TORQUE-ARM II Shaft Mount Speed Reducers

Table 1: NEMA Motor Information (1750 RPM)

Horsepower	NEMA Motor Frame	Shaft Diameter
1	143T	7/8
1-1/2	145T	7/8
2	145T	7/8
3	182T	1-1/8
5	184T	1-1/8
7-1/2	213T	1-3/8
10	215T	1-3/8
15	254T	1-5/8
20	256T	1-5/8
25	284T	1-7/8
30	286T	1-7/8
40	324T	2-1/8
50	326T	2-1/8
60	364T	2-3/8
75	365T	2-3/8
100	+405T	2-7/8
125	+444T	3-3/8
150	+445T	3-3/8
200	+447T	3-3/8

+ Energy Efficient (TEFC-XE) Frame

Table 2: TORQUE-ARM II Reducer Information

TA II Reducer	Ratio	Input Shaft Diameter	Minimum Sheave Diameter
TA0107L	All	1”	See Class I, II and III Selection Tables for minimum reducer sheave recommendations
TA1107H	All	1”	
TA2115H	5:1 - 25:1 33:1	1-1/8” 1”	
TA3203H	5:1 - 25:1 32:1	1-3/8” 1-1/8”	
TA4207H	All	1-7/16”	
TA5215H	All	1-5/8”	
TA6307H	All	2-3/16”	
TA7315H	All	2-7/16”	
TA8407H	All	2-7/16”	
TA9415H	All	2-7/16”	
TA10507H	All	2-11/16”	
TA12608H	All	2-11/16”	

Table 3: TORQUE-ARM II Backstop Lift-off Speed (1)

TA II Reducer	Minimum Input Shaft RPM
TA0107L	875
TA1107H	875
TA2115H	875
TA3203H	825
TA4207H	780
TA5215H	720
TA6307H	610
TA7315H	490
TA8407H	610
TA9415H	490
TA10507H	480
TA12608H	450

(1) For best results, select reducer ratios which exceed input shaft speeds required for backstop sprag lift-off

FEATURES/BENEFITS PAGE G1-3	NOMENCLATURE PAGE G1-8	SELECTION PAGE G1-12	SELECTION/DIMENSION PAGE G1-36

ENGINEERING/TECHNICAL

TORQUE-ARM II Shaft Mount Speed Reducers

Maximum Input Speed - RPM

Case Size	Nominal Ratio				
	05	09	15	25	32/40
TA0107L	2080	1800	1791	2007	1750
TA1107H	2000	1798	1789	2005	1750
TA2115H	2080	1821	1874	2005	1750
TA3203H	1965	1847	1808	1996	1750
TA4207H	2000	1846	1800	2010	1955
TA5215H	2042	1837	1791	2000	1945
TA6307H	1978	1843	1854	1989	1916
TA7315H	2075	1943	1790	1987	1983
TA8407H	N/A	N/A	1814	1997	1983
TA9415H	N/A	N/A	1812	2035	1970
TA10507H	N/A	N/A	1811	2015	1984
TA12608H	N/A	N/A	1775	2002	1909

Maximum Output Speed - RPM

Case Size	Nominal Ratio				
	05	09	15	25	32/40
TA0107L	400	200	120	80	57
TA1107H	400	200	120	80	57
TA2115H	400	200	120	80	53
TA3203H	400	200	120	80	54
TA4207H	400	200	120	80	50
TA5215H	400	200	120	80	50
TA6307H	400	200	120	80	50
TA7315H	400	200	120	80	50
TA8407H	N/A	N/A	120	80	50
TA9415H	N/A	N/A	120	80	50
TA10507H	N/A	N/A	120	80	50
TA12608H	N/A	N/A	120	80	50

TORQUE-ARM II Shaft Mount Speed Reducers

Thrust Capacity for Screw Conveyor Drives (Pounds)

Case Size	Output Speed (RPM) Single Reduction Reducers (05:1)						
	100	150	200	250	300	350	400
TA0107L	2568	2288	2092	2000	1922	1855	1798
TA1107H	3106	2835	2626	2505	2396	2309	2232
TA2115H	5373	4771	4417	4186	4015	3885	3785
TA3203H	6000	5834	5387	5053	4783	4561	4386
TA4207H	6000	6000	6000	6000	6000	5776	5570
TA5215H	6000	6000	6000	6000	6000	6000	6000
TA6307H	6000	5803	5374	5202	4977	4807	4737
TA7315H	†	†	†	†	†	†	†

Thrust Capacity for Screw Conveyor Drives (Pounds)

Case Size	Output Speed (RPM) Double Reduction Reducers (09:1 thru 40:1)								
	10	25	50	75	100	125	150	175	200
TA0107L	5300	4028	3141	2730	2465	2281	2165	2071	1989
TA1107H	6000	4833	3705	3196	2865	2639	2568	2438	2315
TA2115H	6000	6000	6000	5323	4850	4550	4295	4086	3924
TA3203H	6000	6000	6000	6000	5761	5328	5020	4813	4636
TA4207H	6000	6000	6000	6000	6000	6000	6000	6000	6000
TA5215H	6000	6000	6000	6000	6000	6000	6000	6000	6000
TA6307H	6000	6000	6000	5885	5185	4706	4435	4303	4269
TA7315H	†	†	†	†	†	†	†	†	†

† Consult DODGE

TORQUE-ARM II Shaft Mount Speed Reducers

LUBRICATION OF TORQUE-ARM II REDUCERS

CAUTION: Unit is shipped without oil. Add proper amount of rust and oxidation inhibited (R & O) gear oil before operating. Follow instructions on reducer warning tags and in the instruction manual. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Remove all external loads from drive before removing or servicing drive or accessories. Failure to observe these precautions could result in bodily injury.

Lubrication is extremely important for satisfactory operation. The proper oil level as shown in Table 3 on page 135, showing oil level plug location, must be maintained at all times. Approximate oil quantities are shown in Table 4 on page 136. Frequent inspections with the unit not running and allowing sufficient time for the oil to cool and the entrapped air to settle out of the oil should be made by removing the level plug to see that the level is being maintained. If low, add the proper type and viscosity of lubricant through one of the upper openings until it comes out of the oil level hole. Replace the oil level plug securely. Refer to Tables 1 and 2 for viscosity recommendations.

After an initial operation of about two weeks, the oil should be changed. If desired, this oil may be filtered and reused. Very often, small metal particles will show up in the oil due to the wearing process. After the initial break in period, the lubricant should be drained, magnetic drain plug cleaned, gear case flushed and refilled every 2500 hours of operation under average industrial operating conditions.

CAUTION: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly.

More frequent oil changes are recommended when operating continuously or at high temperatures or under conditions of extreme dirt or dust. Use only recommended grades of lubricant listed on next page, or equivalent. Special attention should be given to checking of lubricants when any of the following conditions exist:

High operating temperatures resulting from heavy intermittent loads causes the temperature of the gear case to rise rapidly and then cool

Unusual ambient conditions, which may tend to cause condensation on the inside of the gearcase thereby contaminating the oil

Operating temperatures that would cause oil to approach 200˚F continually

Subjection of reducer to unusual vapors or moist atmosphere

Subjection of reducer to extremely dusty or dirty environment

Under these extreme operating conditions, the oil should be changed every 1 to 3 months depending on severity of conditions.

Operating Temperatures

Heating is a natural characteristic of enclosed gearing, and a maximum gear case temperature approaching 200˚F is not uncommon for some units operating in normal ambient temperatures (80˚F). When operating at rated capacity, no damage will result from this temperature as this was taken into consideration in the design of the gear case and in the selection of the lubricants.

TORQUE-ARM II Shaft Mount Speed Reducers

LUBRICATION OF TORQUE-ARM II REDUCERS (CONT'D)

Table 1 – Oil Recommendations

ISO Grades For Ambient Temperatures of 50˚F to 125˚F

Output RPM	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	320	320	320	220	220	220	220	220	220	220	220	220
201 – 300	320	320	320	220	220	220	220	220	220	220	220	220
151 – 200	320	320	320	220	220	220	220	220	220	220	220	220
126 – 150	320	320	320	220	220	220	220	220	220	220	220	220
101 – 125	320	320	320	320	220	220	220	220	220	220	220	220
81 – 100	320	320	320	320	320	220	220	220	220	220	220	220
41 – 80	320	320	320	320	320	220	220	220	220	220	220	220
11 – 40	320	320	320	320	320	320	320	320	320	320	220	220
1 – 10	320	320	320	320	320	320	320	320	320	320	320	320

Table 2 – Oil Recommendations

ISO Grades For Ambient Temperatures of 15˚F to 60˚F

Output RPM	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	220	220	220	150	150	150	150	150	150	150	150	150
201 – 300	220	220	220	150	150	150	150	150	150	150	150	150
151 – 200	220	220	220	150	150	150	150	150	150	150	150	150
126 – 150	220	220	220	150	150	150	150	150	150	150	150	150
101 – 125	220	220	220	220	150	150	150	150	150	150	150	150
81 – 100	220	220	220	220	220	150	150	150	150	150	150	150
41 – 80	220	220	220	220	220	150	150	150	150	150	150	150
11 – 40	220	220	220	220	220	220	220	220	220	220	150	150
1 – 10	220	220	220	220	220	220	220	220	220	220	220	220

NOTES:

1. Assumes auxiliary cooling where recommended in the catalog.
2. Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature.
3. Extreme pressure (EP) lubricates are not necessary for average operating conditions. When properly selected for specific applications, TORQUE-ARM II backstops are suitable for use with EP lubricants.
4. Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur.
   Consult a lubrication manufacturer's representative for his recommendations.
5. For reducers operating in ambient temperatures between -22°F (-30°C) and 20°F (–6.6°C) use a synthetic hydrocarbon lubricant, 100 ISO grade or AGMA 3 grade (for example, Mobil SHC627). Above 125°F (51°C), consult DODGE Gear Application Engineering (864) 288-9050 for lubrication recommendation.
6. Mobil SHC630 Series oil is recommended for high ambient temperatures.

ENGINEERING/TECHNICAL

TORQUE-ARM II Shaft Mount Speed Reducers

LUBRICATION OF TORQUE-ARM II REDUCERS (CONT'D)

LUBRICANT GRADE EQUIVALENTS •

ISO	AGMA
150	4
220	5
320	6

• See page G1-135 for complete lubricant interchange chart

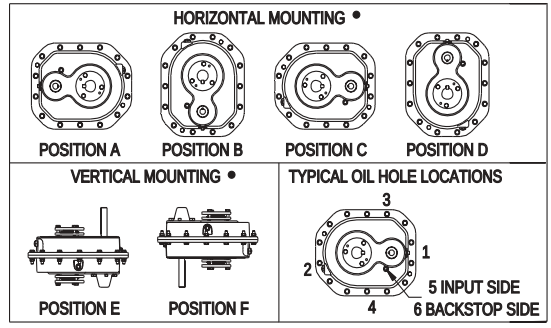
INSTALLATION

Horizontal Installations - Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filter/ventilation plug in shipment and install plug in topmost hole. Of the 2 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

Vertical Installations - Install the filter/ventilation plug in the hole provided in the upper face of the reducer housing as installed. If space is restricted on the upper face, install the vent in the highest hole on the side of the reducer per Figure 1. Install a plug in the hole in the bottom face of the reducer. Do not use this hole for the magnetic drain plug. Of the remaining holes on the sides of the reducer, use the plug in the upper housing half for the minimum oil level plug.

Mounting Position - The running position of the reducer in the horizontal application is not limited to the four positions shown in Figure 1. However, if the running position is over 20˚ off of position "B" or "D" or 5˚ off of position "A" or "C", either way from the sketches, the oil level plug cannot be used to safely check the oil level, unless during the checking, the torque arm is disconnected and the reducer is swung to within 20˚ for position "A" and "C" or 5˚ for position "B" and D" of the positions shown in Figure 1. Because of the many possible positions, of the reducer, it may be necessary or desirable to make special adaptations using the lubrication filling holes furnished along with other standard pipe fittings, stand pipes and oil level gauges as required.

Figure 1



• Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult DODGE.

TORQUE-ARM II Shaft Mount Speed Reducers

LUBRICATION OF TORQUE-ARM II REDUCERS (CONT'D)

Table 3 - Vent and Plug Locations (See Figure 1, page G1-134)

Mounting Position	Output Speed Above 15 RPM						Output Speed 15 RPM and Below ●					
	Vent and Plug Locations						Vent and Plug Locations					
	1	2	3	4	5	6	1	2	3	4	5	6
Position A	Level	Plug	Drain	Vent	Plug	Plug	Plug	Level	Drain	Vent	Plug	Plug
Position B	Drain	Vent	Level	Plug	Plug	Plug	Drain	Vent	Plug	Level	Plug	Plug
Position C	Plug	Level	Vent	Drain	Plug	Plug	Level	Plug	Vent	Drain	Plug	Plug
Position D	Vent	Drain	Level	Plug	Plug	Plug	Vent	Drain	Level	Plug	Plug	Plug
Position E	Level	* Plug	Plug	Drain	Vent	Plug	Level	* Plug	Plug	Drain	Vent	Plug
Position F	Plug	Drain	Level	* Plug	Plug	Vent	Plug	Drain	Level	* Plug	Plug	Vent

* Where space constraints prevent installing the breather in vent locations 5 or 6, install vent in this location and order a vertical breather kit

● Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult DODGE.

RECOMMENDED LUBRICANTS FOR TORQUE-ARM II REDUCERS +				
Standard Oils			EP Oils	
EXXON				
150	Teresstic	150	Spartan EP	150
220		220		220
320		320		320
CHEVRON				
150	Machine	150	Gear Compound	150
220		220	EP	220
320		320		320
UNICAL				
150	Turbine Oil	150	Extra Duty HL	141
220		220	Gear Lube	207
320		320		300
MOBIL SYNTHETIC				
150	SHC	629	SHC	629
220	SHC	630	SHC	630
320	SHC	632	SHC	632
MOBIL				
150	Mobil DTE	BB	Mobil Gear	629
220	Extra Heavy	AA		630
320				632
TEXACO				
150	Regal Oil R&O	150	Meropa	150
220		220		220
320		320		320
SHELL				
150	Morlina Oil	150	Omala	150
220		220		220
320		320		320

+Partial list. Consult DODGE or a lubricant manufacturer for further options.

ENGINEERING/TECHNICAL

TORQUE-ARM II Shaft Mount Speed Reducers

LUBRICATION OF TORQUE-ARM II REDUCERS (CONT'D)

Table 4 - Oil Volumes

Case Size	Ratios	Oil Volume in Quarts † ■ ▲●						Oil Volume in Liters † ■ ▲●					
		Horizontal				Vertical		Horizontal				Vertical	
		A	B	C	D	E (Up)	F (Down)	A	B	C	D	E (Up)	F (Down)
TA0107L	Single	0.7	0.5	0.7	1.4	1.3	1.5	0.6	0.5	0.6	1.3	1.2	1.4
	Doubles	0.7	0.5	0.6	1.3	1.2	1.4	0.6	0.5	0.6	1.3	1.2	1.3
TA1107H	Single	1.3	0.7	0.7	1.7	1.5	1.9	1.3	0.7	0.6	1.6	1.4	1.8
	Doubles	1.3	0.7	0.6	1.7	1.5	1.9	1.3	0.7	0.6	1.6	1.4	1.8
TA2115H	Single	2.1	1.2	1.1	2.7	2.3	3.1	2.0	1.2	1.0	2.5	2.2	2.9
	Doubles	2.1	1.1	1.0	2.6	2.4	3.0	2.0	1.1	1.0	2.5	2.3	2.8
TA3203H	Single	2.8	1.6	1.8	4.1	3.3	4.4	2.7	1.6	1.7	3.9	3.1	4.2
	Doubles	2.8	1.5	1.7	4.0	3.4	4.2	2.7	1.4	1.6	3.8	3.3	4.0
TA4207H	Single	4.4	2.6	2.9	7.4	6.3	7.8	4.2	2.5	2.8	7.0	6.0	7.3
	Doubles	4.4	2.5	2.8	7.3	6.4	7.5	4.2	2.4	2.6	6.9	6.0	7.1
TA5215H	Single	7.4	4.9	5.8	13.2	11.6	13.1	7.0	4.7	5.5	12.5	11.0	12.4
	Doubles	7.4	4.7	5.5	12.9	11.4	12.6	7.0	4.4	5.2	12.2	10.8	11.9
TA6307H	Single	8.8	5.8	6.6	16.1	13.2	16.1	8.4	5.5	6.2	15.3	12.5	15.3
	Doubles	8.8	5.5	6.2	15.8	13.9	15.3	8.4	5.2	5.9	15.0	13.1	14.5
TA7315H	Single	8.4	11.8	13.9	22.5	22.1	25.1	8.0	11.1	13.2	21.3	20.9	23.7
	Doubles	8.4	10.8	13.2	22.0	22.4	23.1	8.0	10.3	12.5	20.9	21.2	21.8
TA8407H	Doubles	7.7	11.7	13.7	25.1	24.0	25.8	7.3	11.1	12.9	23.8	22.7	24.4
TA9415H	Doubles	17.0	16.8	18.1	33.2	33.2	38.6	16.1	15.9	17.1	31.4	31.4	36.5
TA10507H	Doubles	38.0	27.6	25.8	53.5	53.8	56.1	36.0	26.1	24.4	50.6	50.9	53.0
TA12608H	Doubles	53.0	41.5	37.1	70.7	72.2	80.4	50.2	39.3	35.1	66.9	68.3	76.1

■ Oil quantity is approximate. Service with lubricant until oil runs out of oil level hole

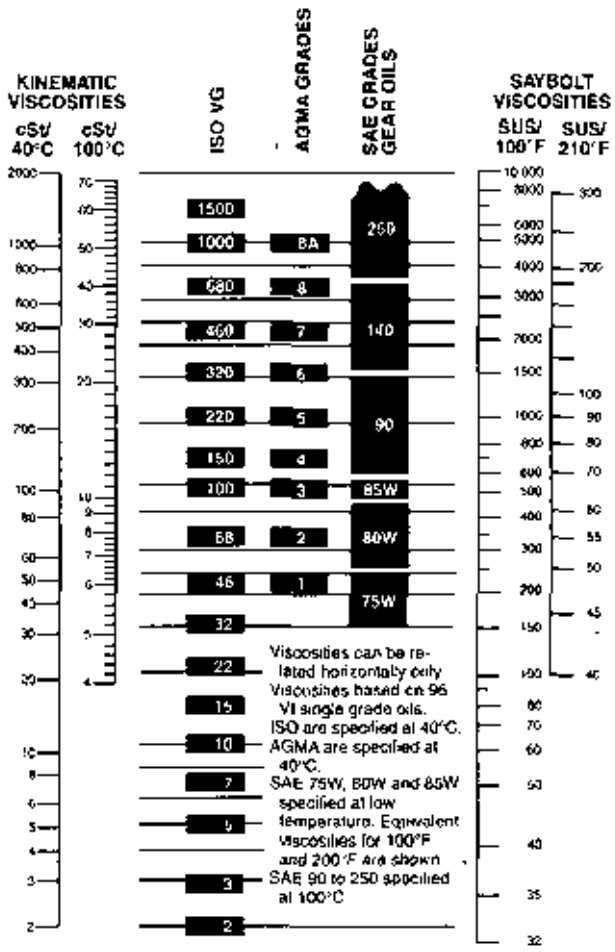
† Refer to Figure 1 for mounting positions

▲ US measure: 1 quart = 32 fluid ounces =.94646 liters

● Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult DODGE.

TORQUE-ARM II Shaft Mount Speed Reducers

VISCOSITY CLASSIFICATION EQUIVALENTS



ISO VISCOSITY CLASSIFICATION SYSTEM

All industrial oils are graded according to the ISO Viscosity Classification System, approved by the International Standards Organizations (ISO). Each ISO viscosity grade number corresponds to the mid-point of viscosity range expressed in centistokes (cSt) at 40C. For example, a lubricant with an ISO grade of 32 has a viscosity within the range of 28.80-35.2, the midpoint of which is 32.

Rule-of-Thumb: The comparable ISO grade of a competitive product whose viscosity in SUS at 1005F is known can be determined by using the following conversion formula:

SUS @ 100ºF ÷ 5 = cSt @ 40˚C

ENGINEERING/TECHNICAL

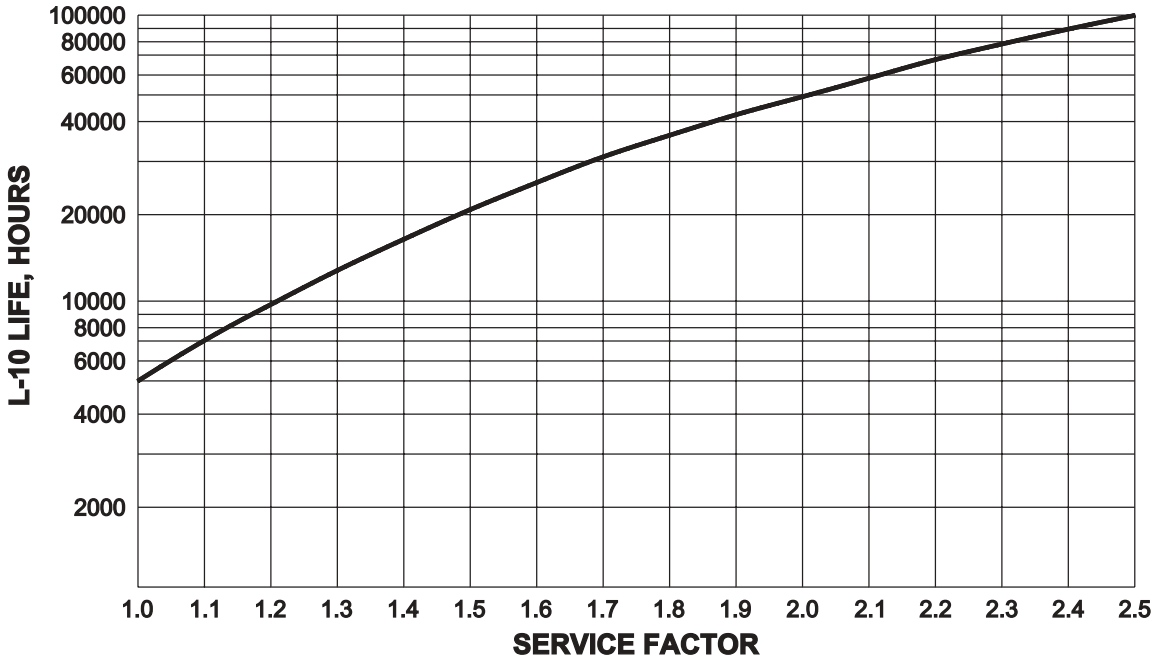
TORQUE-ARM II Shaft Mount Speed Reducers

BEARING L-10 LIFE AS A FUNCTION OF SERVICE FACTOR - AGMA STANDARD 6009-A00

DODGE TORQUE-ARM II Reducers are designed to provide a minimum L-10 bearing life of 5,000 hours for the most severe operating conditions. Since the probability of all maximum load conditions occurring in an application is remote, the actual L-10 life of an application is much greater.

Remember, the L-50 average life would be approximately 25,000 hours.

The graph illustrates how bearing life varies with different service factors. For example, a DODGE TORQUE-ARM II TA3203H Reducer with a 2.0 service factor has over **50,000** hours L-10 life.



1.0 Service Factor = 5,000 hours L-10 bearing life, 25,000 L-50 hours
1.4 Service Factor = 15,300 hours L-10 bearing life, 76,500 L-50 hours
2.0 Service Factor = 50,300 hours L-10 bearing life, 251,500 L-50 hours

NOTE: Average bearing life (L-50) is typically 5 times L-10 bearing life.