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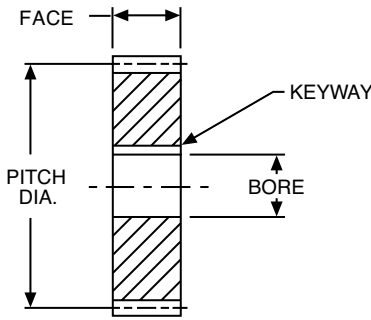
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Helical Gears

24 through 10 Transverse Diametral Pitch (Steel – Hardened)

14-1/2° Normal Pressure Angle – 45° Helix Angle



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

REFERENCE PAGES

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- Selection Procedure — 66

NOTE: Normal Diametral Pitch is equal to the Transverse Diametral Pitch divided by the cosine of the Helix Angle.

These gears are hardened all over, except as noted. Teeth on all steel gears are polished.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Keyway	Style See Page 323	RIGHT HAND		LEFT HAND			
					Catalog Number	Item Code	Catalog Number	Item Code		
24					Face: 8-15 Teeth = .375"					
TRANSVERSE DIAMETRAL PITCH					18-72 Teeth = .250"					
8	.333	.1875	*	A	H2408R	18268	H2408L	18270		
10	.417	.250	**		H2410R	18272	H2410L	18274		
12	.500				H2412R	18276	H2412L	18278		
15	.625	.375	1/8 x 1/16		H2415R	18280	H2415L	18282		
18	.750				H2418R	18284	H2418L	18286		
20	.833	.500			H2420R	18288	H2420L	18290		
24	1.000				H2424R	18292	H2424L	18294		
30	1.250				H2430R	18296	H2430L	18298		
36	1.500	.625			H2436R†	18300	H2436L†	18302		
48	2.000		H2448R†		18304	H2448L†	18306			
60	2.500		H2460R†		18308	H2460L†	18310			
72	3.000		H2472R†		18312	H2472L†	18314			
20					Face: 8-15 Teeth = .563"					
TRANSVERSE DIAMETRAL PITCH					18-72 Teeth = .375"					
8	.400	.250	**	A	H2008R	18228	H2008L	18230		
10	.500	.3125			H2010R	18232	H2010L	18234		
12	.600	.375	1/8 x 1/16		H2012R	18236	H2012L	18238		
15	.750	.4375			H2015R	18240	H2015L	18242		
20	1.000	.500			H2020R	18244	H2020L	18246		
25	1.250	.625			H2025R	18248	H2025L	18250		
30	1.500				H2030R†	18252	H2030L†	18254		
40	2.000	.750			H2040R†	18256	H2040L†	18258		
50	2.500		H2050R†		18260	H2050L†	18262			
60	3.000		H2060R†		18264	H2060L†	18266			
16					Face = .500"					
TRANSVERSE DIAMETRAL PITCH										
12	.750	.375	1/16 x 1/32	A	H1612R	18200	H1612L	18202		
16	1.000		1/8 x 1/16		H1616R	18204	H1616L	18206		
20	1.250	.500			H1620R	18208	H1620L	18210		
24	1.500				H1624R†	18212	H1624L†	18214		
32	2.000				H1632R†	18216	H1632L†	18218		
40	2.500				H1640R†	18220	H1640L†	18222		
48	3.000				H1648R†	18224	H1648L†	18226		
12					Face = .750"					
TRANSVERSE DIAMETRAL PITCH										
12	1.000		1/8 x 1/16	A	H1212R	18170	H1212L	18168		
15	1.250	.625			H1215R	18174	H1215L	18172		
18	1.500				H1218R†	18178	H1218L†	18176		
24	2.000				H1224R†	18182	H1224L†	18180		
30	2.500				H1230R†	18186	H1230L†	18184		
36	3.000				H1236R†	18190	H1236L†	18188		
10					Face = .875"					
TRANSVERSE DIAMETRAL PITCH										
8	.800	.375	1/16 x 1/32	A	H1008R	18130	H1008L	18128		
10	1.000	.500	1/8 x 1/16		H1010R	18134	H1010L	18132		
12	1.200	.625			H1012R	18138	H1012L	18136		
15	1.500				H1015R†	18142	H1015L†	18140		
20	2.000	.750			H1020R†	18146	H1020L†	18144		
25	2.500				H1025R†	18148	H1025L†	18150		
30	3.000				H1030R†	18154	H1030L†	18152		
40	4.000		H1040R†		18158	H1040L†	18156			

*1/16" wide x .04" deep slot cut on end of gear for drive pin, not key.
 **3/32" wide x .06" deep slot cut on end of gear for drive pin, not key.
 †Teeth only hardened.

8 and 6 Transverse Diametral Pitch (Bronze & Steel – Hardened)

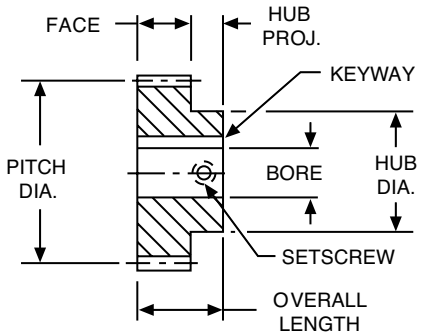
14-1/2° Normal Pressure Angle – 45° Helix Angle

All gears with hubs have setscrew at 90° to keyway. Steel gears have teeth only hardened, except as noted. Teeth on all steel gears are polished.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub		Keyway	Style See Page 323	RIGHT HAND		LEFT HAND	
			Dia.	Proj.			Catalog Number	Item Code	Catalog Number	Item Code
8 TRANSVERSE DIAMETRAL PITCH										
							Face without Hubs = 1.000" -with Hubs = .750" Overall Length = Face + Hub Proj.			
STEEL-HARDENED										
8	1.000	.500	-	-	1/8 x 1/16	A	H808R*	18066	H808L*	18064
10	1.250	.625	-	-			H810R*	18070	H810L*	18068
12	1.500	.750	-	-			H812R	18074	H812L	18072
16	2.000	.875	-	-	3/16 x 3/32	A	H816R	18078	H816L	18076
20	2.500						H820R	18082	H820L	18080
24	3.000						H824R	18086	H824L	18084
32	4.000						H832R	18090	H832L	18088
8	1.000	.500	.75	.50	1/8 x 1/16	A	HS808R*	18092	HS808L*	18094
10	1.250	.625	1.00	.50			HS810R*	18096	HS810L*	18098
12	1.500	.750	1.25	.50	3/16 x 3/32		HS812R*	18100	HS812L*	18102
16	2.000	1.000	2.00	.50	1/4 x 1/8	A	HS816R	18104	HS816L	18106
20	2.500						HS820R	18108	HS820L	18110
24	3.000						HS824R	18112	HS824L	18114
32	4.000						HS832R	18116	HS832L	18118
40	5.000						HS840R	18120	HS840L	18122
48	6.000		2.25				HS848R	18124	HS848L	18126
BRONZE										
8	1.000	.500	.75	.50	1/8 x 1/16	A	HB808R	18356	HB808L	18358
10	1.250	.625	1.00	.50			HB810R	18360	HB810L	18362
12	1.500	.750	1.24	.50	3/16 x 3/32		HB812R	18364	HB812L	18366
16	2.000	1.000	2.00	.50	1/4 x 1/8	A	HB816R	18368	HB816L	18370
20	2.500						HB820R	18372	HB820L	18374
24	3.000						HB824R	18376	HB824L	18378
32	4.000						HB832R	18380	HB832L	18382
40	5.000					B	HB840R	18384	HB840L	18386
48	6.000		2.25				HB848R	18388	HB848L	18390
6 TRANSVERSE DIAMETRAL PITCH										
							Face without Hubs = 1.250" -with Hubs = 1.000" Overall Length = Face + Hub Proj.			
STEEL-HARDENED										
8	1.333	.625	-	-	1/8 x 1/16	A	H608R	18000	H608L	18002
10	1.667	.750	-	-	3/16 x 3/32		H610R	18004	H610L	18006
12	2.000	1.000	-	-	1/4 x 1/8	A	H612R	18010	H612L	18008
15	2.500						H615R	18014	H615L	18012
18	3.000						H618R	18018	H618L	18016
24	4.000						H624R	18022	H624L	18020
8	1.333	.625	1.00	.75	1/8 x 1/16	A	HS608R	18024	HS608L	18026
9	1.500	.750	1.18	.75	3/16 x 3/32		HS609R	18028	HS609L	18030
10	1.667		1.34				HS610R	18032	HS610L	18034
12	2.000	1.000	1.62	.75	1/4 x 1/8		HS612R	18036	HS612L	18038
15	2.500	1.250	2.00	.75	5/16 x 5/32	A	HS615R	18040	HS615L	18042
18	3.000						HS618R	18044	HS618L	18046
20	3.333						HS620R	18048	HS620L	18050
24	4.000						HS624R	18052	HS624L	18054
30	5.000		2.50				HS630R	18056	HS630L	18058
36	6.000						HS636R	18060	HS636L	18062
BRONZE										
12	2.000	1.000	1.62	.75	1/4 x 1/8	A	HB612R	18328	HB612L	18330
15	2.500	1.250	2.00	.75	5/16 x 5/32	A	HB615R	18332	HB615L	18334
18	3.000						HB618R	18336	HB618L	18338
20	3.333						HB620R	18340	HB620L	18342
24	4.000						HB624R	18344	HB624L	18346
30	5.000		2.50			B	HB630R	18348	HB630L	18350
36	6.000						HB636R	18352	HB636L	18354

*Hardened all over.



STANDARD TOLERANCES

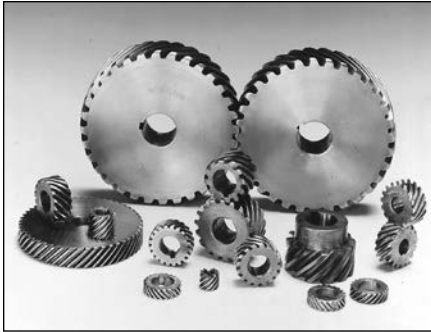
DIMENSION	TOLERANCE
BORE	All ±.0005

REFERENCE PAGES

- Alterations — 322
- Horsepower Ratings — 67, 68
- Lubrication — 322
- Materials — 323
- Selection Procedure — 66

NOTE: Normal Diametral Pitch is equal to the Transverse Diametral Pitch divided by the cosine of the Helix Angle.

Helical Gears



Boston standard stock helical gears are made with a 45° helix angle to transmit motion and/or power between non-intersecting shafts that are parallel or at 90° to each other. They are stocked both right and left-handed. For parallel shaft operation, helical gears having opposite hand helix angles are required, while for shafts at 90° the same hand helix must be used.

For parallel shaft applications, helical gears provide overlapping tooth contact. This results in a smoother, quieter operation and higher horsepower capacity than afforded by spur gears of comparable size.

For 90° shaft applications, the tooth contact area is very small which considerably limits the load capacity. Horsepower ratings are not tabulated in this catalog, for 90° applications.

Boston helical gears are top hobbed, resulting in extremely close concentricity between the pitch diameter and the outside diameter.

B

Selection Procedure

Approximate horsepower and torque ratings for selected sizes (numbers of teeth) at various operating speeds (RPM) are given for hardened steel helical gears. The ratings are based on the beam strength of the gear tooth. These ratings are for parallel shaft applications under normal operating conditions, that is: properly mounted and lubricated, carrying a smooth load for not more than 10 hours per day or a moderate shock load not more than 15 minutes in two hours (Service Factor 1.0). Refer to Table 1, below, for other types of service.

Ratings for gear sizes or speeds not listed may be interpolated from the values indicated. Pitchline velocities are limited as reflected by the lack of ratings for larger numbers of teeth at higher RPM's in the selection chart. Application in this area is not recommended.

Ref. Parallel shafts are approximately 98% efficient
90° shafts are approximately 50% efficient

Horsepower ratings for bronze gears are approximately 33% of these ratings.

1. Determine service factor.
 - a. Using Application Classification Chart I, pages 331-332 determine service factor or
 - b. With knowledge of operating conditions and load classification, select service factor from Table 1.

2. Determine Design Horsepower.

Design HP = Application Load × Service Factor (Table 1)

3. Select pinion with horsepower capacity equal to (or greater than) design horsepower determined in Step 2. Reference Rating Pages 67, 68.
4. Select a driven gear with a catalog rating equal to (or greater than) the horsepower determined in Step 2.

TABLE 1

Service Factor	Operating Conditions
.8	Uniform – not more than 15 minutes in 2 hours.
1.0	Moderate Shock – not more than 15 minutes in 2 hours. Uniform – not more than 10 hours per day.
1.25	Moderate Shock – not more than 10 hours per day. Uniform – more than 10 hours per day.
1.50	Heavy Shock – not more than 15 minutes in 2 hours. Moderate Shock – more than 10 hours per day.
1.75	Heavy Shock – not more than 10 hours per day.
2.0	Heavy Shock – more than 10 hours per day.

Heavy shock loads and/or severe wear conditions may require the use of higher service factors. Consultation with factory is recommended in these applications.

Helical Gears

Approximate Horsepower and Torque* Ratings

For Class I Service (Service Factor = 1.0)

No.	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM					
	Teeth	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque			
8 DIAMETRAL PITCH – 11.31 NORMAL DIAMETRAL PITCH HARDENED STEEL																					1.000" FACE			
8	.13	323	.25	319	.50	313	.95	300	1.4	288	2.5	258	3.3	234	4.1	214	5.2	183	7.2	127				
10	.17	428	.34	422	.65	412	1.20	391	1.8	373	3.1	327	4.2	291	5.0	262	6.3	219	8.4	146				
12	.21	534	.42	525	.81	509	1.50	480	2.2	453	3.7	389	4.9	341	5.8	304	7.1	249	9.2	162				
16	.29	740	.57	725	1.1	696	2.00	644	2.9	599	4.7	496	6.1	423	7.0	370	8.4	294	10.4	182				
20	.38	947	.73	923	1.4	877	2.50	799	3.5	733	5.6	588	7.0	491	8.0	421	9.3	328	11.1	197				
24	.46	1150	.88	1114	1.7	1050	3.00	941	4.1	852	6.3	665	7.7	545	8.8	462	10.1	352	11.9	208				
32	.61	1547	1.20	1485	2.2	1374	3.80	1196	5.0	1059	7.5	788	9.0	628	9.9	521	11.1	389	12.7	221				
8 DIAMETRAL PITCH – 11.31 NORMAL DIAMETRAL PITCH BRONZE																					.750" FACE			
8	.04	97	.08	95.8	.15	93.8	.29	90.0	.41	86.5	.74	77.5	1.00	70.2	1.22	64.2	1.56	54.8	2.17	38.0				
10	.05	128	.10	127	.20	123	.37	117	.53	112	.93	98.1	1.25	87.3	1.50	78.7	1.88	65.7	2.51	43.9				
12	.06	160	.12	158	.24	153	.46	144	.65	136	1.11	117	1.46	102	1.73	91.1	2.13	74.7	2.77	48.4				
16	.09	222	.17	217	.33	209	.61	193	.86	180	1.42	149	1.81	127	2.11	111	2.52	88.2	3.13	54.7				
20	.11	284	.22	277	.42	263	.76	240	1.05	220	1.68	176	2.10	147	2.41	126	2.81	98.4	3.38	59.2				
24	.14	345	.27	334	.50	315	.90	282	1.22	256	1.90	199	2.33	163	2.64	138	3.03	106	3.56	62.3				
32	.18	464	.35	445	.65	412	1.14	359	1.51	318	2.75	236	2.69	188	2.98	156	3.34	117						
40	.23	582	.44	553	.80	504	1.36	427	1.76	371	2.53	266	2.95	207	3.23	169	3.55	124						
48	.28	695	.52	655	.93	587	1.54	486	1.97	414	2.74	288	3.15	220	3.40	179								
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH HARDENED STEEL																					1.000" FACE			
8	.01	572	.45	564	.87	548	1.65	520	2.35	494	4.09	430	5.44	381	6.50	342	8.09	283	10.70	187				
9	.26	664	.52	653	1.00	633	1.89	597	2.68	564	4.61	484	6.06	424	7.19	378	8.84	310	11.47	201				
10	.30	758	.59	745	1.14	720	2.14	674	3.02	634	5.11	537	6.66	466	7.84	412	9.54	334	12.17	213				
12	.37	944	.73	924	1.41	887	2.61	821	3.64	764	6.02	633	7.71	540	8.97	471	10.71	375	13.29	233				
15	.48	1217	.94	1185	1.79	1127	3.26	1026	4.48	942	7.19	755	9.00	630	10.30	541	12.04	421	14.48	253				
18	.59	1478	1.14	1433	2.14	1350	3.84	1210	5.22	1096	8.14	855	10.00	700	11.30	593	12.98	454	15.25	267				
20	.66	1670	1.28	1613	2.40	1511	4.25	1340	5.73	1204	8.79	924	10.69	749	11.99	630	13.65	478						
24	.80	2024	1.54	1942	2.85	1798	4.97	1565	6.60	1386	9.82	1031	11.72	821	12.98	682	14.55	510						
30	1.01	2546	1.92	2420	3.50	2203	5.93	1868	7.72	1622	11.06	1162	12.92	905	14.11	741	15.54	544						
36	1.21	3048	2.28	2872	4.08	2573	6.76	2131	8.65	1818	12.02	1262	13.81	967	14.92	783								
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH HARDENED STEEL																					1.250" FACE			
8	.28	715	.56	705	1.09	685	2.06	650	2.94	617	5.12	537	6.79	476	8.13	427	10.11	354	13.37	234				
10	.38	948	.74	931	1.43	899	2.67	842	3.77	792	6.39	672	8.32	583	9.80	515	11.93	418	15.22	266				
12	.47	1180	.92	1155	1.76	1109	3.26	1026	4.55	955	7.53	791	9.64	675	11.21	589	13.38	469	16.61	291				
15	.60	1521	1.18	1482	2.24	1409	4.07	1282	5.60	1177	8.99	944	11.25	788	12.87	676	15.04	527	18.10	317				
18	.73	1848	1.42	1791	2.68	1687	4.80	1512	6.52	1370	10.17	1068	12.50	876	14.12	742	16.22	568	19.06	334				
24	1.00	2529	1.93	2428	3.57	2247	6.21	1956	8.24	1732	12.27	1289	14.65	1026	16.23	852	18.19	637						
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH BRONZE																					1.000" FACE			
12	.15	378	.29	370	.56	355	1.04	328	1.46	306	2.41	253	3.08	216	3.59	188	4.28	150	5.32	93.1				
15	.19	487	.38	474	.72	451	1.30	410	1.79	377	2.88	302	3.60	252	4.12	216	4.81	169	5.79	101				
18	.23	591	.45	513	.86	540	1.54	484	2.09	439	3.25	342	4.00	280	4.52	237	5.19	182	6.10	107				
20	.26	668	.51	645	.96	604	1.70	536	2.29	482	3.52	369	4.28	300	4.80	252	5.46	191						
24	.32	810	.62	777	1.14	719	1.99	626	2.64	554	3.93	412	4.69	328	5.19	273	5.82	204						
30	.40	1018	.77	968	1.40	881	2.37	747	3.09	649	4.42	465	5.17	362	5.65	296	6.22	218						
36	.48	1219	.91	1149	1.63	1029	2.70	852	3.46	727	4.81	505	5.52	387	5.97	313								

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line exceed 1500 Feet per Minute and should be used for interpolation purposes only.

*Torque Rating (Lb. Ins.)