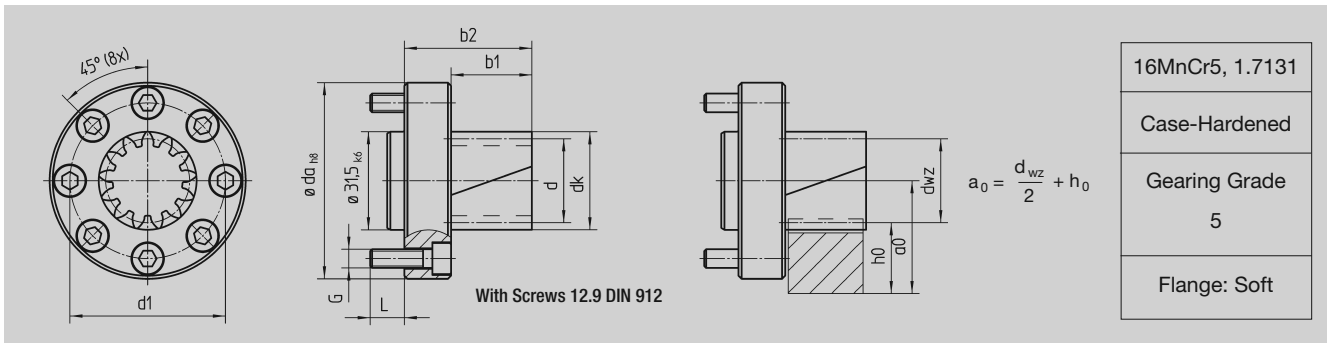




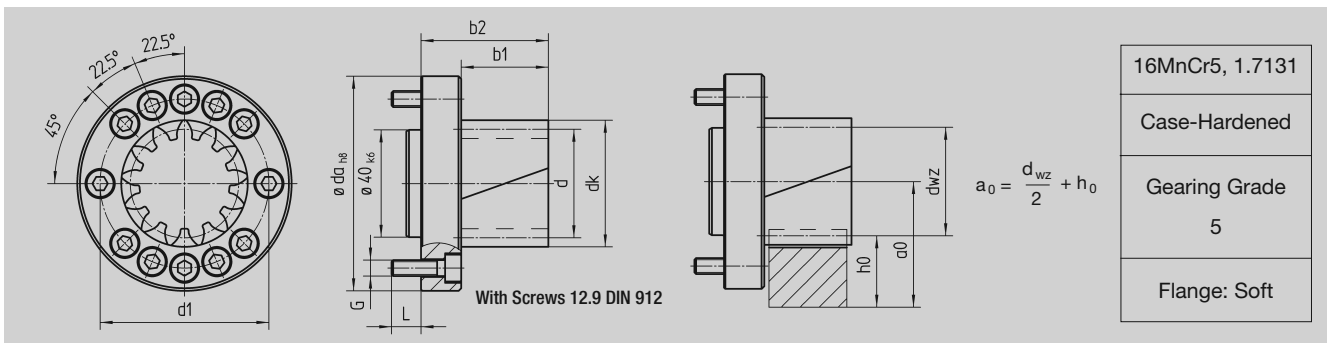
Bolt Circle-ø 50, helical tooth system, 19° 31' 42" left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface													
			z	x	d_{wz}	d_k	b_1	b_2	L	a_0	ISO	d_1	G	d_{ah8}	L	kg
Module 2																
78 21 912	12	0.5	27.46	31.50	26.0	41	80.00	35.73	9409-1-A-50	50	M6	63	11	0.5		
78 21 916	16	0	33.95	37.95	26.0	41	106.67	38.98	9409-1-A-50	50	M6	63	11	0.6		

Further number of teeth on request, min. number of teeth 12, max. number of teeth 16

Bolt Circle-ø 63, helical tooth system, 19° 31' 42" left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface													
			z	x	d_{wz}	[mm] d_k	[mm] b_1	[mm] b_2	[mm] L	[mm] a_0	ISO	d_1	G	d_{ah8}	L	kg
Module 2																
78 22 912	12	0.5	27.46	31.5	26.0	41	80.00	35.73	9409-1-A-63	63	M6	80	11	0.8		
78 22 919	19	0	40.32	44.3	26.0	41	126.67	42.16	9409-1-A-63	63	M6	80	11	0.9		
78 22 923	23	0	48.81	52.8	26.0	41	153.33	46.40	9409-1-A-63	63	M6	80	11	1.0		

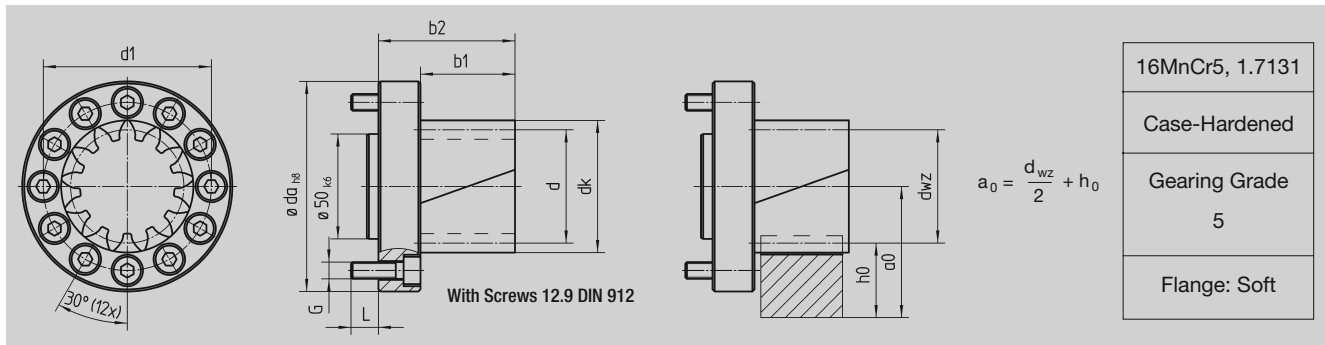
Further number of teeth on request, min. number of teeth 12, max. number of teeth 23

Module 3																
78 32 912	12	0.5	41.20	47.2	32.5	47.5	120.00	46.60	9409-1-A-63	63	M6	80	11	1.0		
78 32 914	14	0.3	46.36	52.4	32.5	47.5	140.00	49.18	9409-1-A-63	63	M6	80	11	1.0		

Further number of teeth on request, min. number of teeth 12, max. number of teeth 14



Bolt Circle- $\varnothing 80$, helical tooth system, $19^\circ 31' 42''$ left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface											
			d_{wz}	d_k	b_1	b_2	L	a_0	ISO	d_1	G	d_{ah8}	L	kg
Module 2														
78 23 912	12	0.5	27.46	31.5	26.0	46	80.00	37.73	9409-1-A-80	80	M8	100	13	1.4
78 23 923 ⁽¹⁾	23	0	48.81	52.8	26.0	46	153.33	46.40	9409-1-A-80	80	M8	100	13	1.6
78 23 929 ⁽¹⁾	29	0	61.54	65.5	26.0	46	193.33	52.77	9409-1-A-80	80	M8	100	13	1.9

Further number of teeth on request, min. number of teeth 12, max. number of teeth 29

Module 3														
78 33 912	12	0.5	41.20	47.2	32.5	52.5	120.00	46.60	9409-1-A-80	80	M8	100	13	1.6
78 33 916	16	0	50.93	56.9	32.5	52.5	160.00	51.46	9409-1-A-80	80	M8	100	13	1.8
78 33 917 ⁽¹⁾	17	0	54.11	60.1	32.5	52.5	170.00	53.06	9409-1-A-80	80	M8	100	13	1.9
78 33 919	19	0	60.48	66.5	32.5	52.5	190.00	56.24	9409-1-A-80	80	M8	100	13	2.0

Further number of teeth on request, min. number of teeth 12, max. number of teeth 19

Module 4														
78 43 912	12	0.5	54.93	62.9	45.0	65	160.00	62.46	9409-1-A-80	80	M8	100	13	2.1

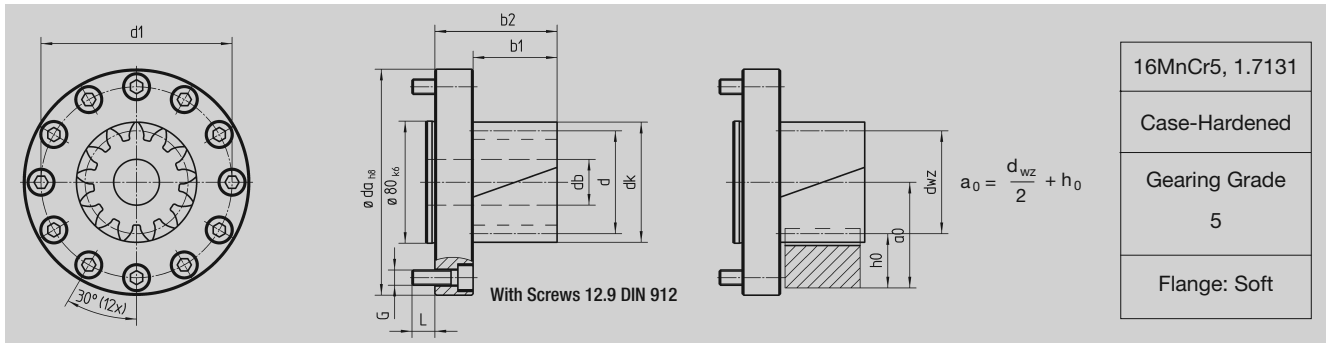
Further number of teeth on request, min. number of teeth 12, max. number of teeth 13

(1) Also available as pinion for counter bearing.





Bolt Circle- \varnothing 125, helical tooth system, 19° 31' 42" left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface											kg	
			z	x	d_{wz}	d_k	b_1	b_2	L	a_0	ISO	d_1	G		d_{ah8}
Module 3															
78 34 912	12	0.5	41.20	47.20	32.5	57.5	120	46.60	9409-1-A-125	125	M10	148	15	-	3.8
78 34 312	12	0.5	41.20	47.20	32.5	57.5	120	46.60	-	125	M12	148	17	-	3.8
78 34 919	19	0	60.48	66.50	32.5	57.5	190	56.24	9409-1-A-125	125	M10	148	15	-	4.2
78 34 319	19	0	60.48	66.50	32.5	57.5	190	56.24	-	125	M12	148	17	-	4.2
78 34 925	25	0	79.58	85.60	32.5	57.5	250	65.79	9409-1-A-125	125	M10	148	15	-	4.8
78 34 926 ⁽¹⁾	26	0	82.76	88.80	32.5	57.5	260	67.38	9409-1-A-125	125	M10	148	15	-	4.9
78 34 326	26	0	82.76	88.80	32.5	57.5	260	67.38	-	125	M12	148	17	-	4.9
78 34 932 ⁽¹⁾	32	0	101.86	107.90	32.5	57.5	320	76.93	9409-1-A-125	125	M10	148	15	-	5.6
78 34 332	32	0	101.86	107.90	32.5	57.5	320	79.63	-	125	M12	148	17	-	5.6

Further number of teeth on request, min. number of teeth 12, max. number of teeth 32

Module 4															
78 44 912	12	0.5	54.93	62.90	45.0	70.0	160.00	62.46	9409-1-A-125	125	M10	148	15	-	4.4
78 44 312	12	0.5	54.93	62.90	45.0	70.0	160.00	62.46	-	125	M12	148	17	-	4.3
78 44 915	15	0	63.66	71.70	45.0	70.0	200.00	66.83	9409-1-A-125	125	M10	148	15	-	4.7
78 44 916	16	0	67.91	75.90	45.0	70.0	213.33	68.95	9409-1-A-125	125	M10	148	15	-	4.8
78 44 917	17	0	72.15	80.15	32.5	57.5	170.00	53.06	9409-1-A-125	125	M10	148	15	-	5.0
78 44 317	17	0	72.15	80.15	32.5	57.5	170.00	53.06	-	125	M12	148	17	-	5.0
78 44 919	19	0.11	81.52	89.50	45.0	70.0	256.10	75.76	9409-1-A-125	125	M10	148	15	-	5.4
78 44 319	19	0.11	81.52	89.50	45.0	70.0	256.10	75.76	-	125	M12	148	17	-	5.3
78 44 920 ⁽¹⁾	20	0	84.88	92.90	45.0	70.0	266.67	77.44	9409-1-A-125	125	M10	148	15	-	5.5
78 44 320	20	0	84.88	92.90	45.0	70.0	266.67	77.44	-	125	M12	148	17	-	5.5
78 44 923	23	0	97.62	105.60	45.0	70.0	306.67	83.81	-	125	M10	148	15	-	6.1

Further number of teeth on request, min. number of teeth 12, max. number of teeth 23

Module 5															
78 54 912	12	0.5	68.66	78.70	55	80	200.00	68.33 ⁽²⁾	9409-1-A-125	125	M10	148	15	-	5.1
78 54 312	12	0.5	68.66	78.70	55	80	200.00	68.33 ⁽²⁾	-	125	M12	148	17	-	5.1
78 54 916 ⁽¹⁾	16	0	84.88	94.90	55	80	266.67	76.44 ⁽²⁾	9409-1-A-125	125	M10	148	15	-	6.0
78 54 316	16	0	84.88	94.90	55	80	266.67	76.44 ⁽²⁾	-	125	M12	148	17	-	6.3
78 54 918	18	0	95.49	105.50	55	80	300.00	81.75 ⁽²⁾	9409-1-A-125	125	M10	148	15	-	6.6
78 54 318	18	0	95.49	105.50	55	80	300.00	81.75 ⁽²⁾	-	125	M12	148	17	-	6.6

Further number of teeth on request, min. number of teeth 12, max. number of teeth 18

Module 6															
78 64 912	12	0.5	82.39	94.40	65	90	240.00	84.20	9409-1-A-125	125	M10	148	15	25	5.8
78 64 312	12	0.5	82.39	94.40	65	90	240.00	84.20	-	125	M12	148	17	25	5.9
78 64 913	13	0.5	88.76	100.80	65	90	260.00	87.38	9409-1-A-125	125	M10	148	15	25	6.3
78 64 915	15	0	95.49	107.50	65	90	300.00	90.75	9409-1-A-125	125	M10	148	15	25	6.8

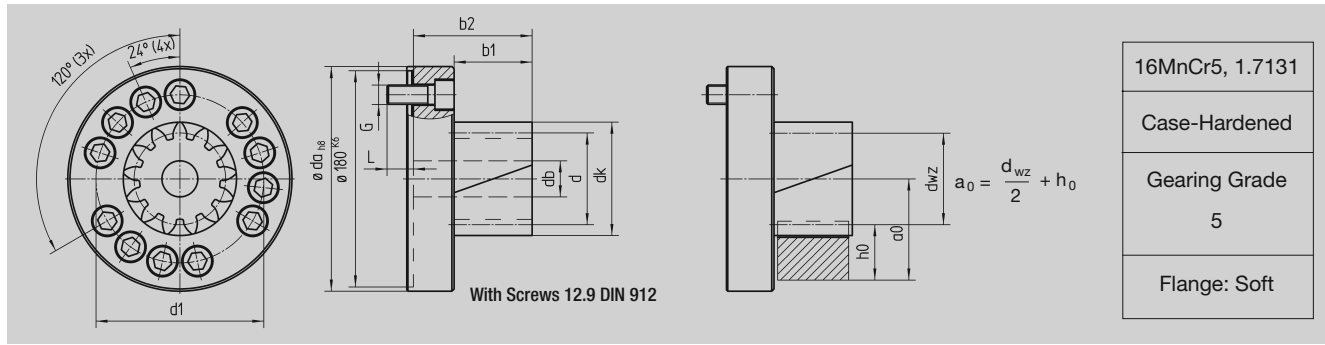
Further number of teeth on request, min. number of teeth 12, max. number of teeth 15

(1) Also available as pinion for counter bearing.

(2) For 29 55 ... $a_0 = a_0 + 10$.



Bolt Circle- \varnothing 140, helical tooth system, $19^\circ 31' 42''$ left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface												
			d_{wz}	d_k	b_1	b_2	L	a_0	ISO	d_1	G	d_{ah8}	L	d_b	kg
Module 4															
78 46 912	12	0.5	54.93	62.90	45	79	160.00	62.46	-	140	M16	187	22	-	8.1
78 46 919	19	0.11	81.52	89.50	45	79	256.10	75.76	-	140	M16	187	22	-	9.1
78 46 920	20	0	84.88	92.90	45	79	266.67	77.40	-	140	M16	187	22	-	9.2
78 46 320	20	0	84.88	92.90	45	79	266.67	77.40	-	145	M20	187	16	-	9.6

Further number of teeth on request, min. number of teeth 12, max. number of teeth 25

Module 5

78 56 914	14	0.3	77.27	87.30	55	89	233.33	72.64 ⁽²⁾	-	140	M16	187	22	-	9.2
78 56 918	18	0	95.49	105.50	55	89	300.00	81.74 ⁽²⁾	-	140	M16	187	22	-	10.3
78 56 919	19	0	100.80	110.80	55	89	316.67	84.40 ⁽²⁾	-	140	M16	187	22	-	10.6

Further number of teeth on request, min. number of teeth 12, max. number of teeth 20

Module 6

78 66 912	12	0.5	82.39	94.40	65	99	240.00	84.20	-	140	M16	187	22	25	9.5
78 66 915	15	0	95.49	107.50	65	99	300.00	90.75	-	140	M16	187	22	25	10.5
78 66 916 ⁽¹⁾	16	0	101.86	113.90	65	99	320.00	93.93	-	140	M16	187	22	25	11.3

Further number of teeth on request, min. number of teeth 12, max. number of teeth 16

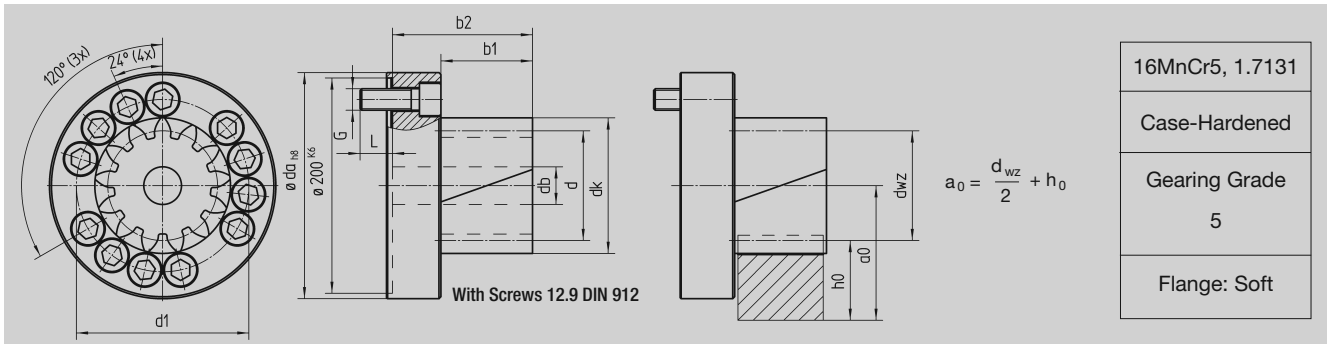
(1) Also available as pinion for counter bearing.

(2) For 29 55 ... $a'_0 = a_0 + 10$.





Bolt Circle-ø 160, helical tooth system, 19° 31' 42" left-hand



Order Code	No. of Teeth	Profile Modification Factor	Interface												
			d_{wz}	d_k	b_1	b_2	L	a_0	ISO	d_1	G	d_{ah8}	L	d_b	kg
Module 5															
78 57 912	12	0.5	68.66	78.7	55	100	200.00	68.33 ⁽¹⁾	-	160	M20	210	30	-	13.8
78 57 919	19	0	100.80	110.8	55	100	316.67	84.40 ⁽¹⁾	-	160	M20	210	30	-	15.6

Further number of teeth on request, min. number of teeth 12, max. number of teeth 22

Module 6															
78 67 912	12	0.5	82.39	94.4	65	110	240.00	84.20	-	160	M20	210	30	25	14.5
78 67 916	16	0	101.86	113.9	65	110	320.00	93.93	-	160	M20	210	30	25	15.9

Further number of teeth on request, min. number of teeth 12, max. number of teeth 18

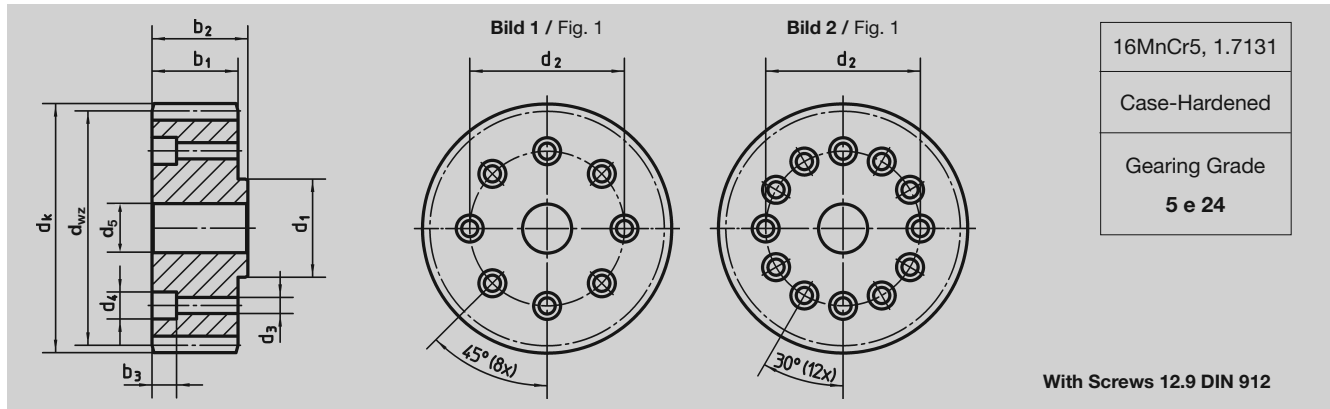
Module 8															
78 87 912	12	0.5	109.86	125.9	85	130	320.00	125.93	-	160	M20	210	30	30	17.8

⁽²⁾ For 29 55 ... $a'_0 = a_0 + 10$.



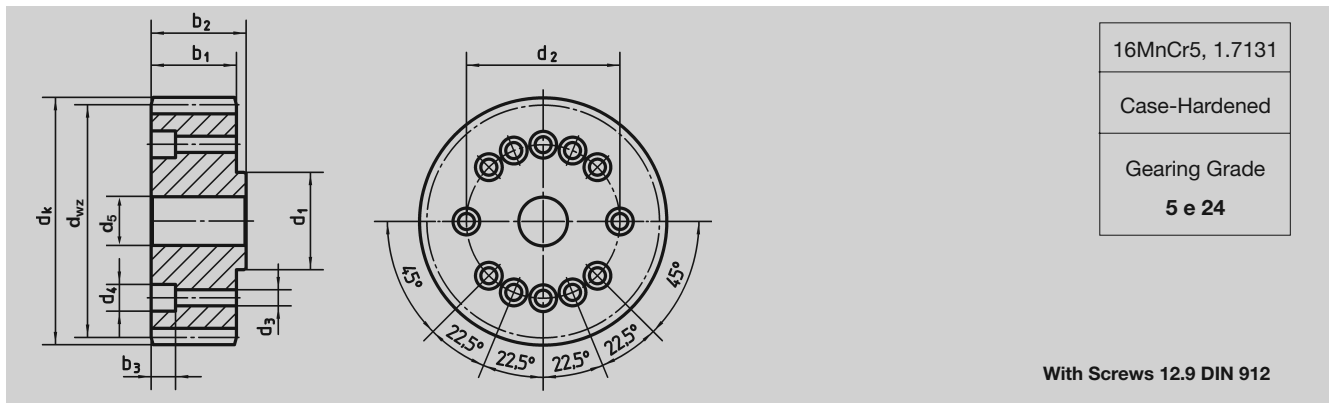


Helical Tooth System, 19° 31' 42" left-hand



Order Code	Fig.	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅ ^{H6}	b ₁	b ₂	b ₃	L=PI*d L	kg	Interface ISO
78 20 526	1	2	26	0.4065	56.80	60.60	20.0	31.5	5.5	10	15	26	29.0	12	173.33	0.4	9409-1-A-31.5
78 20 527	1	2	27	0	57.30	61.29	20.0	31.5	5.5	10	15	30	33.5	11	180.00	0.5	9409-1-A-31.5
78 20 529	1	2	29	0.4150	63.20	67.00	20.0	31.5	5.5	10	15	26	29.0	12	193.33	0.5	9409-1-A-31.5
78 20 535	1	2	35	0.3819	75.80	79.60	20.0	31.5	5.5	10	15	26	29.0	12	233.33	0.8	9409-1-A-31.5
78 25 529	1	2	29	0.4150	63.20	67.00	25.0	40.0	6.6	11	20	26	30.0	14	193.33	0.5	9409-1-A-40
78 21 533	1	2	33	0.3928	71.60	75.30	31.5	50.0	6.6	11	20	26	30.0	14	220.00	0.7	9409-1-A-50
78 20 536	1	2	36	0	76.40	80.39	31.5	50.0	6.6	11	20	30	34.0	8	240.00	1.2	9409-1-A-50
78 21 537	1	2	37	0.4209	80.20	84.00	31.5	50.0	6.6	11	20	26	30.0	14	246.67	0.9	9409-1-A-50
78 31 531	1	3	31	0.3540	100.80	106.60	31.5	50.0	6.6	11	20	31	35.5	9	310.00	1.8	9409-1-A-50
78 29 501	2	2	37	0.4209	80.20	84.00	31.5	50.0	6.6	11	20	26	30.0	14	246.67	0.9	9409-1-A-50

(1) Profile modification factor

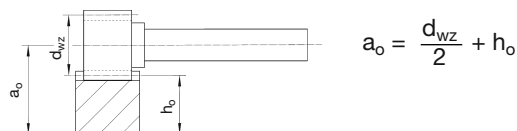


Order Code	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅ ^{H6}	b ₁	b ₂	b ₃	L=PI*d L	kg	Interface ISO
78 22 540	2	40	0.3792	86.40	90.20	40.0	63.0	6.6	11	31.5	26	30	14	266.69	1.0	9409-1-A-63
78 22 545	2	45	0.3267	96.80	100.60	40.0	63.0	6.6	11	31.5	26	30	14	300.00	1.4	9409-1-A-63
78 30 530	3	30	0	95.49	101.49	40.0	63.0	6.6	11	20.0	35	39	10	300.00	2.2	9409-1-A-63

(1) Profile modification factor

The max. torque is limited by the threaded connection.

Calculation of center distance a between gearwheel and rack.





Helical Tooth System, 19° 31' 42" left-hand

16MnCr5, 1.7131

Case-Hardened

Gearing Grade

5 e 24

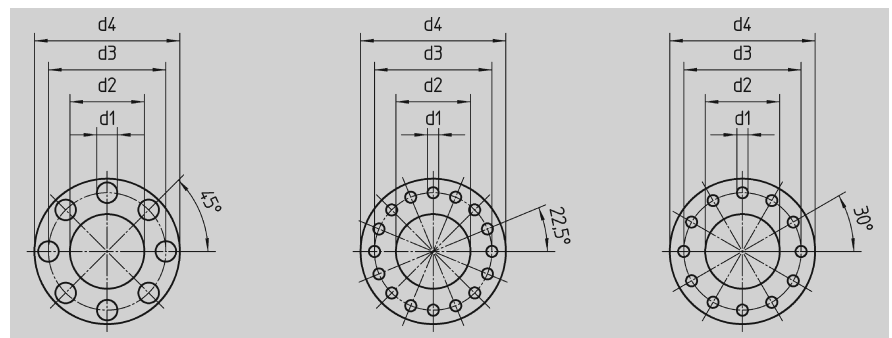
With Screws 12.9 DIN 912

Order Code	Module	N° of Teeth z	χ ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅ ^{H6}	b ₁	b ₂	b ₃	L=PI*d		Interface ISO
														L	kg	
78 33 535	3	35	0.3652	113.60	119.40	50	80	9	15	40	31	35.0	11	350.00	1.8	9409-1-A-80
78 33 540	3	40	0.3792	129.60	135.40	50	80	9	15	40	31	35.0	11	400.00	2.5	9409-1-A-80
78 40 530	4	30	0	127.32	135.32	50	80	9	15	40	45	49.0	11	400.00	3.5	9409-1-A-80
78 50 521	5	21	0	111.40	121.40	50	80	9	-	40	59	64.5	-	350.00	3.5	9409-1-A-80
78 50 536	5	36	0	190.99	200.98	80	125	11	18	60	55	61.0	13	600.00	8.0	9409-1-A-125

(1) Profile modification factor

The max. torque is limited by the threaded connection.

Foil Coated with Diamonds to increase the Friction Coefficient



Order Code	Fig. No.	ISO Connection	d ₁	d ₂	d ₃	d ₄
78 01 001	Fig. 1	A – 31.5	5.5	20.0	31.5	39
78 01 002	Fig. 1	A – 50	6.6	31.5	50.0	62
78 01 003	Fig. 2	A – 63	6.6	40.0	63.0	80
78 01 004	Fig. 3	A – 80	9.0	50.0	80.0	100
78 01 005	Fig. 3	A – 125	11.0	80.0	125.0	148

A transmission of the torque in connections based on friction is limited by the friction coefficient of the materials which are used. The change of the size of a construction is sometimes not possible, so the only possibility to transmit a higher torque is to increase the coefficient of friction. The foil which is coated with diamonds is able to increase this friction coefficient.

Material	Rz [µm]	p [Mpa]	Coefficient of Friction			
			Static		Dynamic	
			Average from 5 test results	Standard deviation	Average from 5 test results	Standard deviation
C45	1-3	50	0.38	0.16	-	-
(HV = 262)		100	0.45	0.07	0.41	0.05
16MnCr5	1-3	50	0.46	0.14	-	-
(HV = 735)		100	0.34	0.05	0.38	0.11

If you need more information please contact us.



Helical Tooth System, 19° 31' 42" left-hand

Interface A50

16MnCr5, 1.7131
Case-Hardened
Gearing Grade 5 e 24
Flange: Soft

With Screws 12.9 DIN 912

Set consists of Order Code Gear and Order Code Flange

Order Code Pinion	Order Code Flange	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	b ₁	b ₂	b ₃	b ₄	L=PI*d L	kg	Interface ISO
78 20 526	265 78001	2	26	0.4065	56.80	60.60	31.5	50	63	20	1.5	6.6	11	26	36	2.5	6.5	173.33	0.6	9409-1-A-31.5/50
78 20 527	265 78001	2	27	0	57.30	61.29	31.5	50	63	20	1.5	6.6	11	30	40	2.5	6.5	180.00	0.7	9409-1-A-31.5/50
78 20 529	265 78001	2	29	0.4150	63.20	67.00	31.5	50	63	20	1.5	6.6	11	26	36	2.5	6.5	193.33	0.7	9409-1-A-31.5/50
78 20 535	265 78001	2	35	0.3819	75.80	79.60	31.5	50	63	20	1.5	6.6	11	26	36	2.5	6.5	233.33	1.0	9409-1-A-31.5/50

(1) Profile modification factor

Interface A63

16MnCr5, 1.7131
Case-Hardened
Gearing Grade 5 e 24
Flange: Soft

With Screws 12.9 DIN 912

Set consists of Order Code Gear and Order Code Flange

Order Code Pinion	Order Code Flange	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	b ₁	b ₂	b ₃	b ₄	L=PI*d L	kg	Interface ISO
78 20 526	265 78002	2	26	0.4065	56.80	60.60	40	63	80	20	1.5	6.6	11	26	36	3	6.5	173.33	0.7	9409-1-A-31.5/63
78 20 527	265 78002	2	27	0	57.30	61.29	40	63	80	20	1.5	6.6	11	30	40	3	6.5	180.00	0.8	9409-1-A-31.5/63
78 20 529	265 78002	2	29	0.4150	63.20	67.0	40	63	80	20	1.5	6.6	11	26	36	3	6.5	193.33	0.8	9409-1-A-31.5/63
78 20 535	265 78002	2	35	0.3819	75.80	79.60	40	63	80	20	1.5	6.6	11	26	36	3	6.5	233.33	1.1	9409-1-A-31.5/63

(1) Profile modification factor

The max. torque is limited by the threaded connection.





Helical Tooth System, 19° 31' 42" left-hand

Interface A80

16MnCr5, 1.7131
Case-Hardened
Gearing Grade 5 e 24
Flange: Soft

With Screws 12.9 DIN 912

Set consists of Order Code Gear and order Code Flange

Order Code Pinion	Order Code Flange	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	b ₁	b ₂	b ₃	b ₄	L=PI*d L	kg	Interface ISO
78 20 526	265 78001⁽²⁾ 265 78003⁽²⁾	2	26	0.4065	56.80	60.60	50	80	100	31.5	15	9	15	26	49	4	9	173.33	1.2	9409-1-A-31.5/50/80
78 20 527	265 78001⁽²⁾ 265 78003⁽²⁾	2	27	0	57.30	61.29	50	80	100	31.5	15	9	15	30	53	4	9	180.00	1.3	9409-1-A-31.5/50/80
78 20 529	265 78001⁽²⁾ 265 78003⁽²⁾	2	29	0.4150	63.20	67.00	50	80	100	31.5	15	9	15	26	49	4	9	193.33	1.3	9409-1-A-31.5/50/80
78 20 535	265 78001⁽²⁾ 265 78003⁽²⁾	2	35	0.3819	75.80	79.60	50	80	100	31.5	15	9	15	26	49	4	9	233.33	1.6	9409-1-A-31.5/50/80
78 21 533	265 78003	2	33	0.3928	71.60	75.30	50	80	100	31.5	20	9	15	26	39	4	9	220.00	1.3	9409-1-A-50/80
78 20 536	265 78003	2	36	0	76.40	80.40	50	80	100	31.5	20	9	15	30	43	4	9	240.00	1.4	9409-1-A-50/80
78 21 537	265 78003	2	37	0.4209	80.20	84.00	50	80	100	31.5	20	9	15	26	39	4	9	246.67	1.5	9409-1-A-50/80
78 31 531	265 78003	3	31	0.3540	100.80	106.60	50	80	100	31.5	20	9	15	31	44	4	9	310.00	2.4	9409-1-A-50/80

(1) Profile modification factor (2) 2 flange



Interface A125

16MnCr5, 1.7131
Case-Hardened
Gearing Grade 5 e 24
Flange: Soft

With Screws 12.9 DIN 912

Set consists of Order Code Gear and Order Code Flange

Order Code Pinion	Order Code Flange	Module	N° of Teeth z	x ⁽¹⁾	d _{wz}	d _k	d _{1h6}	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	b ₁	b ₂	b ₃	b ₄	L=PI*d L	kg	Interface ISO
78 31 531	265 78003⁽²⁾ 265 78004⁽²⁾	3	31	0.3540	100.80	106.60	80	125	148	50	20	11	18	31	63	6	14	310.00	3.4	9409-1-A-50/80/125
78 33 535	265 78004	3	35	0.3652	113.60	119.40	80	125	148	50	40	11	18	31	50	6	14	350.00	3.8	9409-1-A80/125
78 33 540	265 78004	3	40	0.3792	129.60	135.40	80	125	148	50	40	11	18	31	50	6	14	400.00	4.5	9409-1-A80/125
78 40 530	265 78004	4	30	0	127.32	135.32	80	125	148	50	40	11	18	45	64	6	14	400.00	5.5	9409-1-A80/125
78 50 521	265 78004	5	21	0	111.40	121.40	80	125	148	50	40	11	18	59	78	6	14	350.00	5.5	9409-1-A80/125

(1) Profile modification factor (2) 2 flange

The max. torque is limited by the threaded connection.