

# سرویس فاکتور و اطلاعات کلاس باری براساس راهنمای AGMA

Classes of Service and Service Factors .....	A-2
AGMA Service Factors for Worm Gear Reducers & Gearmotors....	A-3
AGMA Load Classifications for Spur, Helical & Bevel Gearmotors & Shaft Mount Reducers .....	A-5
AGMA Service Factors for Spur, Helical & Bevel Gear Drives & Reducers .....	A-7

## CLASS OF SERVICE AND SERVICE FACTORS

The ratings for gear drives in this manual are based on a service factor of 1.00, for uniform load and uniform power source, up to 10 hours of operation per day. For other operating conditions, the application horsepower or torque must be multiplied by the appropriate service factor, to determine the equivalent gear drive power rating. A gear drive should be selected with a rated capacity equal to or greater than the equivalent rating. A condensed service factor chart is located in the selection information pages for each type of gear drive or reducer.

AGMA Service Factors for Worm and Helical Worm Gearmotors and Reducers are listed on pages A-3 to A-4.

AGMA Load Classification Numbers for Spur, Helical & Bevel Gearmotors and Shaft Mount Reducers are listed on pages A-5 to A-6.

AGMA Service Factors for Spur, Helical & Bevel Gear Drives and Reducers are listed on pages A-7 to A-8.

Table 1 indicates the relationship between service factors and load classification numbers.

The AGMA load classification numbers and service factors are based on a uniform power source. If other power sources are used, the service factors must be converted using Table 2. Determine the required service factor with uniform power source. Locate that service factor in the first column and read straight across to obtain required service factor with multi-cylinder or single cylinder engines.

Service factors do not need to be used with thermal ratings.

The Class Number and Service Factor charts are for general guidelines in determining required service factors. Past experience may indicate that different service factors are required. Consult the factory for unusual or severe applications, or when there are any safety considerations.

TABLE 1 – LOAD CLASSIFICATION NUMBERS

<b>LOAD CLASS (S.F.)</b>	<b>UP TO 3 HRS. TOTAL OPERATION PER DAY</b>	<b>3 TO 10 HRS. TOTAL OPERATION PER DAY</b>	<b>OVER 10 HRS. TOTAL OPERATION PER DAY</b>
I (1.0)	Moderate Shock Load	Uniform Load	
II (1.4)	Heavy Shock Load	Moderate Shock Load	Uniform Load
III (2.0)		Heavy Shock Load	Moderate Shock Load

TABLE 2 – SERVICE FACTOR CONVERSION BASED ON TYPE OF POWER SOURCE

<b>STEAM OR GAS TURBINE HYDRAULIC OR ELECTRIC MOTOR</b>	<b>MULTI-CYLINDER ENGINE</b>	<b>SINGLE CYLINDER ENGINE</b>
1.00	1.25	1.50
1.25	1.50	1.75
1.50	1.75	2.00
1.75	2.00	2.25
2.00	2.25	2.50
2.50	2.75	3.00
3.00	3.25	3.50

## A.G.M.A. SERVICE FACTORS

## WORM, HELICAL WORM GEARMOTORS &amp; REDUCERS WITH UNIFORM POWER SOURCE

Application	Total Operation			Application	Total Operation		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Agitators (mixers)				Fans			
Pure liquids	*	1.00	1.25	Centrifugal	*	1.00	1.25
Liquids and solids	1.00	1.25	1.50	Cooling towers	Refer to Manufacturer		
Liquids - variable density	1.00	1.25	1.50	Forced draft	1.25	1.25	1.25
Blowers				Induced draft	1.00	1.25	1.50
Centrifugal	*	1.00	1.25	Industrial & mine	1.00	1.25	1.50
Lobe	1.00	1.25	1.50	Feeders			
Vane	*	1.00	1.25	Apron	*	1.25	1.50
Brewing and distilling				Belt	1.00	1.25	1.50
Bottling machinery	*	1.00	1.25	Disc	*	1.00	1.25
Brew kettles - continuous duty	*	1.00	1.25	Reciprocating	1.25	1.50	1.75
Cookers - continuous duty	*	1.00	1.25	Screw	1.00	1.25	1.50
Mash tubs - continuous duty	*	1.00	1.25	Food industry			
Scale hopper - frequent starts	1.00	1.25	1.50	Cereal cooker	*	1.00	1.25
Can filling machines	*	1.00	1.25	Dough mixer	1.00	1.25	1.50
Car dumpers	1.25	1.50	1.75	Meat grinders	1.00	1.25	1.50
Car pullers	1.00	1.25	1.50	Slicers	1.00	1.25	1.50
Clarifiers	*	1.00	1.25	Generators and exciters	*	1.00	1.25
Classifiers	1.00	1.25	1.50	Hammer mills	1.50	1.50	1.75
Clay working machinery				Hoists			
Brick press	1.25	1.50	1.75	Heavy duty	1.25	1.50	1.75
Briquette machine	1.25	1.50	1.75	Medium duty	1.00	1.25	1.50
Pug mill	1.00	1.25	1.50	Skip hoist	1.00	1.25	1.50
Compactors	1.50	1.75	2.00	Laundry			
Compressors				Tumblers	1.00	1.25	1.50
Centrifugal	*	1.00	1.25	Washers	1.25	1.25	1.50
Lobe	1.00	1.25	1.50	Lumber industry			
Reciprocating, multi-cylinder	1.00	1.25	1.50	Barkers - spindle feed	1.25	1.25	1.50
Reciprocating, single - cylinder	1.25	1.50	1.75	Main drive	1.50	1.50	1.50
Conveyors - general purpose				Conveyors - burner	1.25	1.25	1.50
Uniformly loaded or fed	*	1.00	1.25	Main or heavy duty	1.50	1.50	1.50
Not uniformly fed	1.00	1.25	1.50	Main log	1.50	1.50	1.75
Reciprocating or shaker	1.25	1.50	1.75	Re-saw, merry-go-round	1.25	1.25	1.50
Cranes				Conveyors			
Dry dock				Slab	1.50	1.50	1.75
Main hoist	1.25	1.50	1.75	Transfer	1.25	1.25	1.50
Auxiliary hoist	1.25	1.50	1.75	Chains			
Boom hoist	1.25	1.50	1.75	Floor	1.50	1.50	1.50
Slewing drive	1.25	1.50	1.75	Green	1.50	1.50	1.50
Traction drive	1.50	1.50	1.50	Cut-off saws			
Container				Chain	1.50	1.50	1.50
Main hoist	Refer to Manufacturer			Drag	1.50	1.50	1.50
Boom hoist	Refer to Manufacturer			Debarking drums	1.50	1.50	1.75
Trolley drive				Feeds			
Gantry drive	Refer to Manufacturer			Edger	1.25	1.25	1.50
Traction drive	Refer to Manufacturer			Gang	1.50	1.50	1.50
Mill duty				Trimmer	1.25	1.25	1.50
Main hoist	Refer to Manufacturer			Log deck	1.50	1.50	1.50
Auxiliary	Refer to Manufacturer			Log hauls - incline - well type	1.50	1.50	1.50
Bridge	Refer to Manufacturer			Log turning devices	1.50	1.50	1.50
Trolley travel	Refer to Manufacturer			Planer feed	1.25	1.25	1.50
Industrial duty				Planer tilting hoists	1.50	1.50	1.50
Main	Refer to Manufacturer			Rolls - live-off bearing - roll cases	1.50	1.50	1.50
Auxiliary	Refer to Manufacturer			Sorting table	1.25	1.50	1.50
Bridge	Refer to Manufacturer			Tipple hoist	1.25	1.25	1.50
Trolley travel	Refer to Manufacturer			Transfers			
Crusher				Chain	1.50	1.50	1.50
Stone or ore	1.50	1.75	2.00	Craneway	1.50	1.50	1.50
Dredges				Tray drives	1.25	1.25	1.50
Cable reels	1.00	1.25	1.50	Veneer lathe drives	Refer to Manufacturer		
Conveyors	1.00	1.25	1.50	Metal mills			
Cutter head drives	1.25	1.50	1.75	Draw bench carriage and main drive	1.00	1.25	1.50
Pumps	1.00	1.25	1.50	Runout table			
Screen drives	1.25	1.50	1.75	Non-reversing			
Stackers	1.00	1.25	1.50	Group drives	1.00	1.25	1.50
Winches	1.00	1.25	1.50	Individual drives	1.50	1.50	1.75
Elevators				Reversing	1.50	1.50	1.75
Bucket	1.00	1.25	1.50	Slab pushers	1.25	1.25	1.50
Centrifugal discharge	*	1.00	1.25	Shears	1.50	1.50	1.75
Escalators	Refer to Manufacturer			Wire drawing	1.00	1.25	1.50
Freight	Refer to Manufacturer			Wire winding machine	1.00	1.25	1.50
Gravity discharge	*	1.00	1.25	Metal strip processing machinery			
Extruders				Bridles	1.25	1.25	1.50
General	1.25	1.25	1.25	Coilers & uncoilers	1.00	1.00	1.25
Plastics				Edge trimmers	1.00	1.25	1.50
Variable speed drive	1.50	1.50	1.50	Flatteners	1.25	1.25	1.50
Fixed speed drive	1.75	1.75	1.75				
Rubber							
Continuous screw operation	1.50	1.50	1.50				
Intermittent screw operation	1.75	1.75	1.75				

\* UNSPECIFIED SERVICE FACTORS SHOULD BE 1.00 OR AS AGREED UPON BY USER AND MANUFACTURER.

# A.G.M.A. SERVICE FACTORS

## WORM, HELICAL WORM GEARMOTORS & REDUCERS WITH UNIFORM POWER SOURCE

Application	Total Operation			Application	Total Operation		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Metal strip processing machinery (continued)				Secondary processing			
Loopers (accumulators)	1.00	1.00	1.00	Blow molders	1.50	1.50	1.50
Pinch rolls	1.25	1.25	1.50	Coating	1.25	1.25	1.25
Scrap choppers	1.00	1.25	1.50	Film	1.25	1.25	1.25
Shears	1.50	1.50	1.75	Pipe	1.25	1.25	1.25
Slitters	1.00	1.25	1.50	Pre-plasticizers	1.50	1.50	1.50
Mills, rotary type				Rods	1.25	1.25	1.25
Ball & rod				Sheet	1.25	1.25	1.25
Spur ring gear	1.50	1.50	1.75	Tubing	1.25	1.25	1.50
Helical ring gear	1.50	1.50	1.50	Pullers - barge haul	1.00	1.50	1.75
Direct connected	1.50	1.50	1.75	Pumps			
Cement kilns	1.50	1.50	1.50	Centrifugal	*	1.00	1.25
Dryers & coolers	1.50	1.50	1.50	Proportioning	1.00	1.25	1.50
Mixers				Reciprocating			
Concrete	1.00	1.25	1.50	Single acting, 3 or more cylinders	1.00	1.25	1.50
Paper mills				Double acting, 2 or more cylinders	1.00	1.25	1.50
Agitator (mixer)	1.50	1.50	1.50	Rotary			
Agitator for pure liquors	1.25	1.25	1.25	Gear type	*	1.00	1.50
Barking drums	1.75	1.75	1.75	Lobe	*	1.00	1.25
Barkers - mechanical	1.75	1.75	1.75	Vane	*	1.00	1.25
Beater	1.50	1.50	1.50	Rubber industry			
Breaker stack	1.25	1.25	1.25	Intensive internal mixers			
Calender 2)	1.25	1.25	1.25	Batch mixers	1.50	1.75	1.75
Chipper	1.75	1.75	1.75	Continuous mixers	1.25	1.50	1.50
Chip feeder	1.50	1.50	1.50	Mixing mill - 2 smooth rolls (if corrugated rolls are used, then use the same service factors that are used for a cracker warmer)	1.50	1.50	1.50
Coating rolls	1.25	1.25	1.25	Batch drop mill - 2 smooth rolls	1.50	1.50	1.50
Conveyors				Cracker warmer - 2 rolls; 1 corrugated roll	1.75	1.75	1.75
Chip, bark, chemical	1.25	1.25	1.25	Cracker - 2 corrugated rolls	1.75	1.75	1.75
Log (including slab)	1.75	1.75	1.75	Holding, feed & blend mill - 2 rolls	1.25	1.25	1.25
Couch rolls	1.25	1.25	1.25	Refiner - 2 rolls	1.50	1.50	1.50
Cutter	1.75	1.75	1.75	Calenders	1.50	1.50	1.50
Cylinder molds	1.25	1.25	1.25	Sand muller	1.00	1.25	1.50
Dryers 2)				Sewage disposal equipment			
Paper machine	1.25	1.25	1.25	Bar screens	*	1.00	1.25
Conveyor type	1.25	1.25	1.25	Chemical feeders	1.00	1.00	1.25
Embosser	1.25	1.25	1.25	Dewatering screens	1.00	1.25	1.50
Extruder	1.50	1.50	1.50	Scum breakers	1.00	1.25	1.50
Fourdrinier rolls (includes lump breaker, dandy roll, wire turning, and return rolls)	1.25	1.25	1.25	Slow or rapid mixers	1.00	1.25	1.50
Jordan	1.25	1.25	1.25	Sludge collectors	1.00	1.00	1.25
Kiln drive	1.50	1.50	1.50	Thickeners	1.00	1.25	1.50
Mt. Hope roll	1.25	1.25	1.25	Vacuum filters	1.00	1.25	1.50
Paper rolls	1.25	1.25	1.25	Screens			
Platter	1.50	1.50	1.50	Air washing	*	1.00	1.25
Presses - felt & suction	1.25	1.25	1.25	Rotary - stone or gravel	1.00	1.25	1.50
Pulper	1.50	1.50	1.75	Traveling water intake	*	1.00	1.25
Pumps - vacuum	1.50	1.50	1.50	Sugar industry			
Reel (surface type)	1.25	1.25	1.50	Beet slicer	1.50	1.50	1.75
Screens				Cane knives	1.50	1.50	1.50
Chip	1.50	1.50	1.50	Crushers	1.50	1.50	1.50
Rotary	1.50	1.50	1.50	Mills (low speed end)	1.50	1.50	1.50
Vibrating	1.75	1.75	1.75	Textile industry			
Size press	1.25	1.25	1.25	Batchers	1.00	1.25	1.50
Super calender 3)	1.25	1.25	1.25	Calenders	1.00	1.25	1.50
Thickener (AC motor)	1.50	1.50	1.50	Cards	1.00	1.25	1.50
(DC motor)	1.25	1.25	1.25	Dry cans	1.00	1.25	1.50
Washer (AC motor)	1.50	1.50	1.50	Dryers	1.00	1.25	1.50
(DC motor)	1.25	1.25	1.25	Dyeing machinery	1.00	1.25	1.50
Wind and unwind stand	1.00	1.00	1.00	Looms	1.00	1.25	1.50
Winders (surface type)	1.25	1.25	1.25	Mangles	1.00	1.25	1.50
Yankee dryers 2)	1.25	1.25	1.25	Nappers	1.00	1.25	1.50
Plastics industry				Pads	1.00	1.25	1.50
Primary processing				Slashers	1.00	1.25	1.50
Intensive internal mixers				Soapers	1.00	1.25	1.50
Batch mixers	1.75	1.75	1.75	Spinners	1.00	1.25	1.50
Continuous mixers	1.50	1.50	1.50	Tenter frames	1.00	1.25	1.50
Batch drop mill - 2 smooth rolls	1.25	1.25	1.25	Washers	1.00	1.25	1.50
Continuous feed, holding & blend mill	1.25	1.25	1.25	Winders	1.00	1.25	1.50
Compounding mill	1.25	1.25	1.25				
Calenders	1.50	1.50	1.50				

**NOTES:**

- 1) \* UNSPECIFIED SERVICE FACTORS SHALL BE 1.00 OR AS AGREED UPON BETWEEN USER AND MANUFACTURER.
- 2) ANTI-FRICTION BEARINGS ONLY. USE 1.5 FOR SLEEVE BEARINGS.
- 4) A SERVICE FACTOR OF 1.00 MAY BE APPLIED AT BASE SPEED OF A SUPER CALENDER OPERATING OVER-SPEED RANGE OF PART RANGE CONSTANT HORSEPOWER, PART RANGE CONSTANT TORQUE WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS GREATER THAN 1.5 TO 1. A SERVICE FACTOR OF 1.25 IS APPLICABLE TO SUPER CALENDERS OPERATING OVER THE ENTIRE SPEED RANGE AT CONSTANT TORQUE OR WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS LESS THAN 1.5 TO 1.

# A.G.M.A. LOAD CLASSIFICATION NUMBERS

## SPUR, HELICAL & BEVEL GEARMOTORS & SHAFT MOUNT REDUCERS WITH UNIFORM POWER SOURCE

Application	Class Numbers			Application	Class Numbers		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Agitators (mixers)				Fans			
Pure liquids	I	I	II	Centrifugal	I	I	II
Liquids and solids	I	II	II	Cooling towers	III	III	III
Liquids - variable density	I	II	II	Forced draft	II	II	II
Blowers				Induced draft	II	II	II
Centrifugal	I	I	II	Industrial & mine	II	II	II
Lobe	I	II	II	Feeders			
Vane	I	II	II	Apron	I	II	II
Brewing and distilling				Belt	I	II	II
Bottling machinery	I	I	II	Disc	I	I	II
Brew kettles - continuous duty	II	II	II	Reciprocating	II	III	III
Cookers - continuous duty	II	II	II	Screw	I	II	II
Mash tubs - continuous duty	II	II	II	Food industry			
Scale hopper - frequent starts	II	II	II	Cereal cooker	I	I	II
Can filling machines	I	I	II	Dough mixer	II	II	II
Car dumpers	I	III	III	Meat grinders	II	II	II
Car pullers	I	II	II	Slicers	I	II	II
Clarifiers	I	I	II	Generators and exciters	II	II	II
Classifiers	I	II	II	Hammer mills	III	III	III
Clay working machinery				Hoists			
Brick press	II	III	III	Heavy duty	III	III	III
Briquette machine	II	III	III	Medium duty	II	II	II
Pug mill	I	II	II	Skip hoist	II	II	II
Compactors	III	III	III	Laundry			
Compressors				Tumblers	II	II	II
Centrifugal	I	I	II	Washers	II	II	III
Lobe	I	II	II	Lumber industry			
Reciprocating, multi-cylinder	II	II	III	Barkers - spindle feed	II	II	II
Reciprocating, single - cylinder	III	III	III	Main drive	III	III	III
Cranes 1)				Conveyors - burner	II	II	II
Dry dock				Main or heavy duty	II	II	II
Main hoist	2.50	2.50	2.50	Main log	III	III	III
Auxiliary hoist	2.50	2.50	3.00	Re-saw, merry-go-round	II	II	II
Boom hoist	2.50	2.50	3.00	Slab	III	III	III
Slewing drive	2.50	2.50	3.00	Transfer	II	II	II
Traction drive	3.00	3.00	3.00	Chains			
Container				Floor	II	II	II
Main hoist	3.00	3.00	3.00	Green	II	II	III
Boom hoist	2.00	2.00	2.00	Cut-off saws			
Trolley drive				Chain	II	II	III
Gantry drive	3.00	3.00	3.00	Drag	II	II	III
Traction drive	2.00	2.00	2.00	Debarking drums	III	III	III
Mill duty				Feeds			
Main hoist	3.50	3.50	3.50	Edger	II	II	II
Auxiliary	3.50	3.50	3.50	Gang	III	III	III
Bridge travel	2.50	3.00	3.00	Trimmer	II	II	II
Trolley travel	2.50	3.00	3.00	Log deck	III	III	III
Industrial duty				Log hauls - incline - well type	III	III	III
Main	2.50	2.50	3.00	Log turning devices	III	III	III
Auxiliary	2.50	2.50	3.00	Planer feed	II	II	II
Bridge travel	2.50	3.00	3.00	Planer tilting hoists	II	II	II
Trolley travel	2.50	3.00	3.00	Rolls - live-off bearing - roll cases	III	III	III
Crusher				Sorting table	II	II	II
Stone or ore	III	III	III	Tipple hoist	II	II	II
Dredges				Transfers			
Cable reels	II	II	II	Chain	II	II	III
Conveyors	II	II	II	Craneway	II	II	III
Cutter head drives	III	III	III	Tray drives	II	II	II
Pumps	III	III	III	Veneer lathe drives	II	II	II
Screen drives	III	III	III	Metal mills			
Stackers	II	II	II	Draw bench carriage and main drive	II	II	II
Winches	II	II	II	Runout table			
Elevators				Non-reversing			
Bucket	I	II	II	Group drives	II	II	II
Centrifugal discharge	I	I	II	Individual drives	III	III	III
Escalators	I	I	II	Reversing	III	III	III
Freight	I	II	II	Slab pushers	II	II	II
Gravity discharge	I	I	II	Shears	III	III	III
Extruders				Wire drawing	II	II	II
General	II	II	II	Wire winding machine	II	II	II
Plastics				Metal strip processing machinery			
Variable speed drive	III	III	III	Bridles	II	II	II
Fixed speed drive	III	III	III	Coilers & uncoilers	I	I	II
Rubber				Edge trimmers	I	II	II
Continuous screw operation	III	III	III	Flatteners	II	II	II
Intermittent screw operation	III	III	III	Loopers (accumulators)	I	I	I

# A.G.M.A. LOAD CLASSIFICATION NUMBERS

## SPUR, HELICAL & BEVEL GEARMOTORS & SHAFT MOUNT REDUCERS WITH UNIFORM POWER SOURCE

Application	Class Numbers			Application	Class Numbers		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Metal strip processing machinery (continued)				Secondary processing			
Pinch rolls	II	II	II	Blow molders	II	II	II
Scrap choppers	II	II	II	Coating	II	II	II
Shears	III	III	III	Film	II	II	II
Slitters	I	II	II	Pipe	II	II	II
Mills, rotary type				Pre-plasticizers	II	II	II
Ball & rod				Rods	II	II	II
Spur ring gear	III	III	III	Sheet	II	II	II
Helical ring gear	II	II	II	Tubing	II	II	II
Direct connected	III	III	III	Pullers - barge haul	II	II	II
Cement kilns	II	II	II	Pumps			
Dryers & coolers	II	II	II	Centrifugal	I	I	II
Mixers				Proportioning	II	II	II
Concrete	II	II	II	Reciprocating			
Paper mills				Single acting, 3 or more cylinders	II	II	II
Agitator (mixer)	II	II	II	Double acting, 2 or more cylinders	II	II	II
Agitator for pure liquors	II	II	II	Rotary			
Barking drums	III	III	III	Gear type	I	I	II
Barkers - mechanical	III	III	III	Lobe	I	I	II
Beater	II	II	II	Vane	I	I	II
Breaker stack	II	II	II	Rubber industry			
Calender 2)	II	II	II	Intensive internal mixers			
Chipper	III	III	III	Batch mixers	III	III	III
Chip feeder	II	II	II	Continuous mixers	II	II	II
Coating rolls	II	II	II	Mixing mill -			
Conveyors				2 smooth rolls	II	II	II
Chip, bark, chemical	II	II	II	1 or 2 corrugated rolls	III	III	III
Log (including slab)	III	III	III	Batch drop mill - 2 smooth rolls	II	II	II
Couch rolls	II	II	II	Cracker warmer - 2 rolls; 1 corrugated roll	III	III	III
Cutter	III	III	III	Cracker - 2 corrugated rolls	III	III	III
Cylinder molds	II	II	II	Holding, feed & blend mill - 2 rolls	II	II	II
Dryers 2)				Refiner - 2 rolls	II	II	II
Paper machine	II	II	II	Calenders	II	II	II
Conveyor type	II	II	II	Sand muller	II	II	II
Embosser	II	II	II	Sewage disposal equipment			
Extruder	II	II	II	Bar screens	II	II	II
Fourdrinier rolls (includes lump breaker, dandy roll, wire turning, and return rolls)	II	II	II	Chemical feeders	II	II	II
Jordan	II	II	II	Dewatering screens	II	II	II
Kiln drive	II	II	II	Scum breakers	II	II	II
Mt. Hope roll	II	II	II	Slow or rapid mixers	II	II	II
Paper rolls	II	II	II	Sludge collectors	II	II	II
Platter	II	II	II	Thickeners	II	II	II
Presses - felt & suction	II	II	II	Vacuum filters	II	II	II
Pulper	III	III	III	Screens			
Pumps - vacuum	II	II	II	Air washing	I	I	II
Reel (surface type)	II	II	II	Rotary - stone or gravel	II	II	II
Screens				Traveling water intake	I	I	I
Chip	II	II	II	Screw Conveyors			
Rotary	II	II	II	Uniformly Loaded or Fed	I	I	II
Vibrating	III	III	III	Heavy Duty	I	II	II
Size press	II	II	II	Sugar industry			
Super calender 3)	II	II	II	Beet slicer	III	III	III
Thickener (AC motor)	II	II	II	Cane knives	II	II	II
(DC motor)	II	II	II	Crushers	II	II	II
Washer (AC motor)	II	II	II	Mills (low speed end)	III	III	III
(DC motor)	II	II	II	Textile industry			
Wind and unwind stand	I	I	I	Batchers	II	II	II
Winders (surface type)	II	II	II	Calenders	II	II	II
Yankee dryers 2)	II	II	II	Cards	II	II	II
Plastics industry				Dry cans	II	II	II
Primary processing				Dryers	II	II	II
Intensive internal mixers				Dyeing machinery	II	II	II
Batch mixers	III	III	III	Looms	II	II	II
Continuous mixers	II	II	II	Mangles	II	II	II
Batch drop mill - 2 smooth rolls	II	II	II	Nappers	II	II	II
Continuous feed, holding & blend mill	II	II	II	Pads	II	II	II
Calenders	II	II	II	Slashers	II	II	II
				Soapers	II	II	II
				Spinners	II	II	II
				Tenter frames	II	II	II
				Washers	II	II	II
				Winders	II	II	II

- 1) CRANE DRIVES ARE TO BE SELECTED BASED ON GEAR TOOTH BENDING STRENGTH, USING THE NUMERIC SERVICE FACTORS IN THIS TABLE. SERVICE FACTOR IN DURABILITY SHALL BE A MINIMUM OF 1.0.
- 2) ANTI-FRICTION BEARINGS ONLY.
- 3) A CLASS NUMBER OF I MAY BE APPLIED AT BASE SPEED OF A SUPER CALENDER OPERATING OVER-SPEED RANGE OF PART RANGE CONSTANT HORSEPOWER, PART RANGE CONSTANT TORQUE WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS GREATER THAN 1.5 TO 1. A CLASS NUMBER OF II IS APPLICABLE TO SUPER CALENDERS OPERATING OVER THE ENTIRE SPEED RANGE AT CONSTANT TORQUE OR WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS LESS THAN 1.5 TO 1.

## SPUR, HELICAL &amp; BEVEL GEAR DRIVES &amp; REDUCERS WITH UNIFORM POWER SOURCE

Application	Total Operation			Application	Total Operation		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Agitators (mixers)				Fans			
Pure liquids	1.00	1.00	1.25	Centrifugal	1.00	1.00	1.25
Liquids and solids	1.00	1.25	1.50	Cooling towers	2.00	2.00	2.00
Liquids - variable density	1.00	1.25	1.50	Forced draft	1.25	1.25	1.25
Blowers				Induced draft	1.50	1.50	1.50
Centrifugal	1.00	1.00	1.25	Industrial & mine	1.50	1.50	1.50
Lobe	1.00	1.25	1.50	Feeders			
Vane	1.00	1.25	1.50	Apron	1.00	1.25	1.50
Brewing and distilling				Belt	1.00	1.25	1.50
Bottling machinery	1.00	1.00	1.25	Disc	1.00	1.00	1.25
Brew kettles - continuous duty	1.25	1.25	1.25	Reciprocating	1.50	1.75	2.00
Cookers - continuous duty	1.25	1.25	1.25	Screw	1.00	1.25	1.50
Mash tubs - continuous duty	1.25	1.25	1.25	Food industry			
Scale hopper - frequent starts	1.25	1.25	1.50	Cereal cooker	1.00	1.00	1.25
Can filling machines	1.00	1.00	1.25	Dough mixer	1.25	1.25	1.50
Car dumpers	1.50	1.75	2.00	Meat grinders	1.25	1.25	1.50
Car pullers	1.00	1.25	1.50	Slicers	1.25	1.25	1.50
Clarifiers	1.00	1.00	1.25	Generators and exciters	1.00	1.00	1.25
Classifiers	1.00	1.25	1.50	Hammer mills	1.75	1.75	2.00
Clay working machinery				Hoists			
Brick press	1.50	1.75	2.00	Heavy duty	1.75	1.75	2.00
Briquette machine	1.50	1.75	2.00	Medium duty	1.25	1.25	1.50
Pug mill	1.00	1.25	1.50	Skip hoist	1.25	1.25	1.50
Compactors	2.00	2.00	2.00	Laundry			
Compressors				Tumblers	1.25	1.25	1.50
Centrifugal	1.00	1.00	1.25	Washers	1.50	1.50	2.00
Lobe	1.00	1.25	1.50	Lumber industry			
Reciprocating, multi-cylinder	1.50	1.50	1.75	Barkers - spindle feed	1.25	1.25	1.50
Reciprocating, single - cylinder	1.75	1.75	2.00	Main drive	1.75	1.75	1.75
Cranes 1)				Conveyors - burner	1.25	1.25	1.50
Dry dock				Main or heavy duty	1.50	1.50	1.50
Main hoist	2.50	2.50	2.50	Main log	1.75	1.75	2.00
Auxiliary hoist	2.50	2.50	3.00	Re-saw, merry-go-round	1.25	1.25	1.50
Boom hoist	2.50	2.50	3.00	Conveyors			
Slewing drive	2.50	2.50	3.00	Slab	1.75	1.75	2.00
Traction drive	3.00	3.00	3.00	Transfer	1.25	1.25	1.50
Container				Chains			
Main hoist	3.00	3.00	3.00	Floor	1.50	1.50	1.50
Boom hoist	2.00	2.00	2.00	Green	1.50	1.50	1.75
Trolley drive				Cut-off saws			
Gantry drive	3.00	3.00	3.00	Chain	1.50	1.50	1.75
Traction drive	2.00	2.00	2.00	Drag	1.50	1.50	1.75
Mill duty				Debarking drums	1.75	1.75	2.00
Main hoist	3.50	3.50	3.50	Feeds			
Auxiliary	3.50	3.50	3.50	Edger	1.25	1.25	1.50
Bridge	2.50	3.00	3.00	Gang	1.75	1.75	1.75
Trolley travel	2.50	3.00	3.00	Trimmer	1.25	1.25	1.50
Industrial duty				Log deck	1.75	1.75	1.75
Main	2.50	2.50	3.00	Log hauls - incline - well type	1.75	1.75	1.75
Auxiliary	2.50	2.50	3.00	Log turning devices	1.75	1.75	1.75
Bridge	2.50	3.00	3.00	Planer feed	1.25	1.25	1.50
Trolley travel	2.50	3.00	3.00	Planer tilting hoists	1.50	1.50	1.50
Crusher				Rolls - live-off bearing - roll cases	1.75	1.75	1.75
Stone or ore	1.75	1.75	2.00	Sorting table	1.25	1.25	1.50
Dredges				Tipple hoist	1.25	1.25	1.50
Cable reels	1.25	1.25	1.50	Transfers			
Conveyors	1.25	1.25	1.50	Chain	1.50	1.50	1.75
Cutter head drives	2.00	2.00	2.00	Craneway	1.50	1.50	1.75
Pumps	2.00	2.00	2.00	Tray drives	1.25	1.25	1.50
Screen drives	1.75	1.75	2.00	Veneer lathe drives	1.25	1.25	1.50
Stackers	1.25	1.25	1.50	Metal mills			
Winches	1.25	1.25	1.50	Draw bench carriage and main drive	1.25	1.25	1.50
Elevators				Runout table			
Bucket	1.00	1.25	1.50	Non-reversing			
Centrifugal discharge	1.00	1.00	1.25	Group drives	1.50	1.50	1.50
Escalators	1.00	1.00	1.25	Individual drives	2.00	2.00	2.00
Freight	1.00	1.25	1.50	Reversing	2.00	2.00	2.00
Gravity discharge	1.00	1.00	1.25	Slab pushers	1.50	1.50	1.50
Extruders				Shears	2.00	2.00	2.00
General	1.50	1.50	1.50	Wire drawing	1.25	1.25	1.50
Plastics				Wire winding machine	1.25	1.50	1.50
Variable speed drive	1.50	1.50	1.50	Metal strip processing machinery			
Fixed speed drive	1.75	1.75	1.75	Bridles	1.25	1.25	1.50
Rubber				Coilers & uncoilers	1.00	1.00	1.25
Continuous screw operation	1.75	1.75	1.75	Edge trimmers	1.00	1.25	1.50
Intermittent screw operation	1.75	1.75	1.75	Flatteners	1.25	1.25	1.50

# A.G.M.A. SERVICE FACTORS

## SPUR, HELICAL & BEVEL GEAR DRIVES & REDUCERS WITH UNIFORM POWER SOURCE

Application	Total Operation			Application	Total Operation		
	Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day		Up to 3 hrs. per day	3 to 10 hrs. per day	Over 10 hrs. per day
Metal strip processing machinery (continued)							
Loopers (accumulators)	1.00	1.00	1.25	Secondary processing			
Pinch rolls	1.25	1.25	1.50	Blow molders	1.50	1.50	1.50
Scrap choppers	1.25	1.25	1.50	Coating	1.25	1.25	1.25
Shears	2.00	2.00	2.00	Film	1.25	1.25	1.25
Slitters	1.00	1.25	1.50	Pipe	1.25	1.25	1.25
Mills, rotary type				Pre-plasticizers	1.50	1.50	1.50
Ball & rod				Rods	1.25	1.25	1.25
Spur ring gear	2.00	2.00	2.00	Sheet	1.25	1.25	1.25
Helical ring gear	1.50	1.50	1.50	Tubing	1.25	1.25	1.50
Direct connected	2.00	2.00	2.00	Pullers - barge haul	1.25	1.25	1.50
Cement kilns	1.50	1.50	1.50	Pumps			
Dryers & coolers	1.50	1.50	1.50	Centrifugal	1.00	1.00	1.25
Mixers				Proportioning	1.25	1.25	1.50
Concrete	1.25	1.25	1.50	Reciprocating			
Paper mills 2)				Single acting, 3 or more cylinders	1.25	1.25	1.50
Agitator (mixer)	1.50	1.50	1.50	Double acting, 2 or more cylinders	1.25	1.25	1.50
Agitator for pure liquors	1.25	1.25	1.25	Rotary			
Barking drums	2.00	2.00	2.00	Gear type	1.00	1.00	1.25
Barkers - mechanical	2.00	2.00	2.00	Lobe	1.00	1.00	1.25
Beater	1.50	1.50	1.50	Vane	1.00	1.00	1.25
Breaker stack	1.25	1.25	1.25	Rubber industry			
Calender 3)	1.25	1.25	1.25	Intensive internal mixers			
Chipper	2.00	2.00	2.00	Batch mixers	1.75	1.75	1.75
Chip feeder	1.50	1.50	1.50	Continuous mixers	1.50	1.50	1.50
Coating rolls	1.25	1.25	1.25	Mixing mill - 2 smooth rolls (if corrugated rolls are used, then use the same service factors that are used for a cracker warmer)			
Conveyors				Batch drop mill - 2 smooth rolls	1.50	1.50	1.50
Chip, bark, chemical	1.25	1.25	1.25	Cracker warmer - 2 rolls; 1 corrugated roll	1.75	1.75	1.75
Log (including slab)	2.00	2.00	2.00	Cracker - 2 corrugated rolls	2.00	2.00	2.00
Couch rolls	1.25	1.25	1.25	Holding, feed & blend mill - 2 rolls	1.25	1.25	1.25
Cutter	2.00	2.00	2.00	Refiner - 2 rolls	1.50	1.50	1.50
Cylinder molds	1.25	1.25	1.25	Calenders	1.50	1.50	1.50
Dryers 3)				Sand muller	1.25	1.25	1.50
Paper machine	1.25	1.25	1.25	Sewage disposal equipment			
Conveyor type	1.25	1.25	1.25	Bar screens	1.25	1.25	1.25
Embosser	1.25	1.25	1.25	Chemical feeders	1.25	1.25	1.25
Extruder	1.50	1.50	1.50	Dewatering screens	1.50	1.50	1.50
Fourdrinier rolls (includes lump breaker, dandy roll, wire turning, and return rolls)	1.25	1.25	1.25	Scum breakers	1.50	1.50	1.50
Jordan	1.50	1.50	1.50	Slow or rapid mixers	1.50	1.50	1.50
Kiln drive	1.50	1.50	1.50	Sludge collectors	1.25	1.25	1.25
Mt. Hope roll	1.25	1.25	1.25	Thickeners	1.50	1.50	1.50
Paper rolls	1.25	1.25	1.25	Vacuum filters	1.50	1.50	1.50
Platter	1.50	1.50	1.50	Screens			
Presses - felt & suction	1.25	1.25	1.25	Air washing	1.00	1.00	1.25
Pulper	2.00	2.00	2.00	Rotary - stone or gravel	1.25	1.25	1.50
Pumps - vacuum	1.50	1.50	1.50	Traveling water intake	1.00	1.00	1.25
Reel (surface type)	1.25	1.25	1.25	Sugar industry			
Screens				Beet slicer	2.00	2.00	2.00
Chip	1.50	1.50	1.50	Cane knives	1.50	1.50	1.50
Rotary	1.50	1.50	1.50	Crushers	1.50	1.50	1.50
Vibrating	2.00	2.00	2.00	Mills (low speed end)	1.75	1.75	1.75
Size press	1.25	1.25	1.25	Textile industry			
Super calender 4)	1.25	1.25	1.25	Batchers	1.25	1.25	1.50
Thickener (AC motor)	1.50	1.50	1.50	Calenders	1.25	1.25	1.50
(DC motor)	1.25	1.25	1.25	Cards	1.25	1.25	1.50
Washer (AC motor)	1.50	1.50	1.50	Dry cans	1.25	1.25	1.50
(DC motor)	1.25	1.25	1.25	Dryers	1.25	1.25	1.50
Wind and unwind stand	1.00	1.00	1.00	Dyeing machinery	1.25	1.25	1.50
Winders (surface type)	1.25	1.25	1.25	Looms	1.25	1.25	1.50
Yankee dryers 3)	1.25	1.25	1.25	Mangles	1.25	1.25	1.50
Plastics industry				Nappers	1.25	1.25	1.50
Primary processing				Pads	1.25	1.25	1.50
Intensive internal mixers				Slashers	1.25	1.25	1.50
Batch mixers	1.75	1.75	1.75	Soapers	1.25	1.25	1.50
Continuous mixers	1.50	1.50	1.50	Spinners	1.25	1.25	1.50
Batch drop mill - 2 smooth rolls	1.25	1.25	1.25	Tenter frames	1.25	1.25	1.50
Continuous feed, holding & blend mill	1.25	1.25	1.25	Washers	1.25	1.25	1.50
Compounding mill	1.25	1.25	1.25	Winders	1.25	1.25	1.50
Calenders	1.50	1.50	1.50				

- NOTES:
- 1) CRANE DRIVES ARE TO BE SELECTED BASED ON GEAR TOOTH BENDING STRENGTH. CONTACT GEAR MANUFACTURER FOR STRENGTH RATINGS. SERVICE FACTOR IN DURABILITY SHALL BE A MINIMUM OF 1.0.
  - 2) SERVICE FACTORS FOR PAPER MILL APPLICATIONS ARE APPLIED TO THE NAMEPLATE RATING OF THE ELECTRIC DRIVE MOTOR AT THE MOTOR RATED BASED SPEED.
  - 3) ANTI-FRICTION BEARINGS ONLY. USE 1.5 FOR SLEEVE BEARINGS.
  - 4) A SERVICE FACTOR OF 1.00 MAY BE APPLIED AT BASE SPEED OF A SUPER CALENDER OPERATING OVER-SPEED RANGE OF PART RANGE CONSTANT HORSEPOWER, PART RANGE CONSTANT TORQUE WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS GREATER THAN 1.5 TO 1. A SERVICE FACTOR OF 1.25 IS APPLICABLE TO SUPER CALENDERS OPERATING OVER THE ENTIRE SPEED RANGE AT CONSTANT TORQUE OR WHERE THE CONSTANT HORSEPOWER SPEED RANGE IS LESS THAN 1.5 TO 1.