

Driven Equipment Service Factor

Application	Load Service Factors
Agitators	
Liquids & Solids	1.40
Liquids (Variable Density)	1.40
Pure Liquids	1.25
Semi-Liquids (Variable Density)	1.50
Blowers	
Centrifugal	1.25
Lobe	1.50
Vane	1.25
Brewing & Distilling	
Bottling Machinery	1.25
Brew Kettles (Continuous Duty)	1.25
Can Filling Machines	1.40
Cookers (Continuous Duty)	1.25
Mash Tubs (Continuous Duty)	1.25
Scale Hopper (Frequent Starts)	1.50
Can Filling Machines	—
Cane Knives	—
Car Dumpers	—
Car Pullers -Intermittent Duty	—
Clarifiers	1.25
Classifiers	1.50
Clay Working Machinery	
Brick Press	2.00
Briquette Machine	2.00
Clay Working Machinery	1.40
Extruders & Mixers	1.50
Pug Mills	1.40
Coke Plants	
Pusher Rain Drive	2.50
Door Opener	2.00
Pusher & Lorry Car Traction Drive	3.00
Cold Mills-Strip & Temper Mills	2.00
Hot Mills-Strip & Sheet Mills	3.00
Reversing, Blooming or Slabbing Mills	—
Edging Mills	—
Cooling Beds	1.50
Drawbench	2.00
Furnace Pusher	2.00
Hot & Cold Saws	2.00
Ingot Curs	2.00
Reelers	2.00
Straighteners	2.00
Seamless Tube Mills Piercer	3.00
Rod Mills	3.00
Mill Tables	3.00
Manipulators	3.00
Feed Rolls-Blooming Mills	3.00

Application	Load Service Factors
Compressors	
Centrifugal	1.25
Lobe/Rotary	1.40
Reciprocating:	
1 to 3 Cylinders	3.00
4 or More Cylinders	1.75
Conveyors - Uniformly Loaded or Fed	
Apron	1.25
Assembly	1.25
Belt	1.25
Bucket/Pan	1.25
Chain	1.25
Flight	1.25
Live Roll	1.25
Oven	1.25
Screw	1.25
Conveyors - Heavy Duty Not Uniformly Fed	
Apron	1.50
Assembly	1.50
Belt	1.50
Bucket/Pan	1.50
Chain	1.50
Dredge	1.50
Flight	1.50
Inclined Belt	1.50
Live Roll	—
Oven	1.50
Reciprocating	2.00
Screw	1.40
Shaker	2.00
Cranes & Hoists	
Bridge Drive	1.25
Main Hoists	
Medium Duty	1.40
Heavy Duty	2.00
Long or Cross Travel	1.75
Reversing	1.40
Skip Hoists	1.40
Slope	1.75
Trolley Drive	1.25
Crushers	
Ore	2.00
Stone	2.00
Sugar	1.50
Distilling (See Brewing)	
Crushers	
Ore	2.00
Stone	2.00
Sugar	1.50

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Application	Load Service Factors
Dredgers	
Cable Reels	—
Conveyors	1.40
Cutter Head Drives	2.00
Jig Drives	2.00
Maneuvering Winches	—
Pumps	1.40
Screen Drive	2.00
Stackers	1.40
Utility Winches	—
Elevators	
Bucket - Uniform Load	1.25
Bucket - Heavy Load	1.50
Bucket - Continuous	1.40
Centrifugal Discharge	1.50
Escalators	1.40
Freight	1.50
Gravity Discharge	1.25
Passenger Service - Hand Lift	—
Fans	
Centrifugal	1.25
Cooling Towers - Induced Draft	1.40
Induced Draft with Damper	1.50
Induced Draft without Control	2.00
Large (Mine, etc.)	1.40
Large Industrial	1.50
Light (Small Diameter)	1.25
Feeders	
Apron	1.50
Belt	1.50
Disc	1.25
Reciprocating	2.00
Screw	1.50
Food Industry	
Beet Industry	1.50
Bottling	1.40
Can Filling	1.40
Cereal Cooker	1.25
Dough Mixer	1.50
Meat Grinders	1.50
Generators (Not Welding)	
Even Load	1.00
Hoist & Railway Service	1.50
Weldger Load	2.00
Hammer Mills	2.50
Hoists	
Heavy Duty	2.00
Medium Duty	1.50
Skip Type	1.50
Kiln	2.00

Application	Load Service Factors
Laundry Tumblers	1.50
Laundry Washers	
Reversing	1.40
Line Shafts	
Heavy Shock Load	2.00
Moderate Shock Load	1.40
Uniform Load	1.40
Lumber Industry	
Conveyors - Burner	2.00
Conveyors - Main or Heavy Duty	2.00
Conveyors - Main Log	2.00
Conveyors - Merry-Go-Round	2.00
Conveyors - Slab	2.00
Conveyors - Transfer	2.00
Conveyors - Waste	1.40
Chains - Floor	2.00
Chains - Green	2.00
Cut-Off Saws - Chain	2.00
Cut-Off Saws - Drag	2.00
Debarking Drums	2.00
Feeds - Edger	2.00
Feeds - Gang	2.00
Feeds - Trimmer	2.00
Log Deck	2.00
Log Hauls - Incline Well Type	2.00
Log Turning Devices	2.00
Planer Feed	2.00
Planer Tilting Hoists	2.00
Rolls - Live - Off Brg. - Roll Cases	2.00
Sorting Table	2.00
Tipple Hoist	2.00
Transfer - Chain	2.00
Transfer - Craneway	2.00
Tray Drives	2.00
Machine Tools	
Bending Roll	1.40
Plate Planer	2.00
Punch Press - Gear Driven	2.00
Tapping Machines	2.00
Other Machine Tools:	
Auxillary Drives	1.25
Main Drives - Uniform Load	1.50
Main Drives - Heavy Duty	2.00
Metal Mills	
Bending	1.50
Bridle Roll Drives	2.00
Draw Bench - Carriage	1.50
Draw Bench - Main Drive	1.50
Forming Machines	2.00
Hammers	2.00

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Application	Load Service Factors
Metal Mills (cont.)	
Presses	2.00
Punching	2.00
Shears	1.50
Slitters	1.40
Straighteners	2.00
Table Conveyors:	
Non-Reversing	2.00
Reversing	2.00
Winding Reels - Strip	2.00
Wire Drawing & Flattening Machine	2.00
Wire Winding Machine	1.40
Mills - Rotary Type	
Ball	2.00
Dryers & Coolers	1.40
Kilns	1.40
Pebble	2.00
Rod/Tube	2.00
Tumbling Barrels	2.00
Mixers	
Concrete Mixers (Continuous)	1.50
Concrete Mixers (Intermittent)	1.50
Constant Density	1.25
Drum	1.50
Variable Density	1.40
Grizzly	2.00
Oil Industry	
Chillers	1.50
Oil Well Pumping	—
Paraffin Filter Press	1.50
Rotary Kilns	1.50
Paper Mills	
Aerators	—
Agitators (Mixers)	1.50
Agitators (Pure Liquid)	1.25
Barker Auxiliaries (Hydraulic)	2.00
Barker (Mechanical)	2.00
Beater & Pulper	1.50
Bleacher	1.25
Calenders	1.40
Calenders - Super	2.00
Chemical	1.25
Chipper	2.00
Chip Feeder	1.50
Converting Machines (except Cutters, Platers)	1.40
Conveyors (Chips/Barks)	1.40
Conveyors (Log)	2.00
Couch/Coating Rolls	1.25
Cutters (Platers)	2.00
Cylinders	1.50

Application	Load Service Factors
Paper Mills (cont.)	
Dryers	1.25
Felt Stretcher	1.50
Felt Whipper	2.00
Jordans	1.40
Presses	1.40
Pulp Machines (Reel)	1.40
Screens (Chip & Rotary)	1.50
Stock Chests	1.40
Suction Roll	1.40
Thickeners (AC)	1.40
Washer (AC)	1.40
Winders (Surface Type)	1.40
Plastic	
Calenders	1.50
Crushers	1.50
Extruders Single Screw (Variable Speed)	1.50
Extruders Single Screw (Fixed Speed)	1.75
Extruders Twin Screw (Variable Speed)	1.15
Printing Presses	1.40
Pullers	
Barge Haul	2.00
Pulverisers	
Roller/Hammer Mill (Light Duty)	1.50
Hog/Hammer Mill (Heavy Duty)	1.75
Pumps	
Centrifugal	1.40
Descaling with Accumulators	1.25
Proportioning	1.40
Rotary Gear	
Lobe	1.25
Vane	1.25
Reciprocating:	
1 Cylinder (Single or Double Acting)	3.00
2 Cylinders (Single Acting)	2.00
2 Cylinders (Double Acting)	1.75
3 Cylinders or More	1.50
Rubber Industry	
Batch Mixers	1.75
Continuous Mixers	1.50
Extruders (Continuous)	1.50
Extruders (Intermittent)	1.75
Plasticator	2.50
Rubber Calender	1.40
Rubber Mill (2 or More)	1.40
Sheeter	1.40
Tire Building Machines	—
Tire & Tube Press Openers	—
Tubers & Strainers	1.40

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Application	Load Service Factors
Sewage Disposal Equipment	
Aerators	1.50
Bar Screens	1.50
Chemical Feeders	1.25
Collectors (Circuline/Straightline)	1.25
Dewatering Screws	1.50
Grit Collectors	1.40
Scum Breakers	1.50
Slow or Rapid Mixers	1.50
Sludge Collectors	1.40
Thickeners	1.50
Vacuum Filters	1.50
Screens	
Air Washing	1.25
Rotary (Stone or Gravel)	1.50
Traveling Water Intake	1.25
Skip Hoists	—
Slab Pushers	
Steering Gear	1.50
Stokers	1.50
Slitters	—
Steel Industry	1.50
Soaking Pit/Cover Drive:	
Lift	1.00
Coilers (Up or Down) Cold Mills Only	1.50
Coilers (Up or Down) Hot Mills Only	2.00
Travel	2.00
Stokers	1.25
Sugar Industry	
Cane Carrier & Leveller	1.75
Cane Knife & Crusher	2.00
Mill Stands Turbine Driven-Helical/Herringbone Gears	1.50
Electric Drive or Steam Driven with all Helical/Herringbone or Spur gears with any prime mover	1.75

Application	Load Service Factors
Textile Industry	
Batcher	1.50
Dyeing Machinery	1.50
Calender	1.50
Cards	1.50
Card Machine	2.00
Dry Can	1.50
Dryers	1.50
Loom	1.50
Mangles	1.50
Nappers	1.50
Pads	1.50
Range Drives	—
Slashers	1.40
Soapers	1.50
Spinners	1.50
Tenner Frames	1.50
Washers	1.50
Winders	1.50
Tobacco & Cigarette Machinery	1.50
Tumbling Barrels	2.00
Waste Water Treatment	
Chain & Flight Systems	1.50
Aerators	1.50
Screw Pumps	1.50
Screens	1.50
Windlass	1.50
Wood Working Machinery	
Trimmers	2.00
Haulage	2.00
Barkers	2.00
Planes	2.00
Saws	2.00

Example:

Metal Mill Straightener $T = \frac{\text{DC Drive HP} \times 5,252 \times 2 \text{ Service Factor}}{\text{RPM}} = \text{Minimum Torque Setting (lb-in)}$

$$T = \text{NORM} = \frac{\text{Hp} \times 63025}{\text{Rpm}}$$

$$T_{\text{MAX}} = T_{\text{NORM}} (F_p + F_m)$$

$$T_{\text{MAX}} = T_{\text{NORM}} (0 + 2)$$

$$= \frac{\text{Hp} \times 63025 \times 2}{\text{Rpm}}$$