

## APPENDIX

**Table A1 AGMA Reliability Factors [2]**

Reliability	$K_R, C_R$
0.90	0.8
0.99	1.00
0.999	1.25
0.9999	1.50

**Table A2 Surface {Application} Factor [2]**

For supports of elevators	$K = 2$
For cab-operated traveling-crane support girders and their connections	$K = 1.25$
For pendant-operated traveling-crane support girders and their connections	$K = 1.10$
For supports of light machinery, shaft- or motor-driven	$K = 1.20$
For supports of reciprocating machinery or power-driven units	$K = 1.50$
For hangers supporting floors and balconies	$K = 1.33$

**Table A3 Elastic Coefficient [2]**

	Steel	Malleable iron	Nodular iron	Cast iron	Aluminum bronze	Tin bronze
Steel	191	181	179	174	162	158
Malleable iron	181	174	172	168	158	154
Nodular iron	179	172	170	166	156	152
Cast iron	174	168	166	163	1154	149
Aluminium bronze	162	158	156	154	145	141
Tin bronze	158	154	152	149	141	137

**Table A4 AGMA Bending Strength [2]**

AGMA	COMMERCIAL	HEAT	MINIMUM HARDNESS AT	$S_t$
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MATERIAL	CLASS	DESIGNATION	TREATMENT	SURFACE	CORE	psi	MPa
Steel	A-I through A-5	-	Through- hardened and tempered	180 BHN	-	25-33 000	(170-230)
				240 BHN	-	31-41 000	(210-280)
				300 BHN	-	36-47 000	(250-320)
				360 BHN	-	40-52 000	(280-360)
				400 BHN	-	42-56 000	(290-390)
			Flame- or induction- hardened with type A pattern	50-54 HRC.	-	45-55 000	(310-380)
			Flame- or induction- hardened with type B pattern		-	22 000	(150)
			CarbUize d and case- hardened	55 HRC	-	55-65 000	(380-450)
				60 HRC	-	55-70 000	(380-480)
		AISI 4140	Nitrided*	48 HRC	300 BHN	34-45 000	(230-310)
	AISI 4340	Nitrided*	46 HRC	300 BHN	36-47 000	(250-325)	
	Nitralloy 135M	Nitrided*	60 HRC	300 BHN	38-48 000	(260-330)	
	2'12% chrome	Nitrided*	54-60 HRC	350 BHN	55-65 000	(380-450)	
Cast iron	20		As cast	-	-	5000	(35)
	30		As cast	175 BHN	-	.8500	(69)
	40		As cast	200 BHN	-	13 000	(90)
Nodular (ductile) iron	A-7-a	60-40-18		140 BHN.	-	90-100% of	
	A-7-c	80-55-06	(AnnUIW,] quenched, and tempered	180 BHN	-	Sf for steel of same hardness	
	A-7-d	100-70-03		230 BHN	-		
	A-7-e	120-90-02		270 BHN			
Malleable iron (pearlitic)	A-8-c	45007	-	165 BHN	-	10 000	(70)
	A-8-e	50005	-	180 BHN	-	13 000	(90)
	A-8-f	53007	-	195 BHN	-	16000	(110)
	A-8-i	80002	-	240 BHN	-	21 000	(145)
Bronze	Bronze 2	AGMA 2C	Sand-cast Sand-cast	Tensile strength minimum 40 000 lb/in2 (275 MPa)		5700	(40)
		ASTM B – 148 – 52 alloy 9C	Heat-treated	Tensile strengthminimum 90 000 lb/in2 (620 MPa)		23 600	(160)

Source: AGMA 218.01

**Table A 5 AGMA Surface Fatigue Strength  $S_c$  [2]**

AGMA	COMMERCIAL	HEAT	MINIMUM HARDNESS	$S_c$
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MATERIAL	CLASS	DESIGNATION	TREAT.	AT SURFACE	psi	MPa	
Steel	A-I through A-5	-	Through- hardened and tempered	180 BHN	85-95 000	(590-660)	
				and less			
				240 BHN	105-115000	(720-790)	
				300 BHN	120-135 000	(830-930)	
				360 BHN	145-160000	(1000-1100)	
				400 BHN	155-170000	(1100-1200)	
				Flame- or induction- hardened	50 HRC	170-190000	(1200-1300)
					54 HRC	175-195 000	(1200-1300)
				Carburized and case- hardened	55 HRC	180-200 000	(1250-1400)
					60 HRC	200- 225 000	(1400-1550)
			AISI 4140	Nitrided	48 HRC	155-180000	(1100-1250)
			AISI 4340	Nitrided	46 HRC	150-175000	(1050-1200)
		Nitralloy 135M	Nitrided	60 HRC	170-195000	(1170-1350)	
		2V2% chrome	Nitrided	54 HRC	155-172 000	(1100-1200)	
		2h% chrome	Nitrided	60 HRC	192-216000	(1300-1500)	
Cast iron	20		As cast	-	50-60 000	(340-410)	
	30		As cast	175 BHN	65-75000	(450-520)	
	40		As cast	200 BHN	75-85 000	(520-590)	
Nodular (ductile) iron	A-7-a	60-14-18	rMro. } quenched, and tempered	140 BHN	90-100% of	Se value of steel with same hardness	
	A-7-c	80-55-06		180 BHN			
	A-7<d	100-70-03		230 BHN			
	A-7-e	120-90-02		270 BHN			
Malleable iron (pearlitic)	A-8-c	45007	-	165 BHN	72 000	(500)	
	A-8-e	50005	-	180 BHN	78 000	(540)	
	A-8-f	53007	-	195 BHN	83 000	(570)	
	A-8-i	80002	-	240 BHN	94 000	(650)	
Bronze	Bronze 2	AGMA 2C	Sand-cast	Tensile strength minimum 40 000 lb/in2 (275 MPa)	30 000	(:205)	
	AVBr 3	ASTM B-148-52 alloy 9C	Heat- treated	Tensile strength minimum 90 000 lb/in2 (620 MPa)	65 000	(450)	

Source: AGMA 218.01

**Table A6 Helical-Gear Geometry Factors J**

No. of Teeth	Angle of Helix						
	5°	10°	15°	20°	25°	30°	35°
12	0.418	0.435	0.445	0.445	0.445	0.435	0.406

13	0.425	0.443	0.453	0.453	0.451	0.439	0.409
14	0.431	0.450	0.460	0.460	0.456	0.443	0.412
15	0.438	0.458	0.468	0.468	0.462	0.446	0.415
16	0.444	0.465	0.475	0.475	0.468	0.450	0.418
17	0.451	0.473	0.483	0.483	0.473	0.454	0.421
18	0.457	0.480	0.490	0.490	0.479	0.458	0.424
19	0.464	0.488	0.498	0.498	0.484	0.461	0.427
20	0.470	0.495	0.505	0.505	0.490	0.465	0.430
21	0.475	0.500	0.510	0.510	0.494	0.469	0.433
22	0.481	0.505	0.515	0.515	0.497	0.473	0.436
24	0.492	0.516	0.526	0.525	0.505	0.480	0.442
26	0.502	0.526	0.536	0.535	0.512	0.488	0.448
28	0.513	0.537	0.547	0.545	0.520	0.495	0.454
30	0.524	0.547	0.557	0.555	0.527	0.503	0.460
34	0.532	0.555	0.565	0.562	0.534	0.507	0.464
38	0.540	0.564	0.573	0.568	0.541	0.512	0.467
45	0.555	0.579	0.588	0.580	0.554	0.519	0.474
50	0.565	0.589	0.598	0.588	0.562	0.524	0.478
60	0.585	0.610	0.618	0.605	0.580	0.535	0.487
75	0.592	0.617	0.625	0.611	0.585	0.540	0.492
100	0.603	0.628	0.636	0.621	0.594	0.548	0.499
150	0.625	0.650	0.658	0.640	0.612	0.565	0.515