

# 800 SERIES HELICAL GEAR DRIVES



**B**oston Gear introduced the 800 Series in July of 2000. The 800 Series is a direct drop in for the SEW Eurodrive in line helical gearmotors. Listed below are many of the 800 Series standard features.

### FEATURES

- Dimensionally interchangeable with SEW Eurodrive® and other U.S. and European suppliers
- Standard NEMA C-face design will accept any standard NEMA motor
- Ratio's up to 70:1 in only two stages increases efficiency and reduces case size
- Accessible oil seals for routine product maintenance
- All units can be double sealed on the input for severe applications
- Prefilled with synthetic lubrication for your specific mounting position (sizes 3 and 4 lubricated for life)
- Washdown duty units in white or stainless steel epoxy coatings

The 800 Series carries the following specifications:

### SPECIFICATIONS

- Four in-line helical sizes
- Fractional through 10 horsepower flanged, fractional through 20 horsepower non-flanged
- Output torque ratings up to 5400 inch pounds
- Foot mount and output flange mounted models
- Ratios from 1:5:1 to 250:1
- Standard NEMA C-face and non-flanged models

## 800 SERIES IN-LINE HELICAL GEAR DRIVES

You will find the Boston Gear 800 Series is easy to select, easy to apply and easy to obtain. The Boston Gear 800 Series contains a focused selection of compact, heavy-duty helical gear drives, with long life performance features and simplified maintenance. Models include double and triple reduction units in flanged or foot mounted arrangements. You can choose from a wide range of reduction ratios to suit specific applications and a variety of input shaft configurations for maximum positioning flexibility. All units are adaptable to floor, sidewall or ceiling mounting.

The 800 Series has two available USDA approved finishes

- Durable non-absorbent, non-toxic white (BK) or stainless epoxy finish (SBK)
- Washable & Scrubbable
- Includes all the standard 800 Series features

## THE INSIDE STORY

The key to the success of the popularity of the Boston Gear 800 Series is the following:

- Available in both standard NEMA C-Face flanged and direct input non-flanged configurations. NEMA C-Face units allow for direct assembly of the reducer and any industry standard motor.
- All units shipped prelubricated for standard mounting or for your particular mounting position.
- A wide range of available gear reduction ratios, from 1.5:1 to 250:1, allows the 800 Series to fulfill a broad range of output speed requirements.
- High strength steel output shaft assures capacity for high torque and overhung loads.
- Rugged housing of fine grained, gear quality cast iron provides maximum strength and durability.
- High grade nickel chromium molybdenum steel allows for superior heat treating of gears resulting in a highly efficient (95 to 98%) and quiet gear drive.

(See Figure 7.1)

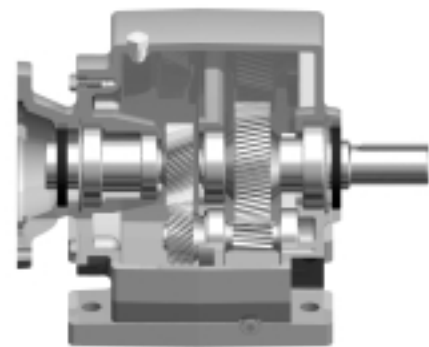


Figure 7.1



Figure 7.2, Foot Mounted NEMA C-face F800



Figure 7.3, Foot Mounted 800



Figure 7.4, Output Flange Mounted NEMA C-Face F800F



Figure 7.5, Output Flange Mounted 800F

- Dimensionally interchangeable with major European manufacturers.
- Oversized ball bearings and reduced straddle distance between bearings enhance the unit's durability, reliability and capability of supporting high overhung loads.
- Oil seal location provides easy, immediate access for routine product maintenance. Additionally, all sizes can be double sealed on the high shafts for severe applications.
- Ratios up to 70:1 in only two stages increases efficiency and reduces case size.  
(See Figures 7.2 - 7.5)

## INTERCHANGE GUIDE

You will find a convenient interchange guide in the Boston Gear 800 Series in-line helical catalog. This allows you to interchange from different manufacturers to the Boston Gear 800 Series.

Boston Gear 800 Series In-Line Helical Gear Drives are designed to be functionally interchangeable with these and many other manufacturer's drives. This chart is intended to be a guide only. Please see appropriate manufacturer's catalogs for exact details regarding ratings and dimensions.

## Interchange Guide

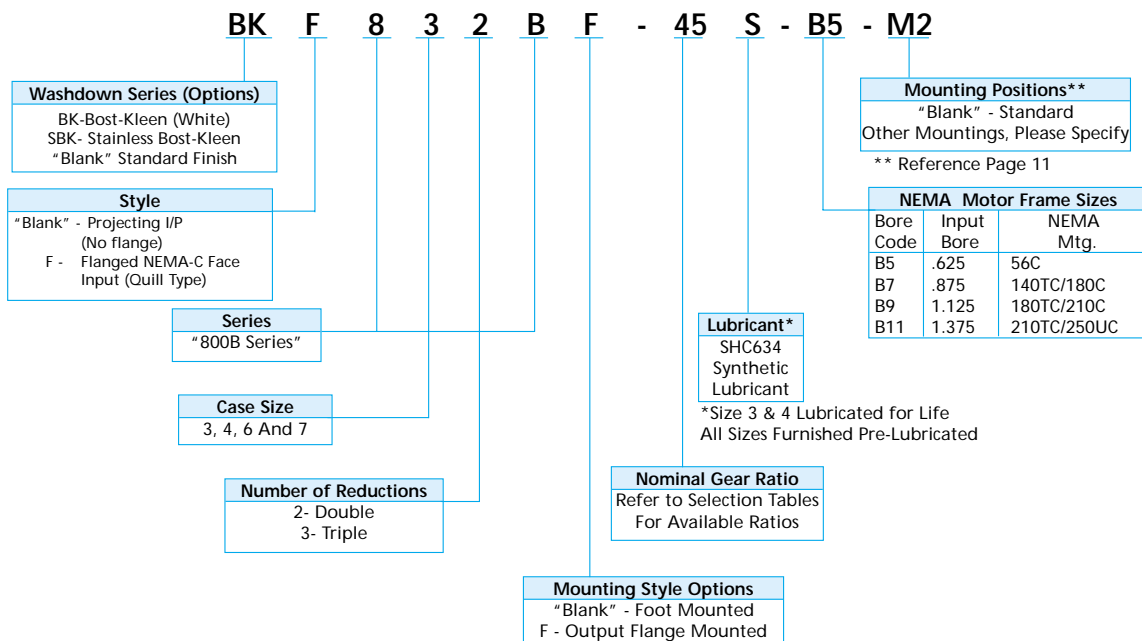
Manufacturers	Size	Foot Mounted NEMA C-Face F800	Foot Mounted 800	Output Flange Mounted NEMA C-Face F800F	Output Flange Mounted 800F
Boston	830	F832/F833	832/833	F832F/F833F	832F/833F
SEW Eurodrive	32	R32LP	Not Available	RF32LP	Not Available
Flender	E20*	E20 (M, G, OR A)*	E20A*	EF20 (M, G OR A)*	EF20A*
Dodge	1	SM1A/DM1A/TM1A	SR1A/DR1A/TR1A	SM1F/DM1F/TM1F	SR1F/DR1F/TR1F
Sumitomo	3090	H (C or M) 3090/95/97	H3090/95/97	HF(C or M) 3090/95/97	HF3090/95/97
Stober	C002	C002N-MR	C002N-AW	C002F-MR	C002F-AW
Boston	840	F842/F843	842/843	F842F/F843F	842F/843F
SEW Eurodrive	40	R40LP	R40	RF40LP	RF40
Flender	30	E30/Z30/D30-(M, G, or A)	E30/Z30/D30	EF30/ZF30/DF30 (M, G or A)	EF30/ZF30/DF30
Dodge	2	SM2A/DM2A/TM2A	SR2A/DR2A/TR2A	SM2F/DM2F/TM2F	SR2F/DR2F/TR2F
Sumitomo	3100	H(C or M) 3100/05	H3100/05	HF(C or M) 3100/05	HF3100/05
Stober	C100	C102/3N-MR	C102/3N-AW	C102/3F-MR	C102/3F-AW
Boston	860	F862/F863	862/863	F862F/F863F	862F/863F
SEW Eurodrive	60	R60LP/R63LP	R60/R63	RF60LP/RF63LP	RF60/RF63
Flender	40	E40/Z40/D40-(M, G or A)	E40/Z40/D40	EF40/ZF40/DF40-(M, G or A)	EF40/ZF40/DF40
Dodge	3	SM3A/DM3A/TM3A	SR3A/DR3A/TR3A	SM3F/DM3F/TM3F	SR3F/DR3F/TR3F
Sumitomo	3110	H(C or M) 3110/15	H3110/15	HF(C or M) 3110/15	HF3110/15
Stober	C200	C202/3N-MR	C202/3N-AW	C202/3F-MR	C202/3F-AW
Boston	870	F872/F873	872/873	F872F/F873F	872F/873F
SEW Eurodrive	70	R70LP/R73LP	R70/R73	RF70LP/RF73LP	RF70/RF73
Flender	60	E60/Z60/D60 - (M,D or A)	E60/Z60/D60	EF60/ZF60/DF60 (M, D or A)	EF60/ZF60/DF60
Dodge	4	SM4A/DM4A/TM4A	SR4A/DR4A/TR4A	SM4F/DM4F/TM4F	SR4F/DR4F/TR4F
Sumitomo	3140	H(C or M) 3140/45	H3140/45	HF(C or M) 3140/45	HF3140/45
Stober	C400	C402/3N-MR	C402/3N-AW	C402/3F-MR	C402/3F-AW

\* Single reduction models only.

## NUMBERING SYSTEM / HOW TO ORDER

### NUMBERING SYSTEM

The Boston Gear numbering system is standard for all Boston Gear Reducers. The 800, 700, 600 and 200 Series share common letter prefixes. It is simple to select any Boston Gear speed reducer by following this easy system.



### HOW TO ORDER

**EXAMPLE:**

Required flange input NEMA 56C, and flanged output, 1/3 HP, Class I, 45:1 ratio, lubricated, and standard mounting position.

**ORDER:**

1 pc F832BF-45S-B5

**OVERHUNG LOAD**

If the output shaft of a gear drive is connected to the driven machine by means other than a flexible coupling, an overhung load is imposed on the shaft. This load may be calculated as follows:

$$OHL = \frac{2TK}{D}$$

- OHL = Overhung Load (LB.)
- T = Shaft Torque (LB.-IN.)
- D = Pitch Diameter of Sprocket, Pinion or Pulley (IN.)
- K = Load Connection Factor

**LOAD CONNECTION FACTOR (K)**

- Sprocket or Timing Belt . . . . . 1.00
- Pinion and Gear Drive. . . . . 1.25
- Pulley and V-Belt Drive . . . . . 1.50
- Pulley and Flat Belt Drive . . . . . 2.50

Overhung load is a necessary consideration in sizing any speed reducer. Too much torque or weight connected to the output shaft can crack or bend. The formula above can help determine the overhung load. After using the formula to find the overhung load, compare the results to the chart below (Table 2).

An overhung load greater than permissible load value may be reduced to an acceptable value by the use of a sprocket, pinion or pulley of a larger PD. Relocation of the load closer to the center of gear drive will also increase OHL capacity.

**Table 2**

**OVERHUNG LOADS (LBS) & AXIAL THRUST (LBS) CAPACITIES ON OUTPUT SHAFT**

OUTPUT RPM	832 / 833 OHL	842 / 843 OHL	862 / 863 OHL	872 / 873 OHL
1000	270	425	715	950
500	300	455	805	1065
350	340	465	830	1065
250	360	485	880	1065
200	385	505	900	1065
150	385	525	945	1090
100	385	620	1010	1275
50	385	770	1360	1720
25 & under	385	770	1600	2090
<b>THRUST</b>	390	635	1200	1580

Overhung loads are calculated at the center of the shaft extension and with no thrust load. For combined loading consult factory.

**OVERHUNG LOADS (LBS) ON INPUT SHAFT AT 1750 RPM**

SIZE	832	833	842	843	862	863	872	873
OHL	344	390	314	373	310	315	402	371

Overhung loads are calculated at the center of the shaft extension and with no thrust load.

### LUBRICANT AND QUANTITY

Improper lubrication or the lack thereof, can result in shortening the life of a reducer. Many times the reducer will totally fail as a result of neglect.

Synthetic SHC634 is recommended for the 800 Series gear drives and, at all times, the lubricant must remain free from contamination. Normal operating temperatures range between 150°F - 170°F. During the initial break-in of the gear drive, higher than normal operating temperatures may result. All gear drives are supplied filled with SHC634 synthetic oil and with the quantity listed below for standard mounting position M1 or M8 or to mounting specified at time of order. (See Figure 7.6 A-D)

- Sizes 832/833 and 842/843 are lubricated for life, for universal mounting. No vent required.
- Sizes 862/863 and 872/873 will require an oil change after 20,000 hours of operation. More frequent changes may be required when operating in high temperature ranges or unusually contaminated environments.
- Satisfactory performance may be obtained in some applications with non-synthetic oils and will require more frequent changes.

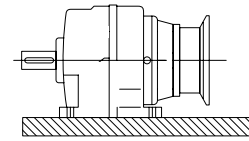


Figure 7.6A, M1

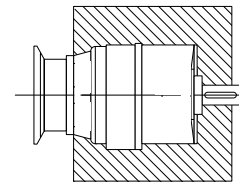


Figure 7.6B, M2

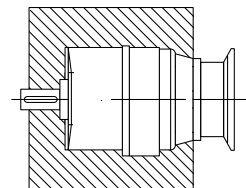


Figure 7.6C, M3

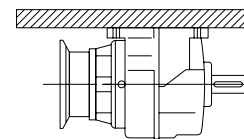


Figure 7.6D, M4

Recommended Lubricant	Ambient Temperature	ISO Viscosity Grade No.	Boston Gear Item Code	
			Quart	Gallon
Mobil SHC634	-30° to 225°F	320 / 460	51493	51494
Mobile D.T.E Oil Extra Heavy	50° to 125°F	710 / 790	N/A	N/A

### OIL CAPACITIES (QUARTS)

UNIT SIZE	MOUNTING POSITIONS								
	M1	M2	M3	M4	M5	M6	M7	M8	M9
	Foot Mounted					Output Flange Mounted			
832	.63	.63	.84	.84	1.1		.63	.84	1.1
833	.84	.84	1.1	1.1	1.8		.84	1.8	1.6
842	.63	.63	1.2	1.2	1.5	1.7	.63	1.5	1.7
843	.95	.95	1.4	1.4	2.2	2.2	.95	2.4	2.2
862	1.3	1.3	2.3	2.3	3.0	3.4	1.3	3.0	3.4
863	1.9	1.9	2.7	2.7	5.0	5.0	1.9	5.0	5.0
872	2.6	2.6	4.8	4.8	6.3	7.1	2.6	6.3	7.1
873	3.0	3.8	5.9	5.9	9.5	9.5	3.0	10.8	9.5

### IN-LINE HELICAL SELECTION TABLES

Beginning on page 30 of the Boston Gear 800 Series catalog are the unit's ratings. Below is an example of how to use the rating tables. First find the correct heading for "Non-flanged" or "Flanged" (gearmotors). As in the example below, select the flanged (gearmotor) 2HP reducer. This reducer carries 3268 LB ins. torque. Continuing to the right, the model #F872B-50S-B7 is selected.

Approx. Output RPM	Ratio *	Non-Flanged				Flanged (Gearmotors)				
		Gear Capacity		Non-Flange O/P	Output Flange	Ratings			Non-Flange O/P	Output Flange
		Output Torque (LB-IN.)	Input HP	Catalog No. (Item Code)	Catalog No. (Item Code)	Motor HP	Output Torque (LB-IN.)	S.C. **	Catalog No. (Item Code)	Catalog No. (Item Code)
35	50	5216	3.16	872B-50S (16886)	872BF-50S (19813)	3	4900	I	F872B-50S-B9 (80863)	F872BF-50S-B9 (33806)
						2	3268	II	F872B-50S-B7 (26494)	F872BF-50S-B7 (33804)
						1.5	2552	III		
		5290	3.02	873B-50S (16918)	873BF-50S (19937)	3	5256	I	F873B-50S-B9 (30868)	F873BF-50S-B9 (27312)
						2	3504	II	F873B-50S-B7 (30866)	F873BF-50S-B7 (27294)
						1.5	2628	II		

\* Gear Ratio is Approximate. For Actual Gear Ratio Reference Pages 30-39. in the 800 Series Catalog

\*\* Service Class I (S.F. = 1.00) Service Class II (S.F. = 1.50) Service Class III (S.F. = 2.00)

Overhung Load Ratings refer to Page 9 in the 800 Series Catalog.

■ Indicates Triple Reduction

**NON-FLANGED**

Example of rating table found in the Boston Gear 800 Series Catalog.

Catalog Number	Input Speed								
	1750 RPM			1450 RPM			1160 RPM		
	Approx. Output RPM	Output Torque (LB-IN)(Max.)	Inut HP (Max.)	Approx. Output RPM	Output Torque (LB-IN)(Max.)	Input HP (Max.)	Approx. Output RPM	Output Torque (LB-IN) (Max.)	Input HP (Max.)
832B/BF1.5S	1170	288	5.80	970	293	4.82	773	293	3.85
842B/BF1.5S	1170	479	9.08	970	509	8.00	773	549	6.89
862B/BF1.5S	1170	830	16.20	970	884	14.30	773	950	12.30
872B/BF1.5S	1170	1094	21.20	970	1090	17.50	773	1090	14.00
832B/BF1.9S	922	325	4.77	763	325	3.95	610	325	3.16
842B/BF1.9S	922	643	8.69	763	685	7.66	610	738	6.60
862B/BF1.9S	922	1100	15.40	763	1189	13.60	610	1278	11.70
872B/BF1.9S	922	1492	21.20	763	1485	17.50	610	1484	14.00
832B/BF2.3S	760	333	4.29	630	339	3.56	504	339	2.84
842B/BF2.3S	760	695	8.52	630	739	7.51	504	788	6.40
862B/BF2.3S	760	1217	15.00	630	1292	13.20	504	1396	11.40
872B/BF2.3S	760	1680	21.20	630	1680	17.50	504	1680	14.00
832B/BF2.6S	673	350	3.98	560	350	3.30	446	350	2.64
842B/BF2.6S	673	715	7.95	560	762	7.01	446	777	5.72
862B/BF2.6S	673	1320	14.50	560	1408	12.80	446	1498	10.90
872B/BF2.6S	673	1800	21.20	560	1796	17.50	446	1796	14.00
832B/BF2.9S	605	533	5.18	500	544	4.38	400	559	3.60
842B/BF2.9S	605	840	8.34	500	872	7.35	400	939	6.33
862B/BF2.9S	605	1560	15.90	500	1660	14.00	400	1790	12.10
872B/BF2.9S	605	2135	21.20	500	2130	17.50	400	2130	14.00
832B/BF3.3S	530	370	3.24	440	370	2.69	350	370	2.15
842B/BF3.3S	530	775	7.03	440	775	5.83	350	775	4.66
862B/BF3.3S	530	1550	13.40	440	1648	11.80	350	1720	9.85
872B/BF3.3S	530	2398	21.20	440	2390	17.50	350	2390	14.00
832B/BF3.5S	500	376	3.11	414	376	2.57	331	376	2.06
842B/BF3.5S	500	858	6.46	414	832	5.35	331	832	4.28
862B/BF3.5S	500	1665	12.70	414	1751	11.10	331	1814	9.16
872B/BF3.5S	500	2704	21.00	414	2720	17.50	331	2720	14.00
832B/BF3.9S	448	552	3.97	372	563	3.36	297	576	2.75
842B/BF3.9S	448	959	6.96	372	1020	6.13	297	1100	5.28
862B/BF3.9S	448	1835	13.30	372	1950	11.70	297	2110	10.10
872B/BF3.9S	448	2902	21.20	372	2892	17.50	297	2892	14.00
832B/BF4.4S	400	572	3.54	330	585	3.00	264	588	2.41
842B/BF4.4S	400	1000	6.59	330	1066	5.81	264	1146	5.00
862B/BF4.4S	400	1933	12.50	330	2050	11.00	264	2215	9.49
872B/BF4.4S	400	3265	21.20	330	3254	17.50	264	3254	14.00
832B/BF5.1S	340	592	3.31	285	592	2.74	227	592	2.19
842B/BF5.1S	340	1065	5.96	285	1135	5.26	227	1232	4.53
862B/BF5.1S	340	2042	11.60	285	2167	10.20	227	2330	8.78
872B/BF5.1S	340	3698	21.20	285	3685	17.50	227	3685	14.00

\* For applications requiring a service factor greater than 1.0, multiply the design torque or horsepower by the application factor, found on pages 58 & 59.  
 Actual Output RPM = Input Speed ÷ Actual Ratio.  
 For Overhung Load Ratings refer to Page 9 in the 800 Series Catalog.



**FOOT MOUNTED**

This is a typical page of dimensional information found in the 800 Series catalog. Example: If the OAH 07A F842 were desired, simply find the "K" dimension for a F842 follow over to the K dimension and find 6.99".

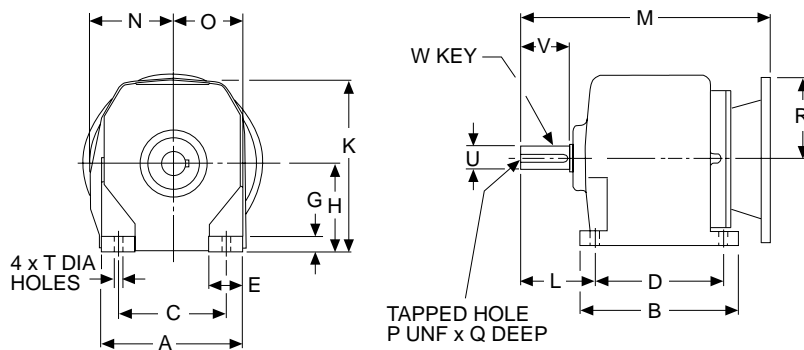
SIZE	A	B	C	D	E	G	H	K	L	N	O	P	Q	T
F832	5.44	4.33	4.33	3.35	1.05	.48	2.95	5.79	2.28	3.16	2.84	1/4	.63	.39
F842	5.71	6.30	4.33	5.12	1.48	.67	3.54	6.99	2.95	3.31	2.95	1/4	.63	.39
F862	7.48	7.87	5.31	6.50	2.19	.81	4.53	9.06	3.54	4.13	3.87	3/8	.87	.59
F872	9.06	9.65	6.69	8.07	2.64	1.03	5.51	10.83	4.53	5.12	4.69	5/8	1.38	.75

Table A

SIZE	LOW SPEED SHAFT				M				R			
	U +.000 -.001	V	W-Key		NEMA MOUNTING				NEMA MOUNTING			
			Sq.	Lgth.	56C	140TC	180TC	210TC	56C	140TC	180TC	210TC
					B5	B7	B9	B11	B5	B7	B9	B11
F832	.750	1.57	.19	1.28	9.82	9.82	10.65	----	3.31	3.31	4.63	----
F842	1.000	1.97	.25	1.75	10.73	10.73	11.55	----	3.31	3.31	4.63	----
F862	1.250	2.36	.25	2.00	12.26	12.26	14.61	14.61	3.31	3.31	4.63	4.63
F872	1.625	3.15	.38	2.37	15.15	15.15	16.76	16.76	3.31	3.31	4.63	4.63

Output shaft rotation, relative to input shaft rotation, is identical for double reduction and opposite for triple reduction.

Table B



### AGMA SERVICE FACTORS AND LOAD CLASSIFICATIONS

Also found in the Boston Gear 800 Series catalog, are AGMA (American Gear Manufacturer Association) Service Factor tables. Find the application that is closest to what is needed and apply that service factor to the required HP, to determine the design horsepower.

SERVICE FACTOR CHART

AGMA CLASS OF SERVICE	SERVICE FACTOR	OPERATING CONDITIONS
I	1.00	Moderate Shock - not more than 15 minutes in 2 hours. Uniform Load - not more than 10 hours per day.
II	1.25	Moderate Shock - not more than 10 hours per day. Uniform Load - 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.
III	1.75	Heavy Shock - not more than 10 hours per day.
	2.00	Heavy Shock - more than 10 hours per day.

TYPE OF MACHINE TO BE DRIVEN	NON-MOTOR REDUCER (SERVICE FACTORS)		MOTORIZED REDUCER (CLASS OF SERVICE)	
	HRS. PER DAY		HRS. PER DAY	
	3 TO 10	3 OVER 10	3 TO 10	3 OVER 10
<b>PAPER MILLS (Continued)</b>				
Chipper	—	2.00	—	III
Chip Feeder	1.25	1.50	—	—
Coating Rolls - Couch Rolls	1.00	1.25	—	—
Conveyors - Chips - Bark Chemical	1.00	1.25	—	—
Conveyors - Log and Slab	—	2.00	—	—
Cutter	—	2.00	—	—
Cylinder Molds, Dryers - Anti-Friction	—	1.25	—	—
Felt Stretcher	1.25	1.50	—	II
Screens - Chip and Rotary	1.25	1.50	—	—
Thickener (AC)	1.25	1.50	—	—
Washer (AC)	1.25	1.50	—	—
Winder - Surface Type	—	1.25	—	II
<b>PLASTICS INDUSTRY</b>				
Intensive Internal Mixers				
Batch Type	—	1.75	—	—
Continuous Type	—	1.50	—	—
Batch Drop Mill - 2 Rolls	—	1.25	—	—
Compounding Mills	—	1.25	—	—
Calendars	—	1.50	—	—
Extruder - Variable Speed	—	1.50	—	—
Extruder - Fixed Speed	—	1.75	—	—
<b>PULLERS</b>				
Barge Haul	—	2.00	—	—
<b>PUMPS</b>				
Centrifugal	—	1.25	—	—
Proportioning	—	1.50	*	*
Reciprocating				
Single Acting, 3 or More Cycles	1.25	1.50	II	III
Double Acting, 2 or More Cycles	1.25	1.50	II	III
Rotary - Gear or Lube	1.00	1.25	I	II
<b>RUBBER INDUSTRY</b>				
Batch Mixers	—	1.75	—	—
Continuous Mixers	—	1.50	—	—
Calendars	—	1.50	—	—

TYPE OF MACHINE TO BE DRIVEN	NON-MOTOR REDUCER (SERVICE FACTORS)		MOTORIZED REDUCER (CLASS OF SERVICE)	
	HRS. PER DAY		HRS. PER DAY	
	3 TO 10	3 OVER 10	3 TO 10	3 OVER 10
<b>RUBBER INDUSTRY (Con't.)</b>				
Extruders - Continuous	—	1.50	—	—
Extruders - Intermittent	—	1.75	—	—
Tire Building Machines	—	—	II	II
Tire and Tube Press Openers	—	—	I	I
<b>SEWAGE DISPOSAL EQUIPMENT</b>				
Bar Screens	1.00	1.25	I	II
Chemical Feeders	1.00	1.25	I	II
Collectors	1.00	1.25	I	II
Dewatering Screws	1.25	1.50	II	II
Scum Breakers	1.25	1.50	II	II
Slow or Rapid Mixers	1.25	1.50	II	II
Thickeners	1.25	1.50	II	II
Vacuum Filters	1.25	1.50	II	II
<b>SCREENS</b>				
Air Washing	1.00	1.25	I	II
Rotary - Stone or Gravel	1.25	1.50	II	II
Traveling Water Intake	1.00	1.25	I	II
Skip Hoists	—	—	II	—
Slab Pushers	1.25	1.50	—	—
Stokers	—	1.25	—	II
<b>TEXTILE INDUSTRY</b>				
Batchers or Calendars	1.25	1.50	II	II
Cards	1.25	1.50	I	II
Card Machines	1.75	2.00	III	III
Dry Cans and Dryers	1.25	1.50	II	II
Dyeing Machines	1.25	1.50	II	II
Looms	1.25	1.50	*	*
Mangles, Nappers and Pads	1.25	1.50	II	II
Soapers, Tenner Frames	1.25	1.50	II	II
Spinners, Washers, Winders	1.25	1.50	II	II
Tumbling Barrels	1.75	2.00	III	III
Windlass	1.25	1.50	II	III

\*Consult Manufacturer.

This list is not all-inclusive and each application should be checked to determine if any unusual operating conditions will be encountered.

# Quiz

**CLICK HERE** or visit <http://www.bostongear.com/quiz> to take the quiz