3940Nm	long	non	Steel	356
	**ST-B**	Ø 11mm	30Nm	Ø 75mm	6000Nm	long	no	Steel	357
	**ST-R** STAINLESS	Ø 10mm	22Nm	Ø 60mm	1450Nm	long	no	Stainless Steel	358
	**ST-K**	Ø 15mm	125Nm	Ø 100mm	5590Nm	medium	no	Steel	359
	**Taper**	Ø 10mm	66Nm	Ø 90mm	2600Nm	short	yes	Grey Cast Iron	360

Locking Assemblies BAR

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For medium torques.
- Very good distribution of pressure.
- Very good self-centering.
- Self-releasing at dismounting.
- Also suitable for large hub and shaft tolerances.
- Slight axial offset possible during assembly.



Ordering Details: e.g.: Product No. 615 405 00, Locking Assembly BAR 5 mm

Product No.	d	D	L	L_2	at T_A transmittable T	F_{ax}	Surface Pressure at Shaft P_W	at Hub P_N	Tensioning Screw DIN 912-12.9 Size	Fastening Torque T_A	Amount	Weight
	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²		Nm		kg
615 405 00	5	16	11	13,5	6	2	150	55	M2,5 x 10	1,2	3	0,012
615 406 00	6	16	11	13,5	9	3	188	69	M2,5 x 10	1,2	3	0,012
615 406 35	6,35	16	11	13,5	10	3	180	72	M2,5 x 10	1,2	3	0,012
615 407 00	7	17	11	13,5	11	3	155	64	M2,5 x 10	1,2	3	0,013
615 408 00	8	18	11	13,5	12	3	141	62	M2,5 x 10	1,2	3	0,015
615 409 00	9	20	13	15,5	17	4	132	60	M2,5 x 12	1,2	4	0,020
615 409 53	9,53	20	13	15,5	18	4	124	59	M2,5 x 12	1,2	4	0,020
615 410 00	10	20	13	15,5	19	4	120	60	M2,5 x 12	1,2	4	0,019
615 411 00	11	22	13	15,5	21	4	108	54	M2,5 x 12	1,2	4	0,024
615 412 00	12	22	13	15,5	24	4	102	55	M2,5 x 12	1,2	4	0,022
615 414 00	14	26	17	20	40	6	94	50	M3 x 16	2,1	4	0,039
615 415 00	15	28	17	20	44	6	93	50	M3 x 16	2,1	4	0,044
615 416 00	16	32	17	21	86	10	158	79	M4 x 16	4,9	4	0,067
615 417 00	17	35	21	25	88	10	116	56	M4 x 20	4,9	4	0,090
615 418 00	18	35	21	25	94	11	110	57	M4 x 20	4,9	4	0,087
615 419 00	19	35	21	25	99	11	104	56	M4 x 20	4,9	4	0,083
615 420 00	20	38	21	26	179	17	169	89	M5 x 20	10	4	0,10
615 422 00	22	40	21	26	187	18	146	80	M5 x 20	10	4	0,11
615 424 00	24	47	26	32	290	24	155	79	M6 x 25	17	4	0,20
615 425 00	25	47	26	32	300	24	147	78	M6 x 25	17	4	0,19
615 425 40	25,4	47	26	32	310	24	145	79	M6 x 25	17	4	0,18
615 428 00	28	50	26	32	480	34	186	105	M6 x 25	17	6	0,22
615 430 00	30	55	26	32	510	34	174	95	M6 x 25	17	6	0,27
615 432 00	32	55	26	32	600	38	181	105	M6 x 25	17	6	0,25
615 435 00	35	60	31	37	820	47	172	100	M6 x 30	17	8	0,36
615 438 00	38	65	31	37	880	47	157	92	M6 x 30	17	8	0,43
615 440 00	40	65	31	37	1000	50	171	99	M6 x 30	17	8	0,40
615 442 00	42	75	36	44	1410	67	177	99	M8 x 35	40	6	0,67
615 445 00	45	75	36	44	1510	67	165	99	M8 x 35	40	6	0,63
615 448 00	48	80	36	44	2150	86	206	123	M8 x 35	40	8	0,74
615 450 00	50	80	36	44	2150	89	190	118	M8 x 35	40	8	0,70
615 455 00	55	85	42	52	2772	110	270	174	M8 x 40	40	8	0,77
615 460 00	60	90	42	52	3060	120	248	166	M8 x 40	40	8	0,82
615 465 00	65	95	42	52	3645	120	253	174	M8 x 40	40	9	0,88
615 470 00	70	110	48	58	5724	180	283	182	M10 x 45	80	8	1,59
615 475 00	75	115	48	58	6210	180	268	129	M10 x 45	80	8	1,67
615 480 00	80	120	54	65	6660	190	260	130	M10 x 50	80	8	1,76
615 485 00	85	125	54	65	7560	190	273	123	M10 x 50	80	9	1,85
615 490 00	90	130	58	70	8100	200	233	121	M10 x 55	80	9	1,94
615 495 00	95	135	58	70	9900	230	271	140	M10 x 55	80	10	2,02
615 500 00	100	145	58	70	11790	260	265	186	M12 x 55	145	8	2,90

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Hub Calculation and Selection Tool
on the Internet at www.maedler.de
in the section MÄDLER®-Tools

Fit, Surface

Shaft and hub up to tolerance h8/H8.
Surface finish for shaft and hub < 12.5µm.

Mounting

The locking assembly has to sit inside the bore by at least the measure „L“. Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or fat. Tighten the screws evenly and crosswise in several steps.

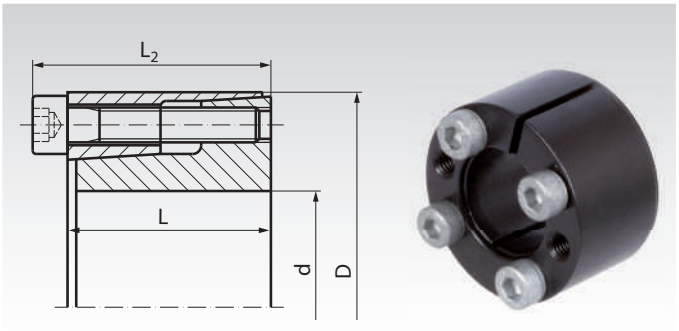
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front ring, until the ring is released.

Locking Assemblies BAR, QPQ-Coated

Material: Steel.

- For fixing a hub on a shaft.
- **QPQ coated:** High corrosion resistance, improved fatigue strength, primarily food safe (further information see below).
- For medium torques.
- Self-centering.
- Slight axial offset possible during assembly.



Ordering Details: e.g.: Product No. 615 705 00, Locking Assembly BAR QPQ, 5 mm Bore

Product No.	d	D	L	L_2	at T_A transmittable T	F_{ax}	Surface Pressure at Shaft P_W	at Hub P_N	Tensioning Screw DIN 912-12.9 Size	Fastening Torque T_A Nm	Amount	Weight kg
	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²				
615 705 00	5	16	11	13,5	6	2	150	55	M2,5 x 10	1,2	3	0,012
615 706 00	6	16	11	13,5	9	3	184	69	M2,5 x 10	1,2	3	0,012
615 706 35	6,35	16	11	13,5	10	3	180	72	M2,5 x 10	1,2	3	0,012
615 708 00	8	18	11	13,5	12	3	141	62	M2,5 x 10	1,2	3	0,015
615 709 00	9	20	13	15,5	17	4	132	60	M2,5 x 12	1,2	4	0,020
615 710 00	10	20	13	15,5	19	4	120	60	M2,5 x 12	1,2	4	0,019
615 711 00	11	22	13	15,5	21	4	108	54	M2,5 x 12	1,2	4	0,024
615 712 00	12	22	13	15,5	24	4	102	55	M2,5 x 12	1,2	4	0,022
615 714 00	14	26	17	20	40	6	94	50	M3 x 16	2,1	4	0,039
615 715 00	15	28	17	20	44	6	93	50	M3 x 16	2,1	4	0,044
615 716 00	16	32	17	21	86	10	158	79	M4 x 16	4,9	4	0,067
615 717 00	17	35	21	25	88	10	116	56	M4 x 20	4,9	4	0,090
615 718 00	18	35	21	25	94	11	110	57	M4 x 20	4,9	4	0,087
615 719 00	19	35	21	25	99	11	104	56	M4 x 20	4,9	4	0,080
615 720 00	20	38	21	26	179	17	169	89	M5 x 20	10	4	0,100
615 722 00	22	40	21	26	187	18	146	90	M5 x 20	10	4	0,110
615 725 00	25	47	26	32	300	24	147	78	M6 x 25	17	4	0,190
615 730 00	30	55	26	32	510	32	174	95	M6 x 25	17	6	0,270
615 735 00	35	60	31	37	820	47	172	100	M6 x 30	17	8	0,360
615 738 00	38	65	31	37	880	47	157	92	M6 x 30	17	8	0,430
615 740 00	40	65	31	37	1000	50	171	99	M6 x 30	17	8	0,400
615 750 00	50	80	36	44	2150	89	190	118	M8 x 35	40	8	0,700

* Screws with special coating.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

What is QPQ Nitro Carburising?

QPQ means:

Q = Quench (nitrocarburising followed by oxidising cooling process).

P = Polish (mechanical polishing up to desired surface finish before nitrocarburising).

Q = Quench (Oxidising to increase the corrosion resistance).

Salt-bath nitro carburising using the TENIFER method is, in many cases, a good alternative to other surface layer treatments as case hardening or hard plating. The principle task of the QPQ surface refinement is to protect machine components of all industries against wear and corrosion, but it also meets other functional requirements as, e.g., improving the endurance strength.

Mounting und Hub Calculation

Notes regarding fit, surface structure, mounting, demounting and hub calculation see page 310.

QPQ Surface Properties

Very good corrosion resistance, better than hard chrome or chem. nickel. Corrosion resistance in the salt spray test SS CASS in accordance with DIN 50021.

Layer thickness of 10 - 25 µm possible. For medium operational demands we recommend a layer thickness of approx. 15 µm at a 90 minute treatment.

Only very small changes in dimensions (only 5 µm), as the surface modification is achieved through diffusion and not application.

Surface hardness same as clamping set material ≥ 350 HV.

Improved wear resistance, no fretting corrosion, no cold shut.

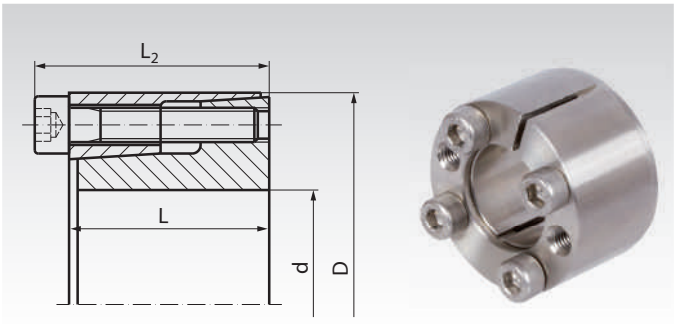
Increased endurance strength, sometimes up to 100% higher.

Is completely safe to use with food as long as there is no contact with any acidic substances with a pH-value of ≤ 4.

Locking Assemblies BAR, Stainless

Material: Stainless steel 1.4401 (SS316).

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- Stainless Steel.
- For low torques.
- Very good distribution of pressure.
- Very good self-centering.
- Self-releasing at dismounting.
- Also suitable for large hub and shaft tolerances.
- Slight axial offset possible during assembly.



Ordering Details: e.g.: Product No. 615 994 06, Locking Assembly BAR Stainless 6 mm

Product No.	d mm	D mm	L mm	L_2 mm	at T_A transmittable T Nm	F_{ax} kN	Surface Pressure at Shaft P_W N/mm²	at Hub P_N N/mm²	Tensioning Screw DIN 912 Size	Fastening Torque T_A Nm	Weight kg
615 994 06	6	16	11	13,5	3	0,9	49	19	M2,5	0,5	0,012
615 994 07	7	17	11	13,5	3	0,9	42	17	M2,5	0,5	0,013
615 994 08	8	18	11	13,5	4	0,9	37	17	M2,5	0,5	0,015
615 994 09	9	20	13	15,5	6	1,2	37	17	M2,5	0,5	0,020
615 994 10	10	20	13	15,5	6	1,2	33	17	M2,5	0,5	0,019
615 994 11	11	22	13	15,5	7	1,2	30	15	M2,5	0,5	0,024
615 994 12	12	22	13	15,5	7	1,2	26	15	M2,5	0,5	0,022
615 994 14	14	26	17	20	13	1,9	28	15	M3	0,9	0,039
615 994 15	15	28	17	20	14	1,9	26	14	M3	0,9	0,044
615 994 16	16	32	17	21	28	3,5	45	23	M4	2,2	0,066
615 994 17	17	35	21	25	30	3,5	34	17	M4	2,2	0,092
615 994 18	18	35	21	25	32	3,5	32	17	M4	2,2	0,087
615 994 19	19	35	21	25	34	3,5	31	17	M4	2,2	0,084
615 994 20	20	38	21	26	55	5,5	45	24	M5	4,2	0,100
615 994 22	22	40	21	26	61	5,5	41	23	M5	4,2	0,110
615 994 24	24	47	26	32	96	8,0	44	23	M6	7,3	0,200
615 994 25	25	47	26	32	100	8,0	43	23	M6	7,3	0,190
615 994 28	28	50	26	32	210	15,0	57	32	M6	7,3	0,220
615 994 30	30	55	26	32	220	15,0	54	29	M6	7,3	0,250
615 994 32	32	55	26	32	240	15,0	50	29	M6	7,3	0,250
615 994 35	35	60	31	37	350	20,0	55	32	M6	7,3	0,360
615 994 38	38	65	31	37	380	20,0	51	29	M6	7,3	0,430
615 994 40	40	65	31	37	400	20,0	48	29	M6	7,3	0,400

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Hub Calculation and Selection Tool
on the Internet at www.maedler.de
in the section MÄDLER®-Tools

Fit, Surface

Shaft and hub up to tolerance h8/H8.
Surface finish for shaft and hub < 10µm.

Mounting

The locking assembly has to sit inside the bore by at least the measure „L“. Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or fat. Tighten the screws evenly and crosswise in several steps.

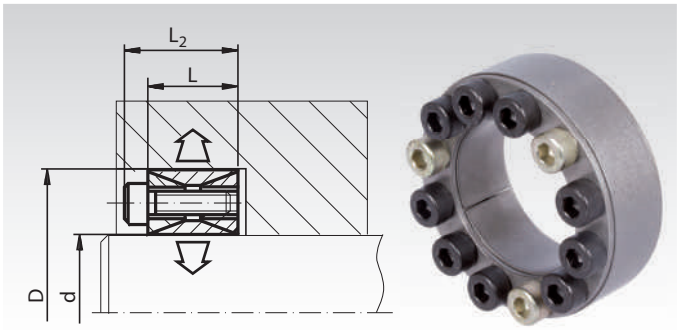
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front ring, until the ring is released.

Locking Assemblies COM-A

Material: Steel.

- For fixing a hub (e.g. V-belt pulley or similar) on a shaft.
- For medium high torques.
- Not self-centering.
- Self-releasing at dismounting.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 519 00, Locking Assembly COM-A, 19 mm

Product No.	d mm	D mm	L mm	L_2 mm	T Nm	F_{ax} kN	P_w N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 519 00	19	47	20	26	270	28	221	93	8 x M6	15	0,20
615 520 00	20	47	20	26	290	28	232	98	8 x M6	15	0,22
615 522 00	22	47	20	26	290	30	200	90	8 x M6	15	0,23
615 524 00	24	50	20	26	380	32	216	103	8 x M6	15	0,23
615 525 00	25	50	20	26	400	33	200	100	8 x M6	15	0,23
615 528 00	28	55	20	26	520	36	208	104	10 x M6	15	0,27
615 530 00	30	55	20	26	520	37	183	99	10 x M6	15	0,26
615 532 00	32	60	20	26	690	43	209	112	12 x M6	15	0,30
615 535 00	35	60	20	26	770	44	196	113	12 x M6	15	0,30
615 538 00	38	65	20	26	940	49	202	116	14 x M6	15	0,35
615 540 00	40	65	20	26	980	49	190	115	14 x M6	15	0,32
615 542 00	42	75	24	32	1560	74	233	129	12 x M8	37	0,57
615 545 00	45	75	24	32	1700	74	216	127	12 x M8	37	0,55
615 548 00	48	80	24	32	1830	74	214	122	12 x M8	37	0,60
615 550 00	50	80	24	32	1830	75	196	118	12 x M8	37	0,56
615 555 00	55	85	24	32	2490	89	218	140	14 x M8	37	0,65
615 560 00	60	90	24	32	2640	92	192	126	14 x M8	37	0,66
615 565 00	65	95	24	32	3240	99	202	136	16 x M8	37	0,72
615 570 00	70	110	28	38	4700	124	218	135	14 x M10	70	1,27
615 575 00	75	115	28	38	4800	135	185	119	14 x M10	70	1,33
615 580 00	80	120	28	38	5400	137	185	124	14 x M10	70	1,35
615 585 00	85	125	28	38	6300	146	195	130	16 x M10	70	1,45
615 590 00	90	130	28	38	6500	148	178	124	16 x M10	70	1,55
615 595 00	95	135	28	38	7800	165	193	134	18 x M10	70	1,65
615 600 00	100	145	33	45	9560	187	195	135	14 x M12	127	2,20

More sizes up to d=1,000mm for 1,980,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

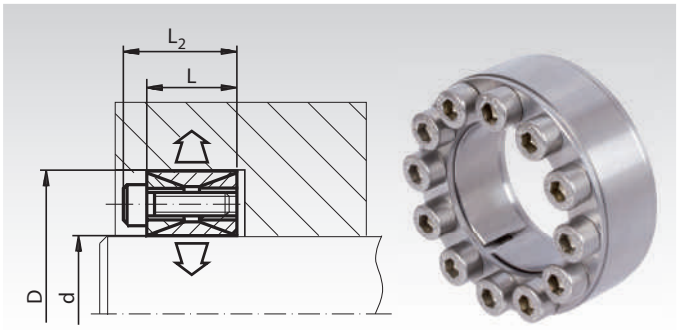
Demounting

Due to the cone angle, the locking assembly is usually released once all screws have been fully unfastened. There a three large auxiliary threads cut into the front ring, which serve to remove this ring.

Locking Assemblies COM-A, Stainless

Material: Stainless steel 1.4401 (SS316).

- For fixing a hub (e.g. V-belt pulley or similar) on a shaft.
- For low torques.
- Not self-centering.
- Self-releasing at dismounting.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 995 20, Locking Assembly COM-A, stainless, 20 mm

Product No.	d mm	D mm	L mm	L_2 mm	T Nm	F_{ax} kN	P_w N/mm²	P_N N/mm²	Screws A2 DIN 912	T_A Nm	Weight kg
615 995 20	20	47	20	26	110	11	133	57	M6	8	0,21
615 995 22	22	47	20	26	120	11	121	57	M6	8	0,20
615 995 24	24	50	20	26	150	12	125	60	M6	8	0,22
615 995 25	25	50	20	26	155	12	120	60	M6	8	0,22
615 995 28	28	55	20	26	170	12	107	55	M6	8	0,27
615 995 30	30	55	20	26	185	12	100	55	M6	8	0,25
615 995 32	32	60	20	26	265	16	125	67	M6	8	0,30
615 995 35	35	60	20	26	290	16	114	67	M6	8	0,29
615 995 38	38	65	20	26	390	20	131	77	M6	8	0,33
615 995 40	40	65	20	26	410	20	125	77	M6	8	0,32
615 995 45	45	75	24	32	635	28	129	78	M8	18	0,53
615 995 50	50	80	24	32	700	28	116	73	M8	18	0,56

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 16µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molibdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

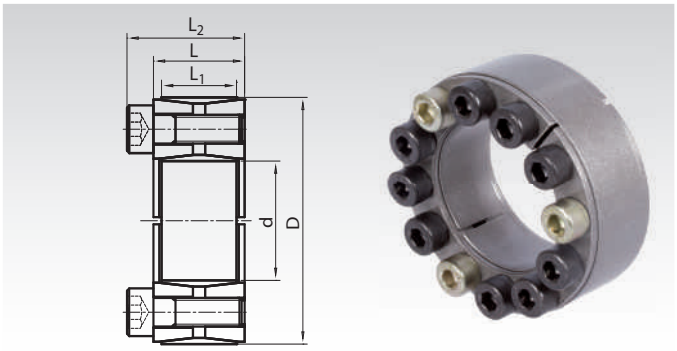
Demounting

Due to the cone angle, the locking assembly is usually released once all screws have been fully unfastened. There a three large auxiliary threads cut into the front ring, which serve to remove this ring.

Locking Assemblies COM-AS

Material: Steel.

- For fixing a hub (e.g. V-belt pulley or similar) on a shaft.
- For medium high torques. Like COM-A, but with slotted rings.
- Not self-centering.
- Self-releasing at dismounting.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 300 19, Locking Assembly COM-AS, 19 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 300 19	19	47	20	17	26	320	33	225	98	8 x M6	15	0,20
615 300 20	20	47	20	17	26	340	33	237	103	8 x M6	15	0,22
615 300 22	22	47	20	17	26	340	35	204	95	8 x M6	15	0,23
615 300 24	24	50	20	17	26	450	38	220	108	8 x M6	15	0,23
615 300 25	25	50	20	17	26	470	39	204	105	8 x M6	15	0,23
615 300 28	28	55	20	17	26	610	42	212	109	10 x M6	15	0,27
615 300 30	30	55	20	17	26	610	44	187	104	10 x M6	15	0,26
615 300 32	32	60	20	17	26	810	51	213	118	12 x M6	15	0,30
615 300 35	35	60	20	17	26	910	52	200	119	12 x M6	15	0,30
615 300 38	38	65	20	17	26	1110	58	206	122	14 x M6	15	0,35
615 300 40	40	65	20	17	26	1160	58	194	121	14 x M6	15	0,32
615 300 42	42	75	24	20	32	1840	87	238	135	12 x M8	37	0,57
615 300 45	45	75	24	20	32	2000	87	220	133	12 x M8	37	0,55
615 300 48	48	80	24	20	32	2200	87	218	128	12 x M8	37	0,60
615 300 50	50	80	24	20	32	2200	89	200	124	12 x M8	37	0,56
615 300 55	55	85	24	20	32	2900	105	222	147	14 x M8	37	0,65
615 300 60	60	90	24	20	32	3100	109	196	132	14 x M8	37	0,66
615 300 65	65	95	24	20	32	3800	117	206	143	16 x M8	37	0,72
615 300 70	70	110	28	24	38	5500	146	222	142	14 x M10	70	1,27
615 300 75	75	115	28	24	38	5700	159	189	125	14 x M10	70	1,33
615 300 80	80	120	28	24	38	6400	162	189	130	14 x M10	70	1,35
615 300 85	85	125	28	24	38	7400	172	199	137	16 x M10	70	1,45
615 300 90	90	130	28	24	38	7700	175	182	130	16 x M10	70	1,55
615 300 95	95	135	28	24	38	9200	195	197	141	18 x M10	70	1,65
615 301 00	100	145	33	26	45	11300	221	199	142	14 x M12	127	2,2

More sizes up to d=1,000mm for 2,336,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

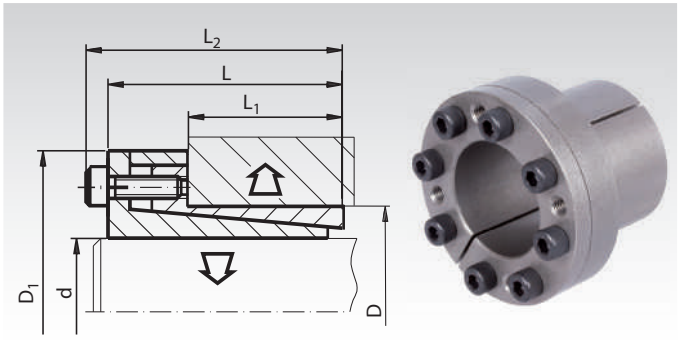
Demounting

Due to the cone angle, the locking assembly is usually released once all screws have been fully unfastened. There are three large auxiliary threads cut into the front ring, which serve to remove this ring.

Locking Assemblies COM-B

Material: Steel.

- For fixing a hub (e.g. timing belt pulley or similar) on a shaft.
- For medium torques.
- Also suitable for small hub diameters.
- Self-centering.
- Self-locking.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 606 00, Locking Assembly COM-B, 6 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	D_1 mm	T Nm	F_{ax} kN	P_w N/mm²	P_N N/mm²	Screw 12.9 Number x Size	T_A Nm	Weight kg
615 606 00	6	14	21	10	24	25	12	4	185	80	3 x M3	2	0,05
615 608 00	8	15	25	12	29	27	29	7	207	111	3 x M4	5	0,07
615 609 00	9	16	26	14	30	28	42	10	197	110	4 x M4	5	0,07
615 610 00	10	16	26	14	30	28	48	10	179	112	4 x M4	5	0,07
615 611 00	11	18	26	14	30	32	51	10	165	102	4 x M4	5	0,07
615 612 00	12	18	26	14	30	32	55	10	152	100	4 x M4	5	0,08
615 614 00	14	23	26	14	30	38	68	10	130	80	4 x M4	5	0,11
615 615 00	15	24	36	16	42	45	133	18	194	121	3 x M6	17	0,22
615 616 00	16	24	36	16	42	45	140	18	180	118	3 x M6	17	0,22
615 618 00	18	26	38	18	44	47	200	22	180	125	4 x M6	17	0,23
615 619 00	19	27	38	18	44	49	210	22	172	121	4 x M6	17	0,25
615 620 00	20	28	38	18	44	50	220	22	160	115	4 x M6	17	0,26
615 622 00	22	32	45	25	51	54	250	22	113	78	4 x M6	17	0,35
615 624 00	24	34	45	25	51	56	270	22	106	76	4 x M6	17	0,36
615 625 00	25	34	45	25	51	56	280	22	101	76	4 x M6	17	0,34
615 628 00	28	39	45	25	51	61	450	32	130	93	6 x M6	17	0,42
615 630 00	30	41	45	25	51	62	500	32	133	95	6 x M6	17	0,43
615 632 00	32	43	45	25	51	65	540	35	115	86	6 x M6	17	0,49
615 635 00	35	47	52	32	58	69	800	44	106	81	8 x M6	17	0,55
615 638 00	38	50	52	32	58	72	900	45	105	79	8 x M6	17	0,62
615 640 00	40	53	52	32	58	75	900	45	92	68	8 x M6	17	0,64
615 642 00	42	55	52	32	58	78	1000	47	90	70	8 x M6	17	0,85
615 645 00	45	59	70	45	78	86	1800	80	105	81	8 x M8	41	1,05
615 648 00	48	62	70	45	78	87	1950	81	102	78	8 x M8	41	1,13
615 650 00	50	65	70	45	78	92	2020	81	96	72	8 x M8	41	1,26
615 655 00	55	71	80	55	88	98	2730	95	89	68	9 x M8	41	1,53
615 660 00	60	77	80	55	88	104	2870	98	76	61	9 x M8	41	1,66
615 665 00	65	84	80	55	88	111	3190	99	73	57	9 x M8	41	1,90
615 670 00	70	90	96	65	106	119	5150	147	88	69	9 x M10	83	3,0
615 675 00	75	95	96	65	106	126	5710	153	82	66	9 x M10	83	3,1
615 680 00	80	100	96	65	106	131	8260	196	103	82	12 x M10	83	3,3
615 685 00	85	106	96	65	106	137	8670	204	97	77	12 x M10	83	3,6
615 690 00	90	112	96	65	106	144	8800	206	88	74	12 x M10	83	4,0
615 695 00	95	120	96	65	106	149	11300	237	103	82	14 x M10	83	4,7
615 700 00	100	125	96	65	106	154	14300	285	114	90	18 x M10	83	5,2

More sizes up to d=130mm for 24,800Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molibdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

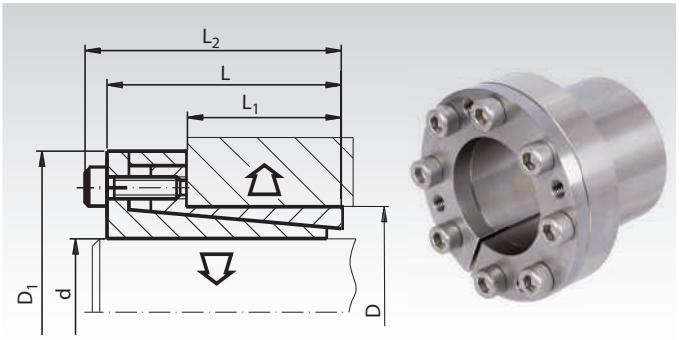
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-B, Stainless

Material: Stainless steel 1.4401 (SS316).

- For fixing a hub (e.g. timing belt pulley or similar) on a shaft.
- For low torques.
- Also suitable for small hub diameters.
- Self-centering.
- Self-locking.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 995 10, Locking Assembly COM-B, stainless, 10 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	D_1 mm	T Nm	F_{ax} kN	P_w N/mm²	P_N N/mm²	Screw A2 DIN 912	T_A Nm	Weight kg
615 996 10	10	16	26	14	30	28	22	4	82	51	M4	2	0,12
615 996 12	12	18	26	14	30	32	26	4	69	46	M4	2	0,14
615 996 14	14	23	26	14	30	38	30	4	59	36	M4	2	0,15
615 996 15	15	24	36	16	42	45	73	10	107	67	M6	8	0,22
615 996 16	16	24	36	16	42	45	78	10	101	67	M6	8	0,22
615 996 18	18	26	38	18	44	47	87	10	79	55	M6	8	0,23
615 996 19	19	27	38	18	44	49	92	10	75	53	M6	8	0,25
615 996 20	20	28	38	18	44	50	97	10	71	51	M6	8	0,25
615 996 22	22	32	45	25	51	54	105	10	47	32	M6	8	0,32
615 996 24	24	34	45	25	51	56	175	15	64	45	M6	8	0,34
615 996 25	25	34	45	25	51	56	180	15	62	45	M6	8	0,35
615 996 28	28	39	45	25	51	61	200	15	55	40	M6	8	0,41
615 996 30	30	41	45	25	51	62	220	15	51	38	M6	8	0,41
615 996 32	32	43	45	25	51	65	310	19	64	48	M6	8	0,48
615 996 35	35	47	52	32	58	69	340	19	46	34	M6	8	0,55
615 996 38	38	50	52	32	58	72	370	19	42	32	M6	8	0,58
615 996 40	40	53	52	32	58	75	390	19	40	30	M6	8	0,63
615 996 45	45	59	70	45	78	86	820	36	48	36	M8	18	1,03
615 996 50	50	65	70	45	78	92	910	36	43	33	M8	18	1,27

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 16µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

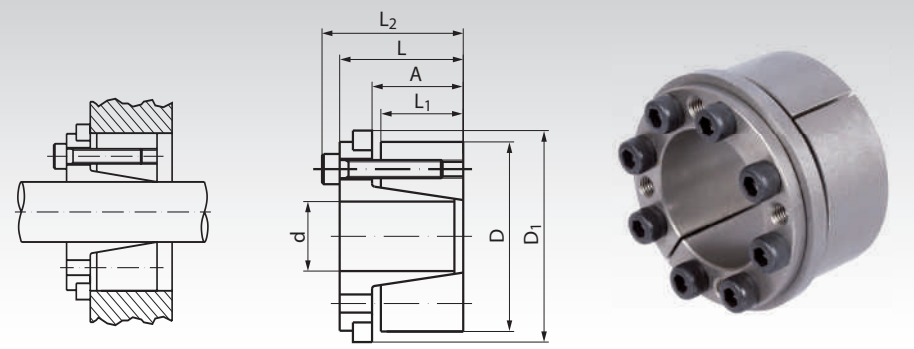
Locking Assemblies COM-C

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For medium to high torques.
- Self-centering.
- No axial offset.

Concentricity: 0.02 to 0.04 mm.

Ordering Details: e.g.: Product No. 615 571 19, Locking Assembly COM-C, 19 mm



Product No.	d mm	D mm	L_1 mm	A mm	L mm	L_2 mm	D_1 mm	at T_A transmittable T Nm	at T_A transmittable F_{ax} kN	Surface Pressure Shaft P_w N/mm²	Surface Pressure Hub P_N N/mm²	Screws DIN 912 12.9 Number x size	T_A Nm	Weight kg
615 571 19	19	47	26	31	39	45	53	294	20	228	96	4x M6x20	17	0,45
615 571 20	20	47	26	31	39	45	53	320	33	172	74	6x M6x20	17	0,37
615 571 22	22	47	26	31	39	45	53	366	33	158	74	6x M6x20	17	0,40
615 571 24	24	50	26	31	39	45	56	380	34	139	67	6x M6x20	17	0,45
615 571 25	25	50	26	31	39	45	56	430	35	144	72	6x M6x20	17	0,44
615 571 28	28	55	26	31	39	45	61	480	35	128	66	6x M6x20	17	0,50
615 571 30	30	55	26	31	39	45	61	530	35	120	68	6x M6x20	17	0,45
615 571 32	32	60	26	31	39	45	66	680	43	138	76	8x M6x20	17	0,59
615 571 35	35	60	26	31	39	45	66	780	43	134	79	8x M6x20	17	0,53
615 571 38	38	65	26	31	39	45	71	860	45	125	70	8x M6x20	17	0,62
615 571 40	40	65	26	31	39	45	71	860	45	115	67	8x M6x20	17	0,60
615 571 42	42	75	30	36	47	55	81	1350	60	138	77	6x M8x30	41	1,05
615 571 45	45	75	30	36	47	55	81	1450	60	129	77	6x M8x30	41	0,98
615 571 48	48	80	30	36	47	55	86	1550	60	125	73	6x M8x30	41	1,30
615 571 50	50	80	30	36	47	55	86	1570	70	109	69	6x M8x30	41	1,00
615 571 55	55	85	30	36	47	55	91	2400	80	142	95	8x M8x30	41	1,10
615 571 60	60	90	30	36	47	55	96	2500	80	125	86	8x M8x30	41	1,20
615 571 65	65	95	30	36	47	55	102	2700	90	113	78	8x M8x30	41	1,25
615 571 70	70	110	40	46	61	71	117	4500	130	120	77	8x M10x35	83	2,40
615 571 75	75	115	40	46	61	71	122	5000	130	119	79	8x M10x35	83	2,70
615 571 80	80	120	40	46	61	71	127	5300	130	109	74	8x M10x35	83	2,70
615 571 85	85	125	40	46	61	71	132	7000	160	129	89	10x M10x35	83	3,00
615 571 90	90	130	40	46	61	71	137	7400	160	123	83	10x M10x35	83	3,00
615 571 95	95	135	40	46	61	71	142	7500	170	109	81	10x M10x35	83	3,00
615 572 00	100	145	46	52	70	82	153	9400	190	112	78	8x M12x40	145	5,50

More sizes up to d=180mm for 34,600Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness hub/shaft max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use MoS2 or grease.
Tighten the screws evenly and crosswise in several steps to the set torque.

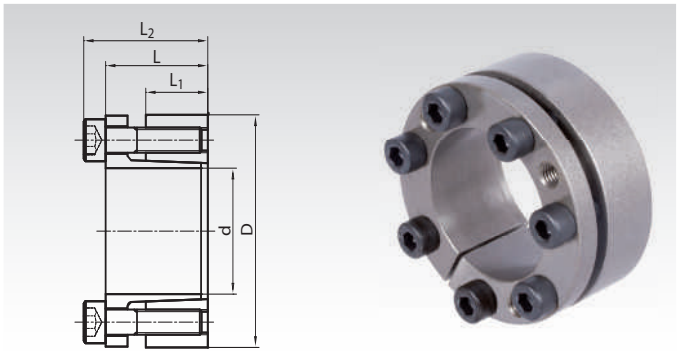
Demounting

Remove all tensioning screws and screw them into the unused forcing threads of the front flange evenly and crosswise in several steps, until the flange is released.

Locking Assemblies COM-CB1

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For medium high torques.
- Self-centering.
- Self-locking.
- Axial movement during mounting.



Ordering Details: e.g.: Product No. 615 573 18, Locking Assembly COM-CB1, 18 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 573 18	18	47	28	17	34	310	28	278	121	5 x M6	14	0,29
615 573 19	19	47	28	17	34	331	29	261	116	5 x M6	14	0,29
615 573 20	20	47	28	17	34	370	35	294	125	5 x M6	14	0,29
615 573 22	22	47	28	17	34	370	37	247	114	5 x M6	14	0,29
615 573 24	24	50	28	17	34	470	40	255	125	5 x M6	14	0,30
615 573 25	25	50	28	17	34	600	44	308	152	6 x M6	14	0,29
615 573 28	28	55	28	17	34	600	46	243	123	6 x M6	14	0,35
615 573 30	30	55	28	17	34	610	46	217	120	6 x M6	14	0,35
615 573 32	32	60	28	17	34	940	58	286	150	8 x M6	14	0,40
615 573 35	35	60	28	17	34	1030	58	262	150	8 x M6	14	0,40
615 573 38	38	65	28	17	34	1140	60	248	144	8 x M6	14	0,40
615 573 40	40	65	28	17	34	1170	60	227	141	8 x M6	14	0,40
615 573 42	42	75	33	20	41	2150	100	315	179	7 x M8	35	0,70
615 573 45	45	75	33	20	41	2220	100	293	172	7 x M8	35	0,70
615 573 48	48	80	33	20	41	2340	100	284	168	7 x M8	35	0,75
615 573 50	50	80	33	20	41	2400	100	242	149	7 x M8	35	0,70
615 573 55	55	85	33	20	41	3080	110	270	174	8 x M8	35	0,77
615 573 60	60	90	33	20	41	3400	120	248	166	8 x M8	35	0,84
615 573 65	65	95	33	20	41	4050	120	253	174	9 x M8	35	0,88
615 573 70	70	110	40	24	50	6360	180	283	182	8 x M10	70	1,58
615 573 75	75	115	40	24	50	6900	180	268	129	8 x M10	70	1,60
615 573 80	80	120	40	24	50	7400	190	260	130	8 x M10	70	1,70
615 573 85	85	125	40	24	50	8400	190	273	142	9 x M10	70	2,0
615 573 90	90	130	40	24	50	9000	200	233	121	9 x M10	70	2,2
615 573 95	95	135	40	24	50	11000	230	271	140	10 x M10	70	1,9
615 574 00	100	145	44	26	56	13100	260	265	186	8 x M12	125	3,0

More sizes up to d=200mm for 69,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

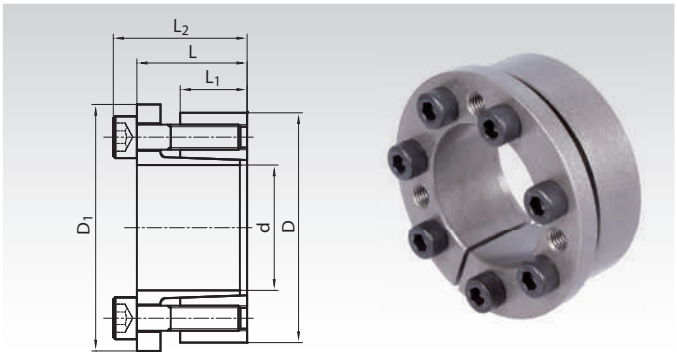
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-CB2

Material: Steel.

- For fixing a hub (e.g. spur toothed gear or similar) on a shaft.
- For medium high torques.
- Self-centering.
- Self-locking.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 575 18, Locking Assembly COM-CB2, 18 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	D_1 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 575 18	18	47	28	17	34	54	270	28	212	94	5 x M6	17	0,30
615 575 19	19	47	28	17	34	54	274	28	215	93	5 x M6	17	0,30
615 575 20	20	47	28	17	34	54	280	28	218	94	5 x M6	17	0,32
615 575 22	22	47	28	17	34	54	300	28	200	95	5 x M6	17	0,32
615 575 24	24	50	28	17	34	57	330	28	178	89	5 x M6	17	0,35
615 575 25	25	50	28	17	34	57	420	34	210	105	6 x M6	17	0,32
615 575 28	28	55	28	17	34	62	480	34	196	98	6 x M6	17	0,37
615 575 30	30	55	28	17	34	62	510	35	177	96	6 x M6	17	0,37
615 575 32	32	60	28	17	34	67	730	40	222	116	8 x M6	17	0,39
615 575 35	35	60	28	17	34	67	770	44	194	112	8 x M6	17	0,39
615 575 38	38	65	28	17	34	72	830	45	181	103	8 x M6	17	0,46
615 575 40	40	65	28	17	34	72	940	50	182	109	8 x M6	17	0,46
615 575 42	42	75	33	20	41	82	1590	70	234	130	7 x M8	41	0,72
615 575 45	45	75	33	20	41	82	1630	70	213	124	7 x M8	41	0,70
615 575 48	48	80	33	20	41	87	1740	70	198	119	7 x M8	41	0,80
615 575 50	50	80	33	20	41	87	1830	80	195	120	7 x M8	41	0,77
615 575 55	55	85	33	20	41	92	2210	80	192	125	8 x M8	41	0,80
615 575 60	60	90	33	20	41	97	2410	80	178	120	8 x M8	41	0,88
615 575 65	65	95	33	20	41	102	3090	90	192	131	9 x M8	41	0,93
615 575 70	70	110	40	24	50	117	4620	130	208	134	8 x M10	83	1,60
615 575 75	75	115	40	24	50	122	4900	130	191	123	8 x M10	83	1,76
615 575 80	80	120	40	24	50	127	5000	130	176	119	8 x M10	83	1,81
615 575 85	85	125	40	24	50	132	6300	150	195	135	9 x M10	83	1,90
615 575 90	90	130	40	24	50	137	6800	150	187	131	9 x M10	83	2,0
615 575 95	95	135	40	24	50	142	7700	160	191	132	10 x M10	83	2,1
615 576 00	100	145	44	26	56	152	9800	190	202	141	8 x M12	145	2,8

More sizes up to d=200mm for 48,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

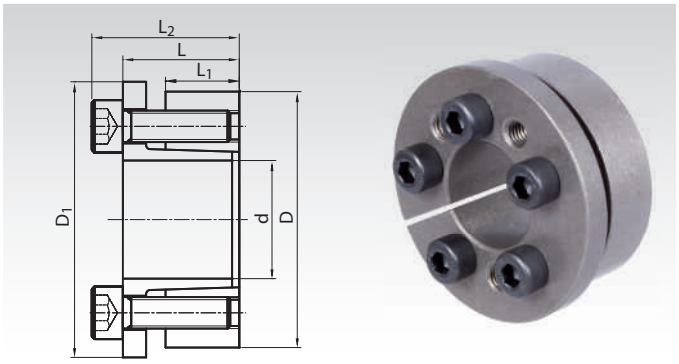
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-CB3

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- 3 Ranges of sizes, for middle, higher and very high torques.
- Compact size in axial direction.
- Self-centering.
- Self-locking.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 577 14, Locking Assembly COM-CB3, 14 mm

Product No.	d	D	L	L_1	L_2	D_1	T	F_{ax}	P_W	P_N	Screws 12.9	T_A	Weight
Light series	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Number x Size	Nm	kg
615 577 14	14	55	30	17	38	62	120	17	207	56	3 x M8	25	0,49
615 577 16	16	55	30	17	38	62	136	18	175	53	3 x M8	25	0,48
615 577 18	18	55	30	17	38	62	150	18	163	56	3 x M8	25	0,47
615 577 19	19	55	30	17	38	62	170	19	158	58	3 x M8	25	0,47
615 577 20	20	55	30	17	38	62	160	17	141	53	3 x M8	25	0,46
615 577 22	22	55	30	17	38	62	290	26	189	77	3 x M8	35	0,45
615 577 24	24	55	30	17	38	62	290	24	165	73	3 x M8	35	0,43
615 577 25	25	55	30	17	38	62	300	24	160	73	3 x M8	35	0,42
615 577 28	28	55	30	17	38	62	430	31	173	89	3 x M8	41	0,40
615 577 30	30	55	30	17	38	62	450	30	158	86	3 x M8	41	0,38
Medium series													
615 578 24	24	65	30	17	38	72	430	40	237	87	5 x M8	30	0,63
615 578 25	25	65	30	17	38	72	440	40	221	86	5 x M8	30	0,62
615 578 28	28	65	30	17	38	72	610	40	248	107	5 x M8	35	0,59
615 578 30	30	65	30	17	38	72	590	40	222	103	5 x M8	35	0,57
615 578 32	32	65	30	17	38	72	660	40	202	100	5 x M8	35	0,56
615 578 35	35	65	30	17	38	72	950	50	243	131	5 x M8	41	0,52
615 578 38	38	65	30	17	38	72	1000	50	218	127	5 x M8	41	0,49
615 578 40	40	65	30	17	38	72	1090	50	213	131	5 x M8	41	0,47
Heavy series													
615 579 30	30	80	33	20	41	87	800	50	239	90	7 x M8	30	1,02
615 579 32	32	80	33	20	41	87	860	50	226	90	7 x M8	30	1,01
615 579 35	35	80	33	20	41	87	1100	60	239	105	7 x M8	35	0,98
615 579 38	38	80	33	20	41	87	1200	60	223	106	7 x M8	35	0,94
615 579 40	40	80	33	20	41	87	1200	60	203	102	7 x M8	35	0,91
615 579 42	42	80	33	20	41	87	1500	70	228	120	7 x M8	41	0,88
615 579 45	45	80	33	20	41	87	1600	70	215	121	7 x M8	41	0,84
615 579 48	48	80	33	20	41	87	1700	70	197	118	7 x M8	41	0,78
615 579 50	50	80	33	20	41	87	1800	70	195	122	7 x M8	41	0,74

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

Demounting

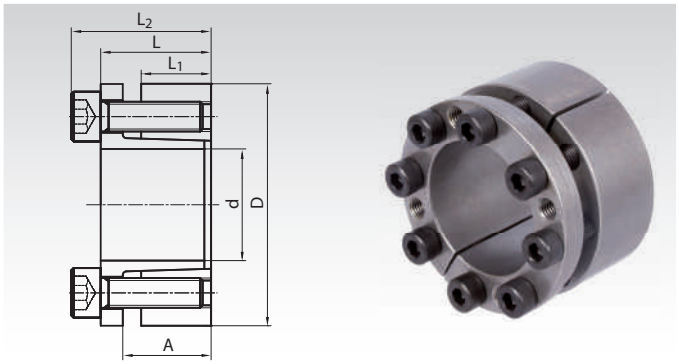
Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-D

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For high torques.
- Self-centering.
- Slight axial offset possible during assembly.

Concentricity: 0.02 to 0.04 mm.



Ordering Details: e.g.: Product No. 615 570 19, Locking Assembly COM-D, 19 mm

Product No.	d	D	L_1	A	L	L_2	at T_A transmittable T	F_{ax}	Surface Pressure Shaft P_w	Hub P_N	Screws DIN 912 12.9	T_A	Weight
	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Number x size	Nm	kg
615 570 19	19	47	26	31	39	45	353	31	228	98	6x M6x25	17	0,39
615 570 20	20	47	26	31	39	45	530	52	274	118	6x M6x25	17	0,37
615 570 22	22	47	26	31	39	45	582	52	247	116	6x M6x25	17	0,35
615 570 24	24	50	26	31	39	45	650	53	244	120	6x M6x25	17	0,40
615 570 25	25	50	26	31	39	45	680	54	216	110	6x M6x25	17	0,38
615 570 28	28	55	26	31	39	45	760	56	200	105	6x M6x25	17	0,45
615 570 30	30	55	26	31	39	45	850	56	192	109	6x M6x25	17	0,43
615 570 32	32	60	26	31	39	45	1130	70	228	121	8x M6x25	17	0,53
615 570 35	35	60	26	31	39	45	1220	71	206	120	8x M6x25	17	0,50
615 570 38	38	65	26	31	39	45	1370	71	198	114	8x M6x25	17	0,60
615 570 40	40	65	26	31	39	45	1410	72	184	112	8x M6x25	17	0,56
615 570 42	42	75	30	36	47	55	2170	100	219	122	6x M8x30	41	0,95
615 570 45	45	75	30	36	47	55	2330	100	204	122	6x M8x30	41	0,92
615 570 48	48	80	30	36	47	55	2480	100	194	117	6x M8x30	41	1,10
615 570 50	50	80	30	36	47	55	2560	100	182	116	6x M8x30	41	1,00
615 570 55	55	85	30	36	47	55	3700	130	222	141	8x M8x30	41	1,10
615 570 60	60	90	30	36	47	55	3800	140	192	130	8x M8x30	41	1,16
615 570 65	65	95	30	36	47	55	4600	140	194	131	8x M8x30	41	1,20
615 570 70	70	110	40	46	61	71	7700	220	209	133	8x M10x35	83	2,30
615 570 75	75	115	40	46	61	71	8100	220	192	126	8x M10x35	83	2,50
615 570 80	80	120	40	46	61	71	8600	220	182	121	8x M10x35	83	2,70
615 570 85	85	125	40	46	61	71	11600	270	214	148	10x M10x35	83	2,90
615 570 90	90	130	40	46	61	71	12000	270	200	135	10x M10x35	83	3,20
615 570 95	95	135	40	46	61	71	13000	280	196	134	10x M10x35	83	3,50
615 571 00	100	145	46	52	70	82	15000	300	173	120	8x M12x40	145	4,00

More sizes up to d=180mm for 58,900Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness hub/shaft max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use MoS2 or grease.
Tighten the screws evenly and crosswise in several steps to the set torque.

Demounting

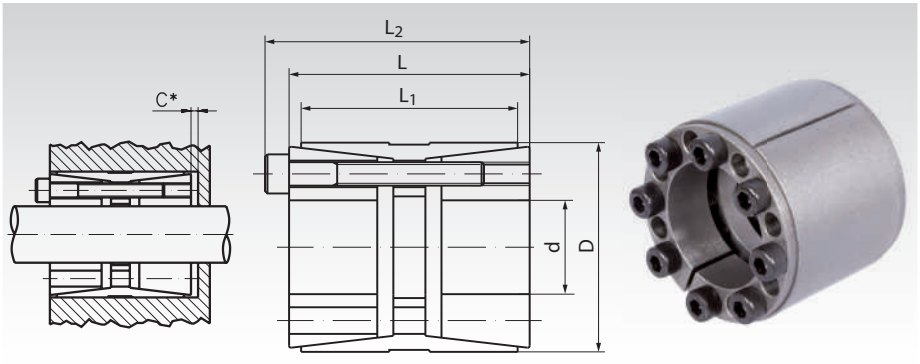
Remove all tensioning screws and screw them into the unused forcing threads of the front tensioning ring, until it is released.

Locking Assemblies COM-L

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For very high torques.
- Self-centering.
- Slight axial offset possible during assembly.

Concentricity: 0.02 to 0.04 mm.



Ordering Details: e.g.: Product No. 615 511 25, Locking Assembly COM-L, 25 mm

Product No.	d	D	L_1	L	C*	L_2	at T_A transmittable T	F_{ax}	Surface Pressure Shaft P_w	Hub P_N	Screws DIN 912 12.9	T_A	Weight
	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Number x size	Nm	kg
615 511 25	25	55	32	40	4	46	810	65	288	98	6x M6x35	17	0,35
615 511 28	28	55	32	40	4	46	950	65	268	102	6x M6x35	17	0,42
615 511 30	30	55	32	40	4	46	970	68	241	98	6x M6x35	17	0,40
615 511 35	35	60	44	54	5	60	1240	70	157	83	7x M6x45	17	0,60
615 511 38	38	75	44	54	5	62	2780	145	263	117	7x M8x50	41	1,15
615 511 40	40	75	44	54	5	62	3020	146	293	121	7x M8x50	41	0,59
615 511 42	42	75	44	54	5	62	3150	151	248	116	7x M8x50	41	1,25
615 511 45	45	75	44	54	5	62	3390	151	261	121	7x M8x50	41	0,74
615 511 48	48	80	56	64	4	72	3920	159	161	96	8x M8x55	41	1,30
615 511 50	50	80	56	64	4	72	4110	163	156	97	8x M8x55	41	1,26
615 511 55	55	85	56	64	4	72	4370	164	137	89	8x M8x55	41	1,36
615 511 60	60	90	56	64	4	72	6320	211	167	111	10x M8x55	41	1,46
615 511 65	65	95	56	64	4	72	7100	217	160	109	10x M8x55	41	1,55
615 511 70	70	110	70	78	4	88	11730	314	184	117	10x M10x60	83	2,9
615 511 75	75	115	70	78	5	88	11900	340	159	104	10x M10x60	83	3,0
615 511 80	80	120	70	78	5	88	16400	392	196	130	12x M10x60	83	3,3
615 511 85	85	125	70	78	5	88	16600	400	175	119	12x M10x60	83	3,4
615 511 90	90	130	70	78	5	88	18000	400	169	116	12x M10x60	83	3,5
615 511 95	95	135	70	78	5	88	19000	412	160	112	12x M10x60	83	3,7
615 512 00	100	145	90	100	6	112	27900	559	165	113	12x M12x80	145	5,5

* When using in a stepped bore, the clearance C is to be foreseen for demounting.

More sizes up to d=300mm for 444,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness hub/shaft max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use MoS2 or grease.
Tighten the screws evenly and crosswise in several steps to the set torque.
To ease mounting the outer ring and the rear tensioning ring can be fixed with screws via the forcing thread.

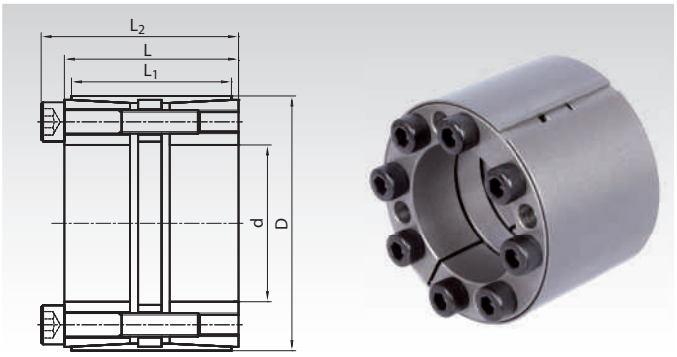
Demounting

Remove all tensioning screws and screw them into the unused forcing threads of the front tensioning ring, until it is released.
Then screw in the screws into the unused forcing threads of the outer ring, until the rear tensioning ring is released.

Locking Assemblies COM-LL

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For very high torques.
- Self-centering.
- Self-locking.
- Axial movement during mounting.



Ordering Details: e.g.: Product No. 615 513 25, Locking Assembly COM-LL, 25 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 513 25	25	50	45	39	51	900	70	245	122	6 x M6	17	0,50
615 513 28	28	55	45	39	51	1010	70	219	111	6 x M6	17	0,60
615 513 30	30	55	45	39	51	1100	70	204	111	6 x M6	17	0,60
615 513 35	35	60	45	39	51	1340	76	175	102	8 x M6	17	0,70
615 513 38	38	65	45	39	51	1810	120	161	94	10 x M6	17	0,70
615 513 40	40	65	45	39	51	1920	120	153	94	10 x M6	17	0,70
615 513 42	42	75	64	56	72	2970	141	188	105	8 x M8	41	1,00
615 513 45	45	75	64	56	72	3150	141	175	105	8 x M8	41	0,90
615 513 48	48	80	64	56	72	4000	166	164	98	8 x M8	41	1,40
615 513 50	50	80	64	56	72	4850	192	159	102	8 x M8	41	1,26
615 513 55	55	85	64	56	72	5810	220	140	93	9 x M8	41	1,36
615 513 60	60	90	64	56	72	7460	249	170	117	10 x M8	41	1,46
615 513 65	65	95	64	56	72	8400	256	163	114	10 x M8	41	1,55
615 513 70	70	110	78	70	88	13800	371	188	123	10 x M10	83	2,9
615 513 75	75	115	78	70	88	14000	401	162	109	10 x M10	83	3,0
615 513 80	80	120	78	70	88	19400	463	200	137	12 x M10	83	3,3
615 513 85	85	125	78	70	88	19600	472	179	125	12 x M10	83	3,4
615 513 90	90	130	78	70	88	21200	472	172	122	12 x M10	83	3,5
615 513 95	95	135	78	70	88	22400	486	163	118	12 x M10	83	3,7
615 514 00	100	145	100	90	112	32900	660	168	119	12 x M12	145	5,5

More sizes up to d=300mm for 524,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

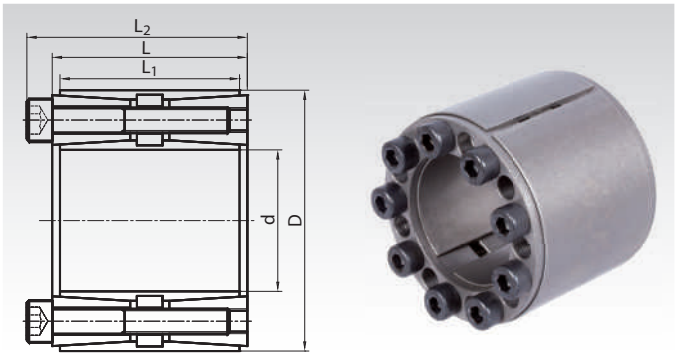
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-LLH

Material: Steel.

- For fixing a hub (e.g. sprocket or similar) on a shaft.
- For very high torques.
- Very good distribution of pressure.
- High resistant against bending forces.
- Self-centering.
- Self-locking.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 580 42, Locking Assembly COM-LLH, 42 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 580 42	42	75	64	56	72	3290	147	175	103	8 x M8	41	1,25
615 580 45	45	75	64	56	72	3500	147	157	95	8 x M8	41	1,30
615 580 48	48	80	64	56	72	3670	149	143	90	8 x M8	41	1,50
615 580 50	50	80	64	56	72	3800	161	141	91	8 x M8	41	1,40
615 580 55	55	85	64	56	72	4430	167	140	88	8 x M8	41	1,50
615 580 60	60	90	64	56	72	5590	182	130	96	10 x M8	41	1,50
615 580 65	65	95	64	56	72	6020	182	134	91	10 x M8	41	1,60
615 580 70	70	110	78	70	88	10200	290	162	100	10 x M10	83	3,0
615 580 75	75	115	78	70	88	11660	308	157	101	10 x M10	83	3,1
615 580 80	80	120	78	70	88	14000	351	166	109	12 x M10	83	3,5
615 580 85	85	125	78	70	88	16200	374	170	113	12 x M10	83	3,5
615 580 90	90	130	78	70	88	16780	380	159	107	12 x M10	83	3,8
615 580 95	95	135	78	70	88	18410	389	158	107	12 x M10	83	4,0
615 581 00	100	145	100	90	112	26600	533	158	109	12 x M12	145	6,0
615 581 10	110	155	100	90	112	29200	533	142	101	12 x M12	145	6,2
615 581 20	120	165	100	90	112	38400	641	157	114	14 x M12	145	6,8

More sizes up to d=600mm for 977,000Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

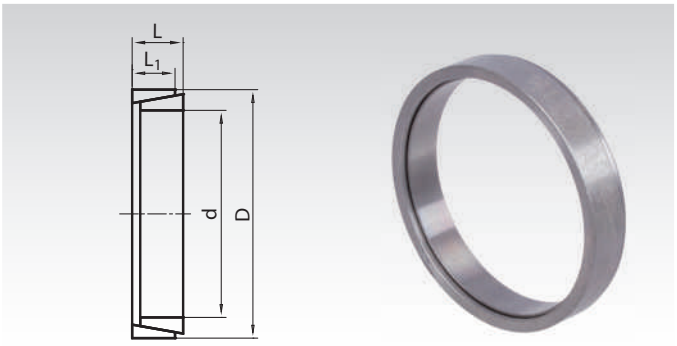
Demounting

Remove all tensioning screws and screw them into the (usually unused) forcing thread of the front flange, until the flange is released.

Locking Assemblies COM-R

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For lower to medium torques.
- Not self-centering.
- Loose clamping rings. For use with customer´s pressure sleeves and customer´s screws.
- Up to 4 clamping sets can be used in line.
- Versatile usage, for customized solutions.



Ordering Details: e.g.: Product No. 615 000 06, Locking Assembly COM-R, 6 mm

Product No.	d mm	D mm	L mm	L_1 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	F_A kN	Weight kg
615 000 06	6	9	4,5	3,7	2	0,83	116	76	4	0,002
615 000 07	7	10	4,5	3,7	3	0,85	101	67	5	0,002
615 000 08	8	11	4,5	3,7	5	1,22	125	94	6	0,002
615 000 09	9	12	4,5	3,7	8	1,83	146	109	15	0,002
615 000 10	10	13	4,5	3,7	10	1,83	130	101	16	0,002
615 000 12	12	15	4,5	3,7	11	1,91	115	90	16	0,002
615 000 14	14	18	6,3	5,3	23	3,31	120	94	26	0,005
615 000 15	15	19	6,3	5,3	25	3,34	113	88	27	0,005
615 000 16	16	20	6,3	5,3	28	3,40	110	89	27	0,006
615 000 17	17	21	6,3	5,3	29	3,59	102	82	27	0,006
615 000 18	18	22	6,3	5,3	33	3,68	102	82	33	0,007
615 000 19	19	24	6,3	5,3	47	4,96	133	105	33	0,007
615 000 20	20	25	6,3	5,3	55	5,54	140	109	33	0,009
615 000 22	22	26	6,3	5,3	65	5,88	132	113	34	0,007
615 000 24	24	28	6,3	5,3	73	5,89	130	110	34	0,008
615 000 25	25	30	6,3	5,3	73	6,02	117	97	37	0,009
615 000 28	28	32	6,3	5,3	85	6,13	112	97	40	0,010
615 000 30	30	35	6,3	5,3	90	6,14	99	84	40	0,012
615 000 32	32	36	6,3	5,3	127	7,99	126	112	44	0,011
615 000 35	35	40	7,0	6,0	166	9,20	121	107	54	0,016
615 000 38	38	44	7,0	6,0	186	9,84	113	98	60	0,021
615 000 40	40	45	8,0	6,6	226	10,8	113	103	70	0,021
615 000 42	42	48	8,0	6,6	226	11,3	106	91	75	0,026
615 000 45	45	52	10,0	8,6	364	16,2	108	98	110	0,045
615 000 48	48	55	10,0	8,6	589	24	160	139	110	0,043
615 000 50	50	57	10,0	8,6	608	25	152	131	110	0,045
615 000 55	55	62	10,0	8,6	700	25	146	130	120	0,049
615 000 60	60	68	12,0	10,4	830	28	120	106	160	0,07
615 000 65	65	73	12,0	10,4	970	30	117	102	170	0,09
615 000 70	70	79	14,0	12,2	1310	37	119	105	210	0,12
615 000 75	75	84	14,0	12,2	1440	39	114	99	230	0,12
615 000 80	80	91	17,0	15,0	2160	54	123	103	300	0,21
615 000 85	85	96	17,0	15,0	2450	58	122	107	320	0,21
615 000 90	90	101	17,0	15,0	2700	60	119	104	330	0,22
615 000 95	95	106	17,0	15,0	2900	61	114	105	340	0,23
615 001 00	100	114	21,0	18,7	4160	83	119	104	460	0,39
615 001 10	110	124	21,0	18,7	5000	91	116	102	475	0,42
615 001 20	120	134	21,0	18,7	6170	103	122	107	475	0,46

More sizes up to d=500mm for 270,000Nm are available.
Price and delivery time on request.

Several sets in line

Several sets can be mounted in line. T and F_A shown in the table are for one set.

At 2 sets: $T_{ges.}$ = T x 1,6.

At 3 sets: $T_{ges.}$ = T x 1,9.

At 4 sets: $T_{ges.}$ = T x 2,1.

Calculation the screws

The screw size can be chosen. The number of screws must be calculated.

Number of screws = $F_{A\ ges.}$: F_S

$F_{A\ ges.}$ = Number of sets x F_A

F_A see data table above.

F_S see data table on the right.

Axial Screw Force F_S and Fastening torque

	Axial Screw Force F_S in kN			Fastening Torque T_A in Nm		
Screw	**8.8**	**10.9**	**12.9**	**8.8**	**10.9**	**12.9**
M4	3,9	5,8	6,7	3,0	4,4	5,1
M5	6,4	9,4	11,0	5,9	8,7	10
M6	9,0	12,2	15,5	10	15	18
M8	16,5	24,3	28,4	25	36	43
M10	26,3	38,7	42,2	49	72	84
M12	38,4	56,5	66,0	85	125	145
M14	52,5	77,5	90,5	135	200	235

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

T = transmittable torque.
F_{ax} = transmittable axial force.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
F_A = required axial preload force.

Mounting

Slightly oil the locking assembly before mounting, do not use molybdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

Demounting

Remove all tensioning screws. Then, due to the cone angle, the locking assembly is usually released. If not, use a wheel puller or use carefully a rubber hammer to loosen the wheel from the clamping rings.

Clamping Bushes E and E-N

Material E: High-quality steel.
Material E-N: Stainless steel 1.405.

The clamping bush consists of a double-walled steel sleeve filled with a pressure medium, and a flange part. Inside the flange there is a screw and a piston with seal to build up compression.

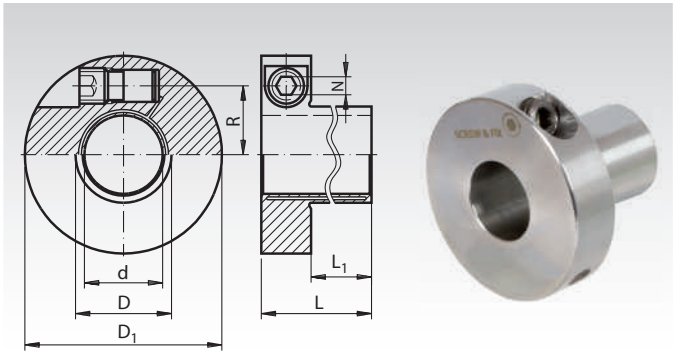
Function: When the thrust screw is tightened, the sleeve expands uniformly against shaft and hub, creating a rigid connection through frictional force. When the thrust screw is loosened, the bush returns to its initial position and can be easily disassembled.

Concentricity: 0.02 mm.

Tolerances: Shaft h7 for d = 15 mm.
Shaft k6-h7 for d = 19, 22, 24, 28 and 38 mm.
Shaft h8 for the other diameters d.
Hub H7.

Temperature range: -30 °C to 85 °C.

Ordering Details: e.g.: Product No. 615 915 00, Clamping Bush E, 15 mm



$P_W \approx 90 N/mm^2$
$P_N \approx 70 N/mm^2$

Product No. Design E Steel	Dimensions d mm	D mm	D_1 mm	L mm	L_1 mm	at T_A transmittable Torque T Nm	Axial Force F_{ax} kN	Radial Force F_r kN	Screw 12.9* Size DIN 915	R mm	N mm	T_A Nm	Moment of Inertia J $kgm^2 \cdot 10^{-3}$	Weight kg
615 915 00	15	18	46	39	25	46	6,1	0,5	M10	15,1	5	5	0,043	0,16
615 915 87	15,875	19	47	40	26	53	6,7	0,5	M10	15,6	5	5	0,047	0,17
615 919 00	19	23	50,5	42	28	85	8,9	1	M10	17,4	5	5	0,064	0,20
615 919 05	19,05	23	50,5	42	28	85	8,9	1	M10	17,4	5	5	0,064	0,20
615 920 00	20	24	51,5	44	30	110	11	1	M10	18	5	5	0,070	0,21
615 922 00	22	27	55,5	46	32	130	11	1,2	M10	19,3	5	5	0,097	0,25
615 924 00	24	29	57,5	47	33	190	15	1,4	M10	20,3	5	5	0,112	0,27
615 925 00	25	30	58	49	35	230	18	1,5	M10	20,8	5	5	0,117	0,27
615 925 40	25,4	31	59	49	35	190	15	1,5	M10	21,2	5	5	0,127	0,29
615 928 00	28	34	63	52	38	280	20	1,8	M10	22,6	5	5	0,170	0,34
615 930 00	30	36	64,5	54	40	380	25	2	M10	23,6	5	5	0,189	0,35
615 931 75	31,75	39	68,5	56	42	430	27	2,2	M10	24,8	5	5	0,249	0,42
615 932 00	32	39	68,5	56	42	440	27	2,2	M10	24,8	5	5	0,249	0,42
615 935 00	35	42	73	59	45	640	36	2,5	M10	26,4	5	5	0,325	0,48
615 938 00	38	46	84,5	72	52	890	46	2,8	M16	31	8	21	0,761	0,84
615 940 00	40	48	86,5	75	55	1100	55	3	M16	32	8	21	0,844	0,88
615 945 00	45	54	93	78	58	1400	62	3,5	M16	34,8	8	21	1,170	1,05
615 950 00	50	60	98,5	80	60	1900	76	4,5	M16	37,5	8	21	1,524	1,20

Product No. Design E-N Stainless	STAINLESS Dimensions d mm	D mm	D_1 mm	L mm	L_1 mm	at T_A transmittable Torque T Nm	Axial Force F_{ax} kN	Radial Force F_r kN	Screw A4* Size DIN 915	R mm	N mm	T_A Nm	Moment of Inertia J $kgm^2 \cdot 10^{-3}$	Weight kg
615 999 15	15	18	46	39	25	46	6,1	0,5	M10	15,1	5	5	0,043	0,16
615 999 20	20	24	51,5	44	30	110	11	1,0	M10	18	5	5	0,070	0,21
615 999 25	25	30	58	49	35	230	18	1,5	M10	20,8	5	5	0,117	0,27
615 999 30	30	36	64,5	54	40	380	25	2	M10	23,6	5	5	0,189	0,35
615 999 35	35	42	73	59	45	640	36	2,5	M10	26,4	5	5	0,325	0,48
615 999 40	40	48	86,5	75	55	1100	55	3	M16	32	8	21	0,844	0,88
615 999 45	45	54	93	78	58	1400	62	3,5	M16	34,8	8	21	1,170	1,05
615 999 50	50	60	98,5	80	60	1900	76	4,5	M16	37,5	8	21	1,524	1,20

T = transmittable torque at axial force of 0, if the screws are fastened with T_A.
F_{ax} = transmittable axial force at torque of 0, if the screws are fastened with T_A.
F_r = maximum transmittable radial force.
T_A = required fastening torque for the screws.
* With coated surface.

Properties

The unique hydraulic principle leads to many advantages:
- very fast mounting/demounting with only **one thrust screw.**
- radial fastening of the thrust screw allows space saving installation conditions.
- very small assembly dimensions.
- good concentricity, even after several mountings.

Dimensioning

For the maximum torque, the shaft must be strong enough (min. strength 350 N/mm², for example C45).
The hub diameter must be big enough.
Recommend minimum hub diameter:
Hub from Steel: ND = 1,4 x D.
Hub from grey cast iron: ND = 2,0 x D.
Hub from Aluminium: ND = 2,5 x D.

Mounting

Before mounting always check whether the threads are lubricated (OKS 260 or Molykote D).

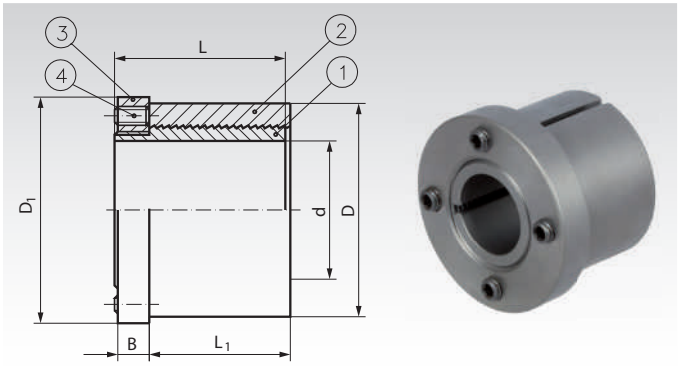
Clamping Bushes MSA

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For medium high torques and axial forces.
- Minimal space requirement.
- Self-centering.
- Not self-locking.
- Little axial movement during mounting.

Concentricity: approx. 0.02 mm.

Tolerance: Shaft h11 up to k6, Hub H7 up to H11.



Ordering Details: e.g.: Product No. 615 019 00, Locking Assembly MSA, Slotted, 19 mm

Product No.	d mm	D mm	D_1 mm	L mm	L_1 mm	B mm	T Nm	F_{ax} kN	P_N N/mm²	Screws Number x Size	T_A Nm	Weight kg
615 019 00	19	42	49	36	27	9,5	170	18	42	4 M6 x 12	8	0,33
615 020 00	20	42	49	36	27	9,5	180	18	42	4 M6 x 12	8	0,32
615 022 00	22	42	49	36	27	9,5	200	18	42	4 M6 x 12	8	0,31
615 024 00	24	46	53	37	27	10,5	325	27	58	6 M6 x 12	8	0,37
615 025 00	25	46	53	37	27	10,5	340	27	58	6 M6 x 12	8	0,36
615 028 00	28	55	63	44	32	12,5	490	35	66	4 M8 x 16	18	0,64
615 030 00	30	55	63	44	32	12,5	525	35	66	4 M8 x 16	18	0,61
615 032 00	32	60	67	49	37	12,5	650	41	60	5 M8 x 16	18	0,81
615 035 00	35	60	67	49	37	12,5	720	41	61	5 M8 x 16	18	0,75
615 038 00	38	67	75	57	45	12,5	950	50	54	6 M8 x 16	18	1,13
615 040 00	40	67	75	57	45	12,5	1000	50	54	6 M8 x 16	18	1,06
615 042 00	42	67	75	57	45	12,5	1050	50	54	6 M8 x 16	18	1,01
615 045 00	45	70	77	63	50	13,5	1280	57	53	7 M8 x 16	18	1,17
615 048 00	48	77	83	68,8	55	14	1560	65	50	8 M8 x 16	18	1,62
615 050 00	50	77	83	68,5	55	14	1625	65	50	8 M8 x 16	18	1,53

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_N = surface pressure onto the hub.
T_A = fastening torque of the screws.

Operating factor f_B for various operating conditions

The values for the maximum transmittable torque and the maximum permissible axial force for the clamping bush at static load are stated in the table below. With dynamic load these values have to be reduced, i.e. divided by the operating factors listed in the adjoining table.

Drive Unit	Type of Load		
	Uniform Load	Moderate Shock	Strong Shock
Electric motors, turbines	1 - 1.25	1.25 - 1.5	1.5 - 1.75
Multi-cylinder piston engines	1.25 - 1.5	1.5 - 1.75	1.75 - 2
One-cylinder piston engines	1.75 - 2	2 - 2.25	2.25 - 3

Description

Mechanical, all-steel clamping elements, containing no hydraulic pressure medium. Both inner part (1) and outer part (2) have a cylindrical buttress thread with a lengthwise slot. The inner ring (3) connected to the inner part has threaded studs (4), that create a tensioning effect when tightened.The bushes are designed for very high loads in radial as well as in axial direction. If a clamping bush without slot on the outside part is to be welded onto a workpiece, we would ask you to contact us first. Feather key grooves in the shaft do not cause any problems; simply remove the frictional corrosion.

Dimensioning

For the maximum torque, the shaft must be strong enough (min. strength 350 N/mm², for example C45).
The hub diameter must be big enough.
Recommend minimum hub diameter:
Hub from Steel: ND = 1,4 x D.
Hub from grey cast iron: ND = 2,0 x D.
Hub from Aluminium: ND = 2,5 x D.

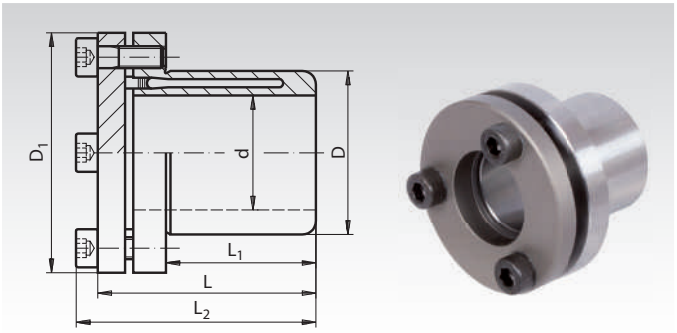
Clamping Bushes MSD

Material: Steel.

The MSD clamping bush consists of a double-walled, hardened steel sleeve filled with a special pressure medium, a seal, a piston, a compression flange and fastening screws. When tightening the screws, the sleeves expand evenly against shaft and hub, creating a rigid connection. When the screws are loosened, the bush returns to its initial position and can be easily demounted.

Temperature range: -30 °C to 85 °C.
Concentricity: ≈ 0.03 - 0.06 mm.
Tolerance: Shaft h8 - k6 (for Prod. No. 615 215 00 only h7), Hub H7.

$P_W \approx 90 N/mm^2$ $P_N \approx 70 N/mm^2$



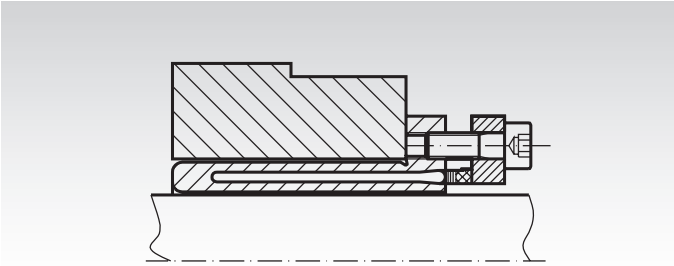
Ordering Details: e.g.: Product No. 615 215 00, Clamping Bush MSD, 15 mm

Product No.	Dimensions d mm	D mm	D_1 mm	L mm	L_1 mm	L_2 mm	at T_A transmittable Torque T Nm	Force F_{ax} kN	Screws DIN 912, 12.9 Amount	Size	T_A Nm	Moment of Inertia J $kgm^2 \cdot 10^{-3}$	Weight kg
615 215 00	15	23	38	30	17	35	55	7,3	3	M5	6	0,018	0,10
615 219 00	19	28	45	37	21	42	100	10,6	3	M5	8	0,046	0,17
615 220 00	20	28	45	37	22	42	125	12,5	3	M5	8	0,046	0,16
615 222 00	22	32	49	37	22	42	135	12,3	4	M5	8	0,065	0,19
615 224 00	24	34	49	40	25	45	200	16,7	4	M5	8	0,067	0,20
615 225 00	25	34	49	43	27	48	250	20,0	4	M5	8	0,071	0,19
615 228 00	28	39	55	45	29	50	300	21,4	4	M5	8	0,120	0,26
615 230 00	30	41	57	47	32	52	420	28,0	4	M5	8	0,142	0,29
615 232 00	32	43	60	52	34	57	420	26,3	4	M5	8	0,195	0,35
615 235 00	35	47	63	55	37	60	650	37,1	6	M5	8	0,250	0,40
615 238 00	38	50	65	59	41	64	750	39,5	6	M5	8	0,310	0,43
615 240 00	40	53	70	63	43	68	940	47,0	6	M5	8	0,441	0,55
615 242 00	42	55	70	65	45	70	940	44,8	6	M5	8	0,467	0,55
615 245 00	45	59	77	69	49	75	1290	57,3	6	M6	13	0,686	0,71
615 248 00	48	62	80	73	52	79	1570	65,4	6	M6	13	0,833	0,78
615 250 00	50	65	83	76	53	82	1900	76,0	6	M6	13	1,045	0,86

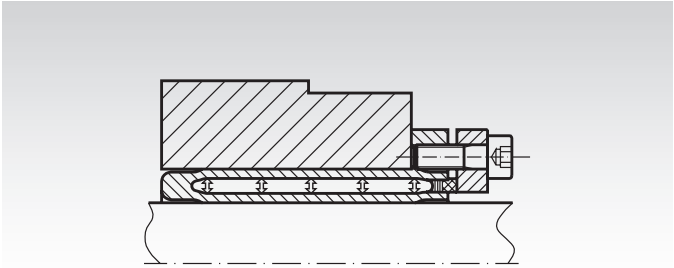
T = transmittable torque at axial force of 0, if the screws are fastened with T_A.
F_{ax} = transmittable axial force at torque of 0, if the screws are fastened with T_A.
T_A = required fastening torque for the screws.

The dimensions refer to bushes before assembly.

Mounting



For mounting, the clamping bush MSD is placed between shaft and hub.



After the screws have been tightened, there is a contact between the surface of hub and shaft.

Advantages

The hydraulic principle leads to many advantages:
- fast mounting/demounting.
- sensitive adjustment of the hub can be carried out during assembly.
- low fastening torque and few screws allow very simple assembly.
- good concentricity.
- small dimensions allow little outside diameter of the hub.
- The clamping bushes are as standard equipped with Allen screws, but hexagon-head screws can also be supplied.

Dimensioning

For the maximum torque, the shaft must be strong enough (min. strength 350 N/mm^2, for example C45).
The hub diameter must be big enough.
Recommend minimum hub diameter:
Hub from Steel: ND = 1,4 x D.
Hub from grey cast iron: ND = 2,0 x D.
Hub from Aluminium: ND = 2,5 x D.

Clamping Bushes MSD-N

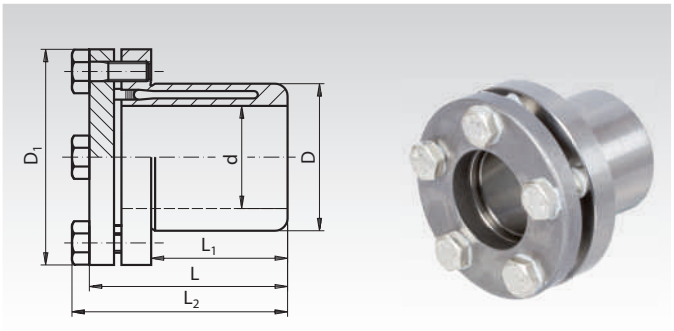
Material: Stainless steel 1.4021.

The MSD-N clamping bush is identical with the MSD bush, but is made from stainless steel. It has been used in many industries for years, as, e.g., the food, medical, automotive, chemical, printing and process engineering industries.

Concentricity 0.03 - 0.06 mm.

Tolerance: Shaft h9 (Ø 15 mm only h8), Hub H7.

Temperature range: -30 °C to 85 °C.



$P_W \approx 90 N/mm^2$ $P_N \approx 70 N/mm^2$

Ordering Details: e.g.: Product No. 615 993 15, Clamping Bush MSD-N, 15 mm

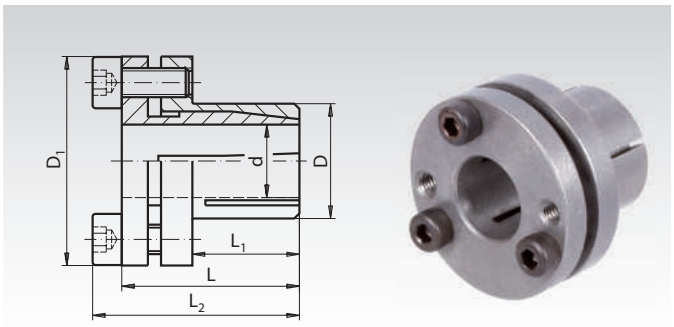
Product No.	Dimensions d mm	D mm	D_1 mm	L mm	L_1 mm	L_2 mm	at T_A transmittable Torque T Nm	Force F_{ax} kN	Screws DIN 933, A4 Amount	Size	T_A Nm	Moment of Inertia J $kgm^2 \cdot 10^{-3}$	Weight kg
615 993 15	15	23	38	30	17	34	45	6	4	M 5	4,5	0,018	0,10
615 993 20	20	28	45	37	22	41	100	10	5	M 5	4,5	0,046	0,16
615 993 25	25	34	49	43	27	46	210	16,8	7	M 5	4,5	0,071	0,19
615 993 30	30	41	57	47	32	51	350	23,3	7	M 5	4,5	0,142	0,29
615 993 40	40	53	70	63	43	67	750	37,5	9	M 5	4,5	0,441	0,55
615 993 50	50	65	83	76	53	80	1550	62	9	M 6	7,8	1,045	0,86

T = transmittable torque at axial force of 0, if the screws are fastened with T_A.
F_{ax} = transmittable axial force at torque of 0, if the screws are fastened with T_A.
T_A = required fastening torque for the screws.
The dimensions refer to bushes before assembly.

Miniature Clamping Bushes MSM and MSM-N

Material: Version MSM: Mild steel.
Version MSM-N: Stainless steel 1.4305.

Concentricity: about 0.02 mm.
Tolerance: Shaft k6-h10, Hub H8.



$P_W \approx 90 N/mm^2$ $P_N \approx 70 N/mm^2$

Ordering Details: e.g.: Product No. 615 206 00, Miniature Clamping Bush MSM, 6 mm

Product No. MSM	Dimensions d mm	D mm	D_1 mm	L mm	L_1 mm	L_2 mm	at T_A transmittable Torque T Nm	Force F_{ax} kN	Screws DIN 912, 12.9 Amount	Size	T_A Nm	Moment of Inertia J $kgm^2 \cdot 10^{-3}$	Weight kg
615 206 00	6	14	25	19	10	22	5	1,7	2	M3	2	2,1	0,03
615 208 00	8	15	27	21,5	12	25,5	17	4,4	2	M4	4	3,3	0,04
615 209 00	9	16	28	24	14	28	20	4,4	2	M4	4	4,4	0,05
615 210 00	10	16	28	24	14	28	23	4,4	2	M4	4	4,3	0,05
615 212 00	12	18	30	25,5	14	29,5	27	4,4	2	M4	4	6,1	0,06
615 214 00	14	22	35	27,5	15	31,5	48	6,5	3	M4	4	13,2	0,08
MSM-N Stainless									Screws DIN 912, A4				
615 992 06	6	14	25	19	10	22	5	1,7	3	M3	1,2	2,1	0,03
615 992 08	8	15	27	21,5	12	25,5	17	4,4	3	M4	2,7	3,3	0,04
615 992 10	10	16	28	24	14	28	23	4,4	3	M4	2,7	4,3	0,05
615 992 12	12	18	30	25,5	14	29,5	27	4,4	3	M4	2,7	6,1	0,06
615 992 14	14	22	35	27,5	15	31,5	48	6,5	4	M4	2,7	13,2	0,08

T = transmittable torque at axial force of 0, if the screws are fastened with T_A.
F_{ax} = transmittable axial force at torque of 0, if the screws are fastened with T_A.
T_A = required fastening torque for the screws.
The dimensions refer to bushes before assembly.

Mounting

The bush is mounted quickly. Just place the bush inside the hub and push both onto the shaft. Fasten with a torque wrench.

Demounting

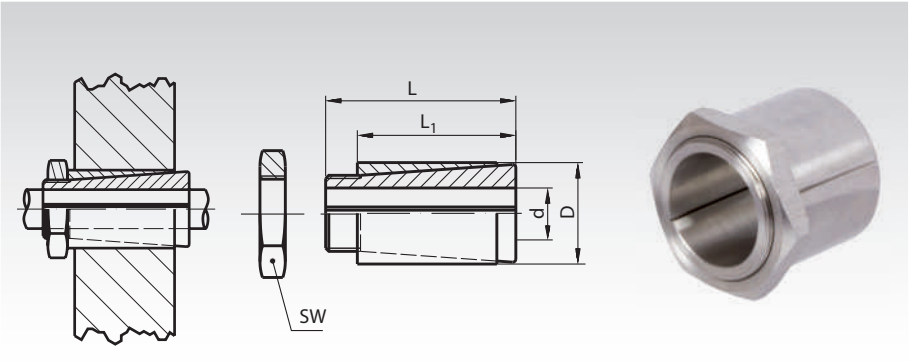
Remove tensioning screws. Put screws in forcing thread and fasten them until the bush is pressed off.

Locking Assemblies SIG

Material: Stainless steel 1.4301.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For lower torques.
- Minimal space requirement.
- The connection can be disassembled with a puller.

Required tolerances: Shaft: h8.
Bore of the part to be clamped: H8.
Surface roughness max. 12.5µm.



Ordering Details: e.g.: Product No. 615 104 00, Locking Assembly SIG, 4 mm

Product No.	d mm	D mm	L mm	L_1 mm	Torque T Nm	Thread	SW mm	Fastening Torque Nm	Weight g
615 104 00	4	8	15	12,5	3	M6x0,5	8	4	3,8
615 105 00	5	10	15	12,5	4	M8x0,5	10	5	6,5
615 106 00	6	10	15	12,5	7	M8x0,5	10	8	5,3
615 106 35	6,35	10	15	12,5	7	M8x0,5	10	8	5,0
615 107 00	7	12	15	12,0	8	M10x0,75	12	9	6,3
615 108 00	8	14	22	19,0	14	M12x1	16	15	17,5
615 109 00	9	14	22	19,0	14	M12x1	16	15	15,0
615 109 52	9,52	14	22	19,0	14	M12x1	16	15	12,8
615 110 00	10	17	22	18,5	18	M15x1	18	19	29,0
615 111 00	11	17	22	18,5	18	M15x1	18	19	28,0
615 112 00	12	17	22	18,5	18	M15x1	18	19	26,2
615 114 00	14	20	28	23,0	24	M17x1	20	25	35,3
615 115 00	15	20	28	23,0	24	M17x1	20	25	36,4
615 115 88	15,88	23	28	23,0	26	M20x1	26	27	48,4
615 116 00	16	23	28	23,0	26	M20x1	26	27	50,7
615 117 00	17	23	28	23,0	26	M20x1	26	27	45,0
615 119 00	19	25	28	23,0	29	M22x1	27	30	46,9
615 120 00	20	28	28	23,0	31	M25x1	30	32	67
615 125 00	25	32	35	27	45	M28x1	34	42	89
615 130 00	30	37	35	27	52	M33x1	38	47	105
615 135 00	35	43	40	29	57	M39x1,5[1)]	48	52	179
615 140 00	40	50	40	29	95	M45x1,5[2)]	55	58	249

[1)] In preperation: M39x1,25.
[2)] In preperation: M45x1,25.

Dimensioning

For the maximum torque, the shaft must be strong enough (min. strength 350 N/mm², for example C45).
The hub diameter must be big enough.
Recommend minimum hub diameter:
Hub from Steel: ND = 1,4 x D.
Hub from grey cast iron: ND = 2,0 x D.
Hub from Aluminium: ND = 2,5 x D.

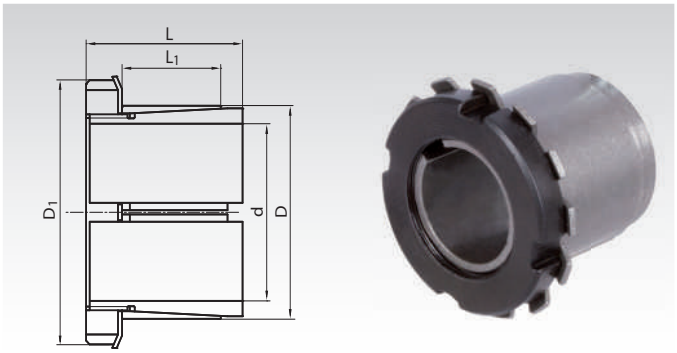
Mounting

- The locking assembly has to be mounted without lubrication to achieve the torques stated above.
- The locking assembly has to be fully in contact with the shaft.
- The locking assembly must not get in contact with any fixed components (e.g. bearing housing or crankcase).
- Tighten the nut with a torque wrench to the torque value as per the table.

Locking Assemblies SSG

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For low to medium torques.
- Also suitable for small hub diameters.
- Self-centering.
- Self-locking.
- Axial movement during mounting.



Ordering Details: e.g.: Product No. 615 200 14, Locking Assembly SSG, 14 mm

Product No.	d mm	D mm	L mm	L_1 mm	D_1 mm	T Nm	F_{ax} kN	P_W N/mm²	P_N N/mm²	Nut 8.8 Thread	T_A Nm	Weight kg
615 200 14	14	25	30	20	32	61	9	81	43	M20x1	95	0,08
615 200 15	15	25	30	20	32	72	9	82	46	M20x1	95	0,08
615 200 16	16	25	30	20	32	73	9	75	45	M20x1	95	0,07
615 200 17	17	25	32	20	32	82	9	72	46	M20x1	95	0,09
615 200 18	18	30	32	20	38	98	10	78	44	M25x1,5	160	0,12
615 200 19	19	30	32	20	38	102	11	73	44	M25x1,5	160	0,12
615 200 20	20	30	32	20	38	110	11	69	44	M25x1,5	160	0,11
615 200 22	22	35	36	25	45	165	13	71	45	M30x1,5	220	0,18
615 200 24	24	35	36	25	45	178	14	65	45	M30x1,5	220	0,16
615 200 25	25	35	36	25	45	178	14	58	43	M30x1,5	220	0,19
615 200 28	28	40	42	30	52	248	17	54	40	M35x1,5	340	0,24
615 200 30	30	40	42	30	52	273	17	51	40	M35x1,5	340	0,24
615 200 32	32	45	44	30	58	347	21	59	45	M40x1,5	480	0,32
615 200 35	35	45	44	30	58	406	22	57	47	M40x1,5	480	0,32
615 200 38	38	50	45	30	65	510	25	62	46	M45x1,5	680	0,35
615 200 40	40	50	45	30	65	520	27	54	44	M45x1,5	680	0,33
615 200 42	42	55	46	30	70	650	29	68	52	M50x1,5	870	0,43
615 200 45	45	55	46	30	70	660	31	57	48	M50x1,5	870	0,40
615 200 48	48	60	46	30	75	810	34	58	48	M55x2	970	0,45
615 200 50	50	60	46	30	75	850	34	58	49	M55x2	970	0,40
615 200 55	55	65	46	30	80	1020	37	59	50	M60x2	1100	0,44
615 200 60	60	70	48	30	85	1290	43	62	52	M65x2	1300	0,55

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
P_N = surface pressure onto the hub.
T_A = fastening torque of slotted nut.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molibdenum disulphide or grease. Tighten the slotted nut and bend the lock washer.

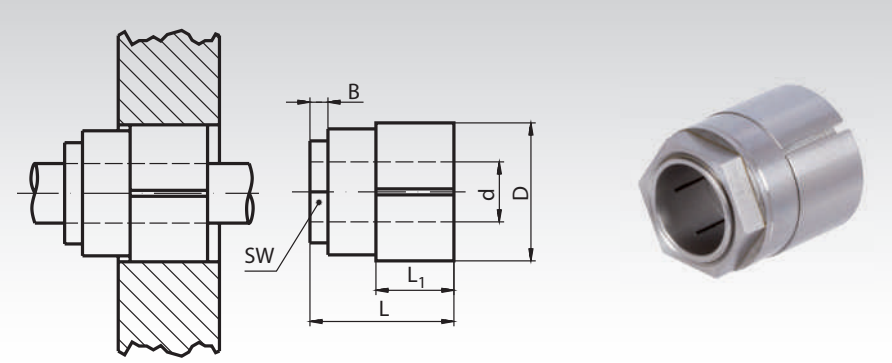
Demounting

Re-bend the lock washer. Remove the nut. Then, due to the cone angle, the locking assembly is usually released. If not, use a wheel puller or use carefully a rubber hammer to loosen the wheel from the clamping rings.

Locking Assemblies TT 5-16 mm

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For high torques.
- Self-centering.
- Axial offset during mounting (can be compensated by correct positioning).



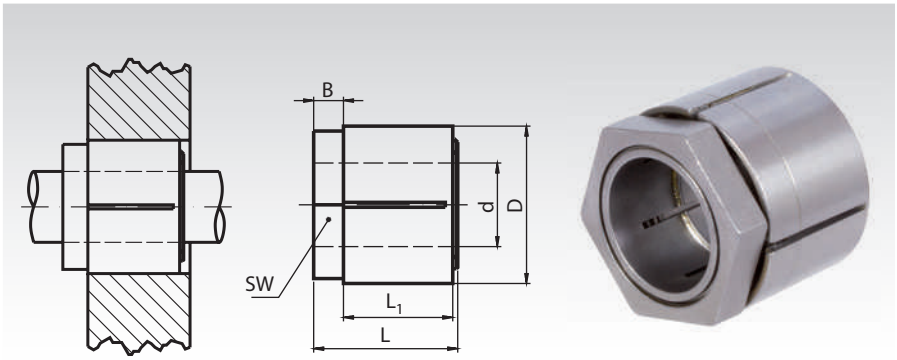
Ordering Details: e.g.: Product No. 615 501 05, Locking Assembly TT, 5 mm

Product No.	d mm	D mm	L mm	L_1 mm	B mm	Torque T max. Nm	Axial force max. kN	Surface pressure on the hub N/mm²	Diameter across flats SW mm	Tightening Torque T_A Nm	Weight g
615 501 05	5	16	19	10	3	11	4	73	13	10	19
615 501 06	6	16	19	10	3	13	4	73	13	10	18
615 501 07	7	20	22	11	3	35	10	119	16	28	34
615 501 08	8	20	22	11	3	40	10	119	16	28	33
615 501 09	9	20	22	11	3	45	10	119	16	28	32
615 501 10	10	23	26	13	5	65	13	116	19	44	49
615 501 11	11	23	26	13	5	72	13	116	19	44	47
615 501 12	12	23	26	13	5	79	13	116	19	44	45
615 501 14	14	26	29	16	5	118	17	107	22	66	65
615 501 15	15	26	29	16	5	126	17	107	22	66	62
615 501 16	16	26	29	16	5	135	17	107	22	66	59

Locking Assemblies TT 17-35 mm

Material: Steel.

- For fixing a hub (e.g. drive wheel, rotor or similar) on a shaft.
- For high torques.
- Self-centering.
- Axial offset during mounting (can be compensated by correct positioning).



Ordering Details: e.g.: Product No. 615 501 17, Locking Assembly TT, 17 mm

Product No.	d mm	D mm	L mm	L_1 mm	B mm	Torque T max. Nm	Axial force max. kN	Surface pressure on the hub N/mm²	Diameter across flats SW mm	Tightening Torque T_A Nm	Weight g
615 501 17	17	32	30	22	6	208	25	92	30	110	119
615 501 18	18	32	30	22	6	221	25	92	30	110	114
615 501 19	19	32	30	22	6	233	25	92	30	110	109
615 501 20	20	35	33	24	7	298	30	94	32	150	144
615 501 22	22	35	33	24	7	328	30	94	32	150	132
615 501 24	24	38	35	25	8	398	33	93	36	185	166
615 501 25	25	38	35	25	8	415	33	93	36	185	159
615 501 28	28	45	41	29	11	505	36	73	46	300	293
615 501 30	30	45	41	29	11	541	36	73	46	300	272
615 501 32	32	50	44	30	12	590	37	65	50	265	377
615 501 35	35	50	44	30	12	645	37	65	50	265	340

Fit, Surfaces

Size 5 to 16: Shaft and hub ±0.04mm.
Size 17 to 35: Shaft and hub ±0.08mm.

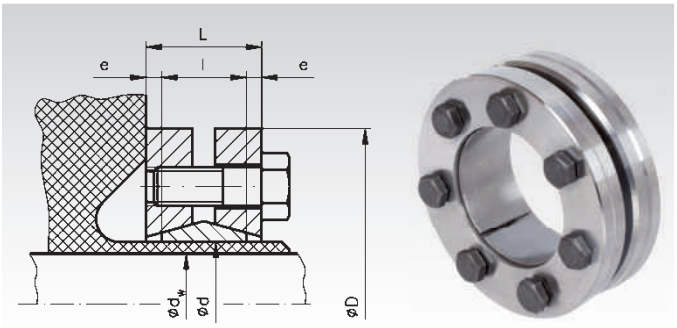
Mounting

It is essential to degrease the shaft and hub.
Install the locking assembly as delivered, never lubricate it.
Tighten the nut with a torque wrench to the torque value as per the table.

Shrink Disks ST

Material: 42CrMo4 quenched.

- For very high torques.
- No axial shaft-hub movement.
- Quick mounting.
- Quick demounting.



Ordering Details: e.g.: Product No. 615 814 00, Shrink Disk Inner-Ø 14 mm

Product No.	Inner-Ø d mm	Shaft-Ø[1] d_w mm	Torque[2] T Nm	Axial Load[2] F_{ax} Nm	D mm	l mm	L mm	e mm	Screws DIN 931 No. x Size	Fastening Torque T_A Nm	Contact-pressure P_N N/mm²	Weight kg
615 814 00	14	10	39	10	38	10	15	2,5	4x M5	3	343	0,1
		11	51	12								
		12	63	14								
615 816 00	16	12	66	14	41	12	17	2,5	4x M5	3	313	0,1
		13	78	16								
		14	96	18								
615 818 00	18	14	83	16	44	12	17	2,5	4x M5	4	298	0,1
		15	102	18								
		16	132	20								
615 824 00	24	19	220	32	50	15	21	3	6x M5	5	357	0,2
		20	272	35								
		21	325	37								
615 830 00	30	24	390	38	60	18	23	2,5	7x M5	5	292	0,3
		25	435	41								
		26	465	43								
615 836 00	36	28	442	50	72	19	25	3	5x M6	12	307	0,4
		30	575	58								
		31	633	58								
615 838 00	38	29	660	62	72	21	27	3	6x M6	12	341	0,5
		30	720	65								
		31	750	64								
615 844 00	44	32	740	62	80	22	26	2	7x M6	12	283	0,6
		35	940	72								
		36	1010	75								
615 850 00	50	38	1275	89	90	22	30	4	8x M6	12	320	0,8
		40	1430	96								
		42	1635	103								
615 855 00	55	42	1170	79	100	23	31	4	8x M6	12	250	1,1
		45	1500	88								
		48	1870	97								
615 862 00	62	48	2220	125	110	23	32	4,5	12x M6	12	330	1,3
		50	2600	132								
		52	2900	135								
615 868 00	68	50	2010	97	115	23	33	5	10x M6	12	260	1,4
		55	2505	106								
		60	3140	120								
615 875 00	75	55	2515	119	138	25	33	4	7x M8	30	272	2,4
		60	3195	137								
		65	3940	155								

[1] Shaft-Ø of the customer's machine (for example). [2] Transmittable values with shaft-Ø d_w of the customer's machine.

More sizes up to inner-Ø d=300mm, for shaft diameter 240mm and 292,000Nm are available.
Price and delivery time on request.

Mounting

Clean and slightly lubricate the contact surfaces of shaft and hub. Place clamping set on the hub. Fasten the tensioning screws evenly, step by step until the fastening torque T_A of the table is reached. To reach the value stated in the table several fastening steps are required. The figures for T and F_{ax} stated in the table were calculated for an assembly with oil.

Attention: Do not use any lubricant containing molybdenum sulphide.

Demounting: Evenly unscrew all tensioning screws one by one. Do not fully remove the screws from the thread. The clamping element usually disengages on its own.

Tolerances, Surface Roughness

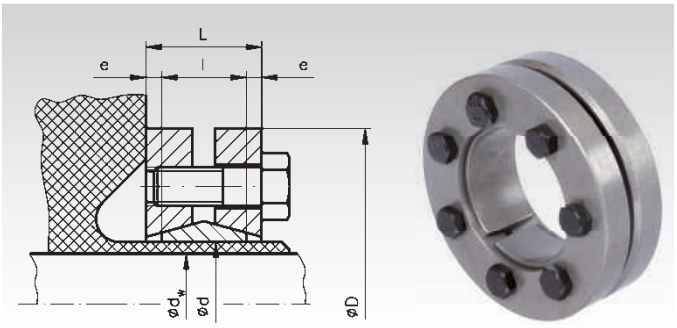
One good turn is sufficient.
Highest permissible surface roughness: R_t=12.5µm.

Tolerances for d_w/d: h8/H8.

Shrink Disks ST-B

Material: Steel.

- For high torques.
- No axial shaft-hub movement.
- Quick mounting.
- Quick demounting.



Ordering Details: e.g.: Product No. 615 870 14, Shrink Disk ST-B, Inner-Ø 14 mm

Product No.	Inner-Ø d mm	Shaft-Ø[1] d_w mm	Torque[2] T Nm	Axial Load[2] F_{ax} Nm	D mm	l mm	L mm	e mm	Screws DIN 931 No. x Size	Fastening Torque T_A Nm	Contact-pressure P_N N/mm²	Weight kg
615 870 14	14	11	30	6,3	38	7	11	2	4x M5	4	193	0,10
		12	50	9,2							179	
615 870 16	16	13	70	10	41	11	15	2	5x M5	4	133	0,10
		14	90	13							131	
615 870 24	24	19	170	26	50	14	19,5	2,75	6x M5	4	292	0,21
		20	200	26							272	
		21	240	28							277	
615 870 30	30	24	300	29	60	16	21,5	2,75	7x M5	4	231	0,32
		25	340	31							235	
		26	370	32							226	
615 870 36	36	28	440	50	72	18	23,5	2,75	5x M6	12	307	0,48
		30	550	56							295	
		31	610	60							319	
615 870 44	44	32	660	63	80	20	25,5	2,75	7x M6	12	314	0,64
		35	800	75							323	
		36	830	75							307	
615 870 50	50	38	980	78	90	22	27,5	2,75	8x M6	12	301	0,80
		40	1110	82							277	
		42	1150	83							292	
615 870 55	55	42	1390	90	100	23	30,5	3,75	8x M6	12	249	1,15
		45	1550	93							257	
		48	1880	94							252	
615 870 62	62	48	1900	97	110	23	30,5	3,75	10x M6	12	293	1,30
		50	1940	105							290	
		52	2300	110							265	
615 870 68	68	50	2300	111	115	23	30,5	3,75	10x M6	12	247	1,32
		55	2600	115							265	
		60	2600	115							245	
615 870 75	75	55	3020	123	138	25	32,5	3,75	7x M8	30	284	1,70
		60	3070	124							262	
		65	3170	132							270	
615 870 80	80	60	3910	141	145	25	32,5	3,75	7x M8	30	253	1,90
		65	3940	153							259	
		70	4600	160							259	
615 870 85	85	65	4650	165	155	30	39	4,5	10x M8	30	276	3,50
		70	4660	170							279	
		75	6000	191							279	

[1] Shaft-Ø of the customer's machine (for example). [2] Transmittable values with shaft-Ø d_w of the customer's machine.

More sizes up to inner-Ø d=300mm, for shaft diameter 240mm and 292,000Nm are available.
Price and delivery time on request.

Mounting

Clean and slightly lubricate the contact surfaces of shaft and hub. Place clamping set on the hub. Fasten the tensioning screws evenly, step by step until the fastening torque T_A of the table is reached. To reach the value stated in the table several fastening steps are required. The figures for T and F_{ax} stated in the table were calculated for an assembly with oil.

Attention: Do not use any lubricant containing molybdenum sulphide.

Demounting: Evenly unscrew all tensioning screws one by one. Do not fully remove the screws from the thread. The clamping element usually disengages on its own.

Tolerances, Surface Roughness

One good turn is sufficient.

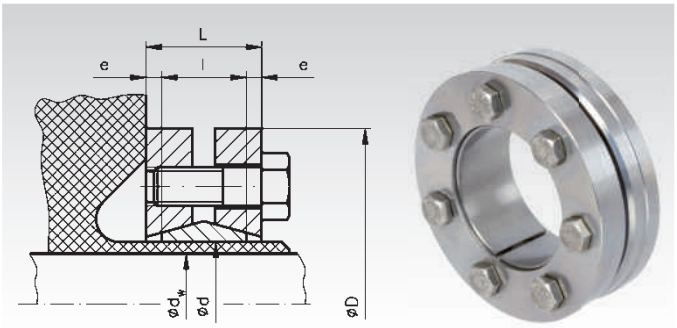
Highest permissible surface roughness: R_t=12.5µm.

Tolerances for d_w/d: H8/h8.

Shrink Disks ST-R, Stainless

Material: Stainless steel 1.4057.

- For medium torques.
- No axial shaft-hub movement.
- Quick mounting.
- Quick demounting.



Ordering Details: e.g.: Product No. 615 998 14, Shrink Disk ST-R, Inner-Ø 14 mm

Product No.	Inner-Ø d mm	Shaft-Ø[1] d_w mm	Torque[2] T Nm	D mm	l mm	L mm	e mm	Screws DIN 931 No. x Size	Fastening Torque T_A Nm	Contact-pressure P_N N/mm²	Weight kg
615 998 14	14	10 11 12	22 28 39	37	9	12	1,5	3x M4	2	229	0,10
615 998 16	16	12 13 14	50 66 79	41	12	15	1,5	4x M5	4	250	0,12
615 998 24	24	19 20 21	141 185 220	50	15	21	3	6x M5	4	268	0,21
615 998 30	30	24 25 26	212 240 265	60	18	23	2,5	7x M5	4	180	0,31
615 998 36	36	26 28 30	325 405 485	72	19	25	3,0	5x M6	7	215	0,53
615 998 44	44	32 35 36	340 480 525	80	22	28	3,0	7x M6	7	220	0,62
615 998 50	50	38 40 42	635 740 850	90	22	29,5	3,75	8x M6	7	225	0,81
615 998 55	55	42 45 48	595 745 900	100	23	30,5	3,75	8x M6	7	174	1,10
615 998 62	62	48 50 52	1150 1275 1450	110	23	32	4,5	12x M6	7	230	1,35
615 998 68	68	50 55 60	905 1060 1450	115	23	33	5,0	10x M6	7	175	1,45

[1] Shaft-Ø of the customer´s machine (for example). [2] Transmittable values with shaft-Ø d_w of the customer´s machine.

More sizes up to inner-Ø d=125mm, for shaft diameter 95mm and 8,555Nm are available.
Price and delivery time on request.

Mounting

Clean and slightly lubricate the contact surfaces of shaft and hub. Place clamping set on the hub. Fasten the tensioning screws evenly, step by step until the fastening torque T_A of the table is reached. To reach the value stated in the table several fastening steps are required. The figures for T and F_{ax} stated in the table were calculated for an assembly with oil.

Attention: Do not use any lubricant containing molybdenum sulphide.

Demounting: Evenly unscrew all tensioning screws one by one. Do not fully remove the screws from the thread. The clamping element usually disengages on its own.

Tolerances, Surface Roughness

One good turn is sufficient.
Highest permissible surface roughness: R_t=16µm.

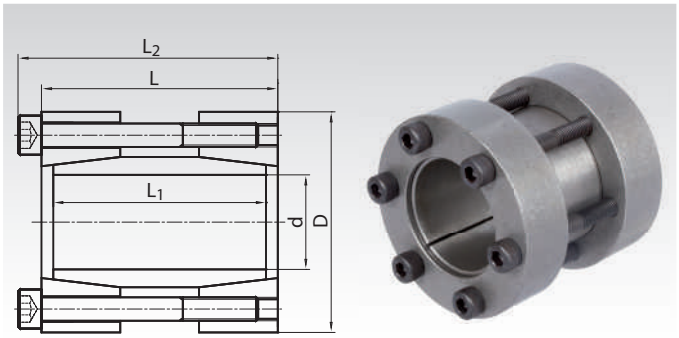
Tolerances for d_w/d:

For d from 14 - 30mm: H6/j6.
For d from 35 - 50 mm: H6/h6.
For d from 55 - 68 mm: H6/g6.

Locking Assemblies (Rigid Couplings) ST-K

Material: Steel.

- For connecting two shafts, as a rigid coupling.
- For medium torques.
- Easy mounting.
- Self-releasing at dismounting.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 880 15, Locking Assembly ST-K, 15 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 880 15	15	45	50	44	56	125	16	126	4 x M6	17	0,40
615 880 16	16	45	50	44	56	131	17	117	4 x M6	17	0,40
615 880 17	17	50	50	44	56	210	23	118	4 x M6	17	0,50
615 880 18	18	50	50	44	56	220	24	109	4 x M6	17	0,46
615 880 19	19	50	50	44	56	230	24	96	4 x M6	17	0,50
615 880 20	20	50	50	44	56	240	25	93	4 x M6	17	0,50
615 880 22	22	55	60	54	66	270	25	107	4 x M6	17	0,60
615 880 24	24	55	60	54	66	290	25	96	4 x M6	17	0,60
615 880 25	25	55	60	54	66	470	35	95	6 x M6	17	0,66
615 880 28	28	60	60	54	66	490	35	84	6 x M6	17	0,70
615 880 30	30	60	60	54	66	540	37	79	6 x M6	17	0,73
615 880 32	32	75	60	54	68	730	43	77	6 x M8	41	1,30
615 880 35	35	75	75	69	83	810	45	82	4 x M8	41	1,34
615 880 38	38	75	75	69	83	860	46	75	4 x M8	41	1,30
615 880 40	40	75	75	69	83	880	46	64	4 x M8	41	1,40
615 880 42	42	90	75	69	83	1430	66	65	4 x M8	41	2,0
615 880 45	45	90	85	79	93	1490	66	73	6 x M8	41	2,5
615 880 48	48	90	85	79	93	1640	68	70	6 x M8	41	2,4
615 880 50	50	90	85	79	93	1670	68	64	6 x M8	41	2,0
615 880 55	55	105	85	79	93	2520	90	63	8 x M8	41	3,3
615 880 60	60	105	85	79	93	2760	92	59	8 x M8	41	2,6
615 880 65	65	105	85	79	93	2930	92	53	8 x M8	41	3,0
615 880 70	70	125	100	94	110	3800	106	50	6 x M10	83	5,4
615 880 75	75	125	100	94	110	3850	107	47	6 x M10	83	5,0
615 880 80	80	125	100	94	110	4030	109	65	8 x M10	83	4,7
615 880 85	85	130	100	94	110	4260	121	64	8 x M10	83	5,5
615 880 90	90	135	100	94	110	4820	122	72	8 x M10	83	7,0
615 880 95	95	140	120	114	130	5170	124	67	8 x M10	83	7,5
615 881 00	100	150	120	114	132	5590	127	66	8 x M12	142	7,8

More sizes up to d=110mm for 7,400Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
T_A = Fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molibdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

Demounting

Due to the cone angle, the locking assembly is usually released once all screws have been fully unfastened.

Taper Bushes

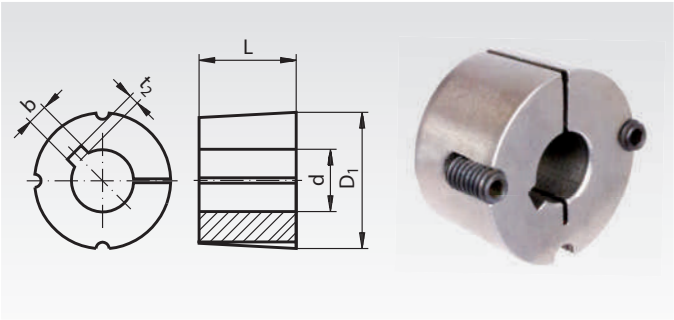
Material: GG20.
Bores ISO E8, feather keyways in accordance with DIN 6885/1.
Screws included in delivery.

Shaft tolerance +0.05/-0.125 mm.
Can be used with or without parallel key, depending on the required torque.

Other bush sizes and bores available at short notice (some in stock).

Assembly instructions see page 824.

Ordering Details: e.g.: Product No. 622 501 10, Taper Bush 1008, 10 mm Bore



Product No.	Taper bush No.	Bore d mm	Keyway b mm	t_2 mm	L mm	D_1 mm	Weight g
622 501 10	1008	10	3	1,4	22,3	35	160
622 501 11	1008	11	4	1,8	22,3	35	140
622 501 12	1008	12	4	1,8	22,3	35	120
622 501 14	1008	14	5	2,3	22,3	35	118
622 501 15	1008	15	5	2,3	22,3	35	116
622 501 16	1008	16	5	2,3	22,3	35	112
622 501 18	1008	18	6	2,8	22,3	35	100
622 501 19	1008	19	6	2,8	22,3	35	98
622 501 20	1008	20	6	2,8	22,3	35	94
622 501 22	1008	22	6	2,8	22,3	35	80
622 501 24	1008	24	8[1)]	1,3[1)]	22,3	35	70
622 501 25	1008	25	8[1)]	1,3[1)]	22,3	35	68
622 502 10	1108	10	3	1,4	22,3	38	180
622 502 11	1108	11	4	1,8	22,3	38	165
622 502 12	1108	12	4	1,8	22,3	38	154
622 502 14	1108	14	5	2,3	22,3	38	148
622 502 16	1108	16	5	2,3	22,3	38	140
622 502 18	1108	18	6	2,8	22,3	38	132
622 502 19	1108	19	6	2,8	22,3	38	126
622 502 20	1108	20	6	2,8	22,3	38	122
622 502 22	1108	22	6	2,8	22,3	38	112
622 502 24	1108	24	8	3,3	22,3	38	96
622 502 25	1108	25	8	3,3	22,3	38	92
622 502 28	1108	28	8[1)]	1,3[1)]	22,3	38	88
622 503 10	1210	10	3	1,4	25,4	47,5	282
622 503 11	1210	11	4	1,8	25,4	47,5	280
622 503 12	1210	12	4	1,8	25,4	47,5	278
622 503 14	1210	14	5	2,3	25,4	47,5	274
622 503 16	1210	16	5	2,3	25,4	47,5	262
622 503 18	1210	18	6	2,8	25,4	47,5	250
622 503 19	1210	19	6	2,8	25,4	47,5	244
622 503 20	1210	20	6	2,8	25,4	47,5	240
622 503 22	1210	22	6	2,8	25,4	47,5	224
622 503 24	1210	24	8	3,3	25,4	47,5	208
622 503 25	1210	25	8	3,3	25,4	47,5	208
622 503 28	1210	28	8	3,3	25,4	47,5	184
622 503 30	1210	30	8	3,3	25,4	47,5	168
622 503 32	1210	32	10	3,3	25,4	47,5	160
622 513 14	1215	14	5	2,3	38,1	47,5	380
622 513 16	1215	16	5	2,3	38,1	47,5	370
622 513 18	1215	18	6	2,8	38,1	47,5	350
622 513 19	1215	19	6	2,8	38,1	47,5	340
622 513 20	1215	20	6	2,8	38,1	47,5	335
622 513 22	1215	22	6	2,8	38,1	47,5	320
622 513 24	1215	24	8	3,3	38,1	47,5	290
622 513 25	1215	25	8	3,3	38,1	47,5	285
622 513 28	1215	28	8	3,3	38,1	47,5	260
622 513 30	1215	30	8	3,3	38,1	47,5	230
622 513 32	1215	32	10	3,3	38,1	47,5	200

Product No.	Taper bush No.	Bore d mm	Keyway b mm	t_2 mm	L mm	D_1 mm	Weight g
622 504 12	1610	12	4	1,8	25,4	57	416
622 504 14	1610	14	5	2,3	25,4	57	412
622 504 15	1610	15	5	2,3	25,4	57	408
622 504 16	1610	16	5	2,3	25,4	57	402
622 504 18	1610	18	6	2,8	25,4	57	390
622 504 19	1610	19	6	2,8	25,4	57	380
622 504 20	1610	20	6	2,8	25,4	57	373
622 504 22	1610	22	6	2,8	25,4	57	366
622 504 24	1610	24	8	3,3	25,4	57	356
622 504 25	1610	25	8	3,3	25,4	57	348
622 504 28	1610	28	8	3,3	25,4	57	324
622 504 30	1610	30	8	3,3	25,4	57	304
622 504 32	1610	32	10	3,3	25,4	57	280
622 504 35	1610	35	10	3,3	25,4	57	264
622 504 38	1610	38	10	3,3	25,4	57	240
622 504 40	1610	40	12	3,3	25,4	57	210
622 504 42	1610	42	12	3,3	25,4	57	200
622 508 18	1615	18	6	2,8	38,1	57	561
622 508 20	1615	20	6	2,8	38,1	57	552
622 508 22	1615	22	6	2,8	38,1	57	540
622 508 24	1615	24	8	3,3	38,1	57	520
622 508 25	1615	25	8	3,3	38,1	57	510
622 508 30	1615	30	8	3,3	38,1	57	446
622 508 32	1615	32	10	3,3	38,1	57	414
622 508 35	1615	35	10	3,3	38,1	57	380
622 508 38	1615	38	10	3,3	38,1	57	346
622 508 40	1615	40	12	3,3	38,1	57	340
622 508 42	1615	42	12[2)]	2,2[2)]	38,1	57	260
622 505 12	2012	12	4	1,8	31,8	70	810
622 505 14	2012	14	5	2,3	31,8	70	800
622 505 15	2012	15	5	2,3	31,8	70	785
622 505 16	2012	16	5	2,3	31,8	70	770
622 505 18	2012	18	6	2,8	31,8	70	762
622 505 19	2012	19	6	2,8	31,8	70	756
622 505 20	2012	20	6	2,8	31,8	70	750
622 505 22	2012	22	6	2,8	31,8	70	736
622 505 24	2012	24	8	3,3	31,8	70	724
622 505 25	2012	25	8	3,3	31,8	70	714
622 505 28	2012	28	8	3,3	31,8	70	684
622 505 30	2012	30	8	3,3	31,8	70	658
622 505 32	2012	32	10	3,3	31,8	70	630
622 505 35	2012	35	10	3,3	31,8	70	604
622 505 38	2012	38	10	3,3	31,8	70	566
622 505 40	2012	40	12	3,3	31,8	70	538
622 505 42	2012	42	12	3,3	31,8	70	510
622 505 45	2012	45	14	3,8	31,8	70	460
622 505 48	2012	48	14	3,8	31,8	70	404
622 505 50	2012	50	14	3,8	31,8	70	372

[1)] With flat keyway 1.3mm.
[2)] With flat keyway 2.2mm.

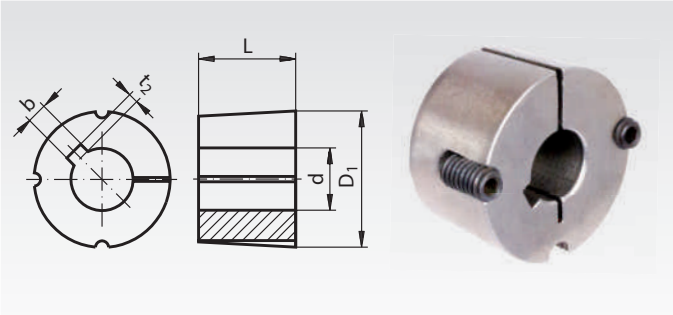
Taper Bushes

Material: GG20.
Bores ISO E8, feather keyways in accordance with DIN 6885/1.
Screws included in delivery.

Shaft tolerance +0.05/-0.125 mm.
Can be used with or without parallel key, depending on the required torque.

Other bush sizes and bores available at short notice (some in stock).

Ordering Details: e.g.: Product No. 622 506 16, Taper Bush 2517, 16 mm Bore



Product No.	Taper bush No.	Bore d mm	Keyway b mm	t_2 mm	L mm	D_1 mm	Weight g
622 506 16	2517	16	5	2,3	44,5	85,5	1800
622 506 18	2517	18	6	2,8	44,5	85,5	1700
622 506 19	2517	19	6	2,8	44,5	85,5	1620
622 506 20	2517	20	6	2,8	44,5	85,5	1602
622 506 22	2517	22	6	2,8	44,5	85,5	1568
622 506 24	2517	24	8	3,3	44,5	85,5	1566
622 506 25	2517	25	8	3,3	44,5	85,5	1556
622 506 28	2517	28	8	3,3	44,5	85,5	1520
622 506 30	2517	30	8	3,3	44,5	85,5	1488
622 506 32	2517	32	10	3,3	44,5	85,5	1450
622 506 35	2517	35	10	3,3	44,5	85,5	1396
622 506 38	2517	38	10	3,3	44,5	85,5	1346
622 506 40	2517	40	12	3,3	44,5	85,5	1316
622 506 42	2517	42	12	3,3	44,5	85,5	1274
622 506 45	2517	45	14	3,8	44,5	85,5	1204
622 506 48	2517	48	14	3,8	44,5	85,5	1126
622 506 50	2517	50	14	3,8	44,5	85,5	1080
622 506 55	2517	55	16	4,3	44,5	85,5	958
622 506 60	2517	60	18	4,4	44,5	85,5	810
622 506 65	2517	65	18[1)]	3,4[1)]	44,5	85,5	650
622 507 25	3020	25	8	3,3	50,8	108	2910
622 507 28	3020	28	8	3,3	50,8	108	2790
622 507 30	3020	30	8	3,3	50,8	108	2840
622 507 32	3020	32	10	3,3	50,8	108	2800
622 507 35	3020	35	10	3,3	50,8	108	2745
622 507 38	3020	38	10	3,3	50,8	108	2700
622 507 40	3020	40	12	3,3	50,8	108	2635
622 507 42	3020	42	12	3,3	50,8	108	2594
622 507 45	3020	45	14	3,8	50,8	108	2515
622 507 48	3020	48	14	3,8	50,8	108	2425
622 507 50	3020	50	14	3,8	50,8	108	2370
622 507 55	3020	55	16	4,3	50,8	108	2234
622 507 60	3020	60	18	4,4	50,8	108	2000
622 507 65	3020	65	18	4,4	50,8	108	1888
622 507 70	3020	70	20	4,9	50,8	108	1700
622 507 75	3020	75	20	4,9	50,8	108	1485

Product No.	Taper bush No.	Bore d mm	Keyway b mm	t_2 mm	L mm	D_1 mm	Weight g
622 511 40	3030	40	12	3,3	76,2	108	3820
622 511 45	3030	45	14	3,8	76,2	108	3550
622 511 50	3030	50	14	3,8	76,2	108	3420
622 511 60	3030	60	18	4,4	76,2	108	2950
622 511 65	3030	65	18	4,4	76,2	108	2680
622 511 70	3030	70	20	4,9	76,2	108	2060
622 511 75	3030	75	20	4,9	76,2	108	1640
622 509 35	3525	35	10	3,3	64,9	127	4910
622 509 38	3525	38	10	3,3	64,9	127	4850
622 509 40	3525	40	12	3,3	64,9	127	4800
622 509 50	3525	50	14	3,8	64,9	127	4440
622 509 60	3525	60	18	4,4	64,9	127	4050
622 509 75	3525	75	20	4,9	64,9	127	3370
622 509 80	3525	80	22	5,4	64,9	127	3050
622 510 50	3535	50	14	3,8	88,9	127	6050
622 510 55	3535	55	16	4,3	88,9	127	5810
622 510 60	3535	60	18	4,4	88,9	127	5500
622 510 65	3535	65	18	4,4	88,9	127	5200
622 510 70	3535	70	20	4,9	88,9	127	4880
622 510 75	3535	75	20	4,9	88,9	127	4460
622 510 80	3535	80	22	5,4	88,9	127	4080
622 510 90	3535	90	25	5,4	88,9	127	3210

Other bush sizes on request.

Assembly Instructions Page 824 and at www.maedler.de

[1)] With flat keyway 3.4mm.

Spare Screws for Taper Bushes

Material: Steel.

Supply: One screw (order quantity as needed).

Taper bushes have two or (from size 3030) three screws depending on size.

Ordering Details: e.g.: Product No. 622 501 99, Spare Screw , Taper Bush 1008 and 1108

Product No.	to match Taper bush	Size inch	Screw type	Tightening Torque Nm	Weight g
622 501 99	1008 and 1108	1/4''	Set screw with internal hexagon	5.6	1.9
622 503 99	1210 to 1615	3/8''	Set screw with internal hexagon	20	5.2
622 505 99	2012 and 2017	7/16''	Set screw with internal hexagon	30	11
622 506 99	2517 and 2525	1/2''	Set screw with internal hexagon	50	16.4
622 507 99	3020 and 3030	5/8''	Set screw with internal hexagon	90	33.2
622 510 99	3525 and 3535	1/2''	Screw with internal hexagon	90	49.7

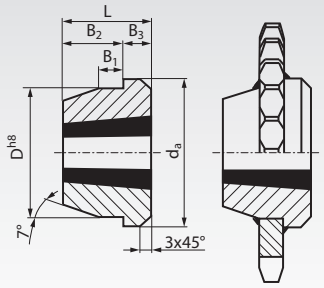
Welding Hubs for Taper Bushes

Material: Steel (St52 or comparable), good weldable.

Hub for fixing a chain plate wheel or similar parts with a low priced taper bush onto a shaft.
Taper bush and chain plate wheel have to be ordered separately.
Recommended bore tolerance: H8.

Before welding, a taper bush should be mounted with a piece of shaft into the welding hub to avoid deforming by heat.

Other sizes for taper bushes up to type 5050 are available at short delivery time.



Ordering Details: e.g.: Product No. 140 901 01, Welding Hub for Taper Bush 1210

Product No.	For Taper Bush Type	d_a mm	D^{h8} mm	B_1 mm	B_2 mm	B_3 mm	L mm	Weight kg
140 901 01	1210	73	60	10	16	9	25	0,31
140 901 02	1215	76	60	11	22	16	38	0,50
140 901 03	1610	83	70	10	16	9	25	0,37
140 901 04	1615	83	70	11	22	16	38	0,60
140 901 05	2012	96	90	12	22	10	32	0,72
140 901 06	2517	127	110	13	26	19	45	1,8
140 901 07	3020	152	130	18	27	24	51	2,6
140 901 08	3030	152	130	19	51	25	76	3,6
140 901 09	3525	184	155	25	40	25	65	7,3
140 901 10	3535	184	155	25	57	32	89	6,4

Taper Bushes page 360

www.maedler.de

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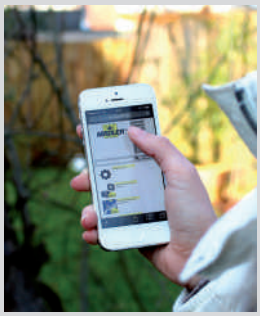

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Couplings Overview

Rigid, One-Piece

One-piece clamp coupling
Steel burnished

Page 368

Shaft diameter up to 50 mm.
Torque up to 2250 Nm.

One-piece clamp coupling
Stainless Steel

Page 368

Shaft diameter up to 50 mm.
Torque up to 2250 Nm.

Rigid Coupling TR
Steel and
Stainless Steel

Page 369

Shaft diameter up to 50 mm.
Torque up to 490 Nm.

Two-Piece clamp Couplings
Grey Cast Iron
DIN 115

Page 369

Shaft diameter up to 100 mm.
Torque up to 5400 Nm.

Rigid Two-Piece

Two-Piece clamp Couplings
Steel burnished

Page 368

Shaft diameter up to 50 mm.
Torque up to 2250 Nm.

Two-Piece clamp Couplings
Stainless Steel

Page 368

Shaft diameter up to 50 mm.
Torque up to 2250 Nm.

Rigid Coupling
ST-K

Page 370

Shaft diameter up to 100 mm.
Torque up to 5590 Nm.

Torsionally Stiff, Angular Flexibility

Torsionally-Stiff Couplings HU
Set-Screw Style

Page 371

Shaft diameter up to 12 mm.
Torque up to 3.5 Nm.

Torsionally-Stiff Couplings HB
Clamp Style

Page 371

Shaft diameter up to 16 mm.
Torque up to 3.5 Nm.

Curved-Tooth Gear Coupling
BW
Two-Part
Plastic

Page 380

Shaft diameter up to 24 mm.
Torque up to 24 Nm.

Curved-Tooth Gear Coupling BOZ
Three-Part
Plastic

Page 381

Shaft diameter up to 24 mm.
Torque up to 24 Nm.

Curved-Tooth Gear Coupling
BOS II
Polyamide/
Sintered Metal

Page 382

Shaft diameter up to 24 mm.
Torque up to 40 Nm.

Torsionally Stiff, Transversal Flexibility

Torsionally-Stiff Couplings
HZ+HZD
Set-Screw Style

Page 372

Shaft diameter up to 30 mm.
Torque up to 44 Nm.

Torsionally-Stiff Couplings
HF + HFD
Clamp Style

Page 372

Shaft diameter up to 30 mm.
Torque up to 44 Nm.

Couplings Overview

Torsionally Stiff, Angular Flexibility, Transversal Flexibility

Self-Aligning Couplings KA Aluminium, Stainless Steel, Plastic

Page 375

Shaft diameter up to 16 mm.
Torque up to 10 Nm.

Self-Aligning Couplings LA Aluminium, Stainless Steel, Plastic

Page 375

Shaft diameter up to 30 mm.
Torque up to 102 Nm.

Torsionally Stiff, Angular, Transv. and Longitudinal Flexibility

Metal-Bellow Couplings MBK (Short) and MBL (Long) Clamp Style

Page 377

Shaft diameter up to 35 mm.
Torque up to 60 Nm.

Membrane Couplings MEM

Page 379

Shaft diameter up to 28mm.
Torque up to 60 Nm.

Torsionally Elastic, Angular Elastic, Transversal Flexible, Longitudinally Flexible

Flexible Couplings EK One Layer

Page 376

Shaft diameter up to 14 mm.
Torque up to 1.5 Nm.

Flexible Couplings EL Three Layers

Page 376

Shaft diameter up to 64 mm.
Torque up to 500 Nm.

Chain Couplings with Casing

Page 384

Shaft diameter up to 60 mm.
Torque up to 770 Nm.

Chain Couplings

Page 384

Shaft diameter up to 70 mm.
Torque up to 1480 Nm.

Elastic Couplings MU Magnesium

Page 385

Shaft diameter up to 73 mm.
Torque up to 2500 Nm.

Highly-Elastic Couplings PU

Page 385

Shaft diameter up to 16 mm.
Torque up to 18 Nm.

Elastic Couplings ME Plastic

Page 386

Shaft diameter up to 32 mm.
Torque up to 40 Nm.

Elastic Couplings RN, Aluminium

Page 386

Shaft diameter up to 48 mm.
Torque up to 310 Nm.

Elastic Couplings RNG, Grey Cast Iron

Page 387

Shaft diameter up to 115 mm.
Torque up to 3300 Nm.

Elastic Couplings RNI, Stainless Steel

Page 387

Shaft diameter up to 48 mm.
Torque up to 310 Nm.

Elastic Couplings RNT for Taper-Bushes

Page 388

Shaft diameter up to 75 mm.
Torque up to 3600 Nm.

Elastic Couplings RNK, backlash-free, with Clamp Hub

Page 389

Shaft diameter up to 48 mm.
Torque up to 495 Nm.

Elastic Couplings RNH, backlash-free, with Half Shell Clamp

Page 390

Shaft diameter up to 48 mm.
Torque up to 452 Nm.

Spiders for Elastic Couplings, 92° Shore A

Page 391

Torque up to 3300 Nm.

Spiders for Elastic Couplings, 98° Shore A

Page 391

Torque up to 4950 Nm.

Spiders for Elastic Couplings, 64° Shore D

Page 391

Torque up to 6185 Nm.

Elastic Couplings DX Grey Cast Iron

Page 393

Shaft diameter up to 100 mm.
Torque up to 3000 Nm.

Spiders for Elastic Couplings DX, 92° Shore A

Page 393

Torque up to 3000 Nm.

Couplings Overview

Friction Clutches

Friction Clutches Type B Axial Arrangement

Page 394

Shaft diameter up to 8 mm.
Torque up to 1.3 Nm.

Friction Clutches Type C Transversal Flexibility

Page 394

Shaft diameter up to 8 mm.
Torque up to 1.3 Nm.

Sliding Hubs with Torsionally-Flexible Coupling

Page 395

Shaft diameter up to 35 mm.
Torque up to 140 Nm.

Multi-Disk Friction Clutches PD

Page 396

Shaft diameter up to 70 mm.
Torque up to 320 Nm.

Safety Clutches SI

Page 397

Shaft diameter up to 50 mm.
Torque up to 180 Nm.

Limit Switch for Safety Clutches

Page 397

Voltage 220 - 250 V AC.
Strength of current up to 10 A.

Safety Coupling CM for Very Exact Setting

Page 398

Shaft diameter up to 55 mm.
Torque up to 800 Nm.

Sliding Hubs

Slip hubs Type A Concentric Design

Page 394

Shaft diameter up to 8 mm.
Torque up to 1.3 Nm.

Sliding Hubs FS Simple Version

Page 399

Shaft diameter up to 65 mm.
Torque up to 1200 Nm.

Sliding Hubs FA Premium-Quality Version

Page 400

Shaft diameter up to 80 mm.
Torque up to 1200 Nm.

Sliding Hubs FA Premium-Quality Version with Clamp Hub

Page 401

Shaft diameter up to 40 mm.
Torque up to 280 Nm.

Sliding Hubs ROBA® Premium-Quality Version

Page 402

Other sizes and designs on request.

Connecting Shafts Page 766

Selection Tool
on the Internet at ***www.maedler.de***
in the section ***MÄDLER®-Tools***

Notes Regarding Couplings

General

Couplings serve to connect two shafts in order to transmit the driving power (transmission of speed and torque). As different applications lead to most diverse requirements for couplings, there is a large number of different types of couplings with sometimes contradictory characteristics available on the market. If possible, the shafts should be supported right besides the couplings in order to avoid unnecessary vibration. This is particularly important for elastic couplings.

Torque Values

Depending on the type of coupling, the torques stated refer to either the maximum value or the nominal torque. The maximum permissible torque must never be exceeded (risk of fracture). The nominal torque is the value valid for the permissible permanent load (e.g. for elastic couplings). This value should be exceeded only as exception and for short times, and only up to the maximum permissible torque. Depending on the type of drive unit used and the type of shock load, the nominal torque of the drive unit has to be multiplied with the respective operating factor taken from the table below:

Operating Torque = Driving Torque x Operating Factor

The operating torque of the drive unit must not exceed the nominal torque of the coupling.

The driving torque can be derived from the driving power with the following formula:

$$T_{[Nm]} = 9550 \cdot \frac{P\ [kW]}{n\ [min^{-1}]} \cdot S$$

Operating Factors

Type of Shock Load	Type of Drive Unit: Electric Engines, Steam Turbines, Shaftings	4 - 6 Cylinder Combustion Engines	1 - 3 Cylinder Combustion Engines
Weak shock load **Low starting torque, uniform operation** small light generators, small centrifugal pumps, small blowers, light machine tools, light transmissions	1.0	1.25	1.75
Medium shock load **Medium starting torque, slight torque fluctuations** larger conveying machinery, large blowers, centrifugal pumps and generators, large machine tools and wood working machines, rapid presses, flower mills and food grinders, shears, punches, grinding machines, washing machines, transmissions	1.25	1.5	2.0
Strong shock load **High starting torque, strong shocks, alternating sense of rotation.** centrifuges, gang saws, paper calender, roller tables, wet presses, ball and rod mills, heavy rolling mills for metal, rubber rolling mill, reciprocating machines without flywheel, cement mills, stone breakers	1.5	2.0	2.5

Rigid Couplings

These couplings do not compensate for misalignment of the shaft neither in axial nor in radial direction. They should therefore only be used with perfectly aligned shafts. Shocks and vibration are transferred without any damping.

Torsionally-Stiff Couplings

These couplings transmit the rotational movement synchronously with hardly any damping. Depending on the type of coupling more or less angular and/or axial displacement can be compensated.

Elastic Couplings

With these couplings an elastic intermediate ring usually dampens the shocks of the driving unit. In types without this ring, the coupling body is elastic. Due to the small endurance strength of the shock-dampening components, the nominal torque of the coupling is much lower than the maximum torque. The elastic rings are available as spare parts.

For couplings with elastics inserts, following factors have to be considered, additional to the standard operating factors above:

Temperature-factor

Temperatur	–30 °C to +30 °C	to +40 °C	to +60 °C	to +80 °C
Factor	1,0	1,2	1,4	1,8

Starting-factor

Starts per hour	100	200	400	800
Factor	1,0	1,2	1,4	1,6

Friction Clutches and Sliding Hubs

These clutches or hubs are used if the torque must only be transmitted up to a certain, adjustable value. If the set maximum value is exceeded the coupling device starts slipping. If the torque falls below the limit again, the slipping stops. Thus for safety reasons a separate stop mechanism for the drive unit might be required.

Friction clutches usually serve to connect two shafts. Sliding hubs usually serve to mount a drive wheel (chain wheel, drive pulley, spur gear, friction wheel, or similar) on a shaft.

Some types can be used for both applications as, e.g., either a drive wheel or a shaft connection can be flange mounted. Combinations of elastic coupling and friction clutch can also be supplied.

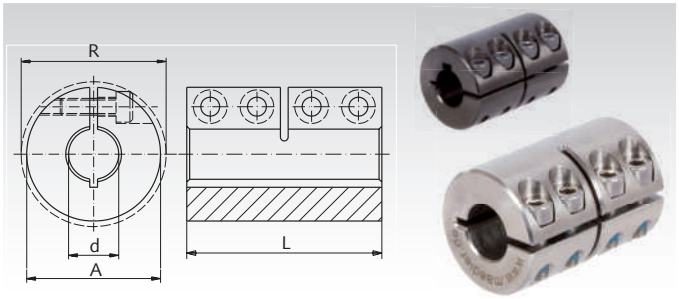
One-Piece Clamp Couplings MAS

Material: Steel C45 burnished,
Stainless steel 1.4301.

STAINLESS

Temperature range from -40°C to +175°C.
Maximum torque 4,000 min^{-1}.
The screws ISO 4762 are covered with a layer of nylon. Thus the bolts do not loosen with vibrations.

Bore tolerance: +0.051 mm.



Ordering Details: e.g.: Product No. 600 603 00, Clamp Coupling MAS, 3 mm Bore, without keyway

Product No. without keyway Steel	Product No. without keyway Stainless Steel	Product No. with keyway* Steel	Product No. with keyway* Stainless Steel	Torque T** Steel Nm	Torque T** Stainless Nm	d mm	A mm	R mm	L mm	Screws ISO 4762 12.9 / A2-70	Fastening Torque T_A Steel Nm	Fastening Torque T_A Stainless Nm	Weight g
600 603 00	600 996 03	-	-	6,6	3,7	3	14	18,0	30	M3 x 8	2,1	1,1	35
600 604 00	600 996 04	-	-	8,0	5,2	4	16	19,3	30	M3 x 8	2,1	1,1	45
600 605 00	600 996 05	-	-	10,6	6,0	5	18	21,2	30	M3 x 8	2,1	1,1	47
600 606 00	600 996 06	600 706 00	600 997 06	34	10	6	18	21,2	30	M3 x 8	2,1	1,1	47
600 608 00	600 996 08	600 708 00	600 997 08	50	16	8	24	26,8	35	M3 x 10	2,1	1,1	102
600 610 00	600 996 10	600 710 00	600 997 10	85	25	10	29	32,7	45	M4 x 12	4,6	2,5	185
600 612 00	600 996 12	600 712 00	600 997 12	105	32	12	29	32,7	45	M4 x 12	4,6	2,5	180
600 614 00	600 996 14	600 714 00	600 997 14	160	40	14	34	39,1	50	M5 x 16	9,5	5,4	272
600 615 00	600 996 15	600 715 00	600 997 15	180	50	15	34	39,1	50	M5 x 16	9,5	5,4	266
600 616 00	600 996 16	600 716 00	600 997 16	200	60	16	34	39,1	50	M5 x 16	9,5	5,4	261
600 619 00	600 996 19	600 719 00	600 997 19	300	90	19	42	48,2	65	M6 x 16	16	9,6	520
600 620 00	600 996 20	600 720 00	600 997 20	350	100	20	42	48,2	65	M6 x 16	16	9,6	518
600 625 00	600 996 25	600 725 00	600 997 25	400	110	25	45	50,8	75	M6 x 16	16	9,6	623
600 630 00	600 996 30	600 730 00	600 997 30	475	150	30	53	58,1	83	M6 x 18	16	9,6	920
600 635 00	600 996 35	600 735 00	600 997 35	1100	330	35	67	74,1	95	M8 x 25	39	23	1880
600 640 00	600 996 40	600 740 00	600 997 40	1325	400	40	77	83,4	108	M8 x 25	39	23	2710
600 650 00	600 996 50	600 750 00	600 997 50	2250	688	50	85	93,2	124	M10 x 25	77	46	3520

* Feather Key Groove DIN 6885/1, Tolerance P9.
** For version without keyway. Maximum values which can only be achieved with perfect mounting and dimensional accuracy of the shaft.

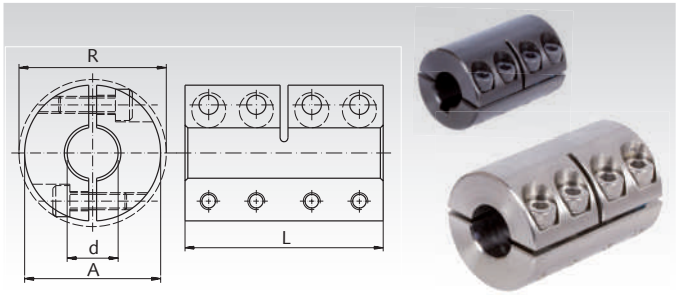
Two-Piece Clamp Couplings MAT

Material: Steel C45 burnished,
Stainless steel 1.4301.

STAINLESS

Temperature range from -40°C to +175°C.
Maximum torque 4,000 min^{-1}.
The screws ISO 4762 are covered with a layer of nylon. Thus the bolts do not loosen with vibrations.

Bore tolerance:+ 0.051 mm.



Ordering Details: e.g.: Product No. 600 803 00, Clamp Coupling MAT, 3 mm Bore, without keyway

Product No. without keyway Steel	Product No. without keyway Stainless Steel	Product No. with keyway* Steel	Product No. with keyway* Stainless Steel	Torque T** Steel Nm	Torque T** Stainless Nm	d mm	A mm	R mm	L mm	Screws ISO 4762 12.9 / A2-70	Fastening Torque T_A Steel Nm	Fastening Torque T_A Stainless Nm	Weight g
600 803 00	600 998 03	-	-	9	5,0	3	14	18,0	30	M3 x 8	2,1	1,1	35
600 804 00	600 998 04	-	-	12	6,7	4	16	19,3	30	M3 x 8	2,1	1,1	45
600 805 00	600 998 05	-	-	15	8,4	5	18	21,2	30	M3 x 8	2,1	1,1	47
600 806 00	600 998 06	600 906 00	600 999 06	34	10	6	18	21,2	30	M3 x 8	2,1	1,1	47
600 808 00	600 998 08	600 908 00	600 999 08	50	16	8	24	26,8	35	M3 x 10	2,1	1,1	102
600 810 00	600 998 10	600 910 00	600 999 10	85	28	10	29	32,7	45	M4 x 12	4,6	2,5	185
600 812 00	600 998 12	600 912 00	600 999 12	105	34	12	29	32,7	45	M4 x 12	4,6	2,5	180
600 814 00	600 998 14	600 914 00	600 999 14	160	67	14	34	39,1	50	M5 x 16	9,5	5,4	272
600 815 00	600 998 15	600 915 00	600 999 15	180	72	15	34	39,1	50	M5 x 16	9,5	5,4	266
600 816 00	600 998 16	600 916 00	600 999 16	200	77	16	34	39,1	50	M5 x 16	9,5	5,4	261
600 819 00	600 998 19	600 919 00	600 999 19	300	130	19	42	48,2	65	M6 x 16	16	9,6	520
600 820 00	600 998 20	600 920 00	600 999 20	350	137	20	42	48,2	65	M6 x 16	16	9,6	518
600 825 00	600 998 25	600 925 00	600 999 25	400	171	25	45	50,8	75	M6 x 16	16	9,6	623
600 830 00	600 998 30	600 930 00	600 999 30	475	206	30	53	58,1	83	M6 x 18	16	9,6	920
600 835 00	600 998 35	600 935 00	600 999 35	1100	438	35	67	74,1	95	M8 x 25	39	23	1880
600 840 00	600 998 40	600 940 00	600 999 40	1325	449	40	77	83,4	108	M8 x 25	39	23	2710
600 850 00	600 998 50	600 950 00	600 999 50	2250	1006	50	85	93,2	124	M10 x 25	77	46	3520

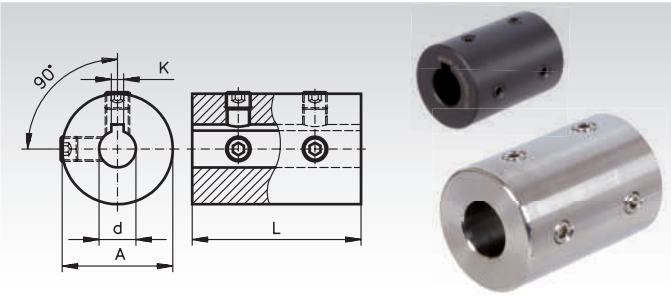
* Feather Key Groove DIN 6885/1, Tolerance P9.
** For version without keyway. Maximum values which can only be achieved with perfect mounting and dimensional accuracy of the shaft.

Set-Screw Couplings TR

Material: Steel C45 burnished.
Stainless Steel 1.4301.

Bore tolerance: +0.05 mm.

These couplings do not allow any shaft displacement in axial or radial direction. They should therefore only be used with perfectly aligned shafts.



Ordering Details: e.g.: Product No. 600 106 00, Set Screw Coupling TR, Steel without Keyway, Bore 6 mm

Product No. without keyway Steel	Product No. without keyway Stainless Steel	Product No. with keyway* Steel	Product No. with keyway* Stainless Steel	Torque T** Steel Nm	Torque T** Stainless Nm	d mm	A mm	L mm	K mm	Screws DIN 916	Fastening Torque T_A Steel Nm	Fastening Torque T_A Stainless Nm	Weight g
600 106 00	**600 991 06**	**600 206 00**	**600 992 06**	4	2,7	6	18	30	2	M4	2,2	1,76	47
600 108 00	**600 991 08**	**600 208 00**	**600 992 08**	8	5,4	8	24	35	2	M4	2,2	1,76	102
600 110 00	**600 991 10**	**600 210 00**	**600 992 10**	12	8,1	10	29	45	3	M5	4,0	3,2	185
600 112 00	**600 991 12**	**600 212 00**	**600 992 12**	17	12	12	29	45	4	M6	7,2	5,8	180
600 114 00	**600 991 14**	**600 214 00**	**600 992 14**	30	20	14	34	50	5	M6	7,2	5,8	272
600 115 00	**600 991 15**	**600 215 00**	**600 992 15**	32	22	15	34	50	5	M6	7,2	5,8	266
600 116 00	**600 991 16**	**600 216 00**	**600 992 16**	35	24	16	34	50	5	M6	7,2	5,8	261
600 120 00	**600 991 20**	**600 220 00**	**600 992 20**	70	47	20	42	65	6	M6	7,2	5,8	518
600 125 00	**600 991 25**	**600 225 00**	**600 992 25**	135	91	25	45	75	8	M8	17	13,6	623
600 130 00	**600 991 30**	**600 230 00**	**600 992 30**	155	105	30	53	83	8	M8	17	13,6	920
600 135 00	**600 991 35**	**600 235 00**	**600 992 35**	230	155	35	67	95	10	M8	17	13,6	1880
600 140 00	**600 991 40**	**600 240 00**	**600 992 40**	310	210	40	77	108	12	M10	33	26,4	2710
600 150 00	**600 991 50**	**600 250 00**	**600 992 50**	490	340	50	85	124	14	M10	33	26,4	3520

* Feather Key Groove DIN 6885/1, Tolerance P9.
** For couplings with keyway: calculations based on feather-key connection.
For couplings without keyway, the transmittable torque is lower and depends on how far the set screws penetrate the shaft.

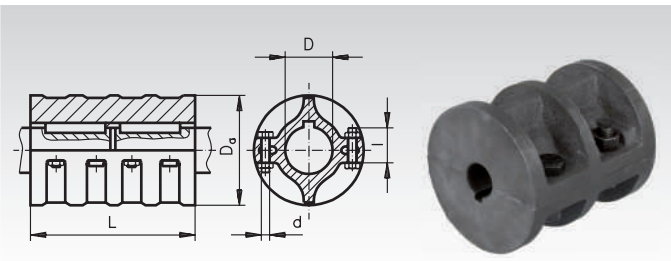
Clamp Couplings (Box couplings) DIN 115 Made from Cast Iron

Material: Grey Cast Iron GG25.

Up to 50 mm bore these two-part couplings are manufactured according to bore tolerance zone V7. For larger bores the fit is U7. All bores have a feather key grove according to DIN 6885/1. Recommended shaft tolerance: f7.

A bearing must be placed right beside both ends of the coupling. Box couplings can be assembled and dismantled in radial direction without moving the shaft in vertical direction.

Version A: For shafts of the same diameter.
Version B: For shafts of different diameter available on request.



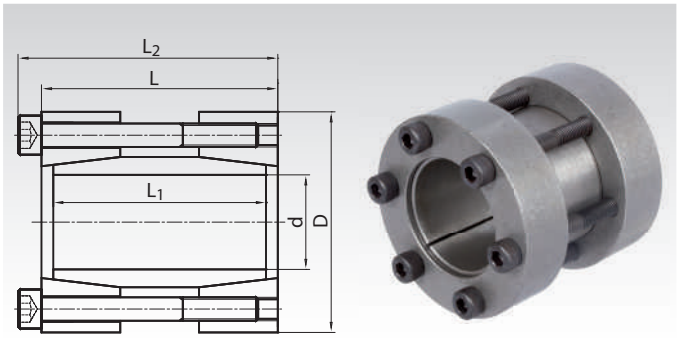
Ordering Details: e.g.: Product No. 600 020 00, clamp Coupling DIN 115 with Keyway

Product No. (with Keyway) Version A	Torque max. Nm	D mm	D_a mm	L mm	Hexagon Screws DIN 931 Amount	Hexagon Screws DIN 931 d x l mm	Speed $n_{max.}$ min^{-1}	Weight kg
600 020 00	25	20	85	100	4	M10 x 30	1700	1,9
600 025 00	40	25	100	130	4	M12 x 40	1500	4,5
600 030 00	60	30	100	130	4	M12 x 40	1500	4,2
600 035 00	80	35	110	160	6	M12 x 50	1420	6,5
600 040 00	100	40	110	160	6	M12 x 50	1420	6,2
600 045 00	125	45	120	190	6	M12 x 50	1350	8,5
600 050 00	150	50	130	190	6	M12 x 50	1300	9
600 055 00	500	55	150	220	6	M16 x 55	1200	13
600 060 00	850	60	150	220	6	M16 x 55	1200	12,5
600 065 00	1250	65	170	250	6	M16 x 55	1120	18,5
600 070 00	1700	70	170	250	6	M16 x 55	1120	17
600 080 00	2500	80	190	280	8	M16 x 60	1060	27
600 090 00	3800	90	215	310	8	M20 x 75	1000	41
600 100 00	5400	100	250	350	8	M20 x 90	920	63

Locking Assemblies (Rigid Couplings) ST-K

Material: Steel.

- For connecting two shafts, as a rigid coupling.
- For medium torques.
- Easy mounting.
- Self-releasing at dismounting.
- No axial movement during mounting.



Ordering Details: e.g.: Product No. 615 880 15, Locking Assembly ST-K, 15 mm

Product No.	d mm	D mm	L mm	L_1 mm	L_2 mm	T Nm	F_{ax} kN	P_W N/mm²	Screws 12.9 Number x Size	T_A Nm	Weight kg
615 880 15	15	45	50	44	56	125	16	126	4 x M6	17	0,40
615 880 16	16	45	50	44	56	131	17	117	4 x M6	17	0,40
615 880 17	17	50	50	44	56	210	23	118	4 x M6	17	0,50
615 880 18	18	50	50	44	56	220	24	109	4 x M6	17	0,46
615 880 19	19	50	50	44	56	230	24	96	4 x M6	17	0,50
615 880 20	20	50	50	44	56	240	25	93	4 x M6	17	0,50
615 880 22	22	55	60	54	66	270	25	107	4 x M6	17	0,60
615 880 24	24	55	60	54	66	290	25	96	4 x M6	17	0,60
615 880 25	25	55	60	54	66	470	35	95	6 x M6	17	0,66
615 880 28	28	60	60	54	66	490	35	84	6 x M6	17	0,70
615 880 30	30	60	60	54	66	540	37	79	6 x M6	17	0,73
615 880 32	32	75	60	54	68	730	43	77	6 x M8	41	1,30
615 880 35	35	75	75	69	83	810	45	82	4 x M8	41	1,34
615 880 38	38	75	75	69	83	860	46	75	4 x M8	41	1,30
615 880 40	40	75	75	69	83	880	46	64	4 x M8	41	1,40
615 880 42	42	90	75	69	83	1430	66	65	4 x M8	41	2,0
615 880 45	45	90	85	79	93	1490	66	73	6 x M8	41	2,5
615 880 48	48	90	85	79	93	1640	68	70	6 x M8	41	2,4
615 880 50	50	90	85	79	93	1670	68	64	6 x M8	41	2,0
615 880 55	55	105	85	79	93	2520	90	63	8 x M8	41	3,3
615 880 60	60	105	85	79	93	2760	92	59	8 x M8	41	2,6
615 880 65	65	105	85	79	93	2930	92	53	8 x M8	41	3,0
615 880 70	70	125	100	94	110	3800	106	50	6 x M10	83	5,4
615 880 75	75	125	100	94	110	3850	107	47	6 x M10	83	5,0
615 880 80	80	125	100	94	110	4030	109	65	8 x M10	83	4,7
615 880 85	85	130	100	94	110	4260	121	64	8 x M10	83	5,5
615 880 90	90	135	100	94	110	4820	122	72	8 x M10	83	7,0
615 880 95	95	140	120	114	130	5170	124	67	8 x M10	83	7,5
615 881 00	100	150	120	114	132	5590	127	66	8 x M12	142	7,8

More sizes up to d=110mm for 7,400Nm are available.
Price and delivery time on request.

T = transmittable torque at F_{ax} = 0.
F_{ax} = transmittable axial force at T = 0.
P_W = surface pressure onto the shaft.
T_A = Fastening torque of the screws.

Fit

Shaft h8, Hub H8.
Surface roughness max. 12.5µm.

Mounting

Slightly oil the locking assembly before mounting, do not use molibdenum disulphide or grease. Tighten the screws evenly and crosswise in several steps.

Demounting

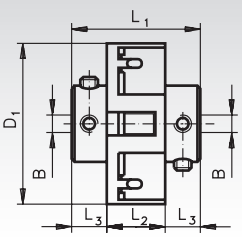
Due to the cone angle, the locking assembly is usually released once all screws have been fully unfastened.

Torsionally-Stiff Couplings HU

Material:
Up to D1 = 28 mm hubs made from brass, chromated and passivated.
From D1 = 41.4 mm aluminium alloy with iridite NCP finish.
Torque disc made from black acetal.
These unique, zero backlash, general purpose couplings provide electrical insulation. They are designed for the lower torque range and offer generous angular and radial misalignment compensation. Their axial stiffness is unique and they can anchor unrestricted shafts or perform light push/pull duties

Applications: pulse-triggered drive units (e.g. stepper motors, transducers, engine speed sensors, potentiometers).
Temperature range: -20°C to +60°C.

Set-screw style



Ordering Details: e.g.: Product No. 601 002 00, Coupling HU, 2 mm Bore

Product No.	Torque max.[2] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min^{-1} [1] Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g
601 002 00	0,3	0,9	2	14,2	5,1	4,6	18	2	0,2	25	7
601 003 00	0,3	0,9	3	14,2	5,1	4,6	18	2	0,2	25	7
601 004 00	0,3	0,9	4	14,2	5,1	4,6	18	2	0,2	25	7
601 007 00	1,7	5	3	19,1	6,9	6,1	28	2	0,2	92	16
601 008 00	1,7	5	4	19,1	6,9	6,1	28	2	0,2	92	16
601 009 00	1,7	5	6	19,1	6,9	6,1	28	2	0,2	92	16
601 010 00	1,7	5	8	19,1	6,9	6,1	28	2	0,2	92	16
601 013 00	3,5	10,5	6	28,4	11,2	8,6	41,4	2	0,25	299	30
601 014 00	3,5	10,5	8	28,4	11,2	8,6	41,4	2	0,25	299	30
601 015 00	3,5	10,5	10	28,4	11,2	8,6	41,4	2	0,25	299	30
601 018 00	3,5	10,5	12	28,4	11,2	8,6	41,4	2	0,25	299	30

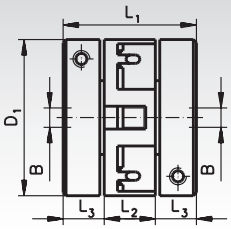
[1] At lower speeds the couplings can compensate up to +/-1 mm radial and 10° angular displacement.
[2] Operating factors: see coupling HB.

Torsionally-Stiff Couplings HB

Material:
Up to D1 = 28 mm hubs made from brass, chromated and passivated.
From D1 = 41.4 mm aluminium alloy with iridite NCP finish.
Torque disc made from black acetal.
These unique, zero backlash, general purpose couplings provide electrical insulation. They are designed for the lower torque range and offer generous angular and radial misalignment compensation. Their axial stiffness is unique and they can anchor unrestricted shafts or perform light push/pull duties

Applications: pulse-triggered drive units (e.g. stepper motors, transducers, engine speed sensors, potentiometers).
Temperature range: -20°C to +60°C.

Clamp style (bore 16 in set-screw style)



Ordering Details: e.g.: Product No. 601 103 00, Coupling HB, 3 mm Bore

Product No.	Torque max.[2] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min^{-1} [1] Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g
601 103 00	0,3	0,9	3	19,1	5,1	7	19,1	2	0,2	25	11
601 104 00	0,3	0,9	4	19,1	5,1	7	19,1	2	0,2	25	11
601 106 00	0,3	0,9	6	19,1	5,1	7	19,1	2	0,2	25	11
601 108 00	1,7	5	4	25,4	6,9	9,3	28	2	0,2	92	26
601 109 00	1,7	5	6	25,4	6,9	9,3	28	2	0,2	92	26
601 110 00	1,7	5	8	25,4	6,9	9,3	28	2	0,2	92	26
601 114 00	3,5	10,5	8	38,1	11,1	13,5	41,4	2	0,25	299	40
601 115 00	3,5	10,5	10	38,1	11,2	13,5	41,4	2	0,25	299	40
601 116 00	3,5	10,5	12	38,1	11,2	13,5	41,4	2	0,25	299	40
601 117 00[3]	3,5	10,5	16[3]	38,1	11,2	13,5	41,4	2	0,25	299	40

[1] At lower speeds the couplings can compensate up to +/-1 mm radial and 10° angular displacement. The sizes D_1 = 19 and D_1 = 28 only 5 degrees.

[2] Operating factors for couplings HU and HB (without shaft displacement):

Load Period	Operating Factor
short term	1
1 hour per day	1.5
3 hours per day	2
6 hours per day	3
12 hours per day	4

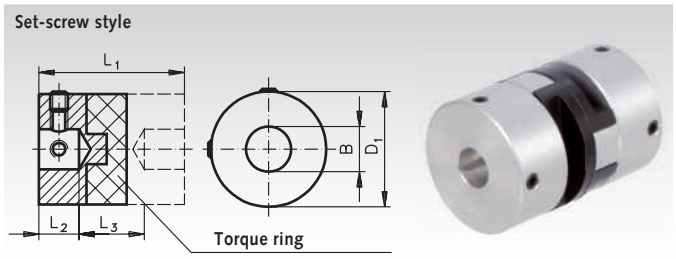
Torsionally-Stiff Couplings HZ with Blind Hole

Material: Hubs made from aluminium alloy with iridite NCP finish. Sliding disc made from black acetal.

These 3-part zero-backlash couplings provide electrical insulation. They consist of two hubs and a sliding disc. They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Applications: Ideal for stepper motors due to the damping properties of plastic torque rings. Positioning drives, position encoders and incremental or absolute encoders, pumps etc.

Temperature range: -20°C to +60°C.



Ordering Details: e.g.: Product No. 601 201 00, Coupling HZ, 2 mm Bore

Product No.	Torque Max.[1] Nm	Static Break Torque Nm	Bore B+0.03 mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min-1 Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g	Product No. Spare Part Sliding disc	Weight g
601 201 00*	0,06	0,7	2	12,7	3,8	5,1	6,4	0,5	0,1	10	2,5	**601 237 00**	0,1
601 202 00*	0,06	0,7	3	12,7	3,8	5,1	6,4	0,5	0,1	10	2,5	**601 237 00**	0,1
601 203 00*	0,21	2	3	12,7	3,8	5,1	9,5	0,5	0,1	30	4	**601 238 00**	0,1
601 204 00*	0,21	2	4	12,7	3,8	5,1	9,5	0,5	0,1	30	4	**601 238 00**	0,1
601 206 00*	0,5	4	3	15,9	4,3	7,3	12,7	0,5	0,1	65	11	**601 239 00**	0,5
601 207 00*	0,5	4	4	15,9	4,3	7,3	12,7	0,5	0,1	65	11	**601 239 00**	0,5
601 208 00*	0,5	4	6	15,9	4,3	7,3	12,7	0,5	0,1	65	11	**601 239 00**	0,5
601 301 00	1,7	8	4	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 302 00	1,7	8	6	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 303 00	1,7	8	8	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 305 00	4	13	6	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 306 00	4	13	8	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 307 00	4	13	10	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 308 00	9	53	8	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 309 00	9	53	10	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 310 00	9	53	12	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 312 00	17	57	10	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,7
601 313 00	17	57	12	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,7
601 315 00	17	57	16	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,7

* Hubs made of brass.

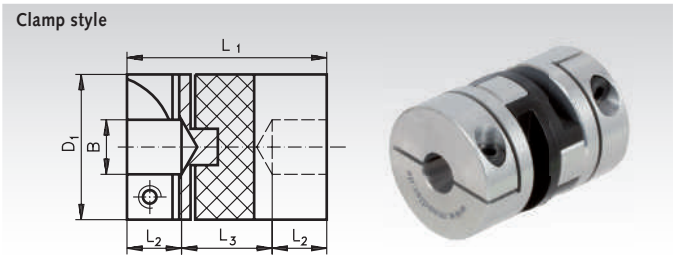
Torsionally-Stiff Couplings HF with Blind Hole

Material: Hubs made from aluminium alloy with iridite NCP finish. Sliding disc made from black acetal.

These 3-part zero-backlash couplings provide electrical insulation. They consist of two hubs and a sliding disc.
They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Applications: Ideal for stepper motors due to the damping properties of plastic torque rings. Positioning drives, position encoders and incremental or absolute encoders, pumps etc.

Temperature range: -20°C to +60°C.



Product No.	Torque max.[1] Nm	Static Break Torque Nm	Bore B+0.03 mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min-1 Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g	Product No. Spare Part Sliding disc	Weight g
601 401 00	1,7	8	4	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 402 00	1,7	8	5	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 403 00	1,7	8	6	22	6,3	9,4	19,1	0,5	0,2	115	12	**601 242 00**	1,5
601 407 00	4	13	6	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 408 00	4	13	8	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 409 00	4	13	10	28,4	8,6	11,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 411 00	9	53	8	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 412 00	9	53	10	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 413 00	9	53	12	48	13	22	33,3	0,5	0,2	615	86	**601 246 00**	8
601 415 00	17	57	10	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,2
601 416 00	17	57	12	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,2
601 418 00	17	57	16	50,8	16,7	17,4	41,3	0,5	0,25	1200	148	**601 248 00**	12,2

[1] Operating factors (without shaft displacement):

Load Period	Operating Factor
short term	1
1 hour per day	2
3 hours per day	4
6 hours per day	6
12 hours per day	8

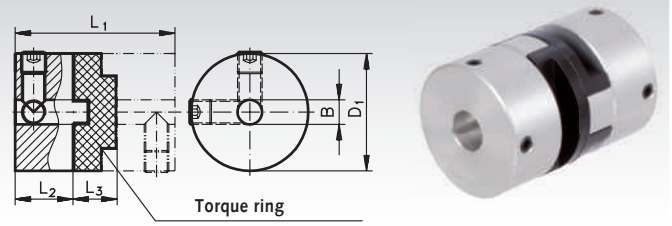
Torsionally-Stiff Couplings HZD with Through Hole

Material: Hubs made from aluminium alloy with iridite NCP finish. Sliding disc made from black acetal.

These 3-part zero backlash couplings provide electrical insulation. They consist of two hubs and a sliding disc.
They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Applications: Ideal for stepper motors due to the damping properties of plastic torque rings. Positioning drives, position encoders and incremental or absolute encoders, pumps etc.

Set-screw style



Ordering Details: e.g.: Product No. 601 301 05, Coupling, 4 mm Bore

Product No.	Torque max.[1] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min^{-1} Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g	Product No. Spare Part Sliding disc	Weight g
601 301 05	1,7	8	4	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 302 05	1,7	8	6	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 303 05	1,7	8	8	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 305 05	4	13	6	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 306 05	4	13	8	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 307 05	4	13	10	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 308 05	9	53	8	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 309 05	9	53	10	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 310 05	9	53	12	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 312 05	17	57	10	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 313 05	17	57	12	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 315 05	17	57	16	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 318 05	30	95	12	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 319 05	30	95	16	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 320 05	30	95	20	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 325 05	44	150	16	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30
601 326 05	44	150	20	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30
601 327 05	44	150	30	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30

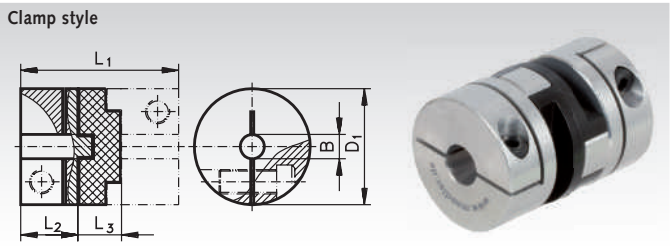
Torsionally-Stiff Couplings HFD with Through Hole

Material: Hubs made from aluminium alloy with iridite NCP finish. Sliding disc made from black acetal.

These 3-part zero backlash couplings provide electrical insulation. They consist of two hubs and a sliding disc.
They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Application: see description HZD (above).

Clamp style



Ordering Details: e.g.: Product No. 601 401 05, coupling, 4 mm Bore

Product No.	Torque Max.[1] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. Compensation at 3000min^{-1} Angular ±Degrees	Radial ±mm	Torsional Stiffness Nm/rad	Weight g	Product No. Spare Part Sliding disc	Weight g
601 401 05	1,7	8	4	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 402 05	1,7	8	5	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 403 05	1,7	8	6	26	9,4	7,2	19,1	0,5	0,2	115	13	**601 242 00**	1,5
601 407 05	4	13	6	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 408 05	4	13	8	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 409 05	4	13	10	32,4	11,6	9,2	25,4	0,5	0,2	205	31	**601 244 00**	2,7
601 411 05	9	53	8	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 412 05	9	53	10	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 413 05	9	53	12	48	15	18	33,3	0,5	0,2	615	74	**601 246 00**	8
601 415 05	17	57	10	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 416 05	17	57	12	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 418 05	17	57	16	50,8	17,8	15,3	41,3	0,5	0,25	1200	142	**601 248 00**	12,7
601 420 00	30	95	12	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 422 00	30	95	16	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 424 00	30	95	20	59,6	20,6	18,4	50	0,5	0,25	1375	208	**601 250 00**	20
601 430 00	44	150	16	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30
601 432 00	44	150	20	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30
601 434 00	44	150	30	78	28,4	21,2	57,1	0,5	0,25	2610	361	**601 257 00**	30

[1] Operating factors (without shaft displacement):

Load Period	Operating Factor
short term	1
1 hour per day	2
3 hours per day	4
6 hours per day	6
12 hours per day	8

Torsionally-Stiff Couplings HZD with Through Hole, Stainless

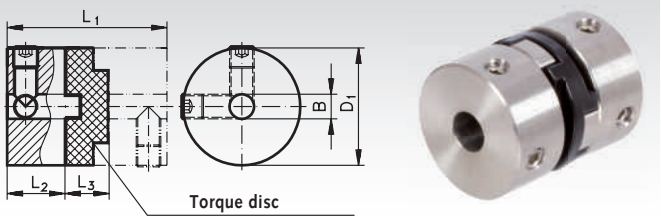
Material: Hubs made from stainless steel 1.4305.
Torque disc made from black acetal.

STAINLESS

These 3-part zero backlash couplings provide electrical insulation. They consist of two hubs and a torque disc. They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Applications: Ideal for stepper motors due to the damping properties of plastic torque discs. Positioning drives, position encoders such as incremental or absolute encoders , pumps etc.
Temperature range: -20°C to +60°C.

Set-screw style



Ordering details: e.g.: Product No. 601 993 05, Coupling, 6 mm bore

Product No.	Torque max.[1] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. displacement at 3000min^{-1} Angular ±Degrees	Radial ±mm	Torsional stiffness Nm/rad	Weight g	Product No. Spare part Torque disc	Weight g
601 993 05	4	13	6	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 993 06	4	13	8	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 993 07	4	13	10	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 993 08	9	53	8	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 993 09	9	53	10	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 993 10	9	53	12	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 993 12	17	57	10	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 993 13	17	57	12	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 993 15	17	57	16	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 993 18	30	95	12	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20
601 993 19	30	95	16	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20
601 993 20	30	95	20	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20

Torsionally-Stiff Couplings HFD with Through Hole, Stainless

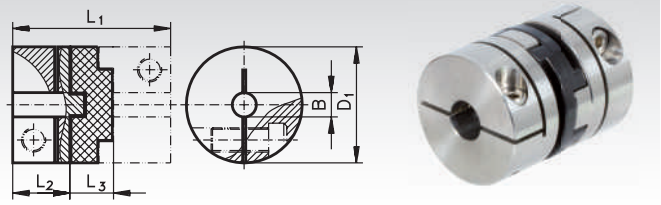
Material: Hubs made from stainless steel 1.4305.
Torque disc made from black acetal.

STAINLESS

These 3-part zero backlash couplings provide electrical insulation. They consist of two hubs and a torque disc. They are versatile and of robust design. Large radial compensation, easy mounting even in confined spaces.

Applications: see description HZD (above).

Clamp style



Ordering Details: e.g.: Product No. 601 994 07, Coupling, 6 mm bore

Product No.	Torque max.[1] Nm	Static Break Torque Nm	Bore $B^{+0.03}$ mm	L_1 mm	L_2 mm	L_3 mm	D_1 mm	max. displacement at 3000min^{-1} Angular ±Degrees	Radial ±mm	Torsional stiffness Nm/rad	Weight g	Product No. Spare part Torque disc	Weight g
601 994 07	4	13	6	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 994 08	4	13	8	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 994 09	4	13	10	32,4	11,6	9,2	25,4	0,5	0,2	205	76	**601 244 00**	2,7
601 994 11	9	53	8	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 994 12	9	53	10	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 994 13	9	53	12	42,0	15,0	12,0	33,3	0,5	0,2	615	165	**601 245 00**	8
601 994 15	17	57	10	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 994 16	17	57	12	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 994 18	17	57	16	50,8	17,8	15,3	41,3	0,5	0,25	1200	305	**601 248 00**	12,7
601 994 20	30	95	12	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20
601 994 22	30	95	16	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20
601 994 24	30	95	20	59,6	20,6	18,4	50	0,5	0,25	1375	510	**601 250 00**	20

[1] Operating factors (without shaft displacement):

Load Period	Operating Factor
short term	1
1 hour per day	2
3 hours per day	4
6 hours per day	6
12 hours per day	8

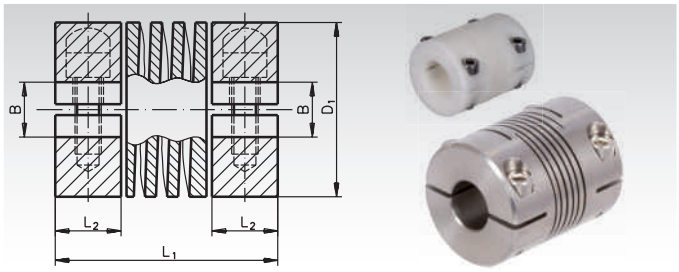
Reworking within 24h-service possible. Custom made parts on request.

Self-Aligning Couplings KA, Short Version

Material: Plastic acetal.
Aluminium 2014A.
Stainless steel 1.4305.

- Torsionally rigid design.
- Zero backlash.
- Perfect transmission of torque.
- Very low restoring force.
- Speed max. 5,000 min^{-1}.

Number of screws: at plastic and steel 2 screws on each side.
At aluminium: 1 screw on each side.



Ordering Details: e.g.: Product No. 602 608 00, Coupling KA, Plastic, Bore 4mm

Product No. Plastic	Product No. Alu	Product No. Stainless Steel	Max. Operating Torque* Plastic Nm	Alu Nm	Stainl. Nm	Bore B$^{+0.03}$ mm	Bore max[1] mm	L_1 mm	L_2** mm	D_1 mm	Angular Misalignment Degrees	Parallel mm	Weight Plastic g	Alu g	Stainl. g
-	-	602 996 00***	-	-	0,45	2	3,00	12,7	3,2	6,35	3	0,07	-	-	2
-	602 702 00	602 996 02	-	0,4	0,5	3	3,18	14,2	4,5	9,52	3	0,1	-	2	6
602 608 00	602 708 00	602 996 08	0,24	0,9	1,0	4	6,00	19,05	6	12,70	5	0,127	2	6	10
602 610 00	602 710 00	602 996 10	0,24	0,9	1,0	6	6,00	19,05	6	12,70	5	0,127	2	6	10
602 612 00	602 712 00	602 996 12	0,35	1,5	1,8	4	6,35	20,3	6	15,87	5	0,127	3	8	22
602 614 00	602 714 00	602 996 14	0,35	1,5	1,8	5	6,35	20,3	6	15,87	5	0,127	3	8	22
602 616 00	602 716 00	602 996 16	0,35	1,5	1,8	6	6,35	20,3	6	15,87	5	0,127	3	8	22
602 620 00	602 720 00	602 996 20	0,64	2,5	2,7	6	8,00	22,85	6,5	19,05	5	0,127	8	12	34
602 622 00	602 722 00	602 996 22	0,64	2,5	2,7	8	8,00	22,85	6,5	19,05	5	0,127	8	12	34
602 624 00	602 724 00	602 996 24	1,4	4,0	6,0	6	11,00	31,75	9	25,40	5	0,127	13	32	90
602 626 00	602 726 00	602 996 26	1,4	4,0	6,0	8	11,00	31,75	9	25,40	5	0,127	13	32	90
602 628 00	602 728 00	602 996 28	1,4	4,0	6,0	10	11,00	31,75	9	25,40	5	0,127	13	32	90
602 630 00	602 730 00	602 996 30	2,5	6,0	10,0	10	16,00	44,45	12	31,75	5	0,127	35	76	220
602 632 00	602 732 00	602 996 32	2,5	6,0	10,0	12	16,00	44,45	12	31,75	5	0,127	35	76	220
602 634 00	602 734 00	602 996 34	2,5	6,0	10,0	16	16,00	44,45	12	31,75	5	0,127	35	76	220

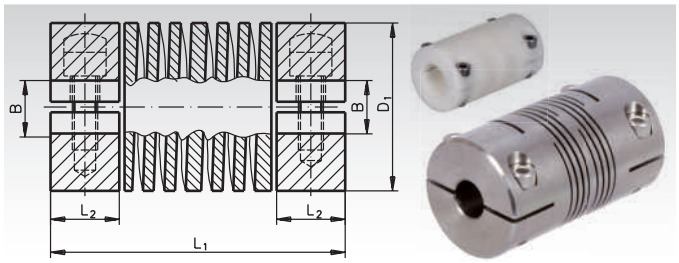
* Please regard the operating factors page 377. ** Shaft can be pushed in further. Middle of coupling is relieved. *** Set-screw style. [1] Against surcharge.

Self-Aligning Couplings LA, Long Version

Material: Plastic acetal.
Aluminium 2014A.
Stainless steel 1.4305.

- torsionally rigid design.
- zero backlash.
- perfect transmission of torque.
- very low restoring force.
- speed max. 5,000 min^{-1}.

Number of screws: at plastic and steel 2 screws on each side.
At aluminium up to Ø D_1=31.75mm only 1 screw on each side.



Ordering Details: e.g.: Product No. 602 806 00, Coupling LA, Plastic, Bore 4mm

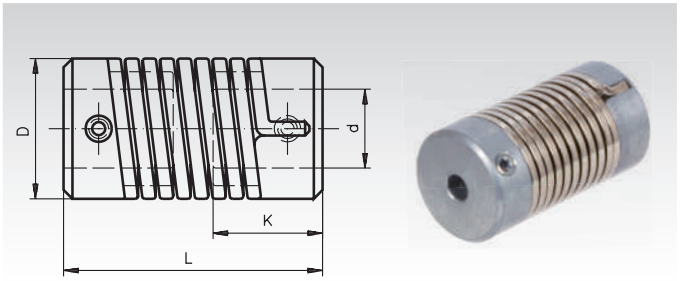
Product No. Plastic	Product No. Alu	Product No. Stainless Steel	Max. Operating Torque* Plastic Nm	Alu Nm	Stainl. Nm	Bore B$^{+0.03}$ mm	Bore max[1] mm	L_1 mm	L_2** mm	D_1 mm	Angular Misalignment Degrees	Parallel mm	Weight Plastic g	Alu g	Stainl. g
-	602 900 00	602 998 00	-	0,6	0,9	3	4,76	19,55	5,3	9,52	3	0,12	-	4	8
-	602 902 00	602 998 02	-	1	1,5	4	4,76	19,55	5,3	9,52	3	0,12	-	4	8
602 806 00	602 906 00	-	0,51	1,3	-	4	6,35	22,85	6,5	12,7	5	0,17	4	8	-
602 808 00	602 908 00	-	0,32	2	-	6	6,35	22,85	6,5	12,7	5	0,17	4	8	-
-	-	602 998 12	-	-	1,9	4	6,35	25,40	6,5	12,7	5	0,17	-	-	18
-	-	602 998 14	-	-	3	6	6,35	25,40	6,5	12,7	5	0,17	-	-	18
-	602 916 00	-	-	3,4	-	4	8,00	25,40	6,5	15,87	5	0,2	-	10	-
602 818 00	602 918 00	602 998 18	0,61	2	3,4	5	8,00	25,40	6,5	15,87	5	0,2	6	10	30
602 820 00	602 920 00	602 998 20	0,91	3,4	5	6	8,00	25,40	6,5	15,87	5	0,2	6	10	30
602 824 00	602 924 00	-	0,87	3	-	6	10,00	26,50	6,5	19,05	7	0,25	12	16	-
602 826 00	602 926 00	-	1,3	5,3	-	8	10,00	26,50	6,5	19,05	7	0,25	12	16	-
-	-	602 998 30	-	-	4,8	6	10,00	28,00	6,5	19,05	7	0,25	-	-	46
-	-	602 998 32	-	-	8	8	10,00	28,00	6,5	19,05	7	0,25	-	-	46
602 834 00	602 934 00	602 998 34	1,67	5	10	6	12,70	38,10	11	25,4	7	0,38	20	44	115
602 836 00	602 936 00	602 998 36	2,5	10	16	8	12,70	38,10	11	25,4	7	0,38	20	44	115
602 838 00	602 938 00	602 998 38	2,5	10	16	10	12,70	38,10	11	25,4	7	0,38	20	44	115
602 840 00	602 940 00	602 998 40	4	15	25	10	16,00	57,15	16	31,75	7	0,5	58	100	290
602 842 00	602 942 00	602 998 42	4	15	25	12	16,00	57,15	16	31,75	7	0,5	58	100	290
602 844 00	602 944 00	602 998 44	4	15	25	16	16,00	57,15	16	31,75	7	0,5	58	100	290
602 846 00	602 946 00	602 998 46	6	22	36	12	19,00	66,67	18	38,1	7	0,6	86	160	440
602 848 00	602 948 00	602 998 48	6	22	36	16	19,00	66,67	18	38,1	7	0,6	86	160	440
602 850 00	602 950 00	602 998 50	6	22	36	19	19,00	66,67	18	38,1	7	0,6	86	160	440
-	602 954 00	602 998 54	-	30	48	16	22,00	76,20	20,00	44,5	7	0,8	-	240	730
-	602 956 00	602 998 56	-	30	48	19	22,00	76,20	20,00	44,5	7	0,8	-	240	730
-	602 958 00	602 998 58	-	40	37	16	26,00	95,30	25,06	50,8	7	0,9	-	405	1045
-	602 960 00	602 998 60	-	40	73	19	26,00	95,30	25,06	50,8	7	0,9	-	405	1045
-	602 962 00	602 998 62	-	40	73	24	26,00	95,30	25,06	50,8	7	0,93	-	405	1045
-	602 966 00	602 998 66	-	55	102	24	30,00	130,00	32	57,15	7	0,95	-	800	2155
-	602 968 00	602 998 68	-	55	102	30	30,00	130,00	32	57,15	7	0,95	-	800	2155

* Please regard the operating factors page 377.

*** Shaft must not be pushed in any further. [1] Against surcharge.

Flexible Couplings EK

Material: Hubs made from zinc die-cast, Spring: Spring steel type C zinc-plated.
These couplings are elastic all-metal couplings, with hubs and spring bodies made from rustproof metal. The couplings only have a one-layer spring body. They are, however, flexible in all directions, suitable for both rotational directions and maintenance-free. They are locked against rotation with Allen set screws.
Temperature range from -40°C to +120°C.
Couplings are available pre-drilled ex stock.
Customized bores and feather-key grooves available at extra charge.



Ordering Details: e.g.: Product No. 602 000 00, Clutch EK, Pre-bored

Product No.	Nominal Torque Nm	Bores d Pilot Bore mm	Bores d max. mm	Bending max. Degree	D mm	K mm	L mm	Speed max. min^{-1}	Weight kg
602 000 00	0,15	2	6	5°	12	9	25	8000	0,014
602 001 00	0,5	3	8	5°	16	12,5	35	3000	0,028
602 002 00	1,5	6	14	5°	26	17	50	3000	0,100

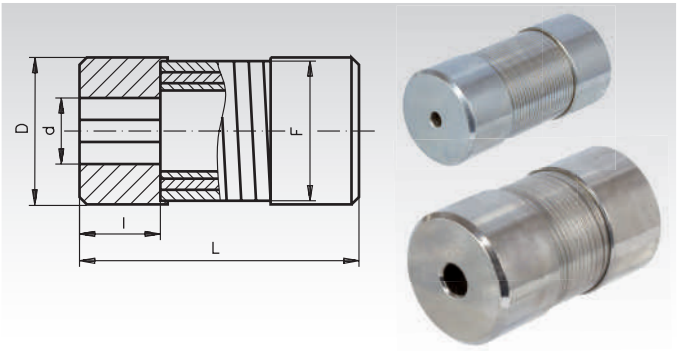
Flexible Couplings EL

Material: Hubs 11 SMn Pb 37, from Ø 55 mm CK45.
Spring: Spring steel type C.

Stainless version: Hub 1.4305.
Spring: Spring steel 1.4310.

STAINLESS

These couplings are elastic all-metal couplings and completely maintenance free. The all-metal design leads to a strong resistance against oil and higher temperatures: -40°C to +100°C. Stainless version: -40°C to +300°C. The elastic part consists of a spring body, made up of three layers of wound springs welded into the connecting hubs. The couplings are suitable for both rotating directions. They can be locked against rotation with a feather key or with pins. The couplings are press-fitted. Demounting is done by pressing or pulling off. Vibrations and shocks are largely absorbed. Depending on the length of the coupling - S, L or Db - bending of 3 - 6° or axial displacement of 3 - 6% of the nominal shaft diameter are possible.



Couplings are available pre-drilled ex stock.
Customized bores and feather-key grooves available at extra charge.

Ordering Details: e.g.: Product No. 602 016 00, Clutch EL, Pre-bored

Product No. Length L short	Product No. Length L short Stainless	Product No. Length L long	Product No. Length L double-length	Nomin. Torque Nm	Bores d Pre-bored mm	Bores d max. for pin mm	Bores d max. for slot mm	Length L S= short mm	Length L L= long mm	Length L Db= double. mm	D mm	F mm	l mm	Speed max. min^{-1}	Weight short kg	Weight long kg	Weight double kg
602 016 00	**602 990 16**	**602 017 00**	**602 018 00**	2,5	2,5	10	6	25	30	35	17	15,5	8	20000	0,032	0,036	0,039
602 005 00	**602 990 05**	**602 006 00**	**602 007 00**	5	3,5	12	8	35	45	50	21	19	10	15000	0,065	0,075	0,08
602 010 00	**602 990 10**	**602 011 00**	**602 012 00**	10	5,5	15	12	50	60	70	26	24	15	12000	0,13	0,15	0,17
602 013 00	**602 990 13**	**602 014 00**	**602 015 00**	10	5,5	19	14	50	60	70	30	28	15	10000	0,17	0,19	0,21
602 020 00	**602 990 20**	**602 021 00**	**602 022 00**	20	5,5	20	16	65	80	90	35	32	20	9000	0,31	0,36	0,39
602 023 00	**602 990 23**	**602 024 00**	**602 025 00**	20	5,5	25	19	65	80	90	38	36	20	8000	0,35	0,40	0,43
602 040 00	**602 990 40**	**602 041 00**	**602 042 00**	40	5,5	27	20	80	95	110	45	40	25	7000	0,65	0,71	0,79
602 043 00	**602 990 43**	**602 044 00**	**602 045 00**	40	5,5	31	24	80	95	110	48	45	25	7000	0,69	0,77	0,85
602 090 00	**602 990 90**	**602 091 00**	**602 092 00**	90	5,5	34	25	100	120	140	55	50	31	6000	1,19	1,34	1,50
602 110 00	**602 991 10**	**602 111 00**	**602 112 00**	90	5,5	35	28	100	120	140	55	52	31	6000	1,14	1,29	1,46
602 150 00	-	**602 151 00**	**602 152 00**	150	5,5	40	30	125	150	175	65	60	37	5000	2,07	2,35	2,65
602 220 00	-	**602 221 00**	**602 222 00**	220	5,5	45	35	150	180	210	75	70	44	4500	3,35	3,87	4,35
602 300 00	-	**602 301 00**	**602 302 00**	300	21	50	40	170	200	240	80	75	50	3000	4,16	4,69	5,39
602 500 00	-	**602 501 00**	**602 502 00**	500	24	64	50	210	250	300	100	95	62	1500	8,08	9,18	10,65

Reworking within 24h-service possible. Custom made parts on request.

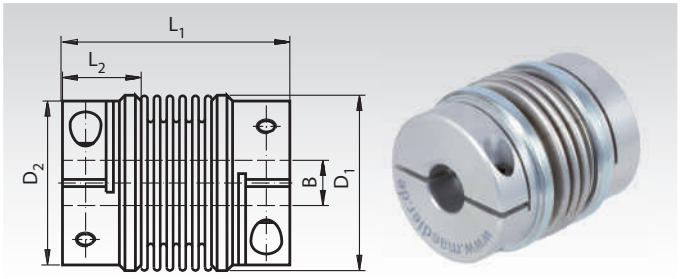
Metal Bellow Couplings MBK and MBL

Material: Hubs aluminium, bellow stainless steel.

- Zero backlash, with high torsional stiffness.
- For highly dynamic positioning and servo systems, pumps, portal drives etc..
- With clamps, ready-to-install for rapid mounting.
- Short and long versions with different misalignment values and different stiffnesses.
- Many different sizes and diameters available.

Temperature range: -40°C to +120 °C.

Ordering Details: e.g.: Product No. 601 518 03, Metal Bellow Coupling MBK, 3mm



Short Version MBK

Product No.	Torque	Bore $B^{+0.03}$ 1)	Bore max.2)	L_1	L_2	D_1	D_2	maximum Misalignment Angular	Radial	Axial	Recommended max. Speed	Torsional Stiffness	Weight
	max. Nm*	mm	mm	mm	mm	mm	mm	±Degrees	± mm	±mm	min^{-1}	Nm/rad	g
601 518 03	2	3	8	31	11	20	18,2	2	0,06	0,35	5000	315	16
601 518 04	2	4	8	31	11	20	18,2	2	0,06	0,35	5000	315	16
601 518 05	2	5	8	31	11	20	18,2	2	0,06	0,35	5000	315	16
601 518 06	2	6	8	31	11	20	18,2	2	0,06	0,35	5000	315	16
601 518 08	2	8	8	31	11	20	18,2	2	0,06	0,35	5000	315	16
601 523 06	3,2	6	12	37,5	14	26	23,4	2	0,06	0,36	5000	755	34
601 523 08	3,2	8	12	37,5	14	26	23,4	2	0,06	0,36	5000	755	34
601 523 10	3,2	10	12	37,5	14	26	23,4	2	0,06	0,36	5000	755	34
601 523 12	3,2	12	12	37,5	14	26	23,4	2	0,06	0,36	5000	755	34
601 531 08	7,5	8	16	40	14	34	31	2,5	0,1	0,6	5000	1740	56
601 531 10	7,5	10	16	40	14	34	31	2,5	0,1	0,6	5000	1740	56
601 531 12	7,5	12	16	40	14	34	31	2,5	0,1	0,6	5000	1740	56
601 531 14	7,5	14	16	40	14	34	31	2,5	0,1	0,6	5000	1740	56
601 531 16	7,5	16	16	40	14	34	31	2,5	0,1	0,6	5000	1740	56
601 537 10	10	10	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99
601 537 12	10	12	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99
601 537 14	10	14	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99
601 537 16	10	16	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99
601 537 18	10	18	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99
601 537 20	10	20	20	49,7	18	41	37,4	2,5	0,15	0,8	5000	2880	99

1) Standard bores. 2) Different bores (even one-sided) up to max bore available against surcharge.

Long Version MBL

Product No.	Torque	Bore $B^{+0.03}$ 1)	Bore max.2)	L_1	L_2	D_1	D_2	maximum Misalignment Angular	Radial	Axial	Recommended max. Speed	Torsional Stiffness	Weight
	max. Nm*	mm	mm	mm	mm	mm	mm	±Degrees	± mm	±mm	min^{-1}	Nm/rad	g
601 618 03	1	3	8	45,2	11	20	18,2	6	0,5	1	5000	170	18
601 618 04	1	4	8	45,2	11	20	18,2	6	0,5	1	5000	170	18
601 618 05	1	5	8	45,2	11	20	18,2	6	0,5	1	5000	170	18
601 618 06	1	6	8	45,2	11	20	18,2	6	0,5	1	5000	170	18
601 618 08	1	8	8	45,2	11	20	18,2	6	0,5	1	5000	170	18
601 623 06	1,6	6	12	54,3	14	26	23,4	6	0,5	1	5000	380	38
601 623 08	1,6	8	12	54,3	14	26	23,4	6	0,5	1	5000	380	38
601 623 10	1,6	10	12	54,3	14	26	23,4	6	0,5	1	5000	380	38
601 623 12	1,6	12	12	54,3	14	26	23,4	6	0,5	1	5000	380	38
601 631 08	3,8	8	16	57	14	34	31	8	1	1,9	5000	915	63
601 631 10	3,8	10	16	57	14	34	31	8	1	1,9	5000	915	63
601 631 12	3,8	12	16	57	14	34	31	8	1	1,9	5000	915	63
601 631 14	3,8	14	16	57	14	34	31	8	1	1,9	5000	915	63
601 631 16	3,8	16	16	57	14	34	31	8	1	1,9	5000	915	63
601 637 10	5	10	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107
601 637 12	5	12	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107
601 637 14	5	14	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107
601 637 16	5	16	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107
601 637 18	5	18	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107
601 637 20	5	20	20	71,4	18	41	37,4	8	1,2	2,5	5000	1310	107

1) Standard bores. 2) Different bores (even one-sided) up to max bore available against surcharge.

* The maximum torque is calculated for drives with uniform load and constant speed, and without shaft misalignment or axial displacement e.g.:

Counter torque of application = 2 Nm
Operating factor = 3
Required torque = 6 Nm

Select a coupling, with a max. torque larger than 6 Nm. Please note that the max. misalignment values (axial, radial and angular displacement) are mutually exclusive, i.e., if the misalignment in one direction reaches the maximum, the other two remaining misalignments must be at zero.

Operating Factors

Type of Load	Operating Factor
Uniform Load	1.5
Alternating Load	2
Shock load	3
Reversing shock load	4

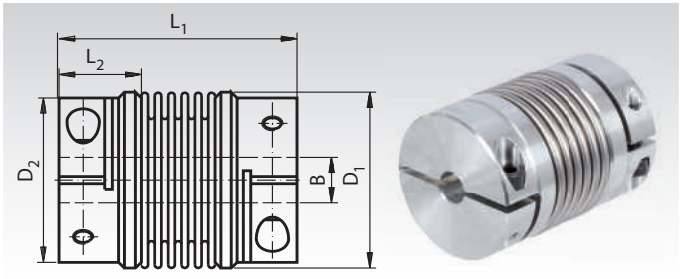
Fastening torques page 378

Metal Bellow Couplings MCK and MCL

Material: Aluminium clamp hubs, stainless steel bellow.

- Zero backlash, with high torsional stiffness.
- For machine tools, packing machines, textile machines, Linear drives etc..
- With clamps, ready-to-install for rapid mounting.
- Short and long versions with different misalignment values and different stiffnesses.
- Many different sizes and diameters available.

Temperature range: -30°C to +120 °C.



Ordering details: e.g.: Product No. 601 546 10, Metal Bellow Coupling MCK, 10mm

Short version MCK

Product No.	Torque	Bore B^{H7} [1]	Bore max.[2]	$L_1 \pm 2$	L_2	D	Breakdown-Ø [3]	max. misalignment Angular	Radial	Axial	Recommended max. Speed	Torsional stiffness	Weight approx.
	max. Nm	mm	mm	mm	mm	mm	mm	±Degrees	±mm	±mm	min^{-1}	Nm/rad	g
601 546 10	18	10	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 546 11	18	11	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 546 14	18	14	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 546 19	18	19	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 546 24	18	24	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 546 25	18	25	25,4	63	19,5	45	48	1,5	0,2	0,5	12800	20000	200
601 556 10	30	10	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 556 11	30	11	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 556 14	30	14	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 556 19	30	19	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 556 24	30	24	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 556 25	30	25	30	65	24,5	56	-	1,5	0,15	0,6	10300	38000	270
601 566 14	60	14	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500
601 566 19	60	19	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500
601 566 24	60	24	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500
601 566 28	60	28	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500
601 566 32	60	32	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500
601 566 35	60	35	35	79	29	66	67	1,5	0,15	0,6	8700	75000	500

[1] Standard bores. [2] Different bores (even one-sided) up to max bore as well feather keyways, available against surcharge.
[3] Screw head protrudes past D.

Long version MCL

Product No.	Torque	Bore B^{H7} [1]	Bore max.[2]	$L_1 \pm 2$	L_2	D	Breakdown-Ø [3]	max. misalignment Angular	Radial	Axial	Recommended max. Speed	Torsional stiffness	Weight approx.
	max. Nm	mm	mm	mm	mm	mm	mm	±Degrees	±mm	±mm	min^{-1}	Nm/rad	g
601 646 10	18	10	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 646 11	18	11	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 646 14	18	14	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 646 19	18	19	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 646 24	18	24	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 646 25	18	25	25,4	71	19,5	45	48	2	0,25	0,5	12800	15000	200
601 656 10	30	10	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 656 11	30	11	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 656 14	30	14	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 656 19	30	19	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 656 24	30	24	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 656 25	30	25	30	73	24,5	56	-	2	0,25	1	10300	28000	270
601 666 14	60	14	35	89	29	66	67	2	0,25	1	8700	50000	500
601 666 19	60	19	35	89	29	66	67	2	0,25	1	8700	50000	500
601 666 24	60	24	35	89	29	66	67	2	0,25	1	8700	50000	500
601 666 28	60	28	35	89	29	66	67	2	0,25	1	8700	50000	500
601 666 32	60	32	35	89	29	66	67	2	0,25	1	8700	50000	500
601 666 35	60	35	35	89	29	66	67	2	0,25	1	8700	50000	500

[1] Standard bores. [2] Different bores (even one-sided) up to max bore as well feather keyways, available against surcharge.
[3] Screw head protrudes past D.

Tightening torques for the mounting screws

Types MBK and MBL			Types MCK and MCL		
Hub-Ø D_2 mm	Screw size	Tightening Torque Nm	Hub-Ø D mm	Screw size DIN 912	Tightening Torque Nm
18,2	M2,5	1,32	45	M5	8
23,4	M3	2,43	56	M6	12
31	M3	2,43	66	M8	30
37,4	M4	5,66			

Operating factors

Type of Load	Operating factor
Uniform Load	1.5
Alternating Load	2
Shock Load	2.5
Reversing shock load	4

Please note that the max. misalignment values (axial, radial and angular displacement) are mutually exclusive. If the misalignment in one direction reaches the maximum, the other two remaining misalignments must be at zero.

Membrane Couplings, Clamp Style MEM

Materials:

Hubs and sleeves: Aluminium alloy 2011T3 and 2011T8 BS 4300/5 FC1, clear anodised finish.

Membranes: stainless high-quality spring steel.

Screw connection: Screws: heat-treated steel, burnished.

Bushes: Steel zinc-plated and chromated black.

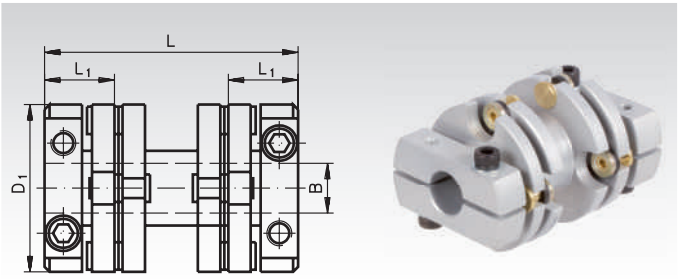
Connecting parts: Heat-treated steel, burnished.

Temperature range: -40°C to +120°C.

Max. speed: 5,000 min^{-1}.

Torsionally-stiff construction, no moving parts, all-metal design, low moment of inertia.

The functional principle offers the highest operational readiness to be achieved with flexible couplings. Excellent kinematic properties and high torsion-spring stiffness. Suitable for servo drives. Tolerant flexural system and a dynamically balanced construction for high-end positioning and servo drives.



Ordering Details: e.g.: Product No. 601 701 00, Membrane Coupling MEM, 4 mm Bore

Product No.	Torque max.	Bore $B^{+0.03}$	L	L_1*	D_1	max. Misalignment			Torsional Stiffness	Weight
						Angular	Radial	Axial		
	Nm	mm	mm	mm	mm	± Grad	± mm	± mm	Nm/rad	g
601 701 00	0,9	4	34,5	9,2	19,2	4	0,4	0,2	145	14
601 702 00	0,9	5	34,5	9,2	19,2	4	0,4	0,2	145	14
601 703 00	0,9	6	34,5	9,2	19,2	4	0,4	0,2	145	14
601 707 00	2,3	5	36,1	10	25,6	4	0,4	0,2	400	25
601 708 00	2,3	6	36,1	10	25,6	4	0,4	0,2	400	25
601 709 00	2,3	8	36,1	10	25,6	4	0,4	0,2	400	25
601 713 00	5,6	6	50,8	14	33,5	3	0,4	0,2	980	55
601 714 00	5,6	8	50,8	14	33,5	3	0,4	0,2	980	55
601 715 00	5,6	10	50,8	14	33,5	3	0,4	0,2	980	55
601 719 00	11,3	12	60,1	17	41,5	2	0,4	0,2	2020	109
601 720 00	11,3	14	60,1	17	41,5	2	0,4	0,2	2020	109
601 721 00	11,3	16	60,1	17	41,5	2	0,4	0,2	2020	109
601 725 00	30	16	78,1	22,9	52	2	0,4	0,2	4800	247
601 726 00	30	20	78,1	22,9	52	2	0,4	0,2	4800	247
601 729 00	60	20	90,7	26	66	2	0,4	0,2	12000	444
601 730 00	60	28	90,7	26	66	2	0,4	0,2	12000	444

* Depth of bore, remaining length relieved.

Operating Factor

Type of Load	Operating Factor
Uniform	1.5
Alternating	2
Shock	3
Reversing	4

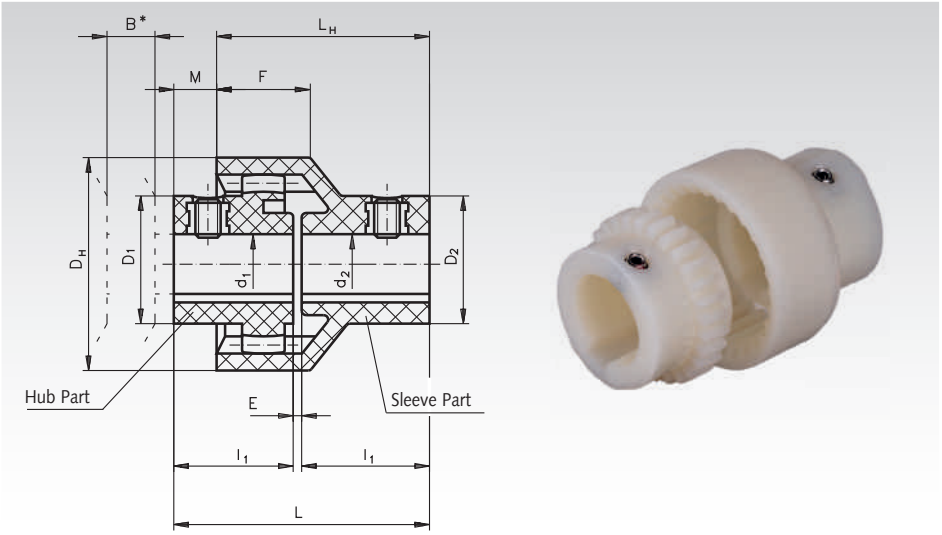
Curved-Tooth Gear Couplings BW, Polyamide 6.6

Bore tolerance + 0.05/-0.10 mm with feather keyways according to DIN 6885/1.

Largest axial displacement = max. ±1 mm.
Largest angular displacement = max. ±1°.
No radial displacement. The permissible displacement values are dependent on power and speed.

Max. speed: 6000 min^{-1}

Both parts have to be ordered seperately.



Ordering Details: e.g.:
1 Item Coupling BW, Bore d_1 = 6, d_2 = 10 mm:
1 Item Product No. 607 006 00 Hub Part
1 Item Product No. 606 110 00 Sleeve Part

Product No. Hub	Size	d_1 mm	D_1 mm	Product No. Sleeve	d_2 mm	D_2 mm	Torque normal Nm	Torque peak Nm	D_H mm	B* mm	l_1 mm	E mm	L mm	L_H mm	M mm	F mm	Weight Hub g	Weight Sleeve g
607 006 00	14	6	22	-	-	-	5	10	40	15	23	2	48	40	8	18,5	13,5	-
607 007 00	14	7	22	-	-	-	5	10	40	15	23	2	48	40	8	18,5	13,5	-
607 008 00	14	8	22	-	-	-	5	10	40	15	23	2	48	40	8	18,5	13,5	-
607 009 00	14	9	22	-	-	-	5	10	40	15	23	2	48	40	8	18,5	13,5	-
607 010 00	14	10	23	**606 110 00**	10	25	5	10	40	15	23	2	48	40	8	18,5	13,5	28
607 011 00	14	11	23	**606 111 00**	11	25	5	10	40	15	23	2	48	40	8	18,5	13,5	28
607 012 00	14	12	26	**606 112 00**	12	26	5	10	40	15	23	2	48	40	8	18,5	13,5	28
607 014 00	14	14	26	**606 114 00**	14	26	5	10	40	15	23	2	48	40	8	18,5	13,5	28
607 212 00	19	12	27	-	-	-	8	16	47	16	25	2	52	42	10	19,0	15,5	-
607 214 00	19	14	27	**606 314 00**	14	29	8	16	47	16	25	2	52	42	10	19,0	15,5	32
607 216 00	19	16	30	**606 315 00**	15	29	8	16	47	16	25	2	52	42	10	19,0	15,5	32
607 219 00	19	19	32	**606 319 00**	19	35	8	16	47	16	25	2	52	42	10	19,0	15,5	32
607 410 00	24	10	26	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 411 00	24	11	26	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 412 00	24	12	26	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 414 00	24	14	32	**606 514 00**	14	32	12	24	53	17	26	2	54	45	9	21,5	25	45
607 415 00	24	15	32	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 416 00	24	16	32	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 418 00	24	18	36	-	-	-	12	24	53	17	26	2	54	45	9	21,5	25	-
607 419 00	24	19	36	**606 519 00**	19	36	12	24	53	17	26	2	54	45	9	21,5	25	45
607 420 00	24	20	36	**606 520 00**	20	36	12	24	53	17	26	2	54	45	9	21,5	25	45
607 424 00	24	24	38	**606 524 00**	24	40	12	24	53	17	26	2	54	45	9	21,5	25	45

* B is the minimum dimension by which a machine part has to be moved in order to demount one of the coupled units in vertical direction.

General

All parts of the couplings are made from plastic (polyamide). This means large wear resistance and excellent resistance to oils, fats, grease, fuels, alcohols, esters, ketones, and grachatic hydrocarbons. But concentrated mineral acids, formic acid, kresol, glycol and benzyl alcohol can - especially at higher temperatures - dissolve polyamide 6.6. The plastics are resistant to condensation and splash water. Operating temperature -25°C to +100°C.

The torque of the couplings is transmitted from the first hub with the toothing via the sleeve part with straight inner toothing onto the second hub. Horizontal as well as vertical shaft connection is possible. The curved-tooth gear couplings BW compensate angular and axial misalignment of the shafts.

When running the coupling in, the outer layer of the plastic teeth is worn away. The resulting flocculent abrasion is not to be interpreted as wear. Simple mounting - no maintenance - low weight - long service life.

Mounting

Align shafts, put feather keys into the keyways, push hub and sleeve part onto the shaft. The set screws can be entered. Now the hub part is pushed that far into the sleeve part, that a gap of 2mm remains between the shaft ends. Then the set screws have to be tightened firmly.

Curved-Tooth Gear Couplings BOZ, Polyamide 6.6

Tolerance of the bore + 0.05/-0.10 mm with feather keyway according to DIN 6885/1.

Largest axial displacement = max. ± 1 mm.
Largest angular displacement = max. ± 1°. per hub part.

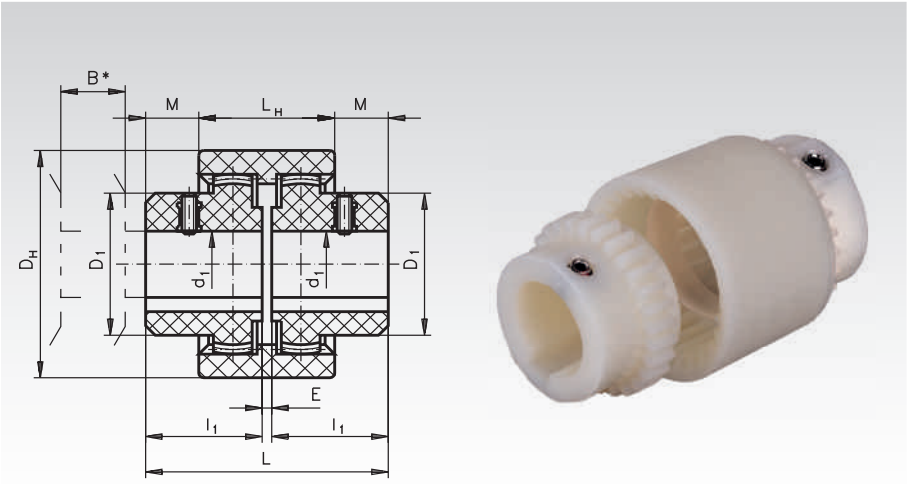
Largest radial displacement at 1500 min^{-1}.
Product No. 607 000 00 to 607 200 00 = max. 0.3 mm.
Product No. 607 400 00 = max. 0.35 mm.

The permissible displacement values are dependent on power and speed.

Max. speed: 6,000 min^{-1}.

All 3 parts have to be ordered seperately.

Ordering Details: e.g.:
1 Item Coupling BOZ 5 Nm
Bore d_1 = 8, d_2 = 10 mm:
1 Item Product No. 607 000 00, Sleeve Part
1 Item Product No. 607 008 00, Hub Part d_1
1 Item Product No. 607 010 00, Hub Part d_2



Product No. Hub	Size	d_1 mm	Product No. Sleeve	Torque normal Nm	Torque peak Nm	D_1 mm	D_H mm	B* mm	l_1 mm	E mm	L mm	L_H mm	M mm	Weight Hub g	Weight Sleeve g
607 006 00	14	6	**607 000 00**	5	10	22	40	15	23	4	50	37	6,5	13,5	27
607 007 00	14	7	**607 000 00**	5	10	22	40	15	23	4	50	37	6,5	13,5	27
607 008 00	14	8	**607 000 00**	5	10	22	40	15	23	4	50	37	6,5	13,5	27
607 009 00	14	9	**607 000 00**	5	10	22	40	15	23	4	50	37	6,5	13,5	27
607 010 00	14	10	**607 000 00**	5	10	23	40	15	23	4	50	37	6,5	13,5	27
607 011 00	14	11	**607 000 00**	5	10	23	40	15	23	4	50	37	6,5	13,5	27
607 012 00	14	12	**607 000 00**	5	10	26	40	15	23	4	50	37	6,5	13,5	27
607 014 00	14	14	**607 000 00**	5	10	26	40	15	23	4	50	37	6,5	13,5	27
607 212 00	19	12	**607 200 00**	8	16	27	47	16	25	4	54	37	8,5	15,5	34
607 214 00	19	14	**607 200 00**	8	16	27	47	16	25	4	54	37	8,5	15,5	34
607 216 00	19	16	**607 200 00**	8	16	30	47	16	25	4	54	37	8,5	15,5	34
607 219 00	19	19	**607 200 00**	8	16	32	47	16	25	4	54	37	8,5	15,5	34
607 410 00	24	10	**607 400 00**	12	24	26	53	17	26	4	56	41	7,5	25	40
607 411 00	24	11	**607 400 00**	12	24	26	53	17	26	4	56	41	7,5	25	40
607 412 00	24	12	**607 400 00**	12	24	26	53	17	26	4	56	41	7,5	25	40
607 414 00	24	14	**607 400 00**	12	24	32	53	17	26	4	56	41	7,5	25	40
607 415 00	24	15	**607 400 00**	12	24	32	53	17	26	4	56	41	7,5	25	40
607 416 00	24	16	**607 400 00**	12	24	32	53	17	26	4	56	41	7,5	25	40
607 418 00	24	18	**607 400 00**	12	24	36	53	17	26	4	56	41	7,5	25	40
607 419 00	24	19	**607 400 00**	12	24	36	53	17	26	4	56	41	7,5	25	40
607 420 00	24	20	**607 400 00**	12	24	36	53	17	26	4	56	41	7,5	25	40
607 424 00	24	24	**607 400 00**	12	24	38,5	53	17	26	4	56	41	7,5	25	40

* B is the minimum dimension by which a machine part has to be moved in order to demount one of the coupled units in vertical direction.

General

The couplings BOZ are double-cardanic couplings to compensate radial and angular misalignment.
All parts of the couplings are made from plastic (polyamide) and consist of one sleeve part with 2 internal toothings and 2 hub parts d_1 and d_2 with external toothing.
This means large wear resistance and excellent resistance to oils, fats, grease, fuels, alcohols, esters, ketones, and grachatic hydrocarbons. But concentrated mineral acids, formic acid, kresol, glycol and benzyl alcohol can - especially at higher temperatures - dissolve polyamide 6.6. The plastics are resistant to condensation and splash water. Operating temperature -25°C to +100°C.

When running the coupling in, the outer layer of the plastic teeth is worn away. The resulting flocculent abrasion is not to be interpreted as wear. Simple mounting - no maintenance - low weight - long service life.

Mounting

Align shafts, put feather keys into the keyways, push hub and sleeve part onto the shaft. The set screws can be entered. Now the hub part is pushed that far into the sleeve part, that a gap of 4mm remains between the shaft ends. Then the set screws have to be tightened firmly.

Curved-Tooth Gear Couplings BOS II made from Polyamide/Sintered Metal

Material: Sleeve part: polyamide 6.6.
Hub parts: sintered metal, burnished.

Bore tolerance H7 with keyways DIN 6885/1 and set screws (2 screws per hub).

Hubs with * are pre-bored, without keyway and without set screw threads.

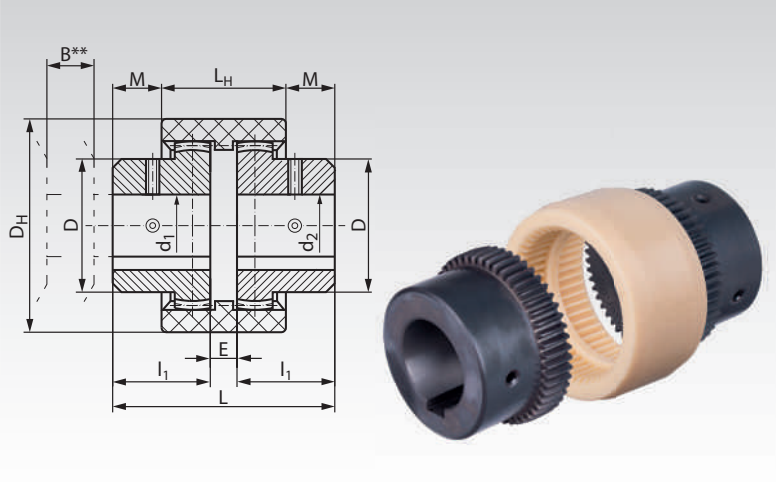
Axial displacement = max. ± 2 mm per hub.
Angular displacement = max. ± 1° per hub.
Radial displacement = max. 0.3 mm at 1500 min^{-1}.
The permissible displacement values are dependent on power and speed.

Temperature range: -40°C to +80°C,
short time up to +120°C.

All 3 parts have to be ordered seperately.

Other sizes and bores on request.

Ordering Details: e.g. for coupling Size 14, with bore 8mm and bore 10mm:
1 Item Product No. 607 614 08 Hub, size 14, bore 8mm
1 Item Product No. 607 614 10 Hub, size 14, bore 10mm
1 Item Product No. 607 614 00 Sleeve, size 14



Position of set screws:
1 x on opposite of keyway, 1 x 90° displaced.

Product No. Hub	Size	Hub-bore d_1 / d_2	Product No. Sleeve	Torque normal Nm	Torque peak Nm	Speed max. min^{-1}	D mm	D_H mm	B** mm	l_1 mm	E mm	L mm	L_H mm	M mm	Weight Hub g	Weight Sleeve g
607 614 01*	14	5*	**607 614 00**	12	22	13000	25	41	14	20	9	49	37	6	80	25
607 614 08	14	8	**607 614 00**	12	22	13000	25	41	14	20	9	49	37	6	80	25
607 614 10	14	10	**607 614 00**	12	22	13000	25	41	14	20	9	49	37	6	80	25
607 614 12	14	12	**607 614 00**	12	22	13000	25	41	14	20	9	49	37	6	80	25
607 614 14	14	14	**607 614 00**	12	22	13000	25	41	14	20	9	49	37	6	80	25
607 619 01*	19	10*	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 10	19	10	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 12	19	12	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 14	19	14	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 15	19	15	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 16	19	16	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 619 19	19	19	**607 619 00**	18	30	11000	32	48	14	21	9	51	37	7	100	35
607 624 01*	24	10*	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 12	24	12	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 14	24	14	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 15	24	15	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 16	24	16	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 19	24	19	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 20	24	20	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35
607 624 24	24	24	**607 624 00**	24	36	10000	36	52	13,5	21	13	55	40	7,5	150	35

* Hubs pre-bored, without keyway, set screw threads and screws.

** B is the minimum dimension by which a machine part has to be moved in order to demount one of the coupled units in vertical direction.

General

When running the coupling in, the outer layer of the plastic teeth is worn away. The resulting flocculent abrasion is not to be interpreted as wear. Simple mounting - no maintenance - low weight - long service life.

Mounting

Align shafts, put feather keys into the shafts, push hubs onto the shafts. Push the hubs into the sleeve part, until you reach length L. The distance between the shafts should be measure E. Then the set screws have to be tightened firmly.

Curved-Tooth Gear Couplings BOS II made from Polyamide/Sintered Metal

Material: Sleeve part: polyamide 6.6.
Hub parts: sintered metal, burnished.

Bore tolerance H7 with keyways DIN 6885/1 and set screws (2 screws per hub).

Hubs with * are pre-bored, without keyway and without set screw threads.

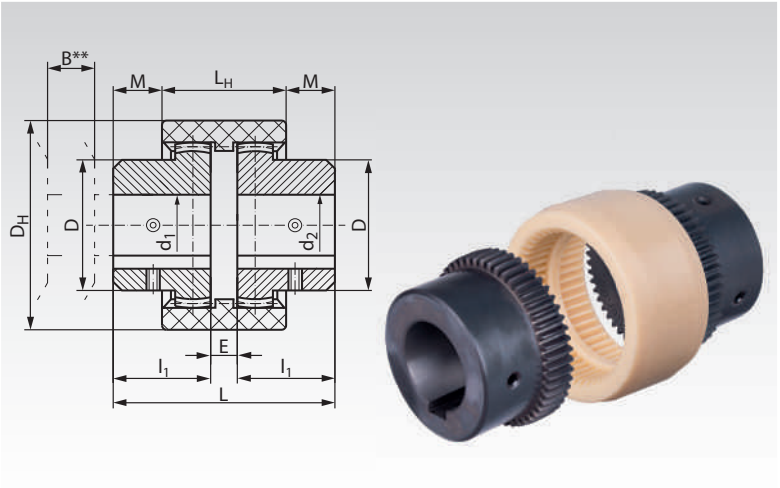
Axial displacement = max. ± 2 mm per hub.
Angular displacement = max. ± 1° per hub.
Radial displacement = max. 0.3 mm at 1500 min^{-1}.
The permissible displacement values are dependent on power and speed.

Temperature range: -40°C to +80°C, short time up to +120°C.

All 3 parts have to be ordered seperately.

Other sizes and bores on request.

Ordering Details: e.g. for coupling Size 28, with bore 14m and bore 15mm:
1 Item Product No. 607 628 14 Hub, size 28, bore 14mm
1 Item Product No. 607 628 15 Hub, size 28, bore 15mm
1 Item Product No. 607 628 00 Sleeve, size 28



Position of set screws:
1 x on keyway, 1 x 90° displaced.

Product No. Hub	Size	Hub-bore d_1 / d_2	Product No. Sleeve	Torque normal Nm	Torque peak Nm	Speed max. min^{-1}	D mm	D_H mm	B** mm	l_1 mm	E mm	L mm	L_H mm	M mm	Weight Hub g	Weight Sleeve g
607 628 01*	28	6*	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 14	28	14	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 15	28	15	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 16	28	16	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 18	28	18	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 19	28	19	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 20	28	20	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 22	28	22	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 24	28	24	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 628 25	28	25	**607 628 00**	48	85	8000	44	67	16,5	35	13	83	46	18,5	380	70
607 632 01*	32	12*	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 632 19	32	19	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 632 20	32	20	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 632 22	32	22	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 632 24	32	24	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 632 25	32	25	**607 632 00**	65	110	7300	50	76	17	35	13	83	47	18	500	90
607 638 01*	38	12*	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 638 19	38	19	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 638 20	38	20	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 638 22	38	22	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 638 25	38	25	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 638 30	38	30	**607 638 00**	95	170	6500	58	84	17,5	35	13	83	48	17,5	650	105
607 642 01*	42	12*	**607 642 00**	115	220	6200	68	93	17,5	38	14	90	49	20,5	930	130
607 642 25	42	25	**607 642 00**	115	220	6200	68	93	17,5	38	14	90	49	20,5	930	130
607 642 30	42	30	**607 642 00**	115	220	6200	68	93	17,5	38	14	90	49	20,5	930	130
607 642 35	42	35	**607 642 00**	115	220	6200	68	93	17,5	38	14	90	49	20,5	930	130
607 642 38	42	38	**607 642 00**	115	220	6200	68	93	17,5	38	14	90	49	20,5	930	130
607 648 01*	48	12*	**607 648 00**	160	300	5500	68	98	19	45	11	101	49	26	1100	160
607 648 30	48	30	**607 648 00**	160	300	5500	68	98	19	45	11	101	49	26	1100	160
607 648 35	48	35	**607 648 00**	160	300	5500	68	98	19	45	11	101	49	26	1100	160
607 648 38	48	38	**607 648 00**	160	300	5500	68	98	19	45	11	101	49	26	1100	160
607 648 40	48	40	**607 648 00**	160	300	5500	68	98	19	45	11	101	49	26	1100	160

* Hubs pre-bored, without keyway, set screw threads and screws.

** B is the minimum dimension by which a machine part has to be moved in order to demount one of the coupled units in vertical direction.

General

Simple mounting - no maintenance - long service life.
When running the coupling in, the outer layer of the plastic teeth is worn away. The resulting flocculent abrasion is not to be interpreted as wear.

Mounting

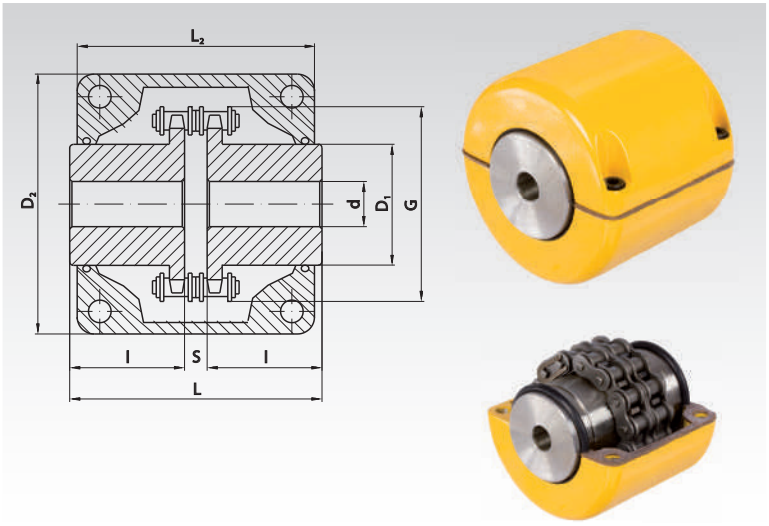
Align shafts, put feather keys into the shafts, push hubs onto the shafts. Push the hubs into the sleeve part, until you reach length L. The distance between the shafts should be measure E. Then the set screws have to be tightened firmly.

Chain Couplings with Casing

Material: Chain wheels made from steel, teeth hardened.
Chain with clip link made from steel.
Casing made from aluminium, yellow painted,
with o-ring-seals.

- Elastic transmission of torque.
- Compensation of large shaft disalignment.
- Fast declutching by simply loosening the chain.
- Axial shaft movement is allowed.
- Not for strong shocks recommend.

The chain wheels are pre-bored. Customized bores, featherkeys and setscrew threads against extra charge.
At mounting, the casing has to be filled with grease.
Temperature range: -30°C to +120°C.



Ordering Details: e.g.: Product No. 140 330 12, Chain Coupling Type 3012

Product No. Coupling complete	Type	Chain-size DIN	Torque Nom. Nm	Torque Peak Nm	Speed max. min^{-1}	d mm	$d_{max.}$ mm	D_1 mm	D_2 mm	G mm	L mm	L_2 mm	l mm	s mm	Weight kg	Product No. spare part Chain	Weight kg
140 330 12	3012	06 B-2	45	190	5000	12	16	27,2	69	45	65,0	63	29,5	6,0	0,53	**140 331 12**	0,09
140 340 12	4012	08 A-2	110	249	4800	12	22	36	77	62	79,4	72	36,0	7,4	1,03	**140 341 12**	0,18
140 340 14	4014	08 A-2	150	329	4800	12	28	45	84	69	79,4	75	36,0	7,4	1,43	**140 341 14**	0,21
140 340 16	4016	08 A-2	180	419	4800	13,5	32	51,5	92	77	87,4	75	40,0	7,4	1,85	**140 341 16**	0,24
140 350 14	5014	10 A-2	250	620	3600	14,5	35	56	101	86	99,7	85	45,0	9,7	2,62	**140 351 14**	0,43
140 350 16	5016	10 A-2	300	791	3600	14,5	40	64	111	96	99,7	85	45,0	9,7	3,25	**140 351 16**	0,49
140 350 18	5018	10 A-2	380	979	3000	16	45	73,5	122	106	99,7	85	45,0	9,7	4,20	**140 351 18**	0,55
140 360 18	6018	12 A-2	630	1810	2500	20	56	89,5	147	127	123,5	105	56,0	11,5	7,75	**140 361 18**	0,99
140 360 20	6020	12 A-2	770	2210	2500	20	60	102,5	160	139	123,5	105	56,0	11,5	9,58	**140 361 20**	1,11

Chain Couplings

Material: Steel, with double-strand chain DIN 8187.

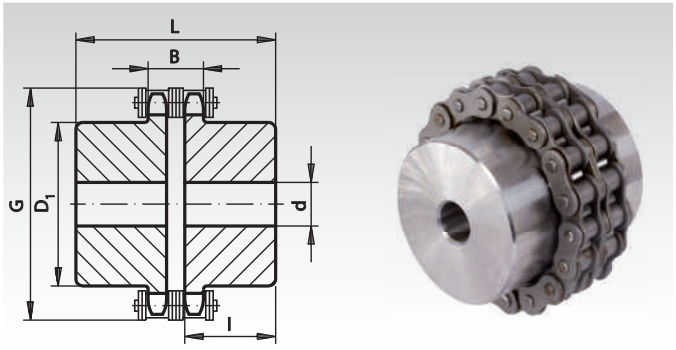
The couplings are delivered assembled or unassembled.
The chain is packed separately. Number of teeth = 18.

- Elastic transmission of torque.
- Compensation of large shaft disalignment.
- Fast declutching by simply loosening the chain.
- Axial shaft movement is allowed.
- Not for strong shocks recommend.

The chain wheels are pre-bored. Customized bores, featherkeys and setscrew threads against extra charge.

Temperature range: -30°C to +220°C.

Ordering Details: e.g.: Product No. 140 301 00, Chain Coupling 06 B-2



Product No.	DIN-ISO	Nominal* Torque Nm	Moment of Inertia mD^2 kgm^2	P/n* max. kW/min^{-1}	n max. min^{-1}	d min. mm	D_1 Ø mm	l mm	B mm	Max. Space required G mm	Max. Space required L mm	Weight kg
140 301 00	06 B-2	95	0,00117	0,0097	6000	12	45	25	15,2	63,9	55	0,78
140 304 00	08 B-2	240	0,00474	0,0246	5500	15	60	32	20,7	86	71	1,83
140 308 00	10 B-2	380	0,013	0,039	4500	15	75	35	25	107	78	3,21
140 312 00	12 B-2	600	0,0301	0,0616	3000	25	90	40	29,5	126,5	89,5	4,97
140 316 00	16 B-2	1480	0,158	0,1519	2500	30	120	60	46,7	170	137	12,30

* Selection according to the ratio of driving power to speed (P/n), the nominal torque must not be exceeded (incl. operating factor).

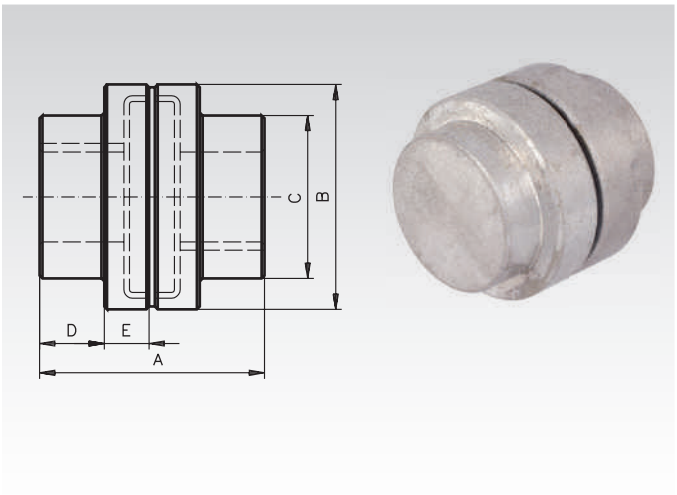
Elastic Couplings MU

Material: The two halves of the coupling are made from magnesium alloy. Insert made from neoprene.

These couplings are particularly suited for pump drives, requiring high torque combined with a low-weight coupling. The two halves of the coupling are made from special magnesium alloy. This keeps the weight of the coupling down. The insert, made from neoprene, elastically assimilates shock loads. The rim of the neoprene insert automatically leads to the correct axial clearance. Its sealing property also means that the coupling does not need to be protected, even in dusty environments.
No frictional corrosion, i.e., easy disassembly even after longterm use. The two halves of the coupling offer full electric insulation.

Couplings are available pre-drilled ex stock.
Customized bores and feather-key grooves available at extra charge.

Temperature range: -30°C to +120°C.



Ordering Details: e.g.: Product No. 603 022 00, Coupling MU, without Bore

Product No.	Torque nominal Nm	Torque max. Nm	max. Speed min^{-1}	Bores pre-bored mm	Bores max. mm	A mm	B mm	C mm	D mm	E mm	Distance between Shaft Ends min. mm	Distance between Shaft Ends max. mm	Weight kg
603 022 00	38,5	150	23100	-	22	66	66	51	14	17	1,6	19	0,34
603 028 00	45	200	19900	-	28	79	74	57	17	21	1,6	22	0,45
603 038 00	79	380	15800	-	38	92	88	74	20	24	1,6	22	0,9
603 044 00	119	600	14700	-	44	109	102	77	26	27	1,6	28,6	1,36
603 057 00	248	800	11200	-	57	120	122	102	27	31	1,6	32	1,8
603 064 00	559	1580	9800	-	64	152	152	114	41	34	1,6	35	3,17
603 073 00	1315	2500	8600	-	73	180	175	132	53	33	1,6	47,6	5,4

Product No. of coupling	**Product No. Spare Part Insert**	Weight g
603 022 00	**603 122 00**	20
603 028 00	**603 128 00**	46
603 038 00	**603 138 00**	50
603 044 00	**603 144 00**	60

Product No. of coupling	**Product No. Spare Part Insert**	Weight g
603 057 00	**603 157 00**	70
603 064 00	**603 164 00**	80
603 073 00	**603 173 00**	90

Highly Elastic Couplings PU

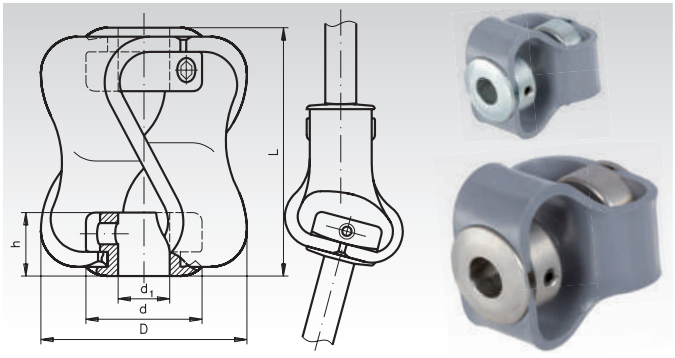
Materials: Polyester, hubs either zinc plated steel or stainless steel 1.4305.

STAINLESS

These torsionally-stiff couplings made in one-part from flexible plastic are easily mounted.

They show very good chemical resistance against acids, bases, solvents, greases and oils. They have a very high tear resistance, are highly flexible at low temperatures, have good shock and vibration damping properties and are corrosion resistant.

Max. speed: 3000 min^{-1}.
Temperature range: -40°C to +100°C.



Ordering Details: e.g.: Product No. 603 201 00, Highly Elastic Coupling PU, zinc-plated

Product No. zinc-plated	**Product No.** stainless	torque[1] Nm	Bore[2] d_1 +0,03 mm	Ø D mm	max. Length L mm	Hub-Ø d mm	Hub Length h mm	max. Misalignment Angular Degrees	max. Misalignment Radial mm	max. Misalignment Axial mm	Screw size	Weight g
603 201 00	**603 992 01**	0,5 (0,8)	6 (10)	27	27	18	7,9	10	2,6	4,5	M3	25
603 202 00	**603 992 02**	1,8 (3)	10 (12,7)	48	48	25	12,7	15	3,2	7,5	M4	92
603 205 00	**603 992 05**	5 (8)	12 (16)	54	55	28	16	15	3,2	8,5	M5	124
603 210 00	**603 992 10**	10 (18)	14 (16)	56	56	28	16	15	3,2	11	M6	136

[1] Max. torque at max. shaft displacement. The bracketed values are valid for a shaft displacement of 1°, 0.5mm radial and 2mm axial.
[2] Standard bore. Other bore sizes on request. Bracketed values: Max. possible bores.

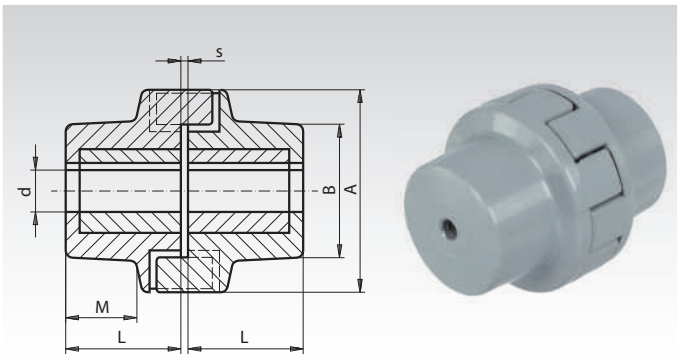
Reworking within 24h-service possible. Custom made parts on request.

Elastic Couplings ME

Material: Polyamide.

These plastic couplings consist of only two parts. There are none of the usual toothed rings or rubber inserts. The coupling bodies are made from polyamide. From 3 Nm, the bores of the coupling are lined with an aluminium bush. Immaculate functioning at operating temperatures of -25° to +80°C, short term up to +100°C. The couplings are resistant to condensation and splash water, as well as oil, grease, fat, fuel, alcohol and bases, but not resistant to phenol, acids and benzyl alcohol. The couplings require no maintenance. A single application of fat or oil onto the contact areas when mounting the coupling does however increase the service life.

Couplings are available pre-drilled ex stock.
Customized bores and feather-key grooves available at extra charge.



Ordering Details: e.g.: Product No. 603 310 00, Coupling ME, Pre-drilled

Product No.	Nominal Torque Nm	Bores d pre-drilled mm	Bores d max. mm	A mm	B mm	L mm	M mm	S min. mm	S normal mm	S* max. mm	Speed max. min^{-1}	Weight kg
603 310 00	0,3	4,9	10	35	20	20	12	1,5	2	2,5	10000	0,02
603 318 00	3	5,9	18	50	35	30	19	1,5	2	2,5	9000	0,13
603 324 00	15	7,9	24	65	45	40	25	2	3	4	7000	0,33
603 332 00	40	11,8	32	80	55	50	34	2	3	4	5000	0,58

* S max. must not be exceeded at axial or angular displacement.

Elastic Couplings RN

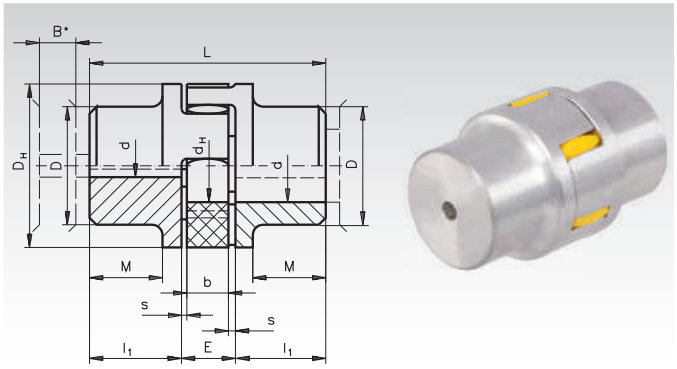
Material: Hubs made from aluminium, plastic spider (insert) made from polyurethane, shore hardness 92° (yellow**).

Spare part plastic insert available in 92° an 98° Shore (red).

Couplings are available undrilled or pre-drilled ex stock.

Customized bores and feather-key grooves available at extra charge.

Temperature range: -40°C to +90°C.

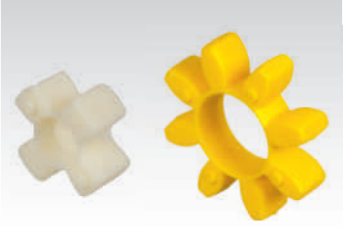


Ordering Details: e.g.: Product No. 605 197 00, Coupling RN

Product No.	Size	Torque nominal Nm	Torque max. Nm	Bores d pre-drilled mm	Bores d max. mm	max. Speed at 30m/s min^{-1}	Torsional Angle at max. Nm	B* mm	l_1 mm	E mm	s mm	b mm	L mm	M mm	D_H mm	D mm	d_H mm	Weight[1] kg
605 197 00**	7	1,12	2,24	-	6,35	40000	2°	7	7	8	1	6	22	-	14	14	-	0,007
605 198 00**	9	2,93	6	-	9	28000	2°	9	10	10	1	8	30	-	20	20	7	0,017
605 199 00	14	7,5	15	-	15	19000	10°	11	11	13	1,5	10	35	-	30	30	10	0,05
605 200 00	19	10	20	5,0	19	14000	5°	13	25	16	2	12	66	20	40	32	18	0,15
605 201 00	24	35	70	7,0	24	10600	5°	15	30	18	2	14	78	24	55	40	27	0,27
605 202 00	28	95	190	9,0	28	8500	5°	16	35	20	2,5	15	90	28	65	48	30	0,46
605 203 00	38	190	380	13,6	38	7100	5°	19	45	24	3	18	114	37	80	66	38	0,98
605 204 00	42	265	530	20,0	42	6000	5°	21	50	26	3	20	126	40	95	75	46	1,15
605 205 00	48	310	620	20,0	48	5600	5°	22	56	28	3,5	21	140	45	105	85	51	1,95

* B is the average dimension by which, e.g., a driven or driving machine has to be moved in order to demount one of the coupled units in radial direction.
** Size 7 and 9: With white insert. [1] Weights refer to max. customized bore without keyways.

Matches coupling Product No.	Size	**Product No.** Spare Part Spider 92° Shore, yellow	Torque nominal Nm	Torque max. Nm	**Product No.** Optional Spider 98° Shore, red	Torque Nominal Nm	Torque max. Nm	Weight g
605 197 00	7	**605 192 07****	1,12	2,24	–	–	–	0,7
605 198 00	9	**605 192 09****	2,93	5,86	–	–	–	1,8
605 199 00	14	**605 092 14**	7,5	15	**605 098 14**	12,5	25	5
605 200 00	19	**605 092 19**	10	20	**605 098 19**	17	34	7
605 201 00	24	**605 092 24**	35	70	**605 098 24**	60	120	22
605 202 00	28	**605 092 28**	95	190	**605 098 28**	160	320	32
605 203 00	38	**605 092 38**	190	380	**605 098 38**	325	650	58
605 204 00	42	**605 092 42**	265	530	**605 098 42**	450	900	70
605 205 00	48	**605 092 48**	310	620	**605 098 48**	525	1050	98



** Size 7 and 9: White insert.

Elastic Couplings RNG

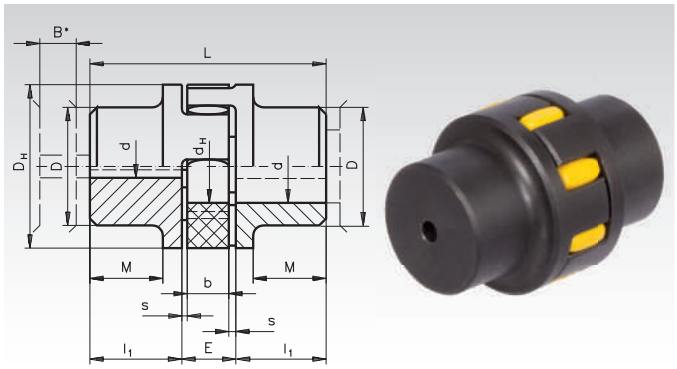
Material: Coupling hubs: Grey Cast Iron GJL25.
Spider (insert): Polyurethane, hardness 92°A Shore (yellow).

Spare part plastic spider available in 92°A (yellow), 98°A (red) or 64°D (green).

Couplings are pre-bored ex stock.

Customized bores and feather-key grooves available at extra charge.

Temperature range: -40°C to +90°C.



Ordering Details: e.g.: Product No. 605 300 00, Coupling RNG

Product No.	Size	Torque nominal Nm	Torque max. Nm	Bores d pre-drilled mm	Bores d max. mm	max. Speed at 30m/s min^{-1}	Torsional Angle at max. Nm	B* mm	l_1 mm	E mm	s mm	b mm	L mm	M mm	D_H mm	D mm	d_H mm	Weight[1] kg
605 300 00	19	10	20	5	19	14000	5	13	25	16	2,0	12	66	20	40	32	18	0,41
605 301 00	24	35	70	7	24	10600	5	15	30	18	2,0	14	78	24	55	40	27	0,73
605 302 00	28	95	190	9	28	8500	5	16	35	20	2,5	15	90	28	65	48	30	1,24
605 303 00	38	190	380	13	38	7100	5	19	45	24	3,0	18	114	37	80	66	38	2,1
605 304 00	42	265	530	13	42	6000	5	21	50	26	3,0	20	126	40	95	75	46	3,2
605 305 00	48	310	620	16	48	5600	5	22	56	28	3,5	21	140	45	105	85	51	4,4
605 307 00	55	410	820	16	55	4750	5	23	65	30	4,0	22	160	52	120	98	60	6,6
605 308 00	65	625	1250	18	70	4250	5	27	75	35	4,5	26	185	61	135	115	68	10,1
605 309 00	75	1280	2560	25	80	3550	5	32	85	40	5,0	30	210	69	160	135	80	16,0
605 310 00	90	2400	4800	29	97	2800	5	36	100	45	5,5	34	245	81	200	160	100	27,5
605 311 00	100	3300	6600	29	115	2500	5	40	110	50	6,0	38	270	89	225	180	113	34,5

* B is the average dimension by which, e.g., a driven or driving machine has to be moved in order to demount one of the coupled units in radial direction.

[1] Weights refer to max. customized bore without keyways.

Spare part spiders page 391

Elastic Couplings RNI, Stainless Steel

Material: Coupling hubs: Stainless steel 1.4301.
Spider (insert): Polyurethane, hardness 92°A Shore (yellow).

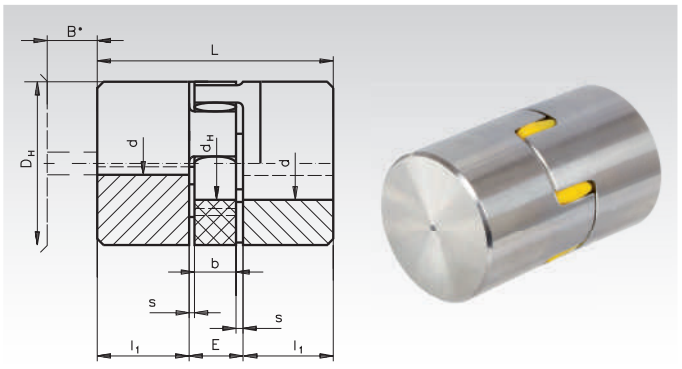
STAINLESS

Spare part plastic spider available in 92°A (yellow), 98°A (red) or 64°D (green).

Couplings are pre-bored ex stock.

Custom bores or feather keyways available at extra charge.

Temperature range: -20°C to +80°C.



Ordering Details: e.g.: Product No. 605 992 00, Coupling RNI, without Bore

Product No.	Size	Torque nominal Nm	Torque peak Nm	d mm	d max. mm	max. Speed at 30 m/s min^{-1}	Torsional angle at max. Nm Degrees	B* mm	l_1 mm	E mm	s mm	b mm	L mm	D_H mm	d_H mm	Weight kg
605 992 00	19	10	20	-	25	14000	5	13	25	16	2,0	12	66	40	18	0,44
605 992 01	24	35	70	-	35	10600	5	15	30	18	2,0	14	78	55	27	0,78
605 992 02	28	95	190	-	40	8500	5	16	35	20	2,5	15	90	65	30	1,33
605 992 03	38	190	380	-	48	7100	5	19	45	24	3,0	18	114	80	38	2,84
605 992 04	42	265	530	-	55	6000	5	21	50	26	3,0	20	126	95	46	3,34
605 992 05	48	310	620	-	62	5600	5	22	56	28	3,5	21	140	105	51	5,66

* B is the average dimension by which, e.g., a driven or driving machine has to be moved in order to demount one of the coupled units in radial direction.

[1] Weights refer to max. customized bore without keyways.

Spare part spiders page 391

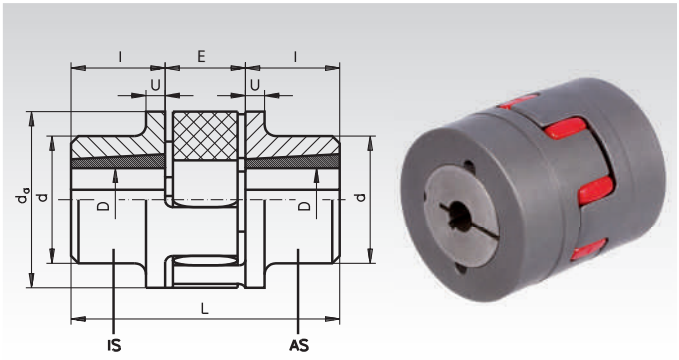
Operating Instructions at www.maedler.de in the section Downloads

Elastic Couplings RNT for Taper Bushes

Material: Coupling hubs: Grey Cast Iron GJL25.
Spider (insert): Polyurethane, hardness 92°A or 98°A Shore.

Two coupling hubs combined with an insert and two taper bushes make up a ready-to-install elastic coupling. **All components have to be ordered separately.** This means accessibility (mounting from the inside or outside) and various bore diameters can be chosen. Temperature range: -20°C to +80°C.

Design IS: Mounting of bush from inside.
Design AS: Mounting of bush from outside.



Ordering Details: e.g.: Product No. 605 201 01, Coupling Hub RNT, Version IS
605 201 01, Coupling Hub RNT, Version AS
605 092 24, Spider
and two matching Clamping Bushes 2x 622 501...

Hubs for Couplings RNT

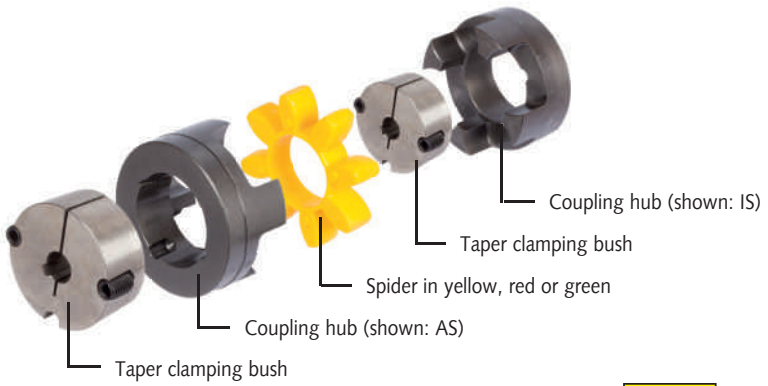
Product No. Coupling hub	Hub version	Size	Nominal Torque 92 Sh Nm	Nominal Torque 98 Sh Nm	d_a mm	d mm	L mm	l mm	U mm	E mm	Bore D min. mm	Bore D max. mm	Bush No.	Speed max. at V=40 m/s min^{-1}	Weight kg
605 201 01	IS	24	35	60	55	55	64	23	-	18	10	25	1008	14000	0,4
605 201 02	AS	24	35	60	55	55	64	23	-	18	10	25	1008	14000	0,4
605 202 01	IS	28	95	160	65	65	66	23	-	20	10	28	1108	11800	0,6
605 202 02	AS	28	95	160	65	65	66	23	-	20	10	28	1108	11800	0,6
605 203 01	IS	38	190	325	80	78	70	23	8	24	10	28	1108	9500	0,9
605 203 02	AS	38	190	325	80	78	70	23	8	24	10	28	1108	9500	0,9
605 204 01	IS	42	265	450	95	94	78	26	10	26	12	42	1610	8000	1,5
605 204 02	AS	42	265	450	95	94	78	26	10	26	12	42	1610	8000	1,5
605 205 01	IS	48	310	525	105	104	106	39	11	28	18	42	1615	7100	2,6
605 205 02	AS	48	310	525	105	104	106	39	11	28	18	42	1615	7100	2,6
605 206 01	IS	55	410	685	120	118	96	33	13	30	12	50	2012	6300	2,8
605 206 02	AS	55	410	685	120	118	96	33	13	30	12	50	2012	6300	2,8
605 207 01	IS	65	625	940	135	115	101	33	14	35	12	50	2012	5600	3,5
605 207 02	AS	65	625	940	135	115	101	33	14	35	12	50	2012	5600	3,5
605 208 01	IS	75	1280	1920	160	135	144	46	10	40	16	65	2517	4750	6,9
605 208 02	AS	75	1280	1920	160	135	144	46	10	40	16	65	2517	4750	6,9
605 209 01	IS	90	2400	3600	200	160	149	52	19	45	25	75	3020	3750	9,6
605 209 02	AS	90	2400	3600	200	160	149	52	19	45	25	75	3020	3750	9,6

Spiders for Couplings RNT (Page 391)

Size	Ø mm	Product No. 92° Shore A yellow	Transmittable torque nominal Nm	max. Nm	alternat. Nm	Product No. 98° Shore A red	Transmittable torque nominal Nm	max. Nm	alternat. Nm	Weight kg
24	55	**605 092 24**	35	70	9,1	**605 098 24**	60	120	16	0,02
28	65	**605 092 28**	95	190	25	**605 098 28**	160	320	42	0,03
38	80	**605 092 38**	190	380	49	**605 098 38**	325	650	85	0,06
42	95	**605 092 42**	265	530	69	**605 098 42**	450	900	117	0,07
48	105	**605 092 48**	310	620	81	**605 098 48**	525	1050	137	0,10
55	120	**605 092 55**	410	820	107	**605 098 55**	685	1370	178	0,12
65	135	**605 092 65**	625	1250	163	**605 098 65***	940	1880	244	0,21
75	160	**605 092 75**	1280	2560	333	**605 098 75***	1920	3840	499	0,34
90	200	**605 092 90**	2400	4800	624	**605 098 90***	3600	7200	936	0,70

* From size 65 shore hardness 95°A.

Note: Spiders with hardness 64°D Shore are not recommended for taper couplings.



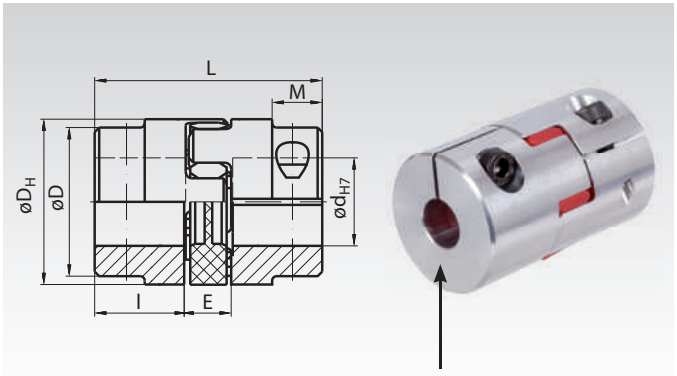
Taper Bushes
Page 360

Elastic Couplings RNK, backlash-free, with clamps

Material: Size 5 - 38: Hubs made from Aluminium.
From size 42, made from steel. Spider made from Polyurethane.
Size 5 - 9: Shore hardness 92° (yellow or white).
From size 14: Shore hardness 98° (red).

- Zero backlash, insertable elastic coupling.
- With clamps, ready-to-install for rapid mounting.
- Many different sizes and diameters available.
- From size 14 can be exchanged with couplings RN, RNH and couplings from many other suppliers.
- On request with soft inserts.

Temperature range: -30°C to +90°C.



Clamp hub

Ordering Details: e.g.: Product No. 605 405 03, Coupling RNK, 3mm bore

Product No.	Size	Torque max. Nm	Bore dH7 1) mm	Bore min.-max. 2) mm	DH 3) mm	D 3) mm	L mm	l mm	E mm	M mm	maximum misalignment 4) Angular Degrees	Radial mm	Axial mm	Speed 5) max. min-1	Weight approx. g
605 405 03	5	0,4	3	2 - 4	10	–	15	5	5	–	1	0,06	+0,4/-0,2	38000	2
605 405 04	5	0,5	4	2 - 4	10	–	15	5	5	–	1	0,06	+0,4/-0,2	38000	2
605 407 05	7	0,95	5	3 - 7	14	–	22	7	8	–	1	0,1	+0,6/-0,3	27000	6
605 407 06	7	1	6	3 - 7	14	–	22	7	8	–	1	0,1	+0,6/-0,3	27000	6
605 409 09	9	2,6	9	5 - 11	20	–	30	10	10	–	1	0,13	+0,8/-0,4	19000	17
605 409 10	9	2,7	10	5 - 11	20	–	30	10	10	–	1	0,13	+0,8/-0,4	19000	17
605 409 11	9	2,8	11	5 - 11	20	–	30	10	10	–	1	0,13	+0,8/-0,4	19000	17
605 414 11	14	5,6	11	6 - 16	30	–	35	11	13	–	0,9	0,09	+1/-0,5	13000	41
605 414 14	14	6,1	14	6 - 16	30	–	35	11	13	–	0,9	0,09	+1/-0,5	13000	41
605 414 16	14	6,5	16	6 - 16	30	–	35	11	13	–	0,9	0,09	+1/-0,5	13000	41
605 419 14	19	29	14	10 - 22	40	–	66	25	16	–	0,9	0,06	+1,2/-0,5	10000	150
605 419 16	19	30	16	10 - 22	40	–	66	25	16	–	0,9	0,06	+1,2/-0,5	10000	150
605 419 19	19	32	19	10 - 22	40	–	66	25	16	–	0,9	0,06	+1,2/-0,5	10000	150
605 424 16	24	38	16	12 - 28	55	–	78	30	18	–	0,9	0,1	+1,4/-0,5	7000	320
605 424 19	24	40	19	12 - 28	55	–	78	30	18	–	0,9	0,1	+1,4/-0,5	7000	320
605 424 24	24	44	24	12 - 28	55	–	78	30	18	–	0,9	0,1	+1,4/-0,5	7000	320
605 428 24	28	91	24	15 - 35	65	–	90	35	20	–	0,9	0,11	+1,5/-0,7	6000	470
605 428 28	28	97	28	15 - 35	65	–	90	35	20	–	0,9	0,11	+1,5/-0,7	6000	470
605 428 32	28	101	32	15 - 35	65	–	90	35	20	–	0,9	0,11	+1,5/-0,7	6000	470
605 438 28	38	110	28	16 - 45	80	–	114	45	24	–	0,9	0,12	+1,8/-0,7	5000	960
605 438 32	38	114	32	16 - 45	80	–	114	45	24	–	0,9	0,12	+1,8/-0,7	5000	960
605 438 38	38	120	38	16 - 45	80	–	114	45	24	–	0,9	0,12	+1,8/-0,7	5000	960
605 442 32	42	265	32	25 - 50	95	85	126	50	26	28	0,9	0,14	+2/-1	4000	3640
605 442 38	42	285	38	25 - 50	95	85	126	50	26	28	0,9	0,14	+2/-1	4000	3640
605 442 45	42	300	45	25 - 50	95	85	126	50	26	28	0,9	0,14	+2/-1	4000	3640
605 448 38	48	445	38	25 - 55	105	95	140	56	28	32	0,9	0,16	+2,1/-1	3600	4900
605 448 45	48	480	45	25 - 55	105	95	140	56	28	32	0,9	0,16	+2,1/-1	3600	4900
605 448 50	48	495	50	25 - 55	105	95	140	56	28	32	0,9	0,16	+2,1/-1	3600	4900

1) Standard bores (both sides).
2) Different bores (even one-sided) up to max bore as well feather keyways, available against surcharge (smaller bores as special parts).
3) Follow the breakdown Ø as per the table below (screw head protrudes over diameter D_H or D).
4) Maximal values are mutually exclusive.
5) Above 30m/s, dynamic balancing is required.

Further details and dimensions

Size	Torque 1) T_{kN} Nm	Torque 1) T_{kmax} Nm	Screw size DIN 912	Tightening Torque Nm	Max Ø 2) mm	Torsion spring stiffness static Nm/rad	Torsion spring stiffness dynam. Nm/rad 4)	Moment of inertia 3) 10^{-6} Kgm²
5	0,5	1	M1,6	0,25	11,5	5,2	16	0,034
7	1,2	2,4	M2	0,35	16,5	14,3	43	0,196
9	3,0	6,0	M2,5	0,75	23,5	31	95	1,08
14	12,5	25	M3	1,5	32,2	172	513	5,7
19	17	34	M6	11	46	860	2580	36
24	60	120	M6	11	57	2060	6189	150
28	160	320	M8	25	71	3440	10314	330
38	325	650	M8	25	83	7160	21486	960
42	450	900	M10	69	91	19200	37690	4920
48	525	1050	M12	120	104,5	22370	45620	8260

1) Nominal moment and max. moment for the design. The permitted torque for each bore size may not be exceeded.
2) Screw head protrudes past diameter D_H or D.
3) Each one calculated with the max. bore.
4) At 0.5 x T_{kN}.

Spare Part Spiders

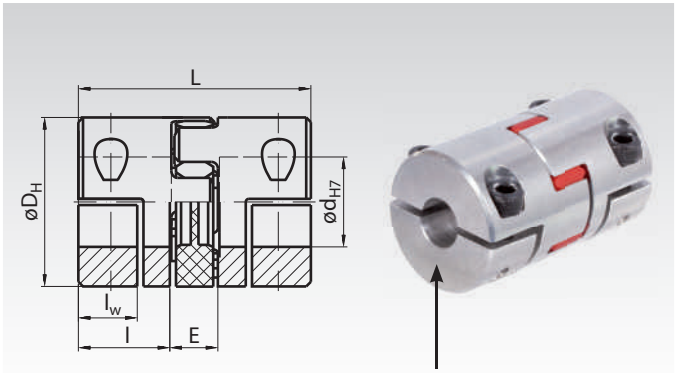
Product No. Spare Part Spider	Size	Shore hardness SH A	Colour	Weight g
605 192 05	5	92	yellow	0,2
605 192 07	7	92	yellow	0,7
605 192 09	9	92	yellow	1,8
605 198 14	14	98	red	5
605 198 19	19	98	red	7
605 198 24	24	98	red	22
605 198 28	28	98	red	32
605 198 38	38	98	red	58
605 198 42	42	98	red	79
605 198 48	48	98	red	98

Elastic Couplings RNH, backlash-free, with half shell clamp

Material: Size 14 - 38: Hubs made from Aluminium.
From size 42, made from steel. Spider made from Polyurethane.
Shore hardness 98° (red).

- Zero backlash, insertable elastic coupling.
- With removable half shell clamps, ready-to-install for rapid mounting with the possibility of demounting without removal of the other units.
- Many different sizes and diameters available.
- Size exchangeable with couplings RN, RNK and couplings from many other suppliers.
- On request with soft inserts.

Temperature range: -30°C to +90°C.



Half shell, removable

Ordering Details: e.g.: Product No. 605 514 10, Coupling RNH, 10mm bore

Product No.	Size	Torque max. Nm	Bore d^{H7} [1] mm	Bore min.-max. [2] mm	D_H [3] mm	L mm	l mm	l_W mm	E mm	maximum misalignment [4] Angular Degrees	Radial mm	Axial mm	Speed [5] max. min^{-1}	Weight approx. g
605 514 10	14	5,5	10	10 - 14	30	35	11	8	13	0,9	0,09	+1/-0,5	13000	41
605 514 11	14	5,6	11	10 - 14	30	35	11	8	13	0,9	0,09	+1/-0,5	13000	41
605 514 14	14	6,1	14	10 - 14	30	35	11	8	13	0,9	0,09	+1/-0,5	13000	41
605 519 14	19	29	14	10 - 20	40	66	25	19,5	16	0,9	0,06	+1,2/-0,5	10000	150
605 519 16	19	30	16	10 - 20	40	66	25	19,5	16	0,9	0,06	+1,2/-0,5	10000	150
605 519 19	19	32	19	10 - 20	40	66	25	19,5	16	0,9	0,06	+1,2/-0,5	10000	150
605 519 20	19	32	20	10 - 20	40	66	25	19,5	16	0,9	0,06	+1,2/-0,5	10000	150
605 524 20	24	40	20	20 - 28	55	78	30	22,0	18	0,9	0,1	+1,4/-0,5	7000	320
605 524 24	24	44	24	20 - 28	55	78	30	22,0	18	0,9	0,1	+1,4/-0,5	7000	320
605 524 25	24	45	25	20 - 28	55	78	30	22,0	18	0,9	0,1	+1,4/-0,5	7000	320
605 524 28	24	47	28	20 - 28	55	78	30	22,0	18	0,9	0,1	+1,4/-0,5	7000	320
605 528 24	28	91	24	24 - 35	65	90	35	25,0	20	0,9	0,11	+1,5/-0,7	6000	470
605 528 25	28	92	25	24 - 35	65	90	35	25,0	20	0,9	0,11	+1,5/-0,7	6000	470
605 528 28	28	97	28	24 - 35	65	90	35	25,0	20	0,9	0,11	+1,5/-0,7	6000	470
605 528 32	28	101	32	24 - 35	65	90	35	25,0	20	0,9	0,11	+1,5/-0,7	6000	470
605 528 35	28	104	35	24 - 35	65	90	35	25,0	20	0,9	0,11	+1,5/-0,7	6000	470
605 538 32	38	114	32	32 - 44	80	114	45	33,0	24	0,9	0,12	+1,8/-0,7	5000	960
605 538 35	38	117	35	32 - 44	80	114	45	33,0	24	0,9	0,12	+1,8/-0,7	5000	960
605 538 38	38	120	38	32 - 44	80	114	45	33,0	24	0,9	0,12	+1,8/-0,7	5000	960
605 538 44	38	129	44	32 - 44	80	114	45	33,0	24	0,9	0,12	+1,8/-0,7	5000	960
605 542 35	42	217	35	35 - 50	95	126	50	36,5	26	0,9	0,14	+2/-1	4000	3640
605 542 38	42	235	38	35 - 50	95	126	50	36,5	26	0,9	0,14	+2/-1	4000	3640
605 542 44	42	270	44	35 - 50	95	126	50	36,5	26	0,9	0,14	+2/-1	4000	3640
605 542 50	42	310	50	35 - 50	95	126	50	36,5	26	0,9	0,14	+2/-1	4000	3640
605 548 40	48	362	40	40 - 60	105	140	56	39,5	28	0,9	0,16	+2,1/-1	3600	4900
605 548 44	48	390	44	40 - 60	105	140	56	39,5	28	0,9	0,16	+2,1/-1	3600	4900
605 548 50	48	452	50	40 - 60	105	140	56	39,5	28	0,9	0,16	+2,1/-1	3600	4900

[1] Standard bores (both sides).
[2] Different bores (even one-sided) up to max bore as well feather keyways, available against surcharge (smaller bores as special parts).
[3]) Follow the breakdown Ø as per the table below (screw head protrudes over diameter D_H.
[4] Maximal values are mutually exclusive.
[5] Above 30m/s, dynamic balancing is required.

Further details and dimensions

Size	Torque[1] T_{kN} Nm	Torque[1] T_{kmax} Nm	Screw size DIN 912	Tightening Torque Nm	Max. Ø [2] mm	Torsion spring stiffness static Nm/rad	Torsion spring stiffness dynam. Nm/rad[4]	Moment of inertia [3] 10^{-6} Kgm²
14	12,5	25	M3	1,5	35	172	513	5,7
19	17	34	M6	10	46	860	2580	36
24	60	120	M6	10	58	2060	6189	150
28	160	320	M8	25	73	3440	10314	330
38	325	650	M8	25	84	7160	21486	960
42	450	900	M10	49	94	19200	37690	4920
48	525	1050	M12	86	105	22370	45620	8260

[1] Nominal moment and max. moment for the design. The permitted torque for each bore size may not be exceeded.
[2] Screw head protrudes past diameter D_H.
[3] Each one calculated with the max. bore.
[4] At 0.5 x T_{kN}.

Spare Part Spiders

Product No. Spare Part Spider	Size	Shore hardness SH A	Colour	Weight g
605 198 14	14	98	red	5
605 198 19	19	98	red	7
605 198 24	24	98	red	22
605 198 28	28	98	red	32
605 198 38	38	98	red	58
605 198 42	42	98	red	79
605 198 48	48	98	red	98

Spiders for Elastic Couplings, standard type, 92° Shore A

Material: Polyurethane, shore hardness 92°A (soft), yellow.

Spiders (plastic inserts) for elastic couplings (jaw couplings) like RN, RNG, RNI, RNR, RNT and foreign parts of the same kind from other suppliers. Soft type, for common usage. Temperature range -40°C to +90°C.

Ordering Details: e.g.: Product No. 605 092 07, Spider standard, 92°A, Size 7

Product No. yellow	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Peak Nm	Altern. Nm	Torsional angle T_{KN} °	$T_{K\,max}$ °	Weight g
605 192 07	7*	14	4	1,1	2,2	0,3	1,3	2	0,7
605 192 09	9*	20	4	2,9	5,9	0,8	1,3	2	1,8
605 092 14	14	30	4	7,5	15	2,0	6,4	10	5
605 092 19	19	40	6	10	20	2,6	3,2	5	7
605 092 24	24	55	8	35	70	9,1	3,2	5	22
605 092 28	28	65	8	95	190	25	3,2	5	32
605 092 38	38	80	8	190	380	49	3,2	5	58
605 092 42	42	95	8	265	530	69	3,2	5	70
605 092 48	48	105	8	310	620	81	3,2	5	98
605 092 55	55	120	8	410	820	107	3,2	5	120
605 092 65	65	135	8	625	1250	163	3,2	5	210
605 092 75	75	160	10	1280	2560	333	3,2	5	340
605 092 90	90	200	10	2400	4800	624	3,2	5	700
605 092 95	100	225	10	3300	6600	858	3,2	5	900

* Size 7 and 9: White or yellow, depending on the producer.

T_{kN} = Nominal torque.
$T_{K\,max.}$ = Peak torque.

Spiders for Elastic Couplings, standard type, 98° Shore A

Material: Polyurethane, shore hardness 98°A (medium hard), red.

Spiders (plastic inserts) for elastic couplings (jaw couplings) like RN, RNG, RNI, RNR, RNT and foreign parts of the same kind from other suppliers. Medium hard type, for high torques. Temperature range -30°C to +100°C.

Ordering Details: e.g.: Product No. 605 098 14, Spider standard, 98°A, Size 14

Product No. red	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Peak Nm	Altern. Nm	Torsional angle T_{KN} °	$T_{K\,max}$ °	Weight g
605 098 14	14	30	4	12,5	25	3,3	6,4	10	5
605 098 19	19	40	6	17	34	4,4	3,2	5	7
605 098 24	24	55	8	60	120	16	3,2	5	22
605 098 28	28	65	8	160	320	42	3,2	5	32
605 098 38	38	80	8	325	650	85	3,2	5	58
605 098 42	42	95	8	450	900	117	3,2	5	70
605 098 48	48	105	8	525	1050	137	3,2	5	98
605 098 55	55	120	8	685	1370	178	3,2	5	120
605 098 65	65*	135	8	940	1880	244	3,2	5	210
605 098 75	75*	160	10	1920	3840	499	3,2	5	340
605 098 90	90*	200	10	3600	7200	936	3,2	5	700
605 098 95	100*	225	10	4950	9900	1287	3,2	5	900

* From size 65 shore hardness 95° A.

T_{kN} = Nominal torque.
$T_{K\,max.}$ = Peak torque.

Spiders for Elastic Couplings, standard type, 64° Shore D

Material: Polyurethane, shore hardness 64°D (hard), green.

Spiders (plastic inserts) for elastic couplings (jaw couplings) like RN, RNG, RNI, RNR and foreign parts of the same kind from other suppliers. Hard type, for very high torques at small torsion angle. Temperature range -20°C to +100°C.

Ordering Details: e.g.: Product No. 605 064 14, Spider standard, 64°D, Size 14

Product No. green	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Peak Nm	Altern. Nm	Torsional angle T_{KN} °	$T_{K\,max}$ °	Weight g
605 064 14	14	30	4	16	32	4,2	4,5	7,0	5
605 064 19	19	40	6	21	42	5,5	2,5	3,6	7
605 064 24	24	55	8	75	150	19,5	2,5	3,6	22
605 064 28	28	65	8	200	400	52	2,5	3,6	32
605 064 38	38	80	8	405	810	105	2,5	3,6	58
605 064 42	42	95	8	560	1120	146	2,5	3,6	70
605 064 48	48	105	8	655	1310	170	2,5	3,6	98
605 064 55	55	120	8	825	1650	215	2,5	3,6	120
605 064 65	65	135	8	1175	2350	306	2,5	3,6	210
605 064 75	75	160	10	2400	4800	624	2,5	3,6	340
605 064 90	90	200	10	4500	9000	1170	2,5	3,6	700
605 064 95	100	225	10	6185	12370	1608	2,5	3,6	900

Note: Spiders with hardness 64°D Shore are not recommended for taper couplings. At couplings made from aluminium, the effective torque should not be higher than the transmittable torque of the 98°A Shore spiders.

T_{kN} = Nominal torque.
$T_{K\,max.}$ = Peak torque.

Spiders for Elastic Couplings, backlash-free type, 92° Shore A

Material: Polyurethane, shore hardness 92°A (soft), yellow.

Spiders (plastic inserts) for backlash-free elastic couplings (jaw couplings) like RNH and RNK and foreign parts of the same kind from other suppliers. Soft type, for common usage. Temperature range -40°C to +90°C.

Ordering Details: e.g.: Product No. 605 192 05, Spider backlash-free, 92°A, Size 5

Product No. yellow	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Transmittable torque Peak Nm	Tors. spring stiffness static Nm/rad	Tors. spring stiffness dynam. Nm/rad	Stiffn. radial N/mm	Weight g
605 192 05	5	10	4	0,5	1,0	5,2	16	154	0,2
605 192 07	7*	14	4	1,1	2,2	14,3	43	219	0,7
605 192 09	9*	20	4	2,9	5,9	31	95	262	1,7
605 192 14	14	30	4	7,5	15	115	344	336	4,6
605 192 19	19	40	6	10	20	573	1720	1120	7
605 192 24	24	55	8	35	70	1432	4296	1480	18
605 192 28	28	65	8	95	190	2292	6876	1780	29
605 192 38	38	80	8	190	380	4584	13752	2350	49
605 192 42	42	95	8	265	530	6300	14490	2430	79
605 192 48	48	105	8	310	620	7850	18055	2580	98
605 192 55	55	120	8	410	820	9500	21850	2980	115

* Size 7 and 9: White or yellow, depending on the producer.

Spiders for Elastic Couplings, backlash-free type, 98° Shore A

Material: Polyurethane, shore hardness 98°A (medium hard), red.

Spiders (plastic inserts) for backlash-free elastic couplings (jaw couplings) like RNH and RNK and foreign parts of the same kind from other suppliers. Medium hard type, for high torques. Temperature range -30°C to +100°C.

Ordering Details: e.g.: Product No. 605 198 14, Spider backlash-free, 98°A, Size 14

Product No. red	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Transmittable torque Peak Nm	Tors. spring stiffness static Nm/rad	Tors. spring stiffness dynam. Nm/rad	Stiffn. radial N/mm	Weight g
605 198 14	14	30	4	12,5	25	172	513	654	4,6
605 198 19	19	40	6	17	34	860	2580	2010	7
605 198 24	24	55	8	60	120	2060	6190	2560	18
605 198 28	28	65	8	160	320	3440	10314	3200	29
605 198 38	38	80	8	325	650	7160	21486	4400	49
605 198 42	42	95	8	450	900	19200	37690	5570	79
605 198 48	48	105	8	525	1050	22370	45620	5930	98
605 198 55	55	120	8	685	1370	23800	59500	6686	115

Spiders for Elastic Couplings, backlash-free type, 64° Shore D

Material: Polyurethane, shore hardness 64°D (hard), green.

Spiders (plastic inserts) for backlash-free elastic couplings (jaw couplings) like RNH and RNK and foreign parts of the same kind from other suppliers. Hard type, for very high torques at small torsion angle. Temperature range -20°C to +100°C.

Ordering Details: e.g.: Product No. 605 164 14, Spider backlash-free, 64°D, Size 14

Product No. green	Size	Ø mm	No. of teeth	Transmittable torque Nominal Nm	Transmittable torque Peak Nm	Tors. spring stiffness static Nm/rad	Tors. spring stiffness dynam. Nm/rad	Stiffn. radial N/mm	Weight g
605 164 14	14	30	4	16	32	234	702	856	4,6
605 164 19	19	40	6	21	42	2560	3810	2930	7
605 164 24	24	55	8	75	150	2978	8934	3696	18
605 164 28	28	65	8	200	400	4350	13050	4348	29
605 164 38	38	80	8	405	810	10540	31620	6474	49
605 164 42	42	95	8	560	1120	27580	68950	7270	79
605 164 48	48	105	8	655	1310	36200	90500	8274	98
605 164 55	55	120	8	825	1650	41460	103650	9248	115

Note: Spiders with hardness 64°D Shore are not recommended for taper couplings. At couplings made from aluminium, the effective torque should not be higher than the transmittable torque of the 98°A Shore spiders.

Elastic Couplings DX

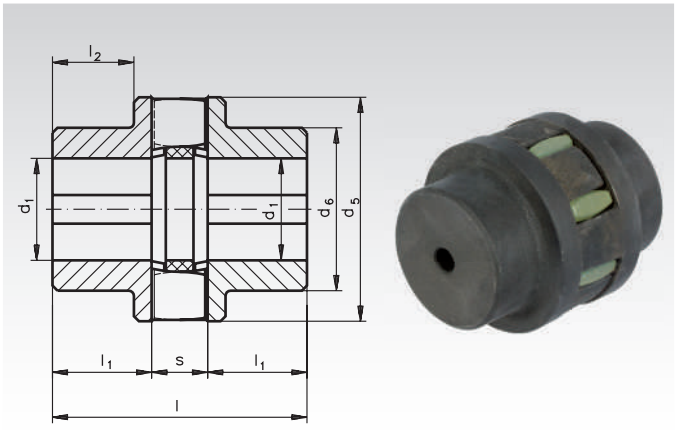
Material: To product 604 028 00: Hubs made from Aluminium. From product 604 032 00: Hubs made from grey cast iron GG25. Insert made from Polyurethane, shore hardness 92° A (soft).

- Insertable elastic coupling.
- Not backlash-free. Does not transfer any axial forces.
- Robust component for relatively large shaft offset. Particularly suitable for large radial offset.
- Different sizes, up to a maximum nominal torque of 3,000 Nm.

Temperature range: -20°C to +80°C.

Couplings are available pre-drilled ex stock.
Customized bores and feather-key grooves available at extra charge

Ordering Details: e.g.: Product No. 604 024 00, Coupling DX without Bore



Product No.	Torque			Bores		d_5	d_6	l	l_1	l_2	S	Max. Shaft Misalignment[1]			Speed	Weight
	nominal	max.	alternating	pre-drilled	max. d_1							Radial	Axial	Angular	Max.	Max.
	Nm	Nm	Nm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°	min^{-1}	kg
604 024 00*	40	120	15	-	24	55	55	66	24	-	18	0,3	1,2	0,7	12500	0,55
604 028 00*	63	190	25	-	28	62	62	76	28	-	20	0,3	1,2	0,7	11100	0,76
604 032 00	100	300	35	9	32	70	52	86	32	22	22	0,3	1,2	0,7	9800	1,09
604 038 00	160	480	60	14	38	84	60	100	38	27	24	0,4	1,5	0,7	8100	1,76
604 042 00	220	660	80	14	42	92	68	110	42	31	26	0,4	1,5	0,7	7400	2,38
604 048 00	320	960	120	17	48	105	76	124	48	36	28	0,4	1,5	0,7	6500	3,38
604 055 00	450	1350	180	17	55	120	88	140	55	43	30	0,5	1,8	0,7	5700	4,89
604 060 00	630	1900	230	22	60	130	96	152	60	47	32	0,5	1,8	0,7	5200	6,29
604 065 00	900	2700	300	24	65	142	104	165	65	51	35	0,5	1,8	0,7	4800	8,15
604 075 00	1250	3750	450	30	75	165	120	190	75	59	40	0,6	2,1	0,7	4100	12,6
604 085 00	1800	5400	675	40	85	185	136	214	85	68	44	0,7	2,1	0,7	3700	17,9
604 100 00	3000	9000	1125	58	100	220	160	250	100	80	50	0,8	2,4	0,7	3100	29,3

* Material aluminium.
[1] The stated maximum values for shaft misalignment must only occur in a single direction. With multiple misalignment the values have to be reduced. Furthermore, the figures stated are only valid up to a speed of 600 min^{-1}. At higher speeds the misalignment values must again be reduced.

Spiders for Coupling DX

Material: Polyurethane, shore hardness 92° A (soft).
Only suitable for couplings DX.
Temperature range: -20°C to +80°C.

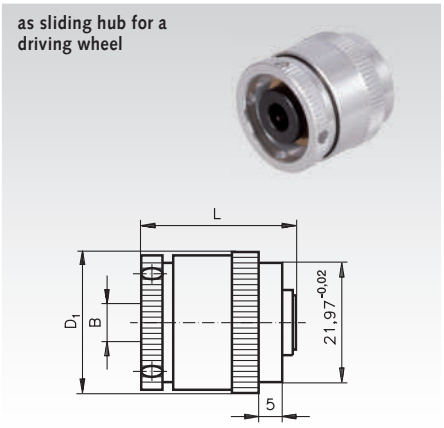
Product No. Spare Part Insert	Matching Product No.	Weight g
604 124 00	604 024 00	9
604 128 00	604 028 00	14
604 132 00	604 032 00	24
604 138 00	604 038 00	28
604 142 00	604 042 00	40
604 148 00	604 048 00	50
604 155 00	604 055 00	80
604 160 00	604 060 00	92
604 165 00	604 065 00	120
604 175 00	604 075 00	200
604 185 00	604 085 00	260
604 200 00	604 100 00	450

Recommendation: Coupling RNG page 387

Reworking within 24h-service possible. Custom made parts on request.

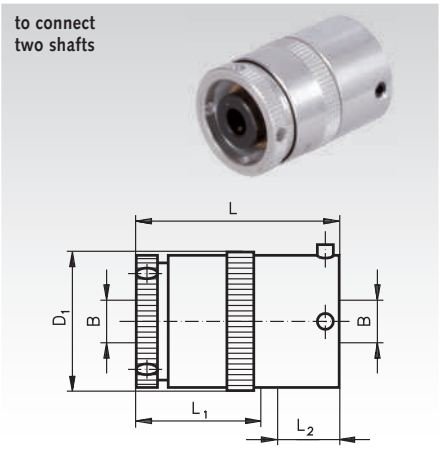
Type A - Concentric Arrangement

as sliding hub for a driving wheel



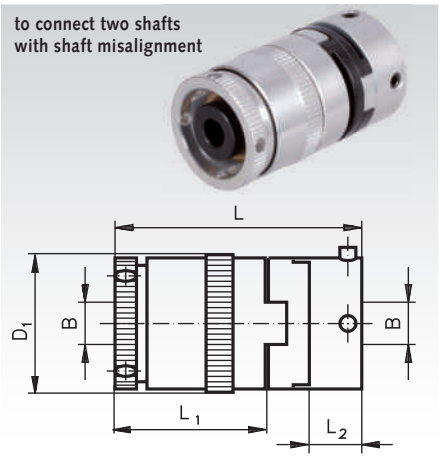
Type B - Axial Arrangement

to connect two shafts



Type C - Axial Arrangement

to connect two shafts with shaft misalignment

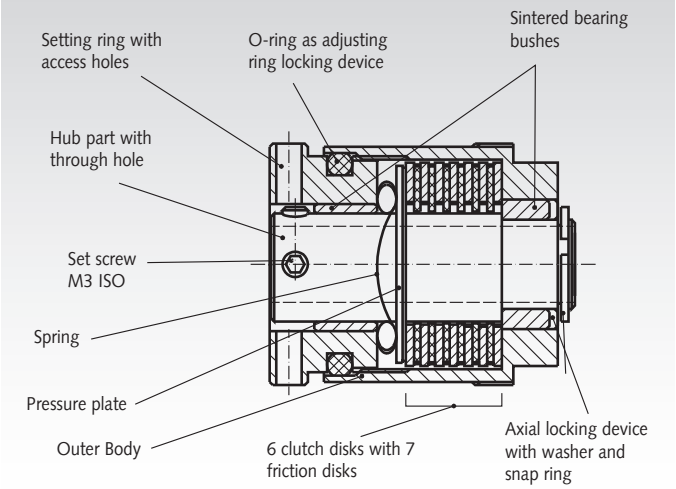


Material: Housing made of aluminium alloy with iridite NCP finish. Inner Hub made of steel. Max. slip-speed 1,000 min^{-1}. Torsional backlash of the coupling below 2°.

Ordering Details: e.g.: Product No. 610 403 00, Friction Clutch, Type A, 6 mm Bore

Product No.	Type	Number of Friction Plates Pieces	L mm	L_1 mm	L_2 mm	D_1 mm	Bore $B^{+0.03}$ mm	Set Screw Size and Arrangement	Weight g	Product No. Spare Part Insert	Weight g
610 403 00	A	2	26,4		-	25,8	6	M 3x3,	37	-	-
610 404 00	A	2	26,4		-	25,8	8	2x90°	37	-	-
610 408 00	A	6	32,4		-	25,8	6	only	48	-	-
610 409 00	A	6	32,4		-	25,8	8	at 1 Side	48	-	-
610 423 00	B	2	36	25	9	25,8	6	M 3x3, 2x90°	50	-	-
610 424 00	B	2	36	25	9	25,8	8	at Side 1	50	-	-
610 428 00	B	6	42,5	31	9	25,8	6	M 4x4, 2x90°	61	-	-
610 429 00	B	6	42,5	31	9	25,8	8	at Side 2	61	-	-
610 443 00	C	2	46,5	25	8,6	25,8	6	M 3x3, 2x90°	57	**601 244 00**	2,7
610 444 00	C	2	46,5	25	8,6	25,8	8	at Side 1	57	**601 244 00**	2,7
610 448 00	C	6	53,4	31	8,6	25,8	6	M 4x4, 2x90°	83	**601 244 00**	2,7
610 449 00	C	6	53,4	31	8,6	25,8	8	at Side 2	83	**601 244 00**	2,7

Sectional drawing of a slip clutch with 6 clutch plates



Torque range with 2 friction plates 2.4 Ncm to 53.8 Ncm. Dissipation at 20°C ambient temperature up to 7 watts. **Torque range with 6 friction plates 7.8 Ncm to 132.4 Ncm.** Dissipation at 20°C ambient temperature up to 8.6 Watt. Maximum permissible temperature at the surface for all sizes during operation 80°C.

An adjusting ring - screwed to the outer body - serves to adjust the torque. This ring acts via a disk spring onto the clutch or friction disks. Two sintered bearing sleeves serve as bearing housing to inner component. An O-Ring seals the hub off against dirt and with its friction force it also makes sure that the adjusting ring is not moved unintentionally. **The power can be connected to either the hub or the housing.**

Depending on the specific application, the friction clutch can be employed as torque limiter, as overrunning clutch or as brake. As the generation of heat is basically a function including the slip torque and the employed torque, the following formula was derived:

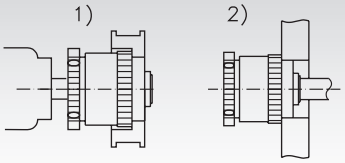
$$\frac{\text{Slippage (min}^{-1}\text{) x Torque (Ncm)}}{955} = \text{Heat Dissipation in Watts}$$

As the connected components (shafts, gears, etc.) support the heat dissipation, in case of doubt please calculate the effective surface temperature under adverse operating conditions. The permissible temperatures are stated above.

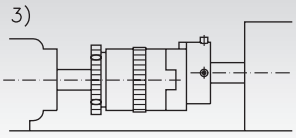
Special designs: the modular-design principle used in slip clutches leads to many different designs and possible connecting parts, e.g., special flanges and other components, according to drawings.

ATTENTION: the adjusting screws can damage the adjusting ring if they are loosened too far. 3/4 to 1 turn is sufficient.

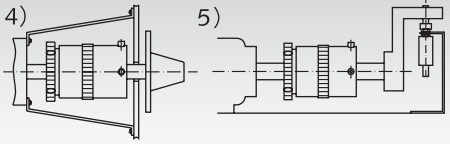
Concentric mounting (type A)



Axial arrangement, both shafts outside (type C)



Axial arrangement, one shaft outside (type B)



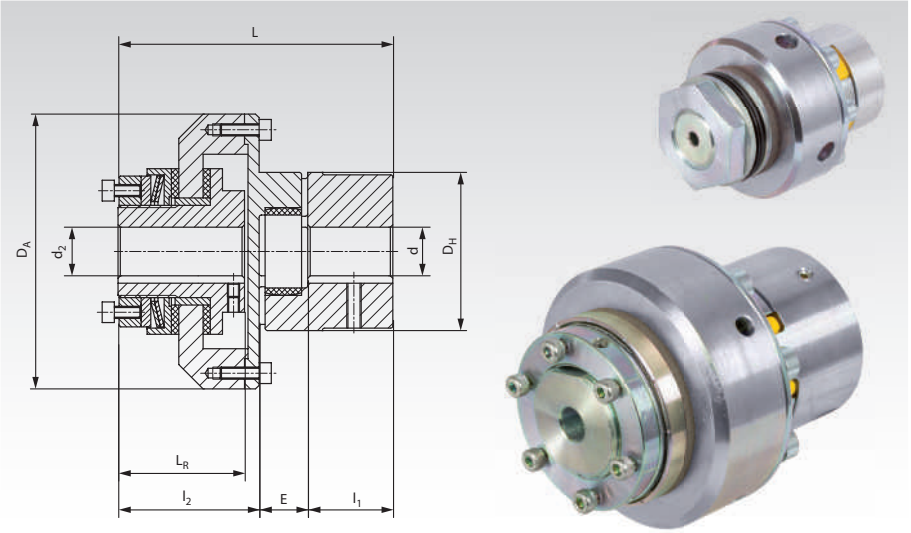
1) Pulley or sprocket (bondage recommend), shaft also used as bearing.
2) Mounted to the housing as permanent brake and shaft bearing.
3) Connection electronic engine and gear box, with assembly-related shaft misalignment.
4) Shaft of a multi-turn potentiometer divided with slip clutches. No overrevving.
5) Protecting a lever key from damage using a slip clutch.

Sliding Hubs with Torsionally-Flexible Coupling RNR

Material: Sliding hub: steel, zinc-plated and chromated, rust-proof friction pads.

Elastic coupling: coupling hub steel (size 00 from aluminium), spider (plastic insert) Polyurethane. Hardness 92° Shore A (optional 98° Shore A).

- The slipping torque can be adjusted with common assembly tools for screws.
- The elastic coupling can be mounted in axial direction.
- Torque can be altered after mounting.
- By mounting additional springs, the torque range can be increased. (additional springs have to be ordered separately).
- Customized bores and feather-key grooves available at extra charge.



Ordering Details: e.g.: Product No. 612 199 00, Sliding Hub RNR with Torsionally-Flexible Coupling

Product No.	Size	d ; d_2	$d_{max.}$ mm	$d_{2\,max.}$ mm	D_A mm	D_H mm	l_1 mm	E mm	l_2 mm	L_R mm	L mm	Weight kg
612 199 00	00	4,8	16	10	44	30	11	13	35	31	59	0,35
612 200 00	0	5,7	25	20	63	40	25	16	37	33	78	0,90
612 201 00	01	10	35	22	80	55	30	18	50	45	98	1,95
612 202 00	1	10	40	25	98	65	35	20	58	52	113	3,10
612 203 00	2	14	48	35	120	80	45	24	64	57	133	5,50

Size	Torque of Sliding Hub Standard [1] Nm	Optional [2] Nm	Optional [2] Nm	Torque Coupling T_{KN} [3] Nm	Torque Coupling $T_{Kmax.}$ [4] Nm	Speed max. min^{-1}
00	0,5 - 5	1 - 10	- -	7,5	15	10.000
0	2,0 - 10	4 - 20	- -	10,0	20	8.500
01	5,0 - 35	10 - 70	60 - 105	35,0	70	6.600
1	20,0 - 75	40 - 150	130 - 200	95,0	190	5.600
2	25,0 - 140	50 - 280	250 - 400	190,0	380	4.300

[1] With one disc spring (standard version).
[2] With second or third disc spring (order separately).
[3] Nominal torque of the elastic coupling with standard spider 92° Shore A.
[4] Maximum torque of the elastic coupling with standard spider 92° Shore A.

Replacement Friction Discs and additional Disc Springs

Matching Coupling Product No.	Size	Product No. Friction Disc[1]	Outer Ø mm	Weight g	Product No. Disc Spring	Outer Ø mm	Weight g
612 199 00	00	**612 100 01**	30	2	**612 100 02**	30	5
612 200 00	0	**612 100 11**	45	3	**612 100 12**	42,5	5
612 201 00	01	**612 101 01**	58	10	**612 101 02**	53,1	10
612 202 00	1	**612 101 11**	68	13	**612 101 12**	61,5	20
612 203 00	2	**612 102 01**	88	21	**612 102 02**	79,5	40

[1] 2 pieces required.

Spiders for RNR

Matching Coupling Product No.	Size	Product No. Spare Part Spider 92° Shore, yellow	Torque Nom. Nm	Torque max. Nm	Product No. Optional Spider 98° Shore, red	Torque Nom. Nm	Torque max. Nm	Weight g
612 199 00	00 (14)	**605 092 14**	7,5	15	**605 098 14**	12,5	25	5
612 200 00	0 (19)	**605 092 19**	10	20	**605 098 19**	17	34	7
612 201 00	01 (24)	**605 092 24**	35	70	**605 098 24**	60	120	22
612 202 00	1 (28)	**605 092 28**	95	190	**605 098 28**	160	320	32
612 203 00	2 (38)	**605 092 38**	190	380	**605 098 38**	325	650	58

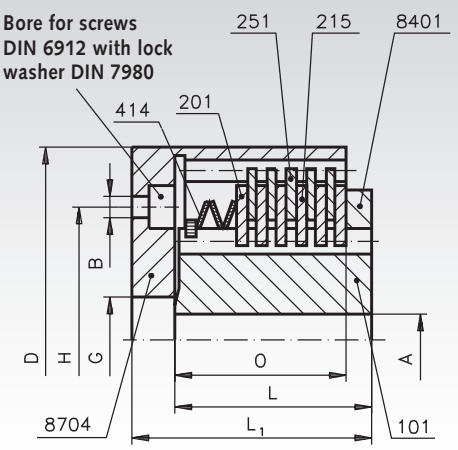
Reworking within 24h-service possible. Custom made parts on request.

Multi-Plate Friction Clutches PD

Material: Steel.

Multi-plate friction clutches have proven to deliver an optimal performance when used with slow-starting machines. They are also used as safety couplings. The occurring torque peaks are levelled out by friction clutches. The disk pairing is steel/sintered bronze, with the inner plates of the pairings lined. The composition of the lining means up to 400°C can be withstood short term. At permanent load, however, only up to 250°C. Sintered clutch plates have the advantage of an almost constant friction coefficient even with fast growing circumferential speeds and higher temperatures. The assembly can be used for dry and wet operation. Advantages of these couplings are: Practical dimensions. Easy adjustment and re-adjustment. Inner and outer plates with special splines.

Couplings are available pre-drilled H7 ex stock.
Customized bores and feather-key grooves available at extra charge



Product No.	Torque* Dry Nm	Torque* Wet Nm	Bore. A Pre-bore mm	Bore. A H7 max. mm	B mm	D mm	G^{H7} mm	H mm	L mm	L_1 mm	O mm	Speed max. min^{-1}	Weight kg	Product No. Spare Plates Compl. Set	Weight Spare Part g
611 001 00	14	6	10	20[1)]	3x for M5	55	22	34	28	36	22	3000	0,44	**611 011 00**	71
611 002 00	33	14	12	25[2)]	3x for M5	67	32	44	35	43	28	3000	0,81	**611 012 00**	140
611 003 00	62	26	12	40[3)]	4x for M6	82	45	58	40	48	30	3000	1,45	**611 013 00**	227
611 004 00	126	54	25	42	4x for M6	100	62	76	45	53	36	2500	2,24	**611 014 00**	339
611 005 00	230	100	25	55	4x for M8	120	72	90	55	65	42	2500	3,97	**611 015 00**	703
611 006 00	380	160	25	70	6x for M10	145	85	110	65	77	53	2500	5,82	**611 016 00**	1558

[1)] From Bore 17 mm only with flat feather key-grooves according to DIN 6885/3.
[2)] From Bore 22 mm only with flat feather key-grooves according to DIN 6885/3.
[3)] From Bore 38 mm only with flat feather key-grooves according to DIN 6885/3.
* Max. transmittable torque for dry or wet operation. The minimum adjustable torque is at about 50% of the maximum value.

Construction and Mounting

The hub 101 is equipped with splines, guiding the sinter-plates 215. The casing 8704 also has splines, which guide the outer plates 251 made from steel. The last component of the plate pack is the pressure plate 201. The disc springs 414 together with the adjusting screw 8401 lead to the friction grip of the plate pack. During assembly please make sure that the hub 101 and the casing are securely fixed in axial direction. When connecting 2 shaft ends, one shaft has to be mounted inside the housing 8704 supported by a centering bearing.
The hub 101 must not rub against the casing 8704, but against the sleeve or the inner bearing ring. At dry operating, make sure no oil or lubricate enters the plate pack. For re-adjustment loosen the locking screw in the adjusting nut 8401. Turning right will increase the torque, turning left leads to a reduction. After re-setting always re-tighten the locking screw. When ordering spare parts always state the factory number 8401 on the adjusting screw.

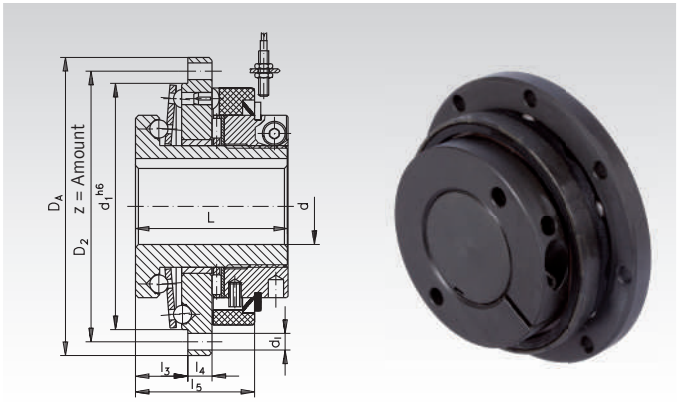
Reworking within 24h-service possible. Custom made parts on request.

Safety Clutchs SI

Material: Steel.

This clutch is a backlash-free overload system operating on the positive principle. It works with the recently developed principle of the "punched disk spring". At overload the disk spring disengages, the torque flow is interrupted. After the overload has passed, the clutch re-engages on its own.
The axial movement of the shift ring can be used to trigger a limit switch/sensor turning off the engine (travel 2mm).
Customer components (e.g. sprockets, pulleys) can be easily integrated; special components, as needed for the common systems, are not required here.

Customized bores and feather-key grooves available at extra charge.



Ordering Details: e.g.: Product No. 612 720 00, Safety Clutch SI, 6-20 Nm

Product No.	Torque Nm	$d_{max.}$ mm	L mm	D_A mm	D_2, z mm	d_l mm	d_1 mm	l_3 mm	l_4 mm	l_5 mm	*Speed max. min^{-1}	Weight kg
612 720 00	6 - 20	20	45	80	71, z= 8	4,5	65	16	6	35	1500	0,69
612 725 00	20 - 60	25	50	98	89, z= 8	5,5	81	17	8	39	1500	1,26
612 735 00	25 - 80	35	60	120	110, z=12	5,5	102	21	10	42	1500	1,89
612 750 00	60 - 180	50	70	162	152, z=12	6,6	142	25	13	56	1500	3,93

* Higher speeds possible if technical data is transmitted.

Limit Switch (Engine-Emergency-Stop Switch)

Ordering Details: e.g.: Product No. 612 605 00 Limit Switch

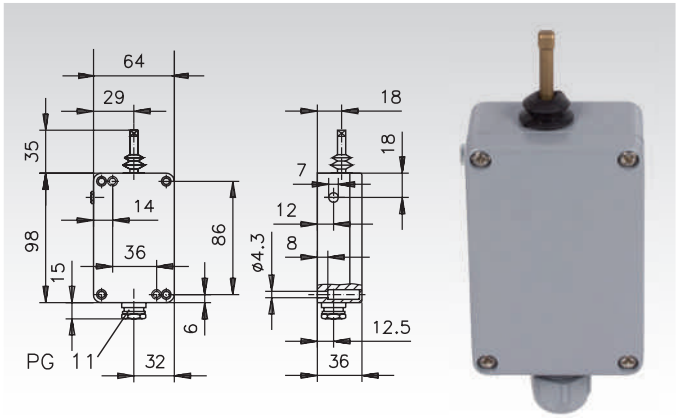
Product No.	Weight in g
612 605 00	324

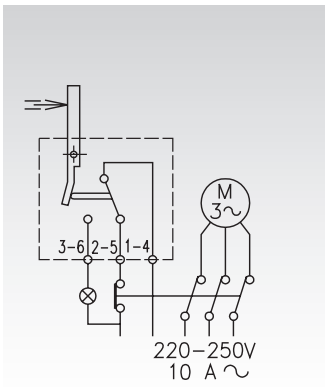
Material: Housing made from aluminium die-cast, painted grey, with rubber seal. Switch made from brass. Bellow made from neoprene (black). Housing screws zinc-plated. Cable connection made from plastic (grey).

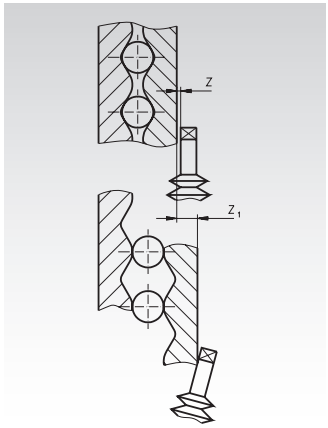
Electrical connection: 220-250V AC, 10 A.

Application: Robust limit switch for safety clutches SI (see above) and safety clutches CM (page 398) or similar applications. If the torque set on the clutch is exceeded, the clutch slips. At the same time the shift ring moves. The shift ring then triggers the switch and turns off the engine. This protects the entire drive system and prevents possible damage.

Mounting: On the back wall are two bores Ø 4.3 mm. These fit two screws M4 with internal hexagon, slot or cross recess (head-Ø up to 7 mm). The wall thickness around the mounting holes is 8 mm.





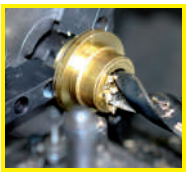


Dimension Z_1 for Limit Stop with Clutches SI

Product No. 612 720 00 to 612 750 00: 2 mm

Dimensions Z_1 for Limit Stop with Clutches CM

Size 20: 1.4 mm
Size 25: 2.3 mm
Size 35: 2.4 mm
Size 45: 2.7 mm
Size 55: 3.7 mm



Reworking within 24h-service possible. Custom made parts on request.

Safety Clutches CM

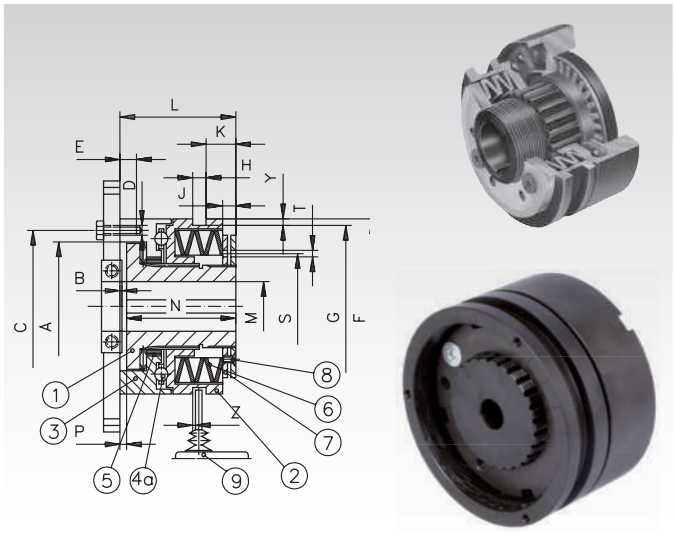
Material: Steel.

Overload system operating on the positive principle, available in 5 sizes. For each size there are 4 different disk-plate sets for different torque ranges. **The required disk-plate set has to be ordered separately and is supplied unassembled.**

When mounting simple driving elements, as sprockets, pulleys, etc., always make sure the shaft is supported.
Optimal protection against overloads.
Trigger torque can be adjusted.
High reproducibility of the triggering and re-engaging process.
Robust design, long service life, absolutely maintenance free.
Immediate free-wheeling of the drive. Automatic emergency stop of the driving unit through switch (to be ordered separately).
Not negatively affected by frequent triggering sequences.

The disk-plate sets (S, M, L or LL) and the limit switch (emergency-stop switch) for all sizes Product No. 612 605 00 (page 397) have to be ordered separately.

Customized bores and feather-key grooves available at extra charge.



Ordering Details: e.g.: Product No. 612 620 00, Safety Clutch CM, Size 20
Product No. 612 620 02, Disk-Plate Set M (essential information)

Product No.	Size	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	K mm	J mm	L mm	$M_{min.}$ mm	$M_{max.}$ mm	N mm	P mm	R mm	S mm	T mm	Y mm	Z mm	Weight kg
612 620 00	20	41	4	48	6xM5	6,5	55	50	9	7,5	3	38,5	7	20	35	3,1	6	38,5	5	2	0,3	0,5
612 625 00	25	60	4	70	6xM5	8	82	72	9	11,5	6	52	10	25	48	3,1	6	54	6	2	0,3	1,5
612 635 00	35	78	5	89	6xM6	10	100	91	9	12	6	61	14	35	56	3,6	8	70	6	2	0,5	2,9
612 645 00	45	90,5	5	105	6xM8	12	120	112	9	22	8,5	78	18	45	72	4,1	10	84	6	2	0,5	5,0
612 655 00	55	105	6,5	125	6xM10	15	146	140	9	27	11	100	24	55	93,5	4,1	14	108	10	2	0,8	9,8

Technical Data and Product No. of Disk-Plate Sets

		Nm for Disk-Plate Sets					Max. Speed	
Product No.	**Product No**	S	**Product No.**	M	**Product No.**	L	**Product No.**	LL	S-M	L-LL
612 620 00	**612 620 01**	2,5 - 5	**612 620 02***	5 - 10	**612 620 02***	10 - 20	**612 620 04**	20 - 40	3300	1800
612 625 00	**612 625 01**	6,0 - 12	**612 625 02**	12 - 25	**612 625 03**	25 - 60	**612 625 04**	60 - 100	2890	1450
612 635 00	**612 635 01**	12,0 - 25	**612 635 02**	25 - 50	**612 635 03**	50 - 120	**612 635 04**	120 - 200	2350	1200
612 645 00	**612 645 01**	25,0 - 50	**612 645 02**	50 - 100	**612 645 03**	100 - 250	**612 645 04**	250 - 400	2000	1000
612 655 00	**612 655 01**	50,0 - 100	**612 655 02**	100 - 200	**612 655 03**	200 - 500	**612 655 04**	500 - 800	1650	850

* This spring set covers both torque ranges M and L (only for size 20).

Possible Disk-Plate Sets

S (light)		M (medium)		L (heavy)		LL (very heavy)	
Size 20 - 55	6 x 1S	**Size 20 - 55**	5 x 1M	**Size 20**	5 x 1M	**Size 20**	4 x 1L
				Size 25 - 55	5 x 1L	**Size 25 - 55**	3 x 2L

Functioning

At normal operating conditions, the safety clutch transmits the torque from the driving shaft via the ball race onto the flange (3). The balls (4a) are pressed into the CNC-milled recesses in part (2) and (3) by the disk plates (6). In case of overload, i.e., if the torque request exceeds the preset limit, the clutch halves are separated; the remaining transmitted torque is very low. When the balls are lifted out of the recesses, against the spring pressure, the clutch part number (2) is moved in axial direction. This movement can be used to trigger an emergency-stop switch (9) for an engine. The clutch re-engages on its own as soon as the torque requirement falls below the set limit. Torque adjustment: By screwing in the torque-adjusting nut (7) all disk plates are further pretensioned (6). As soon as the desired pretension is achieved, the adjusting screw has to be fixed in position with the set screws (8).

Operating Factors

This table shows the operating factor that should - dependent on the type of application - be used as basis for calculating the correct size.

Operating Conditions

Centrifugal Moment	Uniform	Shock	Reversing
Low	1,4	1,7	2,0
Medium	1,7	2,0	2,3
High	2,0	2,4	2,6

Reworking within 24h-service possible. Custom made parts on request.

Sliding Hubs FS

Material:

Hub: Steel, zinc-plated and yellow passivated. Spring: Steel, black.

The sliding hubs can be delivered ex stock, pre-drilled with a bush of the length in **bold print**.

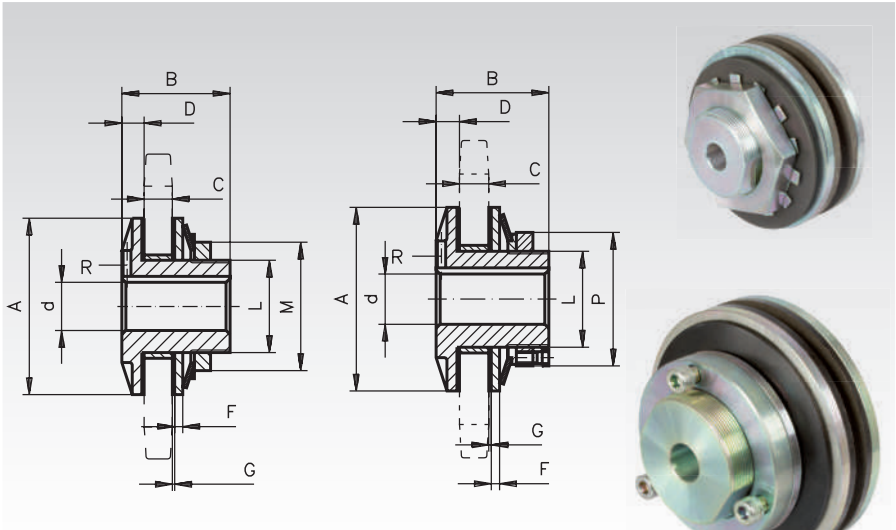
Required bush length:
The required bush length depends on the width of the component to be joined.

Up to Prod. No. 612 006 00:
Bush length 4.2 mm for a component width of 5.3 to 6.0 mm.

From Prod. No. 612 010 00:
Bush length in mm = 1.5 x G + C.

Other bush lengths and customized bores or feather-key grooves against extra charge.

Ordering Details: e.g.: Product No. 612 000 00, Sliding Hub FS



Up to No. 612 040 00 with hexagonal nut

From No. 612 050 00 with round nut

Product No.	Torques min. Nm	Torques max. Nm	Bores d Pilot B.* mm	Bores d min. mm	Bores d max. mm	AØ mm	B mm	C max. mm	D mm	F mm	G mm	LØ mm	M mm	PØ mm	R mm	Available Bush Lengths L1 mm	Available Bush Lengths L2 mm	Available Bush Lengths L3 mm	Bore of the mounted Parts +0.05 mm	Weight kg
612 000 00	0,5	5	3,7	4	10	30	31	6	8,5	2	2,5	M16	SW 27	-	M4	**4,2**	-	-	21,00	0,15
612 001 00	1	10	3,7	4	10	30	31	6	8,5	2	2,5	M16	SW 27	-	M4	**4,2**	-	-	21,00	0,17
612 005 00	2	10	5,7	6	20	45	33	7	8,5	2	2,5	M30	SW 41	-	M4	**4,2**	-	-	34,00	0,35
612 006 00	4	20	5,7	6	20	45	33	7	8,5	2	2,5	M30	SW 41	-	M4	**4,2**	-	-	34,00	0,37
612 010 00	7	34	10	11	22	64	48	9	16	5	4	M35	SW 50	-	M5	**10,3**	12,2	14	41,33	0,70
612 020 00	14	68	10	11	22	64	48	9	16	5	4	M35	SW 50	-	M5	**10,3**	12,2	14	41,33	0,72
612 030 00	20	90	13	14	25	90	62	16	19	5	4	M42	SW 60	-	M6	10,3	**13,7**	21	49,28	1,36
612 040 00	40	180	13	14	25	90	62	16	19	5	4	M42	SW 60	-	M6	10,3	**13,7**	21	49,28	1,40
612 050 00	50	300	19	20	40	127	76	16	21	6	4	M63	-	92	M8	**16**	19,5	21	73,10	3,36
612 060 00	100	600	19	20	40	127	76	16	21	6	4	M63	-	92	M8	**16**	19,5	21	73,10	3,70
612 070 00	115	690	24	25	60	178	98	28	25	6	5	M95	-	133	M10	17	**20,6**	22	104,88	8,60
612 080 00	230	1360	24	25	60	178	98	28	25	6	5	M95	-	133	M10	17	**20,6**	22	104,88	8,90

* ca.-dimensions.

Matching Sliding Hub Product No.	Product No. Friction Disc*	Weight g	Product No. Disc Spring	Weight g	Product No. Threaded Ring or Adjusting Screw	Weight g	Product No. Bushes Length 1	Weight g	Product No. Bushes Length 2	Weight g	Product No. Bushes Length 3	Weight g
612 000 00	**612 003 00**	2	**612 004 00**	3	**612 000 07**	9	**612 000 02**	3	-	-	-	-
612 001 00	**612 003 00**	2	**612 004 00**	3	**612 000 07**	9	**612 000 02**	3	-	-	-	-
612 005 00	**612 007 00**	4	**612 008 00**	5	**612 005 07**	44	**612 005 02**	10	-	-	-	-
612 006 00	**612 007 00**	4	**612 008 00**	5	**612 005 07**	44	**612 005 02**	10	-	-	-	-
612 010 00	**612 015 00**	12	**612 016 00**	15	**612 017 00**	80	**612 012 00**	25	**612 013 00**	40	**612 014 00**	50
612 020 00	**612 015 00**	12	**612 016 00**	15	**612 017 00**	80	**612 012 00**	25	**612 013 00**	40	**612 014 00**	50
612 030 00	**612 035 00**	30	**612 036 00**	45	**612 037 00**	140	**612 032 00**	37	**612 033 00**	44	**612 034 00**	85
612 040 00	**612 035 00**	30	**612 036 00**	45	**612 037 00**	140	**612 032 00**	37	**612 033 00**	44	**612 034 00**	85
612 050 00	**612 055 00**	60	**612 056 00**	120	**612 057 00**	320	**612 052 00**	97	**612 053 00**	135	**612 054 00**	200
612 060 00	**612 055 00**	60	**612 056 00**	120	**612 057 00**	320	**612 052 00**	97	**612 053 00**	135	**612 054 00**	200
612 070 00	**612 075 00**	140	**612 076 00**	280	**612 077 00**	660	**612 072 00**	103	**612 073 00**	183	**612 074 00**	300
612 080 00	**612 075 00**	140	**612 076 00**	280	**612 077 00**	660	**612 072 00**	103	**612 073 00**	183	**612 074 00**	300

* 2 pieces required.

General

The sliding hubs FS are safety devices working on the positive principle. In case of overload, the disk clamped between the friction disks starts slipping and thus keeps the torque within the permissible limits. The power reengages automatically as soon as normal load is reached again. The hubs are cadmium plated for rust-protection. The drive disk is mounted on a maintenance-free bush made from sintered metal. Up to product no. 612 040 00, the torque is set with a hexagon adjusting screw. From product no. 612 050 00 the torque is set with a threaded ring with 3 hexagon nuts. On first use, the sliding hubs should be run in for about 250 turns at a speed of 60 min^{-1}. This should be done at a hub setting of 70-80% of the max. torque for one plate disk. Wear due to frequent slipping reduces the set torque. The figures in the table are calculated for dry operation.

With oil the load can be reduced by 50%. Higher torques, at the same outer diameter, can be achieved with a second spring disk.

Exception: Product No. 612 000 00 has 2 springs,
Product No. 612 001 00 has 4 springs.

Mounting instruction at **www.maedler.de** in the section **Downloads**.

Reworking within 24h-service possible. Custom made parts on request.

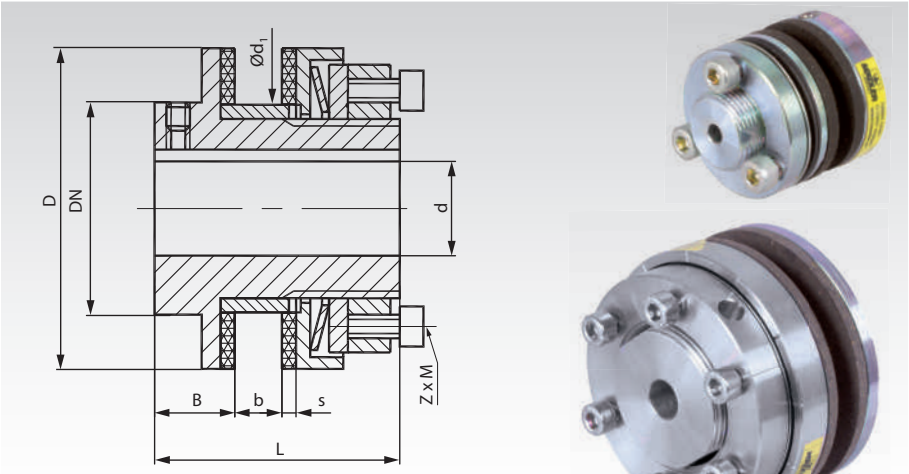
Sliding Hubs FA as Torque Limiters for Chain-, Gear- and Belt Drive-wheels

Material: Steel, zinc-plated and chromated.

- High-quality version.
- The slipping torque can be adjusted with common assembly tools for screws, also after mounting.
- By mounting additional springs, the torque range can be increased. (additional springs have to be ordered separately).
- The hubs are delivered with pilt bore and max. bush length. Customized bores, key-ways and bush lengths at extra charge.

Required bush length:
The bush length required depends on the width of the component to be joined. To calculate the bush length take the width of the component and add 1.5 times the thickness of the friction disc, plus an additional 0.5mm.

Bush length in mm = 1.5 x s + b + 0.5.



Drawing: size 01 - 05

Ordering Details: e.g.: Product No. 612 100 00, Sliding Hub FA size 00

Product No	Size	Torque range 1 Spring[1] Nm	Torque range 2 Springs[2] Nm	Speed max. min^{-1}	Bore Pilot mm	Bore $d_{max.}$ mm	D mm	DN mm	B mm	Bore of Sprocket d_1^{H8} mm	Width $b_{min.}$ mm	Width $b_{max.}$ mm	Bush length min. mm	Bush length max. mm	s mm	L mm	Screws Z x M mm	Weight prebored kg
612 100 00	00	0,5-5	1-10	10000	3,7	10	30	-	8,5	21	2	6	6	10	2,5	31	3x M4	0,1
612 100 10	0	2-10	4-20	8500	5,7	20	45	-	8,5	35	2	6	6	10	2,5	33	6x M4	0,3
612 101 00	01	5-35	10-70	6600	10	22	58	40	16	40	3	8	8	13	3	45	6x M4	0,6
612 101 10	1	20-75	40-150	5600	10	25	68	45	17	44	3	10	8	15	3	52	6x M5	0,9
612 102 00	2	25-140	50-280	4300	14	35	88	58	19	58	4	12	9	17	3	57	6x M6	1,8
612 103 00	3	50-300	100-600	3300	18	45	115	75	21	72	5	15	11	21,5	4	68	6x M8	3,4
612 104 00	4	90-600	180-1200	2700	24	55	140	90	23	85	6	18	12	24,5	4	78	6x M8	5,5
612 105 00	5	280-800	800-1600	2200	28	65	170	102	29	98	8	20	16	28	5	92	6x M8	8,8
612 106 00	6	300-1200	600-2400	1900	38	80	200	120	31	116	8	23	16	31	5	102	8x M20	14,0
612 107 00	7	600-2200	1200-4400	1600	45	100	240	150	33	144	8	25	16	33	5	113	12x M20	22,6
612 108 00	8	900-3400	1800-6800	1300	58	120	285	180	35	170	8	25	16	33	5	115	16x M20	33,6

[1] With one disc spring (standard version). [2] With second disc spring (order separately).

Replacement Friction Discs and additional Disc Springs

Matching Sliding Hub Product No.	Size	Outer Ø mm	Product No. Friction Disc[1]	Weight g	Product No. Disc Spring	Weight g
612 100 00	00	30	**612 100 01**	2	**612 100 02**	5
612 100 10	0	45	**612 100 11**	3	**612 100 12**	5
612 101 00	01	58	**612 101 01**	10	**612 101 02**	10
612 101 10	1	68	**612 101 11**	13	**612 101 12**	20
612 102 00	2	88	**612 102 01**	21	**612 102 02**	40
612 103 00	3	115	**612 103 01**	51	**612 103 02**	100
612 104 00	4	140	**612 104 01**	79	**612 104 02**	200
612 105 00	5	170	**612 105 01**	157	**612 105 02**	400
612 106 00	6	200	**612 106 01**	216	**612 106 02**[2]	320
612 107 00	7	240	**612 107 01**	250	**612 107 02**[3]	480
612 108 00	8	285	**612 108 01**	400	**612 108 02**[4]	640

[1] 2 pieces required. [2] Set with 16 springs. [3] Set with 24 springs. [4] Set with 32 springs.

Remarkes to the versions

The pictures above show size 01 to 5.
Sizes 00 and 0 are on the left side without hub.
From size 6, instead of the central disc spring, there are pairs of little disc springs around each preload screw.

Customized bores, keyways and bush lengths are available at extra charge.

Technical Explanations

The driving element (sprocket or pulley) is pushed onto the bush and clamped between the friction discs, supported by the round adjusting nut, the pressure plate, preload screws and the disk spring. The harder the disk spring is compressed by the pressure plate, the higher is the torque at which the driving element slips. The exact adjustment values for the torque can be found in the table stuck onto the sliding hubs.

Mounting instruction at **www.maedler.de** in the section **Downloads**.

Torque – Increase

The torque values refer to the sprocket version with ground surfaces. Non-ground surfaces lead to faster wear of the friction disks.

Wear due to frequent slipping reduces the set torque.

At all sizes, the specified torque can be doubled by the addition of a (second) disc spring. The torque ranges with one or two disc springs are shown in the table.

At sizes from 01 to 5, the specified torque can be tripled by the addition of a (third) disc spring. The minimum torque setting is then approx. 65% of the maximum value.

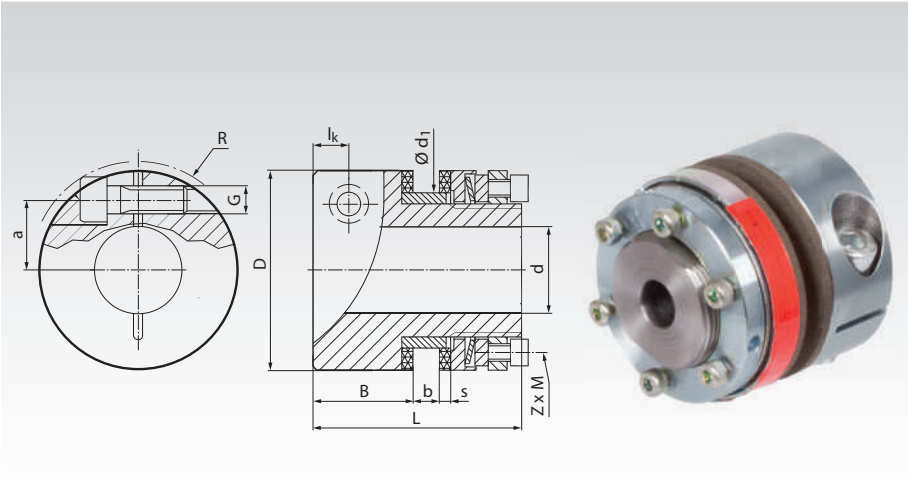
Sliding Hubs FAK as Torque Limiters, with Clamp Hub

Material: Steel, zinc-plated and chromated.

- Clamp hub version.
- The slipping torque can be adjusted with common assembly tools for screws, also after mounting.
- By mounting an additional springs the torque range can be increased (additional spring has to be ordered separately).
- The hubs are delivered with pilt bore and max. bush length. Customized bores, keyways and bush lengths at extra charge.

Required bush length:
The bush length required depends on the width of the component to be joined. To calculate the bush length take the width of the component and add 1.5 times the thickness of the friction disc, plus an additional 0.5mm.

Bush length in mm = 1.5 x s + b + 0.5.



Ordering Details: e.g.: Product No. 612 110 10, Sliding Hub FAK size 0

Product No.	Size	Torque range 1 Spring[1] Nm	Torque range 2 Springs[2] Nm	Speed max. min^{-1}	Bore Pilot mm	Bore $d_{max.}$ mm	D mm	B mm	Bore of Sprocket d_1^{H8} mm	Width $b_{min.}$ mm	Width $b_{max.}$ mm	Bush length min. mm	Bush length max. mm	s mm	L mm	Screws Z x M mm	Weight prebored kg
612 110 10	0	2 - 10	4 - 20	8500	10	22	45	21,5	35	2	6	6	10	2,5	46	6x M4	0,3
612 111 00	01	5 - 35	10 - 70	6600	10	25	58	26	40	3	8	8	13	3	55	6x M4	0,6
612 111 10	1	20 - 75	40 - 150	5600	18	28	68	30	44	3	10	8	15	3	65	6x M5	0,9
612 112 00	2	25 - 140	50 - 280	4300	18	40	88	34	58	4	12	9	17	3	72	6x M6	1,8

Clamp Screw Dimensions and Fastening Torque

Size	R mm	G mm	T_A Nm	l_K mm	a mm
0	50	M6	16	8	16
01	62	M8	41	10	19
1	74	M10	83	12	22
2	93	M12	145	14	30

[1] With one disc spring (standard version).
[2] With second disc spring (order separately).

Replacement Friction Discs and additional Disc Springs

Matching Sliding Hub Product No.	Size	Outer Ø mm	Product No. Friction Disc[1]	Weight g	Product No. Disc Spring	Weight g
612 110 10	0	45	**612 100 11**	3	**612 100 12**	5
612 111 00	01	58	**612 101 01**	10	**612 101 02**	10
612 111 10	1	68	**612 101 11**	13	**612 101 12**	20
612 112 00	2	88	**612 102 01**	21	**612 102 02**	40

[1] 2 pieces required.

Remarkes to the versions

The pictures above show size 01 to 2.
Size 0 is on the left side without hub.

Customized bores, keyways and bush lengths are available at extra charge.

Technical Explanations

The driving element (sprocket or pulley) is pushed onto the bush and clamped between the friction discs, supported by the round adjusting nut, the pressure plate, preload screws and the disk spring. The harder the disk spring is compressed by the pressure plate, the higher is the torque at which the driving element slips. The exact adjustment values for the torque can be found in the table stuck onto the sliding hubs.

Torque – Increase

The torque values refer to the sprocket version with ground surfaces. Non-ground surfaces lead to faster wear of the friction disks.

Wear due to frequent slipping reduces the set torque.

At all sizes, the specified torque can be doubled by the addition of a (second) disc spring. The torque ranges with one or two disc springs are shown in the table.

Operating Instructions at www.maedler.de in the section Downloads

ROBA®-Sliding Hubs as Torque Limiters for Chain-, Gear- and Belt Drive-wheels

Material: Steel, zinc-phosphated.

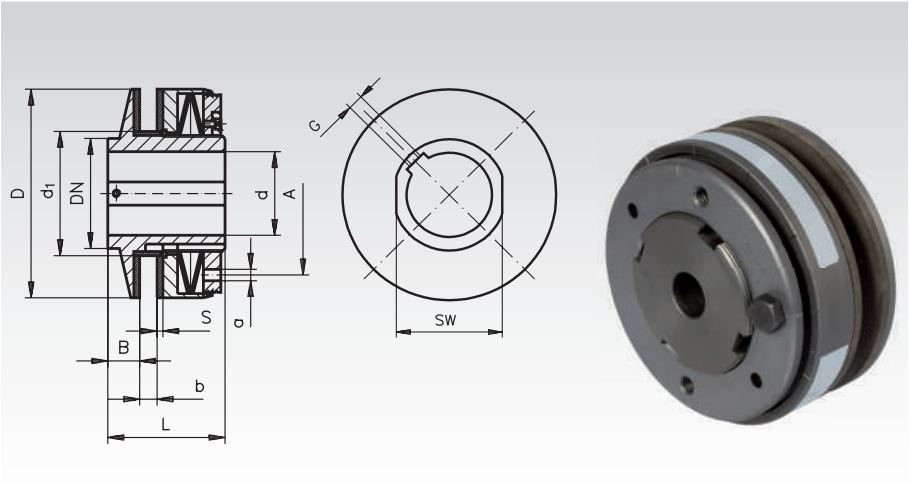
ROBA®-sliding hubs are high-quality machine components. They are machined all-round and zinc-phosphated, i.e. rust-proof. They are of fully-closed design.

The sliding hubs are delivered pre-drilled with the max bush length (for b_{max}).

Required bush length:
The bush length required depends on the width of the component to be joined. To calculate the bush length take the width of the component and add 1.5 times the thickness of the friction lining, plus an additional 0.5mm.

Bush length in mm = b + 1.5 x s + 0.5.

Other bush lengths, customized bores feather-key grooves and setscrew-threads available at extra charge.



Pictured version for up to 700 Nm max.

Ordering Details: e.g.: Product No. 612 300 00, ROBA-Sliding Hub

Product No.	Size	Torque min. Nm	Torque max. Nm	Speed max. min^{-1}	Clamping Tool A mm	Clamping Tool $a^{-0,2}$ mm	B mm	$b_{min.}$ mm	$b_{max.}$ mm	D mm	DN mm	Sprocket Bore d_1^{H8} mm	d max. mm	Pilot Bore mm	Set Screw G mm	L mm	SW mm	Lining S mm	Weight Pre-drilled g
612 300 00	0	2	10	8500	37	3	8,5	2	6	45	45	35	20[1)]	6	M4	33	-	2,5	300
612 320 00	1	14	70	5600	50	5	17	3	10	68	45	44	25	10	M*	52	41	3	900
612 340 00	2	26	130	4300	67	6	19	4	12	88	58	58	35	14	M**	57	50	3	1600
612 360 00	3	50	250	3300	84	6	21	5	15	115	75	72	45	18	M***	68	65	4	3100
612 380 00	4	110	550	2700	104	7	23	6	18	140	90	85	55	24	M8	78	80	4	5400
612 400 00	5	140	700	2200	125	8	29	8	20	170	102	98	65	28	M8	92	90	5	9000
612 420 00	6	240	1200	1900	150	8	31	8	23	200	120	116	80	38	M8	102	105	5	12400

M* Up to Ø12 M4, above Ø12 M5, above Ø17 M6.
M** Up to Ø 17 M5, above Ø 17 M6.
M*** Up to Ø 22 M6, above Ø 22 M8.

[1)] Above Ø19 only with keyway DIN6885/3.

Replacement Friction Linings and Face Spanners

Matching Product No.	Product No. Spare Part Friction Lining*	Weight g	Product No. Face Spanner	Weight g
612 300 00	**612 301 00**	3	**612 302 00**	114
612 320 00	**612 321 00**	13	**612 322 00**	159
612 340 00	**612 341 00**	21	**612 342 00**	240
612 360 00	**612 361 00**	51	**612 342 00**	240
612 380 00	**612 381 00**	79	**612 382 00**	750
612 400 00	**612 401 00**	157	**612 402 00**	1700
612 420 00	**612 421 00**	216	**612 402 00**	1700

* 2 pieces required.

Technical Explanations

The driving element (sprocket or pulley) is pushed onto the bush and clamped between the friction disks, supported by the pressure plate, the disk springs and the adjusting nut. The harder the disk springs are compressed by the adjusting nuts, the higher is the torque at which the driving element slips. The exact adjustment values for the torque can be found in the table stuck onto the sliding hubs.

The torque values refer to the sprocket version with ground surfaces. Non-ground surfaces lead to faster wear of the friction disks.

Wear due to frequent slipping reduces the set torque.

Torque – Increase

Changing the series stacking shown to a parallel stacking the maximum torque can be doubled. The minimum torque setting is then approx. 50% of the maximum value.

For product no. 612 320 00 to 612 400 00 the specified torque can be tripled by the addition of a (third) spring washer. The minimum torque setting is then approx. 65% of the maximum value.

For Product No. 612 360 00 to 612 400 00 this requires a special adjusting nut, and the pressure plate has to be shortened (both against surcharge).