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Transmission Speed			
n1	2600.000	rpm	given
n3	400.000	rpm	given, ideal
n1/n3	6.500		given

Gear Property		
m	0.0050	m
a	0.0050	m
b	0.006250	m
phi	20.0000	deg

Factor of Safety
1.1000

Gearing	N		Pitch Diameter (d0)	Pitch Radius (r0)	Outer Circle (do)	Root Circle (dr)	Face Width (bw)		Torque	Wt	Wr	W		Power		Addendum	ɔdendum
N1	19.0000	teeth	0.095	0.048	0.105	0.083	0.065	m	257.096	5412.557	1970.010	5759.923	N	70000.000	W		
N2	47.0000	teeth	0.235	0.118	0.245	0.223	0.060	m	635.975	5412.557	1970.010	5759.923	N	70000.000	W		
N3	27.0000	teeth	0.135	0.068	0.145	0.123	0.065	m	635.975	9421.858	3429.276	10026.532	N	70000.000	W		
N4	71.0000	teeth	0.355	0.178	0.365	0.343	0.060	m	1672.380	9421.858	3429.276	10026.532	N	70000.000	W		
n1/n3	6.5049																
n3	399.7003	rpm															
% Error	-0.07%																

N1/N2	0.4043
N3/N4	0.3803

				Left		Right										
	Shaft		Diameter	Ay	Az	By	Bz		My	Mz	M	V_A	V_B	sigma,bs	tau,T	tau,S	
Shaft 1	2600.0000	rpm	0.0450	1546.4448	562.8599	3866.1120	1407.1497	N	-70.3575	193.3056	205.7115	1645.6922	4114.2304	22.9944	14.3691	3.4492	MPa
Shaft 2	1051.0638	rpm	0.0600	8007.1475	1788.6436	6827.2674	329.3773	N	-98.3754	-440.3931	451.2470	8204.4900	6835.2081	21.2795	14.9954	3.8690	MPa
Shaft 3	399.7003	rpm	0.0550	6460.7027	2351.5035	2961.1554	1077.7724	N	117.5752	323.0351	343.7668	6875.3362	3151.1958	21.0463	19.4680	3.8585	MPa

Material	E	UTS	Poisson Ratio	Ys
AISI 1020 Steel	200000.0000	394.7200	0.2900	294.7400

Fatigue	Kf	Kfs	kf (grinding)	ks	kr	kt	km	Se'	von-mises amplitude	von-mises mean	ns	nsy
Shaft 1	3.0000	2.8000	0.9505	0.7763	0.8200	1.0000	1.0000	197.3600	70.9822	24.8880	1.5210	6.0589
Shaft 2	3.0000	2.8000	0.9505	0.7517	0.8200	1.0000	1.0000	197.3600	66.5388	25.9727	1.5595	6.1045
Shaft 3	3.0000	2.8000	0.9505	0.7590	0.8200	1.0000	1.0000	197.3600	65.8535	33.7196	1.5398	5.2819

Geometry			
a	0.0550	m	left
b	0.0700	m	middle
c	0.0500	m	right
Ltotal	0.1750		
D1	0.1650	m	
D2	0.2450	m	
Dtotal	0.4100	m	
Dtotal*	0.6350	m	
Height	0.3550	m	
Volume	0.0394	m^3	

Cycles	873600.0000	
Shaft 1	2271360000.0000	cycles

Shaft 2	918209361.7021	cycles
Shaft 3	349178207.9712	cycles

Gear Material			E (MPa)	Poisson Ratio	Type
Gear 1	AISI 1045 Carbon Steel	500.0000	200000.0000	0.2850	pinion
Gear 2	AISI 1045 Carbon Steel	400.0000	200000.0000	0.2850	gear
Gear 3	AISI 1045 Carbon Steel	500.0000	200000.0000	0.2850	pinion
Gear 4	AISI 1045 Carbon Steel	400.0000	200000.0000	0.2850	gear

ns

Contact Stress	S_c	Z_N	HBp/HBg	Ch	K_T	K_R	sigma,all (MPa)	Ke (sqrtPa)	I	Ka	Ks	Km	Kv	ma. actual (I	ma, actual (Mf	ns	A	B	Qv	V (m/s)	Kv
Gear 1	1437.0000	0.7380	1.2500		1.0000	1.0000	1060.4686	466563.1271	0.7190	1.0000	1.0000	1.2000	1.6623	7560398.21	727.5604	1.4576	59.7730	0.8255	6.0000	12.9329	1.6623
Gear 2	1088.0000	0.7764	1.2500	1.0042	1.0000	1.0000	848.2032	466563.1271	0.7190	1.0000	1.0000	1.1000	1.6623	5029745.68	725.0297	1.1699	59.7730	0.8255	6.0000	12.9329	1.6623
Gear 3	1437.0000	0.7764	1.2500		1.0000	1.0000	1115.6426	466563.1271	0.7315	1.0000	1.0000	1.2000	1.5081	0405495.80	760.4055	1.4672	59.7730	0.8255	6.0000	7.4295	1.5081
Gear 4	1088.0000	0.8196	1.2500	1.0046	1.0000	1.0000	895.7861	466563.1271	0.7315	1.0000	1.0000	1.1000	1.5081	7760599.10	757.7606	1.1821	59.7730	0.8255	6.0000	7.4295	1.5081

Bending Stress	Sb	Yn	Kt	Kr	sigma, all (MPa)	Yj	ka	ks	km	kv	ki	kb	sigma. actual (Pa)	na. actual (M	ns
Gear 1	464.5000	0.8392	1.0000	1.0000	389.8179	0.3500	1.0000	1.0000	1.2000	1.6623	1.0000	1.0000	94917027.8329	94.9170	4.1069
Gear 2	301.5000	0.8641	1.0000	1.0000	260.5364	0.4200	1.0000	1.0000	1.1000	1.6623	1.0000	1.0000	78548234.8385	78.5482	3.3169
Gear 3	464.5000	0.8641	1.0000	1.0000	401.3902	0.3500	1.0000	1.0000	1.2000	1.5081	1.0000	1.0000	149894271.0744	149.8943	2.6778
Gear 4	301.5000	0.8915	1.0000	1.0000	268.8011	0.4200	1.0000	1.0000	1.1000	1.5081	1.0000	1.0000	124044448.8636	124.0444	2.1670

Lifetime	Hours	Rotation Speed	L10	Ap	m	Pr	X	P	C (N)	Bearing Spec	Link	C (N)	C0 (N)	d (m)	D (m)	W (m)
Shaft 1	14560.0000	2600.0000	2271.3600	1.0000	3.0000	1645.6922	1.0000	1645.6922	21632.6934	6209	s/ball-beari	35100.0000	21600.0000	0.0450	0.0850	0.0190
Shaft 2	14560.0000	1051.0638	918.2094	1.0000	3.0000	8204.4900	1.0000	8204.4900	79744.1494	6312	s/ball-beari	97500.0000	60000.0000	0.0650	0.1400	0.0330
Shaft 3	14560.0000	399.7003	349.1782	1.0000	3.0000	6875.3362	1.0000	6875.3362	48414.5965	6311	ıs/ball-bear	74100.0000	45000.0000	0.0550	0.1200	0.0290