



SELECTION

TIGEAR-2 Reducers

SELECTION USING RATING TABLES

Because the efficiency of worm gear speed reducers varies from approximately 60 to 95%, it is important to consider the horsepower/torque conditions at both input and output in a given application. In a situation where motor horsepower is known (e.g., competitive interchange or when a particular motor is available), selection can be done based on input ratings. Where a gearbox is being selected by a designer who knows driven equipment loads, the reducer is selected from the output torque capacity.

NOTE: On applications where input speeds exceed 2500 rpm or frequent start/stops or reversals occur, a three piece coupled input reducer is recommended. Use of Quill reducers on these applications may result in aggravated fretting corrosion between the motor shaft and the input bore.

NOTE: Applications using single phase motors with Quill style reducers can exhibit excessive noise. We recommend using 3-piece coupled reducers with single phase motors.

Reducer Service Factors

Prime Mover	Duration of Service Per Day	Driven Machine Load Classification		
		Uniform	Medium Shock	Heavy Shock
Electric Motor	Occasional 1/2 hour	Note (1)	Note (1)	1.00
	Less than 3 hours	1.00	1.00	1.25
	3 - 10 hours	1.00	1.25	1.50
	Over 10 hours	1.25	1.50	1.75
Electric Motor With Up To 10 Starts And Stops Per Hour (Note 2)	Occasional 1/2 hour	Note (1)	1.00	1.25
	Less than 3 hours	1.00	1.25	1.50
	3 - 10 hours	1.25	1.50	1.75
	Over 10 hours	1.50	1.75	2.00

* NOTE:

- (1) Unspecified service factors should be 1.00 or as agreed upon by the user and manufacturer.
- (2) Frequent Start and Stop applications, more than 10 Starts and Stops per hour, require special consideration in selecting a service factor. Contact DODGE Application Engineering for proper selection of TIGEAR-2 Reducers. The brake torque should be limited to two times the normal operating Motor torque.

Overhung Load

To determine overhung load, divide the torque required by the pitch radius of the sprocket, sheave, etc. and multiply by the appropriate factor as follows.

Chain drive	1.00
Synchronous Belt Drive	1.30
Spur or Helical Gear	1.25
V-Belt	1.50
Flat Belt	2.50

The calculated overhung load must not exceed the output overhung load rating.

For loads acting at more than one shaft diameter from the seal face use the following conversion factors:

Distance in Shaft Diameters from Output Seal Face	Multiply Overhung Load Capacity by this Factor
1D	1.00
2D	0.62
3D	0.42
4D	0.32
5D	0.26

Thermal Rating

Ambient Temp, degree F	Derating Factor
75	1.00
90	.87
100	.79
110	.71
120	.62

The thermal ratings listed on selection pages are based on the gear unit continuously operating in an ambient temperature of 75° F. For the ambient condition above 75° F, the derating factor needs to be applied to the thermal rating, or contact DODGE Application Engineering.

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HORSEPOWER METHOD OF SELECTION

- Step 1: **Determine Service Factor** Referring to the reducer service factor table, determine the appropriate service factor.
- Step 2: **Determine Equivalent Horsepower**
Multiply the motor horsepower by the service factor obtained in Step 1.
- Step 3: **Calculate Required Ratio** Divide the motor shaft rpm by the reducer output shaft rpm.
- Step 4: **Determine Unit Size** Refer to the rating tables and read across from ratio row and down from motor rpm column to select a unit whose **mechanical** input horsepower rating meets or exceeds the equivalent horsepower.
- Step 5: **Check Thermal Rating** Compare the thermal input horsepower rating of the reducer selected to the motor horsepower. Thermal rating should always equal or exceed applied motor horsepower. For continuous duty operation in ambient temperature above 75°F derate the thermal rating per table on page 8 or contact DODGE Engineering. Contact DODGE Engineering for use with non-ventilated motors.

- Step 4: **Determine Unit Size** Refer to the rating tables and read across from ratio row and down from motor rpm column to select a unit whose **mechanical** output torque rating meets or exceeds the equivalent torque.
- Step 5: **Determine Required Motor Horsepower**
First, calculate the output horsepower using the following equation where output torque is the torque required to drive the load at the output of the reducer.

$$\text{Output HP} = \frac{\text{Output Speed} \times \text{Output Torque}}{63025}$$

Then calculate the required motor horsepower using the following equation to account for reducer efficiency:

$$\text{Required Motor Horsepower} = \frac{\text{Output Hp} \times \text{Rated Input Hp of reducer}}{\text{Rated output Hp of reducer}}$$

- Step 6: **Select Motor Hp** From available motors, select a horsepower that is equal to or greater than the value from Step 5: When the nearest motor horsepower is greater, check service factor at input by dividing rated input of reducer horsepower by actual motor horsepower. If the service factor is less than the value from Step 1, a larger reducer may be required.
- Step 7: **Check Thermal Rating** Compare the thermal input horsepower rating of the reducer selected to the motor horsepower. Thermal rating should always equal or exceed applied motor horsepower. For continuous duty operation in ambient temperatures above 75°F contact DODGE Engineering. Contact DODGE Engineering for use with non-ventilated motors.

TORQUE METHOD OF SELECTION

- Step 1: **Determine Service Factor** Referring to the reducer service factor table, determine the appropriate service factor.
- Step 2: **Determine Equivalent Torque** Multiply the torque required to drive the load at the output of the reducer by the service factor obtained in Step 1. (If drive components, e.g, chain or belt drives are used between reducer and driven equipment be sure to account for them when calculating output torque at the reducer).
- Step 3: **Calculate Required Ratio** Divide the motor shaft rpm by the reducer output shaft rpm.

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TIGEAR-2 Selection Table

1.00 REDUCER SERVICE FACTOR

1750 RPM INPUT

Output Rpm	Ratio		Motor Horsepower												
			0.25	0.33	0.50	0.75	1.00	1.50	2.00	3.00	5.00	7.50	10.00	15.00	20.00
350	5	SIZE	13	13	13	13	13	15	17	20	23	30	30	35	40
		Torque	42	55	83	125	166	250	332	502	840	1279	1706	2563	3408
		OHL	650	650	650	650	650	710	1050	1380	1330	1330	1330	2120	2860
233	7.5	SIZE	13	13	13	13	13	17	17	23	26	30	35	40	47
		Torque	60	79	120	180	240	364	485	736	1231	1863	2495	3727	4969
		OHL	650	650	650	650	650	1190	1190	1520	1520	1540	2430	3280	5600
175	10	SIZE	13	13	13	13	15	17	20	23	30	35	35	47	
		Torque	80	105	160	240	321	480	644	972	1650	2498	3331	4973	
		OHL	650	650	650	650	710	1190	1560	1610	1720	2700	2700	5600	
117	15	SIZE	13	13	13	15	17	20	23	26	30	40	40		
		Torque	114	150	227	343	459	701	935	1417	2391	3599	4799		
		OHL	650	650	650	710	1190	1560	1610	1610	2300	4190	4190		
88	20	SIZE	13	13	13	17	17	23	23	30	35	40	47		
		Torque	143	189	286	438	583	898	1198	1845	3125	4665	6156		
		OHL	650	650	650	1190	1190	1610	1610	2300	2760	4300	5600		
70	25	SIZE	13	13	15	17	20	23	26	30	40	47			
		Torque	169	223	341	517	707	1074	1485	2245	3719	5489			
		OHL	650	650	710	1190	1560	1610	1610	2300	4300	5600			
58	30	SIZE	13	13	15	17	23	26	26	35	40				
		Torque	200	264	404	607	847	1312	1750	2662	4365				
		OHL	650	650	710	1190	1610	1610	1610	2760	4300				
44	40	SIZE	13	15	17	20	23	26	30	35	47				
		Torque	249	333	520	793	1071	1630	2224	3361	5350				
		OHL	650	710	1190	1560	1610	1610	2300	2760	5600				
35	50	SIZE	13	15	17	23	26	30	35	40					
		Torque	289	388	600	929	1262	1940	2637	3767					
		OHL	650	710	1190	1610	1610	2300	2760	4300					
29	60	SIZE	15	17	20	23	26	30	35	40					
		Torque	329	442	691	1037	1432	2179	2923	4234					
		OHL	710	1190	1560	1610	1610	2300	2760	4300					

Torque = Actual output torque in lb. - in
 OHL - Maximum OHL capacity in lbs

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TIGEAR-2 Selection Table

1.25 REDUCER SERVICE FACTOR

1750 RPM INPUT

Output Rpm	Ratio		Motor Horsepower												
			0.25	0.33	0.50	0.75	1.00	1.50	2.00	3.00	5.00	7.50	10.00	15.00	20.00
350	5	SIZE	13	13	13	13	13	17	17	23	26	30	35	40	47
		Torque	42	55	83	125	166	249	332	504	846	1279	1709	2556	3397
		OHL	520	520	520	520	520	840	840	1064	1064	1064	1696	2288	4080
233	7.5	SIZE	13	13	13	13	15	17	20	23	30	35	40	47	
		Torque	60	79	120	180	241	364	489	736	1242	1871	2485	3727	
		OHL	520	520	520	520	568	952	1248	1216	1232	1944	2624	4480	
175	10	SIZE	13	13	13	15	17	20	23	26	30	35	40	47	
		Torque	80	105	160	241	320	483	648	979	1650	2498	3315	4973	
		OHL	520	520	520	568	952	1248	1288	1288	1376	2160	2912	4480	
117	15	SIZE	13	13	13	17	17	23	23	30	35	40	47		
		Torque	114	150	227	345	459	701	935	1434	2418	3599	4796		
		OHL	520	520	520	952	952	1288	1288	1840	2208	3352	4480		
88	20	SIZE	13	13	15	17	20	23	26	30	40	47			
		Torque	143	189	292	438	596	898	1236	1845	3110	4617			
		OHL	520	520	568	952	1248	1288	1288	1840	3440	4480			
70	25	SIZE	13	13	17	20	23	26	30	35	40				
		Torque	169	223	345	530	716	1114	1497	2279	3719				
		OHL	520	520	952	1248	1288	1288	1840	2208	3440				
58	30	SIZE	13	150	17	20	23	26	30	35	47				
		Torque	200	267	404	625	847	1312	1766	2662	4308				
		OHL	520	568	952	1248	1288	1288	1840	2208	4480				
44	40	SIZE	13	150	20	23	26	30	35	40					
		Torque	249	333	529	803	1087	1668	2241	3253					
		OHL	520	568	1248	1288	1288	1840	2208	3440					
35	50	SIZE	150	17	20	23	26	35	35	47					
		Torque	294	396	617	929	1262	1978	2637	3705					
		OHL	568	952	1248	1288	1288	2208	2208	4480					
29	60	SIZE	17	17	23	26	30	35	40	47					
		Torque	335	442	692	1074	1453	2192	2822	4143					
		OHL	952	952	1288	1288	1840	2208	3440	4480					

Torque = Actual output torque in lb. - in
 OHL - Maximum OHL capacity in lbs

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TIGEAR-2 Selection Table 1.50 REDUCER SERVICE FACTOR

1750 RPM INPUT															
Output Rpm	Ratio		Motor Horsepower												
			0.25	0.33	0.50	0.75	1.00	1.50	2.00	3.00	5.00	7.50	10.00	15.00	20.00
350	5	SIZE	13	13	13	13	15	17	20	23	30	35	35	47	
		Torque	42	55	83	125	167	249	335	504	853	1281	1709	2548	
		OHL	433	433	433	433	473	700	700	887	887	1413	1413	3400	
233	7.5	SIZE	13	13	13	15	17	20	23	26	30	35	40	47	
		Torque	60	79	120	181	243	367	491	739	1242	1871	2485	3727	
		OHL	433	433	433	473	793	1040	1013	1013	1027	1620	2187	3733	
175	10	SIZE	13	13	13	15	17	20	23	26	35	40	47		
		Torque	80	105	160	241	320	483	648	979	1666	2486	3315		
		OHL	433	433	433	473	793	1040	1073	1073	1800	2427	3733		
117	15	SIZE	13	13	15	17	20	23	26	30	40	47			
		Torque	114	150	228	345	467	701	944	1434	2400	3597			
		OHL	433	433	473	793	1040	1073	1073	1533	2793	3733			
88	20	SIZE	13	13	17	20	23	26	30	35	40				
		Torque	143	189	292	447	599	927	1230	1875	3110				
		OHL	433	433	793	1040	1073	1073	1533	1840	2867				
70	25	SIZE	13	15	17	23	23	26	30	35	47				
		Torque	169	225	345	537	716	1114	1497	2279	3659				
		OHL	433	473	793	1073	1073	1073	1533	1840	3733				
58	30	SIZE	13	15	17	23	26	30	35	40	47				
		Torque	200	267	404	635	875	1324	1775	2619	4308				
		OHL	433	473	793	1073	1073	1533	1840	2867	3733				
44	40	SIZE	15	17	20	26	26	35	35	47					
		Torque	252	343	529	815	1087	1680	2241	3210					
		OHL	473	793	1040	1073	1073	1840	1840	3733					
35	50	SIZE	17	17	23	26	30	35	40	47					
		Torque	300	396	619	947	1293	1978	2511	3705					
		OHL	793	793	1073	1073	1533	1840	2867	3733					
29	60	SIZE	17	20	23	30	30	40	40						
		Torque	335	456	692	1090	1453	2117	2822						
		OHL	793	1040	1073	1533	1533	2867	2867						

Torque = Actual output torque in lb. - in
OHL - Maximum OHL capacity in lbs

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TIGEAR-2 Selection Table

2.00 REDUCER SERVICE FACTOR

1750 RPM INPUT															
Output Rpm	Ratio		Motor Horsepower												
			0.25	0.33	0.50	0.75	1.00	1.50	2.00	3.00	5.00	7.50	10.00	15.00	20.00
350	5	SIZE	13	13	13	15	17	20	23	26	30	35	40		
		Torque	42	55	83	125	166	251	336	508	853	1281	1704		
		OHL	325	325	325	355	525	690	665	665	665	1060	1430		
233	7.5	SIZE	13	13	13	17	17	23	23	30	35	40	47		
		Torque	60	79	120	182	243	368	491	745	1248	1863	2485		
		OHL	325	325	325	595	595	760	760	770	1215	1640	2800		
175	10	SIZE	13	13	15	17	20	23	26	30	35	47			
		Torque	80	105	160	240	322	486	653	990	1666	2487			
		OHL	325	325	355	595	780	805	805	860	1350	2800			
117	15	SIZE	13	15	17	20	23	26	30	35	40				
		Torque	114	151	230	350	468	708	956	1451	2400				
		OHL	325	355	595	780	805	805	1150	1380	2095				
88	20	SIZE	13	15	17	23	23	30	35	40	47				
		Torque	143	193	292	449	599	922	1250	1866	3078				
		OHL	325	355	595	805	805	1150	1380	2150	2800				
70	25	SIZE	15	17	20	23	26	30	35	40					
		Torque	170	227	354	537	743	1122	1519	2231					
		OHL	355	595	780	805	805	1150	1380	2150					
58	30	SIZE	150	17	23	26	26	35	35	47					
		Torque	202	267	424	656	875	1331	1775	2585					
		OHL	355	595	805	805	805	1380	1380	2800					
44	40	SIZE	17	20	23	26	30	35	40	47					
		Torque	260	349	536	815	1112	1680	2168	3210					
		OHL	595	780	805	805	1150	1380	2150	2800					
35	50	SIZE	17	23	26	30	35	40	47						
		Torque	300	409	631	970	1318	1884	2470						
		OHL	595	805	805	1150	1380	2150	2800						
29	60	SIZE	20	23	26	30	35	40	47						
		Torque	345	456	716	1090	1462	2117	2762						
		OHL	780	805	805	1150	1380	2150	2800						

Torque = Actual output torque in lb. - in
 OHL - Maximum OHL capacity in lbs

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