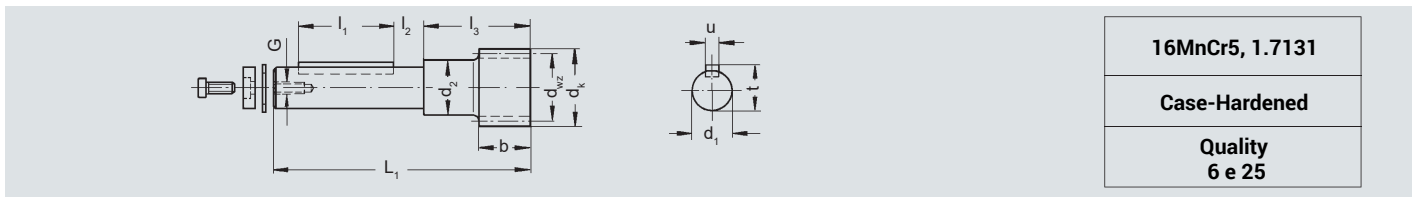


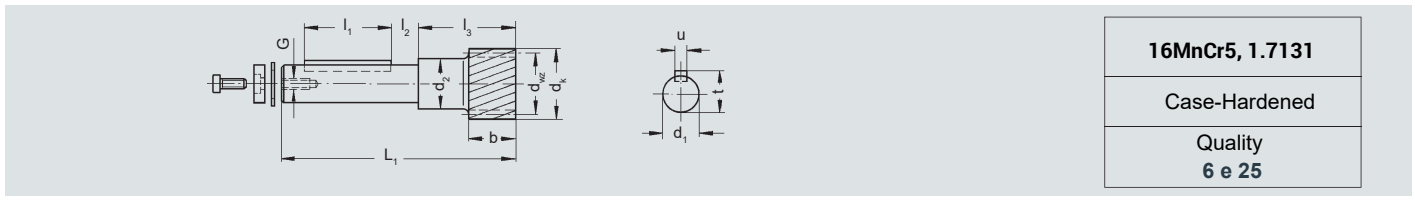
**Straight-Tooth Pinion Shafts**, 20° pressure angle, hardened & ground, crowned, tolerances according to DIN 3962/63/67



<b>16MnCr5, 1.7131</b>
<b>Case-Hardened</b>
<b>Quality 6 e 25</b>

Order Code	Gearbox ao HP / E	Module	Number of teeth	x	d <sup>1)</sup>	d <sub>wz</sub> <sup>2)</sup>	d <sub>k</sub>	b	d <sub>1h6</sub>	d <sub>2</sub>	L <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	u	t	G	a	kg
20 28 115	32	2	15	0.375	30.00	31.50	35.5	25	20	24	105	28	13.5	50.0	6	22.5	M 5	37.75	0.50
20 28 021	50	2	21	-	42.00	42.00	46.0	25	25	35	141	63	13.0	53.0	8	28.0	M 8	43.00	1.21
20 28 332	50	2	32	-	64.00	64.00	68.0	25	25	38	141	63	13.0	53.0	8	28.0	M 8	54.00	1.25
20 28 321	50	3	21	-	63.00	63.00	69.0	30	25	38	143	63	13.0	55.0	8	28.0	M 8	57.50	1.33
20 28 432	63	2	32	-	64.00	64.00	68.0	25	28	42	166	80	14.5	57.5	8	31.0	M 8	54.00	1.50
20 28 421	63	3	21	-	63.00	63.00	69.0	30	28	42	168	80	14.5	60.0	8	31.0	M 8	57.50	1.60
20 28 417	63	4	17	-	68.00	68.00	76.0	40	28	42	173	80	14.5	65.0	8	31.0	M 8	69.00	2.00
20 28 532	80	2	32	-	64.00	64.00	68.0	25	36	48	181	100	12.5	57.0	10	39.0	M 12	54.00	2.35
20 28 521	80	3	21	-	63.00	63.00	69.0	30	36	48	186	100	12.5	62.0	10	39.0	M 12	57.50	2.50
20 28 517	80	4	17	-	68.00	68.00	76.0	40	36	48	191	100	12.5	67.0	10	39.0	M 12	69.00	2.65
20 28 621	100	3	21	-	63.00	63.00	69.0	30	48	57	206	125	9.0	62.0	14	51.5	M 12	57.50	3.50
20 28 617	100	4	17	-	68.00	68.00	76.0	40	48	57	216	125	9.0	72.0	14	51.5	M 12	69.00	4.05
20 28 630	100	4	30	-	120.00	120.00	128.0	40	48	57	216	125	9.0	72.0	14	51.5	M 12	95.00	6.40
20 28 613	100	5	13	0.500	65.00	70.00	80.0	50	48	57	226	125	9.0	82.0	14	51.5	M 12	69.00	4.20
20 28 730	125	4	30	-	120.00	120.00	128.0	40	60	70	262	150	10.0	80.0	18	64.0	M 16	95.00	8.80
20 28 715	125	5	15	0.500	75.00	80.00	90.0	50	60	68	272	150	10.0	90.0	18	64.0	M 16	74.00	6.94
20 28 713	125	6	13	0.500	78.00	84.00	96.0	60	60	68	282	150	10.0	100.0	18	64.0	M 16	85.00	7.45

**Helical-Tooth Pinion Shafts**, 19°31'42" left-hand, 20° pressure angle, hardened & ground, crowned, tolerances according to DIN 3962/63/67



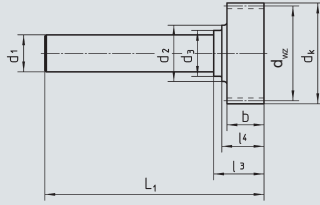
<b>16MnCr5, 1.7131</b>
<b>Case-Hardened</b>
<b>Quality 6 e 25</b>

Order Code	Gearbox ao HP / E	Module	Number of Teeth	x	d <sup>1)</sup>	d <sub>wz</sub> <sup>2)</sup>	d <sub>k</sub>	b	d <sub>1h6</sub>	d <sub>2</sub>	L <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	u	t	G	a	kg
20 29 120	32	1.5	20	-	31.83	31.83	34.83	20	20	26	100	40	7.5	45.0	6	22.5	M 5	33.42	0.60
20 29 115	32	2	15	0.4172	31.83	33.50	37.50	25	20	24	105	28	13.5	50.0	6	22.5	M 5	39.75	0.50
20 29 020	50	2	20	-	42.44	42.44	46.44	25	25	35	141	63	13.0	53.0	8	28.0	M 8	43.22	1.21
20 29 330	50	2	30	-	63.66	63.66	67.70	25	25	38	141	63	13.0	53.0	8	28.0	M 8	53.83	1.25
20 29 320	50	3	20	-	63.66	63.66	69.70	30	25	38	143	63	13.0	55.0	8	28.0	M 8	57.83	1.33
20 29 430	63	2	30	-	63.66	63.66	67.70	25	28	42	166	80	14.5	57.5	8	31.0	M 8	53.83	1.50
20 29 420	63	3	20	-	63.66	63.66	69.70	30	28	42	168	80	14.5	60.0	8	31.0	M 8	57.83	1.60
20 29 415	63	4	15	-	63.66	63.66	71.70	40	28	42	173	80	14.5	65.0	8	31.0	M 8	66.83	1.85
20 29 530	80	2	30	-	63.66	63.66	69.70	25	36	48	181	100	12.5	57.0	10	39.0	M 12	53.83	2.40
20 29 520	80	3	20	-	63.66	63.66	69.70	30	36	48	186	100	12.5	62.0	10	39.0	M 12	57.83	2.40
20 29 515	80	4	15	-	63.66	63.66	71.70	40	36	48	191	100	12.5	67.0	10	39.0	M 12	66.83	2.50
20 29 620	100	3	20	-	63.66	63.66	69.70	30	48	57	206	125	9.0	62.0	14	51.5	M 12	57.83	3.50
20 29 615	100	4	15	-	63.66	63.66	71.70	40	48	57	216	125	9.0	72.0	14	51.5	M 12	66.83	3.90
20 29 630	100	4	30	-	127.32	127.32	135.30	40	48	57	216	125	9.0	72.0	14	51.5	M 12	98.66	6.90
20 29 612	100	5	12	0.434	63.66	68.00	78.00	50	48	57	226	125	9.0	82.0	14	51.5	M 12	68.00	4.20
20 29 730	125	4	30	-	127.32	127.32	135.30	40	60	70	262	150	12.5	80.0	18	64.0	M 16	98.66	9.00
20 29 715	125	5	15	0.500	79.58	84.58	94.50	50	60	68	272	150	10.0	90.0	18	64.0	M 16	76.29	7.24
20 29 713	125	6	13	0.500	82.76	88.76	100.70	60	60	70	282	150	10.0	100.0	18	64.0	M 16	87.38	7.89

1) d = reference pitch diameter  
2) d<sub>wz</sub> = working pitch diameter

For calculation of center distance 'a' between rack and pinion, see page B-62

**Straight-Tooth Pinion Shafts**, 20° pressure angle, hardened & ground, crowned, tolerances according to DIN 3962/63/67



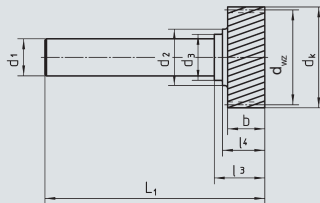
16MnCr5, 1.7131

Case-Hardened

Quality  
6 e 25

Order Code	Gearbox Size			Number of Teeth	x	d <sup>1)</sup>	d <sub>wz</sub> <sup>2)</sup>	d <sub>k</sub>	b	d <sub>rh6</sub>	d <sub>2</sub>	d <sub>3</sub>	L <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	a	T kg
	HT	HP/E	Module														
20 88 115	x	32	2	15	0.375	30.00	31.50	35.5	25	20	24	-	105	31.0	-	37.75	0.50
20 88 021	x	50	2	21	-	42.00	42.00	46.0	25	25	35	31	148	34.0	28.5	43.00	1.21
20 88 332	x	50	2	32	-	64.00	64.00	68.0	25	25	38	31	148	34.0	28.5	54.00	1.25
20 88 321	x	50	3	21	-	63.00	63.00	69.0	30	25	31	-	150	36.5	-	57.50	1.33
20 88 432	50	63	2	32	-	64.00	64.00	68.0	25	28	42	36	180	38.5	33.0	54.00	1.50
20 88 421	50	63	3	21	-	63.00	63.00	69.0	30	28	42	36	183	41.0	35.5	57.50	1.60
20 88 417	50	63	4	17	-	68.00	68.00	76.0	40	28	36	-	188	46.0	-	69.00	2.00
20 88 532	63	80	2	32	-	64.00	64.00	68.0	25	36	48	-	203	32.5	-	54.00	2.35
20 88 521	63	80	3	21	-	63.00	63.00	69.0	30	36	48	-	208	37.5	-	57.50	2.50
20 88 517	63	80	4	17	-	68.00	68.00	76.0	40	36	48	-	213	42.5	-	69.00	2.65
20 88 621	80	100	3	21	-	63.00	63.00	69.0	30	48	57	-	230	33.5	-	57.50	3.65
20 88 617	80	100	4	17	-	68.00	68.00	76.0	40	48	57	-	240	43.5	-	69.00	4.05
20 88 630	80	100	4	30	-	120.00	120.00	128.0	40	48	57	-	240	43.5	-	95.00	6.40
20 88 613	80	100	5	13	0.500	65.00	70.00	80.0	50	48	57	-	250	53.5	-	69.00	4.10
20 88 730	100	125	4	30	-	120.00	120.00	128.0	40	60	68	-	265	45.0	-	95.00	8.70
20 88 715	100	125	5	15	0.500	75.00	80.00	90.0	50	60	68	-	275	55.0	-	74.00	6.30
20 88 713	100	125	6	13	0.500	78.00	84.00	96.0	60	60	68	-	285	65.0	-	85.00	6.84

**Helical-Tooth Pinion Shafts**, 19°31'42" left-hand, 20° pressure angle, hardened & ground, crowned, tolerances according to DIN 3962/63/67



16MnCr5, 1.7131

Case-Hardened

Quality  
6 e 25

Order Code	Gearbox Size			Number of Teeth	x	d <sup>1)</sup>	d <sub>wz</sub> <sup>2)</sup>	d <sub>k</sub>	b	d <sub>rh6</sub>	d <sub>2</sub>	d <sub>3</sub>	L <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	a	T kg
	HT	HP/E	Module														
20 89 120	x	32	1.5	20	-	31.83	31.83	34.83	20	20	26	-	100.25	26.0	-	33.40	0.50
20 89 115	x	32	2	15	0.4172	31.83	33.50	37.50	25	20	24	-	105	31.0	-	38.75	0.50
20 89 020	x	50	2	20	-	42.44	42.44	46.44	25	25	35	31	148	34.0	28.5	43.22	1.21
20 89 330	x	50	2	30	-	63.66	63.66	67.70	25	25	38	31	148	34.0	28.5	53.83	1.25
20 89 320	x	50	3	20	-	63.66	63.66	69.70	30	25	31	-	150	36.5	-	57.83	1.33
20 89 430	50	63	2	30	-	63.66	63.66	67.70	25	28	42	36	180	38.5	33.0	53.83	1.60
20 89 420	50	63	3	20	-	63.66	63.66	69.70	30	28	42	36	183	41.0	35.5	57.83	1.60
20 89 415	50	63	4	15	-	63.66	63.66	71.70	40	28	36	-	188	46.0	-	66.83	1.85
20 89 530	63	80	2	30	-	63.66	63.66	69.70	25	36	48	-	203	32.5	-	53.83	2.35
20 89 520	63	80	3	20	-	63.66	63.66	69.70	30	36	48	-	208	37.5	-	57.83	2.40
20 89 515	63	80	4	15	-	63.66	63.66	71.70	40	36	48	-	213	42.5	-	66.83	2.50
20 89 620	80	100	3	20	-	63.66	63.66	69.70	30	48	57	-	230	33.5	-	57.83	3.65
20 89 615	80	100	4	15	-	63.66	63.66	71.70	40	48	57	-	240	43.5	-	66.83	3.90
20 89 630	80	100	4	30	-	127.32	127.32	135.30	40	48	57	-	240	43.5	-	98.66	6.90
20 89 612	80	100	5	12	0.434	63.66	68.00	78.00	50	48	57	-	250	53.5	-	68.00	4.10
20 89 613	80	100	6	13	0.500	82.76	88.76	100.76	60	48	57	-	260	63.5	-	87.38	4.30
20 89 730	100	125	4	30	-	127.32	127.32	135.30	40	60	70	-	265	45.0	-	98.66	9.15
20 89 715	100	125	5	15	0.500	79.58	84.58	94.50	50	60	70	-	275	55.0	-	76.29	6.57
20 89 713	100	125	6	13	0.500	82.76	88.76	100.76	60	60	70	-	285	65.0	-	84.38	7.13
20 48 713	100	125	6	13	0.500	82.76	88.76	100.76	60	60	70	-	285	65.0	-	87.38	7.13
20 48 715	100	125	6	15	0.500	95.49	101.49	113.49	60	60	70	-	285	65.0	-	73.75	7.60

1) d = Reference Pitch Diameter

2) d<sub>wz</sub> = Working Pitch Diameter</