

LOAD-BEARING CAPACITY OF BEVEL GEARS

DESIGNED FOR TRANSMISSION BETWEEN ORTHOGONAL AXES

The mechanical performance or the load-bearing capacity of bevel gears is defined by the twisting moments that the gears are capable of transmitting:

- in the form of dynamic torque, when in motion;
- in the form of static torque, when stationary or moving slowly.

The dynamic torque (M_d) represents the limiting torque yielding due to bending fatigue, whereas the static torque (M_s) indicates the limiting torque at failure by yielding due to tooth bending.

The values declared for both torques are the maximum permitted values and have been tested in compliance with the calculation codes and based on the limiting stress values detailed in the DIN 3991 STANDARDS method C.

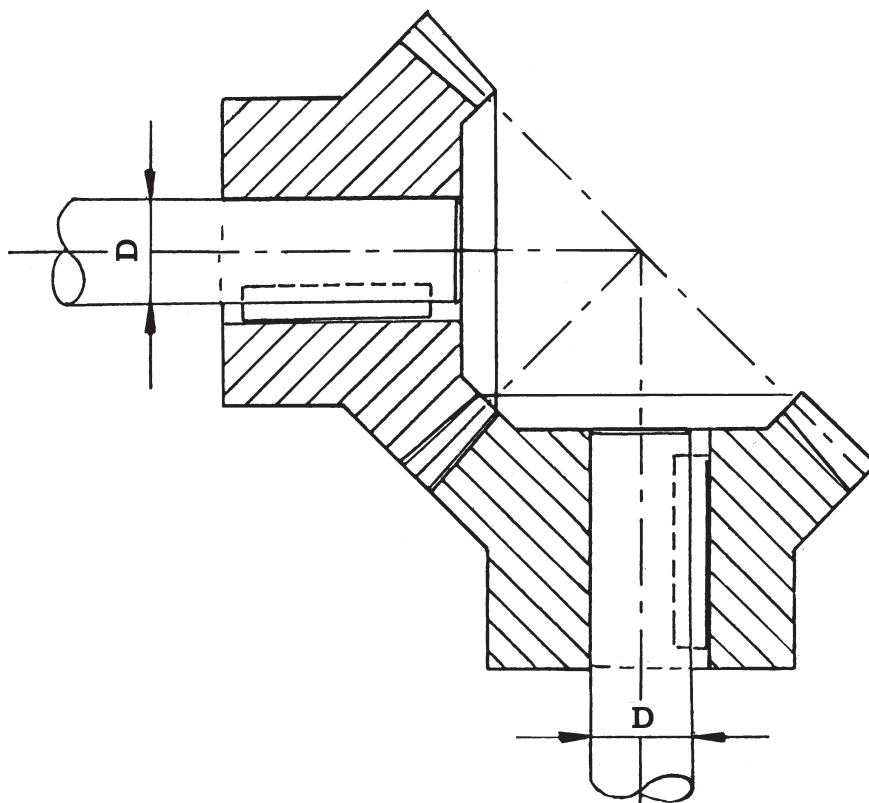
The test calculations are valid for a Service Factor (SF) equal to 1 in the absence of data regarding the real operating conditions. **We recommend adopting a safety factor equal to at least 1.5 to adjust the nominal torque to the operating torque.**

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Ratio	M	Z	M_d (Nm)	M_s (Nm)	M	Z	M_d (Nm)	M_s (Nm)	
1:1	1	16	1.35	3.6	3	16	36.8	96	
		18	1.61	4.25		18	48	107	
		20	2	5.35		20	60	158	
		22	2.5	6.55		22	68	182	
		25	3.2	8.35		25	90	235	
		28	4	10.4		28	105	276	
	1.5	32	5.25	13.8	32	135	354		
		16	4.4	11.5	3.5	16	58	152	
		18	5.5	14.35		18	71	171	
		20	6.7	17.6		20	90	246	
		22	8	21.10		22	111	300	
		25	10.5	27.6		25	140	361	
28	13.2	35.	28	175		449			
2	2	32	17.2	40.10	4	32	218	584	
		16	10	26.3		5	16	83.6	219
		18	12.5	30			18	111	290
		20	15	39.5			20	138	360
		22	18.6	48.8			22	167	437
		25	25.4	65.5			25	212	554
	28	31.5	82.5	28	260		681		
	2.5	32	40	95.15	32	327	855		
		16	18.5	48.5	5	16	159	415	
		18	24	62		18	201	525	
		20	29.5	68.8		20	248	645	
		22	36	94		22	300	782	
25		45	118	25		394	1029		
28	58.5	132	28	480		1253			
	32	76.5	200	32	595	1557			

Ratio	M	Dynamic torque M_d		Static torque M_s	
1:2	1	6.5	Nm	17.2	Nm
	1.5	23.5	Nm	61.5	Nm
	2	52.3	Nm	137	Nm
	2.5	102	Nm	267	Nm
	3	176	Nm	460	Nm
1:3	3.5	287	Nm	745	Nm
	4	416	Nm	1086	Nm
	5	808	Nm	2114	Nm
	1	18.5	Nm	48.5	Nm
	1.5	55	Nm	145	Nm
1:4	2	136	Nm	355	Nm
	2.5	270	Nm	704	Nm
	3	470	Nm	1228	Nm
	3.5	731	Nm	1910	Nm
	4	1074	Nm	2807	Nm
1:5	5	2085	Nm	3508	Nm
	1	40.5	Nm	106	Nm
	1.5	117	Nm	306	Nm
	2	277	Nm	724	Nm
	2.5	540	Nm	1410	Nm
1:6	3	956	Nm	2500	Nm
	3.5	1471	Nm	3845	Nm
	4	2087	Nm	5454	Nm
	5	3926	Nm	10270	Nm

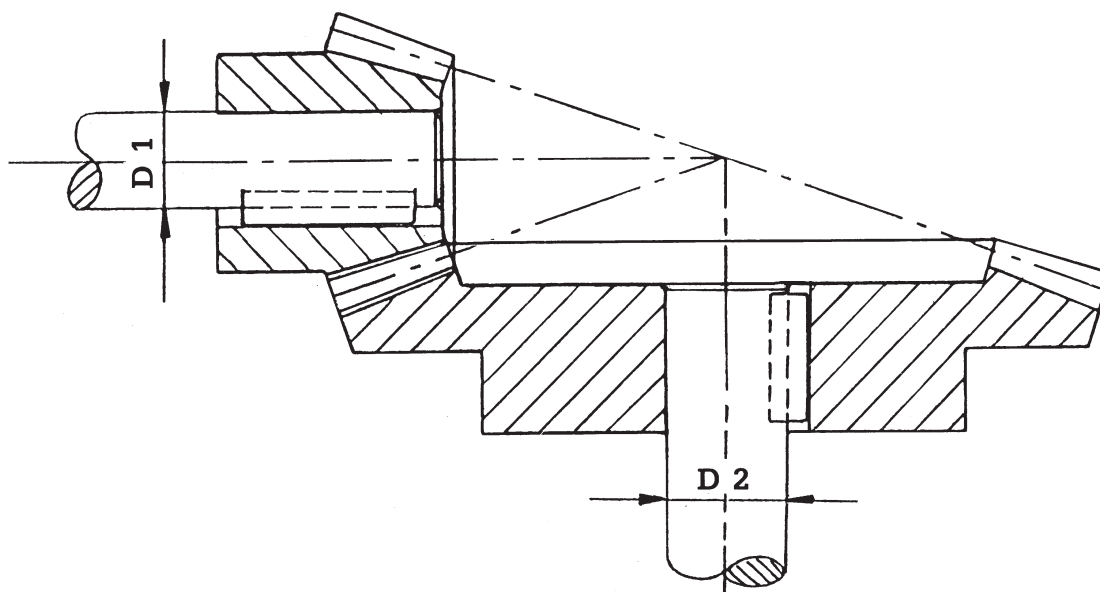
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Shaft D = this is the minimum shaft diameter capable of transmitting the dynamic twisting torque with a shear stress equal to 60 N/sq. mm.

Ratio	M	Z	Shaft D	$M_s (N_m)$	M	Z	$M_d (N_m)$	Shaft D
1:1	1	16	4	3.6	3	16	13	96
		18	5	4.25		18	15	107
		20	5	5.35		20	16	158
		22	5	6.55		22	16	182
		25	6	8.35		25	18	235
		28	6	10.4		28	19	276
	32	7	13.8	32	20	354		
	1.5	16	7	11.5	3.5	16	15	152
		18	7	14.35		18	17	171
		20	8	17.6		20	18	246
		22	8	21.1		22	19	300
		25	9	27.6		25	21	361
		28	9	35		28	22	449
	32	10	40.1	32	24	584		
	2	16	9	26.3	4	16	17	219
		18	9	30		18	19	290
		20	10	39.5		20	21	360
		22	11	48.8		22	22	437
		25	12	65.5		25	24	554
		28	13	82.5		28	25	681
	32	14	95.15	32	28	855		
	2.5	16	11	48.5	5	16	22	415
		18	12	62		18	23	525
		20	12	68.8		20	25	645
22		13	94	22		27	782	
25		14	118	25		29	1029	
28		16	132	28		31	1253	
32	17	200	32	34	1557			

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D1 = minimum shaft diameter on sprocket input.

D2 = minimum shaft diameter on wheel

N.B. - The shaft diameters are sized to the output dynamic torque and are tested to withstand a shear stress equal to 60 N/sq. mm.

Ratio	M	Dynamic torque M_d		Static torque M_s		D1	D2
1:2	1	6.5	Nm	17.2	Nm	6	7
	1.5	23.5	Nm	61.5	Nm	9	11
	2	52.3	Nm	137	Nm	12	15
	2.5	102	Nm	267	Nm	15	19
	3	176	Nm	460	Nm	18	22
1:3	3.5	287	Nm	745	Nm	21	26
	4	416	Nm	1086	Nm	24	30
	5	808	Nm	2114	Nm	30	37
	1	18.5	Nm	48.5	Nm	7	11
	1.5	55	Nm	145	Nm	11	15
1:4	2	136	Nm	355	Nm	14	21
	2.5	270	Nm	704	Nm	18	26
	3	470	Nm	1228	Nm	22	31
	3.5	731	Nm	1910	Nm	25	36
	4	1074	Nm	2807	Nm	28	41
1:5	5	2085	Nm	3508	Nm	35	51
	1	40.5	Nm	106	Nm	9	14
	1.5	117	Nm	306	Nm	12	20
	2	277	Nm	724	Nm	16	26
	2.5	540	Nm	1410	Nm	20	33
1:6	3	956	Nm	2500	Nm	25	39
	3.5	1471	Nm	3845	Nm	29	45
	4	2087	Nm	5454	Nm	32	51
	5	3926	Nm	10270	Nm	40	63