Westinghouse Electric Corporation
Medium Motor and Gearing Division
Buffalo, NY, USA 14240

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Type TDS Single Helical
Single, Double and Triple Reduction

Parallel Shaft Speed Reducers

The TDS design encompasses sixty years of Westinghouse experience in the speed reducer field. It is designed for maximum flexibility, minimum maintenance and long life. The smooth, custom designed housing lends itself to numerous modifications including the mounting of brakes, clutches, backstops, tachometers and motor mounting brackets. It is available in single, double and triple reductions in ratios ranging from 1.84:1 to 292:1 in ratings from 1 through 5000 horsepower. Cast iron and steel housings are both available.

Further Information
Discounts and Multipliers:
Selling Policy 2900, page 2.
Price List 2980-3, pages 1-2.
Dimension Sheet 2980-4, pages 1-10.
Couplings: Price List 2988-3, pages 1-2.

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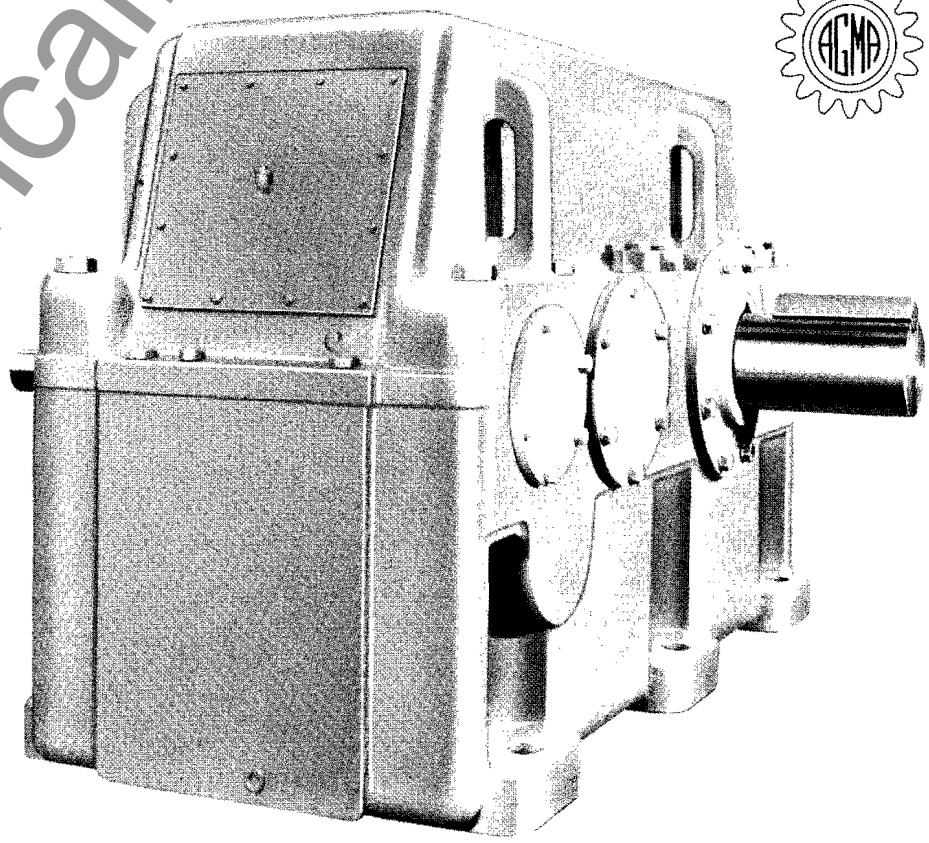

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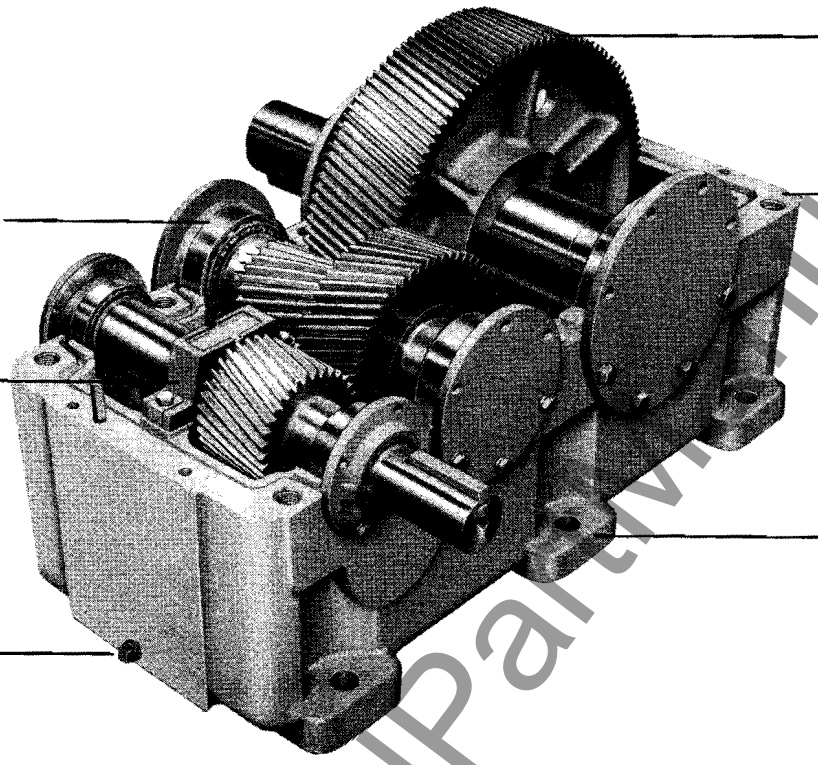
Product Features



Westinghouse type TDS single helical speed reducers are designed in accordance with the applicable practices of the American Gear Manufacturers' Association (AGMA). These recommendations give full consideration to conservative selection of materials and proportions of working parts to suit most types of service. In addition, standard AGMA ratios provide a broad range of output speeds from which selections can be made for the majority of applications.

Literally thousands of Westinghouse reducers are in operation throughout the United States and the world. The countless applications driven by Westinghouse gearing are a tribute to the expert engineering and manufacturing skills attained through many years of experience.

Westinghouse has utilized the shorter centers-wider face approach in the TDS line. Shorter centers mean lower velocity of tooth engagement and smaller dynamic forces.

Another benefit derived from lower "pitch line velocities" is a reduction in losses in the oil reservoir since power loss caused by the churning of oil by the dipping gear is proportional to the square of the velocity.

Although two housings are available, one for type S and one for type D and T, the "family resemblance" is readily apparent. The specially designed type S unit for single reduction (one gear mesh) service occupies only the floor area required to support a substantially designed, one-mesh housing . . . an example of custom design with real user benefits.

Westinghouse TDS speed reducers are built for rugged industrial service. In typical applications, they are used to drive agitators, blowers, conveyors, elevators, rotary mills, and other kinds of machinery throughout industry. TDS parallel shaft reducers are available in a wide variety of ratings.

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Selection and Pricing

Certain information must be obtained to properly select and price a speed reducer. A checklist has been provided on page 6.

After obtaining complete inquiry information, the following steps are necessary to arrive at a selection:

1. Determine the service factor from pages 4 and 5.

2. Multiply actual horsepower or torque times service factor to obtain equivalent horsepower or torque rating.

3. Select reducer from pages 7-18, using input rpm, required ratio and equivalent horsepower, or torque.

4. Check thermal rating.

5. Check overhung load rating on pages 19, 20 and 21, if shafts are not coupled.

Designation System

A simple designation system provides the basic identification of parallel shaft speed reducers. For example:

T18F, T18H or T18L

1. **T** – The first letter signifies the stages of reduction: S-Single, D-Double, or T-Triple.

2. **18** – The numbers signify the unit size: 7, 9, 11, 12, 15, 18, 20, 22, 25, 28, 30, or 31

3. **H** – The letter signifies different torque ratings. Refer to application tables for ratings: F, H or L

How to Select and Price a Parallel Shaft Speed Reducer

A. Horsepower Method

1. Determine the service factor. See pages 4 and 5.

2. Calculate the equivalent horsepower by multiplying the actual horsepower by the service factor.

3. Calculate the gear ratio by dividing the high speed shaft rpm by the low speed shaft rpm.

4. Turn to pages 7 through 18 and select the proper input speed and ratio in the left hand columns. Read across the page until the listed horsepower is equal to or greater than the equivalent horsepower (from 2 above). Read to the top of the column to select the unit drive. Check the reducer thermal rating. If the thermal horsepower rating is less than the actual horsepower required (not including service factor) additional cooling will be required to increase the thermal rating. (For additional thermal capacity, see Price List 2980-3, page 1 or consult Westinghouse.)

5. From Price List 2988-3 select the proper high and low speed couplings, if required. Check the overhung load capacity of the reducer from pages 19 through 21 if the application does not call for coupled service.

6. From Price List 2980-3, pages 1 and 2, determine the list price of the reducer and any necessary modifications.

B. Torque Method

1. Determine the service factor. See pages 4 and 5.

2. Calculate the equivalent output torque by multiplying the actual torque by the service factor.

3. Calculate the gear ratio by dividing the high speed shaft rpm by the low speed shaft rpm.

4. Turn to pages 7 through 18 and select the proper input speed and ratio in the left hand columns. Read across the page until the listed torque is equal to or greater than the equivalent torque (from 2 above). Read to the top of the column to select the unit size.

Convert torque to horsepower using the following formula and check thermal ratings.

$$\text{Actual HP} = \frac{\text{Actual torque (without service factor) x output speed}}{63{,}000}$$

If the thermal horsepower rating is less than the actual horsepower required (not including service factor), additional cooling will be required to increase the thermal capacity. (For additional thermal capacity, see Price List 2980-3, page 1 or consult Westinghouse.)

5. The rest of the torque selection procedure is identical to the horsepower selection method.

Selection and Pricing Examples

1. Horsepower Method

A heavy loaded bucket elevator operates 24 hours per day. The prime mover is an electric motor, 75 hp, 1750 rpm. Desired output speed is 100 rpm. Select a speed reducer.

a. From pages 4 and 5, the service factor for a bucket elevator operating 24 hours per day is 1.50.

b. Equivalent hp = 75 x 1.50 = 113 hp.

c. Required ratio is 1750/100 = 17.5 ratio. The nearest AGMA ratio is 17.09.

d. From page 8 at an input speed of 1750 and a ratio of 17.09:1 we find that the horsepower for a size D9L is adequate for the application.

e. Verify that thermal hp capacity equals or exceeds actual horsepower and thus no thermal problem exists.

f. Refer to Price List 2980-3, page 1. The list price of a size D9L reducer at 17.09:1 ratio is $6442.

g. Refer to Selling Policy 2900, page 2, for the appropriate multipliers.

2. Horsepower Method

A paper mill barking drum will operate 8 hours per day. It will be driven by an 8 cylinder gasoline engine, rated 75 hp, 1170 rpm. Desired output speed is 100 rpm. A common bedpate is required. Select the unit.

a. Determine a service factor of 2.00 from pages 4 and 5 for multi-cylinder engine drives.

b. Equivalent hp = 75 x 2.00 = 150 hp.

c. Required ratio is: 1170/100 = 11.7 ratio. The nearest AGMA ratio is 11.39.

d. From page 12, at an input speed of 1170 and a ratio of 11.39, we find that the horsepower for a size D11H is adequate for the application.

e. Confirm that thermal hp capacity equals or exceeds 75 actual HP and no thermal limitation exists.

f. Refer to Price List 2980-3, page 1. The list price of a size D11H reducer at 11.39:1 ratio is $7420. The list price of the bedplate is $1420.

g. Refer to Selling Policy 2900, page 2, for the appropriate multipliers.

3. Torque Method

A car puller requires 110,000 in.-lbs. torque when operating at 80 rpm. The car puller operates approximately 8 hours per day, and is driven by an electric motor, 150 hp, 1750 rpm.

a. The service factor for car puller operating 8 hours per day is 1.25 from pages 4 and 5.

b. Equivalent torque is 110,000 x 1.25 =138,000 in.-lbs.

c. Ratio is 1750/80 = 21.9 ratio. The nearest AGMA ratio is 20.93.

d. From page 8, at an input speed of 1750 and a ratio of 20.93, the torque for a size D12H is adequate for the application.

e. Confirm that thermal hp capacity equals or exceeds the actual horsepower. From the torque conversion formula on this page, 110,000 in.-lbs. torque is equal to 147 actual hp. From the thermal rating table, a D12H at a 20.93 ratio has a thermal capacity of 154 hp which is greater than required by the application. Therefore, the size D12H reducer selected does not require auxiliary cooling.

f. Refer to Price List 2980-3, page 1. The list price of a size D12H reducer is $10,866.

g. Refer to Selling Policy 2900, page 2, for the appropriate multipliers.

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Service Factors

To provide long life and reliability for any given application, a suitable service factor must be applied to the gear drive rating.

The required equivalent horsepower or equivalent torque necessary to select a reducer from the rating tables is found by multiplying the load horsepower or torque by the service factor.

The gear drive selected will require a rating equal to or in excess of the equivalent horsepower or equivalent torque.

Table 1 shows the recommended minimum service factors for various load characteristics and duration of service with common types of prime movers.

Table 2 lists "Application Classification" for many common speed reducer applications, according to the nature of the load and the usual duty cycle. The three types of load classifications shown: uniform, moderate shock and heavy shock, are used in conjunction with Table I to arrive at a numerical value. It is not possible to list all possible applications requiring gear drives, but a sufficient variety of types is covered to serve as a guide for other applications.

It should be noted that the values given in the tables are based on field experience of average operating conditions for each class of equipment and may not be correct in all cases, due to unique operating conditions or design of the driving or driven equipment.

Proper service factors can be determined if full operating conditions are known, and it is necessary to have this data before a final gear drive selection is made. Any drive for use under abnormal conditions must be referred to Westinghouse.

Basic conditions to be observed before applying service factors are as follows:

1. Excessive Overloads
The maximum momentary or starting load must not exceed 200 percent of rated load (100% overload). Rated load is defined as the unit rating with a service factor of 1.0. Driven equipment with high inertia loading, sleeve bearings, etc., may require higher service factors than indicated because of the high momentary torque required for breakaway. Expected breakaway and shock load torques must not exceed 200% rated gear torque.

2. Oversize Prime Mover The practice of using oversize motors for motor standardization or starting conditions must be given special attention due to the potential high starting torque available.

Selecting reducers on the basis of calculated or brake horsepower is satisfactory provided the available motor does not have a starting torque which exceeds the capacity of the reducer. For cases where the motor rating exceeds the calculated HP by a considerable amount, it is advisable to have at least a service factor of 1.0 of the motor rating for standard Nema 'B' motors.

3. Braking Conditions When the rating of a shaft mounted or motor mounted brake exceeds the motor rating, the rating of the brake must be used in selection of the reducer.

4. Drive-Train Vibrations Gear reducers are sold with the understanding that the entire system of rotating parts is free from serious critical speeds or torsional vibrations. Calculation required to check entire system is the responsibility of the systems builder, however details of reducer rotating parts sufficient for such calculations, are available on request at time of order.

5. Pulsating Loading The responsibility for satisfactory operating of reducers driving or driven by pulsating or reciprocating apparatus such as compressors, pumps, internal combustion engines is assumed by Westinghouse provided that:

a. The gears are not operated with torque reversals at the gear mesh, except when starting or stopping.

b. When loaded, the torque variation at the gear mesh does not exceed ±25% of average transmitted torque.

c. When unloaded, the torque variation at the gear mesh does not exceed ±15% of rated torque with no negative torque.

Thermal Ratings
The thermal horsepower rating represents the actual horsepower that a gear drive will transmit continually for more than three (3) hours without overheating. Maximum sump temperature is not to exceed 200°F.

It is not necessary to check thermal horsepower ratings when the continuous operating period is three (3) hours or less, and the shutdown time equals or exceeds the running time. If however, the running time exceeds the shutdown time selection must be made on the basis of an adequate thermal rating.

It is important that the thermal horsepower be checked prior to application, for if the unit develops heat at a faster rate than can be dissipated, premature failure may occur.

Thermal ratings are shown in the rating table for all instances where the thermal rating is less than the mechanical rating at service factor 1.0 condition.

Note: Service factors do not apply to thermal rating. Only the actual transmitted horsepower is subject to thermal horsepower consideration.

In cases where transmitted horsepower exceeds the thermal rating horsepower, artificial cooling by means of shaft mounted fans or an oil to water heat exchanger will be necessary at added cost. It should be noted that fan cooling may not be effective in high ambient conditions and all such applications must be referred to the factory.

The area in which the reducer is located should allow adequate air circulation. Also, the housing should be free from dust or other material which can become an insulator. Gear drives operating outdoors should be provided with a sun shie lding roof structure to eliminate the effects of solar heating. If these precautions are not taken, overheating with premature failure may occur.

Environmental Conditions
Standard speed reducers are basically designed for horizontal floor mounted operation in a heated building where reasonably clean and dry conditions exist. For conditions other than this, special features may be required. Full data should be provided to insure that the gear drive will be adequate.

Some of the more commonly used special features, such as seals for abrasive dust atmosphere, high humidity and special paint are covered in this catalog.
Other conditions such as corrosive or explosive atmospheres, mounting position other than horizontal, high altitude location, etc., must be given careful consideration.

Particular attention is required for operation at high or low temperatures.

Low Temperature Operation
Starting and operating gear drives at temperatures below 40°F could result in damage to the gears and bearings if the pour point of the lubricant is higher than the ambient temperature. This is of particular concern when controlled splash lubrication or circulating lube oil systems with pump and piping are employed. In such cases, it may be necessary to provide immersion heaters in the oil sump also, so as to provide a method of heating the external oil pump and piping at start-up.

High Temperature Operation
Operation at sustained ambient temperatures in excess of 100°F will greatly affect thermal modifications required to provide a reasonable operating temperature. High oil sump temperatures will drastically reduce the life of most lubricants and require frequent oil changes.

Table 1: Recommended Service Factors

Prime Mover	Duration of Service	Driven Machine Load Classification		
		Uniform	Moderate Shock	Heavy Shock
Electric Motor, Steam Turbine, Hydraulic Motor	Occasional ½ hr./day	.50	.80	1.25
	Intermittent 3 hrs./day	.80	1.00	1.50
	Over 3 through 10 hrs./day	1.00	1.25	1.75
	Over 10 hrs./day	1.25	1.50	2.00
Multi-Cylinder Internal Combustion Engine	Occasional ½ hr./day	.80	1.00	1.50
	Intermittent 3 hrs./day	1.00	1.25	1.75
	Over 3 through 10 hrs./day	1.25	1.50	2.00
	Over 10 hrs./day	1.50	1.75	2.25
Single Cylinder Internal Combustion Engine	Occasional ½ hr./day	1.00	1.25	1.75
	Intermittent 3 hrs./day	1.25	1.50	2.00
	Over 3 through 10 hrs./day	1.50	1.75	2.25
	Over 10 hrs./day	1.75	2.00	2.50

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Table 2: Application Classification Loads: U = Uniform, M = Moderate Shock, H = Heavy Shock

Application	Load
Agitators	
Pure liquids	U
Liquids and solids	M
Liquids, variable density	M
Blowers	
Centrifugal	U
Lobe	M
Vane	U
Brewing and Distilling	
Bottling machinery	U
Brew kettles, cont. duty	U
Cookers, continuous duty	U
Mash tubs, cont. duty	U
Scale hopper, frequent starts	M
Can Filling Machines	U
Cane Knives①	M
Car Dumpers	H
Car Pullers	M
Clarifiers	U
Classifiers	M
Clay Working Machinery	
Brick press	H
Briquette machine	H
Clay working machinery	M
Pug mill	M
Compressors	
Centrifugal	U
Lobe	M
Reciprocating	
Multi-cylinder	M
Single cylinder	H
Conveyors, Uniformly Loaded or Fed	
Apron	U
Assembly	U
Belt	U
Bucket	U
Chain	U
Flight	U
Oven	U
Screw	U
Conveyers, Heavy Duty-Not Uniformly Fed	
Apron	M
Assembly	M
Belt	M
Bucket	M
Chain	M
Flight	M
Live roll②	
Oven	M
Reciprocating	H
Screw	M
Shaker	H
Cranes and Hoists	
Dry dock cranes, see Table 3.	
Main hoists	U
Bridge travel②	
Trolley travel②	
Crushers	
Ore	H
Stone	H
Sugar①	M
Dredges	
Cable reels	M
Conveyors	M
Cutter head drives	H
Jig drives	H
Maneuvering winches	M
Pumps	M
Screen drive	H
Stackers	M
Utility winches	M
Elevators	
Bucket, uniform load	U
Bucket, heavy load	M
Bucket, continuous	U
Centrifugal discharge	U
Escalators	U
Freight	M
Gravity discharge	U
Man lifts②	
Passenger②	
Extruders (Plastic)①	
Film	U
Sheet	U
Coating	U
Rods	U
Pipe	U
Tubing	U
Blow molders	M
Pre-plasticizers	M
Fans	
Centrifugal	U
Cooling towers	
Induced draft②	
Forced draft①	U
Induced draft	M
Large (mine, etc)	M
Large industrial	M
Light (small diameter)	U
Feeders	
Apron	M
Belt	M
Disk	U
Reciprocating	H
Screw	M
Food Industry	
Beet slicer	M
Cereal cooker	U
Dough mixer	M
Meat grinders	M
Generators (not Welding)	U
Hammer Mills	H
Hoists	
Heavy duty	H
Medium duty	M
Skip hoists	M
Laundry Tumblers	M
Laundry Washers	
Reversing	M
Line Shafts	
Driving processing equipment	M
Light	U
Other line shafts	U
Lumber Industry	
Barkers-hydraulic-mech'l	H
Burner conveyor	M
Chain saw and drag saw	H
Chain transfer	H
Craneway transfer	H
De-barking drum	H
Edger feed	M
Gang feed	M
Green chain	M
Live rolls	H
Log deck	H
Log haul – incline	H
Log haul – well type	H
Log turning device	H
Main log conveyor	H
Off bearing rolls	M
Planer feed chains	M
Planer floor chains	M
Planer tilting hoist	M
Re-saw merry-go-round conveyor	M
Roll cases	H
Slab conveyor	H
Small waste conveyor-Belt	U
Small waste conveyor-Chain	M
Sorting table	M
Tipple hoist conveyor	M
Tipple hoist drive	M
Transfer conveyor	M
Transfer rolls	M
Tray drive	M
Trimmer feed	M
Waste conveyor	M
Machine Tools	
Bending roll	M
Notching press, belt driven②	
Plate planer	H
Punch press, gear driven	H
Tapping machines	H
Other machine tools	
Main drives	M
Auxiliary drives	U
Metal Mills	
Draw bench, carriage	M
Draw bench, main drive	M
Forming machines	H
Pinch dryer and scrubber rolls, reversing②	
Slitters	M
Table conveyors	
Non-reversing	
Group drives	M
Individual Drives	H
Reversing②	
Wire drawing and flattening machine	M
Wire winding machine	M
Mills, Rotary Type	
Ball and Rod	
Spurring gear①	H
Helical ring gear①	M
Direct connected①	H
Cement kilns①	M
Dryers and coolers①	M
Kilns	M
Pebble①	M
Plain and wedge bar①	M
Tumbling barrels	H
Mixers	
Concrete mixers, continuous	M
Concrete mixers, intermittent	M
Constant density	U
Variable density	M
Oil Industry	
Chillers	M
Oil well pumping②	
Paraffin filter press	M
Rotary kilns	M
Paper Mills①③	
Agitator (mixer)	M
Agitator (pure liquors)	U
Barkers, mechanical	H
Barking drum	H
Beaters	M
Breaker stack	U
Calender	U
Chip feeder	M
Chipper	H
Coating rolls	U
Conveyors:	
Chip, bark, chem.	U
Log (incl. slab)	H
Couch roll	U
Cutter	H
Cylinder mold	U
Dryers, paper machine and conveyor type	U
Embosser	U
Extruder	M
Fourdrinier rolls	U
Jordan	M
Kiln drive	M
Mt. Hope rolls	U
Paper rolls	U
Platter	M
Presses, felt & suction	U
Pulper	H
Pumps, vacuum	M
Reel, surface type	U
Screens, chip and rotary	M
Screens, vibrating	H
Size press	U
Super calender	U
Thickener, ac drive	M
Thickener, dc drive	U
Washer, ac drive	M
Washer, dc drive	U
Wind and unwind stands, core type	U
Winders, surface type	U
Yankee dryer	U
Plastics Industry	
Intensive Internal Mixers	
(a) Batch Mixers	SF=1.75
(b) Continuous mixers	SF=1.50
Batch Drop Mill-2 smooth rolls	SF=1.25
Continuous feed, holding & blend mill	SF=1.25
Compounding mills	SF=1.25
Calenders	SF=1.50
Extruders	SF=1.50
(a) Variable speed drive	SF=1.50
(b) Fixed speed drive	SF=1.75
Printing Presses②	
Pullers	
Barge haul	H
Pumps	
Centrifugal	U
Proportioning	M
Reciprocating	
Single acting, 3 or more cylinders	M
Double acting, 2 or more cylinders	M
Single acting, 1 or 2 cylinders②	
Double acting, single cylinder②	
Rotary – gear type	U
Rotary – lobe, vane	U
Rubber Industry	
Intensive Internal Mixers	
(a) Batch Mixers	SF=1.75
(b) Continuous mixers	SF=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)	SF=1.50
Batch drop mill-2 smooth rolls	SF=1.50
Cracker warmer-2 roll; 1 corrugated roll	SF=1.75
Cracker 2 corrugated roll	SF=2.00
Holding, feed and blend mill-2 roll	SF=1.25
Refiner-2 roll	SF=1.50
Calenders	SF=1.50
Extruders	
(a) Continuous Screw Operation	SF=1.50
(b) Intermittent screw Operation	SF=1.75
Sand Muller	M
Screens	
Air washing	U
Rotary – stone or gravel	M
Traveling water intake	U
Sewage Disposal Equipment	
Bar screens	U
Chemical feeders	U
Collectors, circuline or Straightline	U
Dewatering screws	M
Grit collectors	U
Scum breakers	M
Slow or rapid mixers	M
Sludge collectors	U
Thickeners	M
Vacuum filters	M
Slab Pushers	M
Steering Gear②	
Stokers	U
Sugar Industry	
Cane knives①	M
Crushers①	M
Mills①	H
Textile Industry	
Batchers	M
Calenders	M
Cards	M
Dry cans	M
Dryers	M
Dyeing machinery	M
Knitting machines②	
Looms	M
Mangles	M
Nappers	M
Pads	M
Range drives②	
Slashers	M
Soapers	M
Spinners	M
Tenter frames	M
Washers	M
Winders	M
Windlass②	

① To be selected on basis of 24 hr. service only.
② Refer to Westinghouse.
③ Apply service factors to motor rated hp. at base speed.

Table 3: Application for Dry Dock Cranes

(Hammerhead, Rotating and Whirler, Stationary or Moving)
Due to the nature of these crane drives, the following service factors are to be used for any duration of service.

Application	Load Classification
Main Hoist	1.00
Auxiliary Hoist	1.00
Boom (Luffing)	1.00
Rotating (Swing or Slow)	1.25
Tracking (Drive Wheels)	1.50

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Selection and Ordering Information
(Basic Data Required to Select and Price Speed Reducers)

It is imperative that the following information be obtained before attempting to select and price the proper speed reducer. There will be occasions when complete information cannot be obtained at the time of inquiry. In such cases, it shall be understood that selection and pricing may have to be changed at time of order if the final data changes or adds to the initial inquiry information.

1. Application Description of Driven Equipment_____

Type of Load: ☐ Smooth, ☐ Moderate Shock, ☐ Heavy Shock. Duty Cycle_____Hr/Min Operation Every_____Day/Hr/Min.

Required Hp and Rpm at Driven Equipment: Peak_____Hp/_____Rpm.

Cycle of Occurrence_____. Normal_____Hp/_____Rpm.

Environmental Conditions – Location: ☐ Indoor, ☐ Outdoor. Ambient Temperature_____°F.

Atmosphere: ☐ Clean, ☐ Dusty, ☐ Abrasive Dust, ☐ Normal Humidity, ☐ High Humidity.

2. Prime Mover Driving Equipment: ☐ Motor, ☐Turbine, ☐ Internal Combustion Engine,_____

☐ Other____Description_____

Hp.____, Rpm.____ If Variable Speed: Base Speed____Rpm,____Maximum Rpm,____Hp/____Minimum Rpm,____Hp.

3. Method of Connecting Prime Mover to Reducer ☐ Flexible Coupling, Type and Size_____

☐ V-Belt, ☐ Sprocket____P.D. of Driven Sheave or Sprocket_____

Number of Grooves or Strands____. Belt or Chain Section_____

Rpm of Driven Sheave or Sprocket_____Rpm. Other: Description_____

4. Reducer Type_____, Size_____. Minimum Service Factor Required_____. Assembly Position_____.

Input_____Rpm/Output_____Rpm (From 1 and 2 or 3 Above). Ratio Req'd._____. Closest Std. Ratio_____.

Mechanical Hp Rating_____. Thermal Hp Rating_____. Cooling Required: ☐ Fan, ☐ Heat Exchanger.

If Inclined Mounting Required, Give Angle and Whether Low Speed Shaft Pointing Up or Down_____

5. Method of Connecting Reducer to Driven Equipment ☐ Flexible Coupling, Type and Size_____

☐ Pinion: Pitch Dia._____, Face Width_____. ☐Sprocket: Type_____

P.D. of Driving Sprocket_____. Number of Strands_____. Type of Sprocket: ☐ Type B, ☐ Type C,

☐ Other____Description_____

6. Accessories and Modifications

☐ Thermal Assist
☐ Moisture Resistant Seals, (Required If Cleaning by Hosing Necessary)
☐ Abrasive Dust Seals
☐ Taconite Seals
☐ Bedplate
☐ Tachometer Mounting Make_____, Size_____
☐ Brake Mounting, Make_____, Size_____
☐ Backstop①
☐ Special Paint
Mounting Equipment on:
☐ L.S. Shaft②, ☐ H.S. Shaft②
☐ Mounting Motor on Bedplate②

Special Shaft Requirement_____

Other Special Feature or Modification_____

① If backstop required, rotation facing end of low speed shaft must be included in ordering information.

② Westinghouse catalog apparatus purchased with the reducer will be mounted free of charge.

For apparatus furnished by the customer, or purchased by Westinghouse to meet customer specifications, add mounting plus outgoing transportation charges.

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1750 Rpm Input – (1.84-7.59 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S7H	D7H	S9H	D9H	S11F	S11H	S12F	S12H	S15F	S15H	S18F	S18H
			Capacities: Torque in 1000 Inch-Lbs.											
950	**1.84**	**Mechanical Hp**	321	...	635	...	888	1055	...	1318	1701	2020	....	....
		Thermal Hp	121	...	160	...	161	161	...	192	231	231	....	....
		Torque	21	...	42	...	59	70	...	87	113	134	....	....
780	**2.25**	**Mechanical Hp**	279	...	565	...	770	915	...	1137	1477	1755	2408	2860
		Thermal Hp	127	...	163	...	169	169	...	198	241	241	266	266
		Torque	23	...	46	...	62	74	...	92	119	142	194	231
640	**2.76**	**Mechanical Hp**	248	...	495	...	666	792	...	980	1300	1544	2080	2470
		Thermal Hp	129	...	167	...	170	170	...	204	250	250	276	276
		Torque	24	...	49	...	65	78	...	97	128	152	204	243
520	**3.38**	**Mechanical Hp**	207	...	430	...	519	617	707	840	1098	1304	1776	2110
		Thermal Hp	136	...	176	...	185	185	220	220	270	270	303	303
		Torque	25	...	52	...	63	76	86	102	133	158	215	256
420	**4.13**	**Mechanical Hp**	159	...	343	...	410	487	607	722	917	1089	1515	1800
		Thermal Hp	147	...	191	...	197	197	236	236	290	290	331	331
		Torque	24	...	50	...	60	72	90	108	138	164	227	270
350	**5.06**	**Mechanical Hp**	120	...	254	...	307	365	492	585	713	847	1078	1281
		Thermal Hp	...	...	201	...	210	210	252	252	309	309	355	355
		Torque	22	...	46	...	56	67	90	107	128	153	197	234
280	**6.20**	**Mechanical Hp**	89	...	195	...	236	281	365	434	525	624	807	959
		Thermal Hp	...	...	...	...	222	222	268	268	328	328	378	378
		Torque	20	...	42	...	52	62	81	97	117	140	182	217
230	**7.59**	**Mechanical Hp**	...	84	...	172	...	208	266	317	387	460	590	701
		Thermal Hp	...	47	...	70	...	....	...	275	340	340	398	398
		Torque	...	23	...	47	...	56	73	87	106	127	164	195

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S20H	S22H	S25K	S25H
			Capacities: Torque in 1000 Inch-Lbs.			
640	**2.76**	**Mechanical Hp**	2940	3560	....	....
		Thermal Hp	274	293	....	....
		Torque	290	351	....	....
520	**3.38**	**Mechanical Hp**	2540	3050	3545	4210
		Thermal Hp	304	310	320	320
		Torque	308	370	429	510
420	**4.13**	**Mechanical Hp**	2180	2600	3040	3610
		Thermal Hp	335	346	359	359
		Torque	327	390	454	540
350	**5.06**	**Mechanical Hp**	1585	2035	2375	2821
		Thermal Hp	363	377	395	395
		Torque	299	366	426	507
280	**6.20**	**Mechanical Hp**	1257	1468	1716	2038
		Thermal Hp	391	409	427	427
		Torque	281	333	389	462
230	**7.59**	**Mechanical Hp**	956	1092	1278	1518
		Thermal Hp	419	430	460	460
		Torque	257	304	355	422

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3 page 1.

Units larger than indicated, refer to Westinghouse for quotation.

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1750 Rpm Input – (9.30-47.08 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D7H	T7H	D7L	D9H	T9H	D9L	D11H	D11L	T11H	T11L	D12H	D12L	T12H	T12L
			Capacities: Torque in 1000 Inch-Lbs.													
190	9.30	Mechanical HP	85	..	..	172	..	...	282	349	...	...	426	527	...	...
		Thermal HP	49	..	..	73	..	...	104	104	...	...	135	135	...	...
		Torque	28	..	..	58	..	...	95	118	...	...	144	178	...	...
155	11.39	Mechanical HP	78	..	96	162	..	177	238	295	...	...	358	443	...	...
		Thermal HP	51	..	51	75	..	75	108	108	...	...	140	140	...	...
		Torque	31	..	37	65	..	71	97	121	...	...	148	183	...	...
125	13.95	Mechanical HP	61	..	75	133	..	158	198	245	...	...	300	371	...	...
		Thermal HP	52	..	52	78	..	78	111	111	...	...	145	145	...	...
		Torque	30	..	37	66	..	75	100	124	...	...	146	180	...	...
100	17.09	Mechanical HP	49	..	60	104	..	125	160	199	...	...	241	298	...	...
		Thermal HP	..	..	54	80	..	80	115	115	...	...	149	149	...	...
		Torque	29	..	35	62	..	76	97	121	...	...	142	175	...	...
84	20.93	Mechanical HP	42	..	51	85	..	104	125	154	...	...	201	248	...	...
		Thermal HP	..	..	...	...	..	85	...	125	...	...	154	154	...	...
		Torque	30	..	37	63	..	77	94	116	...	...	145	179	...	...
68	25.63	Mechanical HP	35	..	43	72	..	88	104	128	...	...	166	205	...	...
		Thermal HP	..	..	..	...	..	...	..	125	...	...	...	166	...	...
		Torque	30	..	37	64	..	78	95	117	...	...	148	183	...	...
56	31.39	Mechanical HP	27	..	33	59	..	72	87	...	106	132	...	...	157	195
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	172
		Torque	30	..	37	66	..	80	97	...	118	147	...	...	176	218
45	38.44	Mechanical HP	21	..	25	45	..	55	68	...	89	111	...	...	131	163
		Thermal HP	..	..	...	...	..	...	...	...	...	...	...	...	...	...
		Torque	28	..	34	60	..	74	94	...	120	149	...	...	179	221
37	47.08	Mechanical HP	..	16	..	...	32	...	54	...	74	92	...	...	113	140
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	...
		Torque	..	27	..	...	55	...	90	...	122	151	...	...	181	225

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D15H	D15L	T15H	T15L	D18H	T18H	T18L	D20F	D20H	D22H	T20H	D22L	T22H	T22L	D25F	D25H	D25L
			Capacities: Torque in 1000 Inch-Lbs.																
190	9.30	Mechanical HP	599	740	...	...	917	...	...	1127	1281	1455	...	...	...	...	1868	2172	...
		Thermal HP	177	177	...	...	236	...	...	274	274	295	...	...	...	...	328	328	...
		Torque	197	244	...	...	314	...	...	382	434	475	...	...	...	...	619	720	...
155	11.39	Mechanical HP	505	624	...	...	768	...	...	929	1056	1221	...	...	...	...	1512	1758	...
		Thermal HP	184	184	...	...	244	...	...	282	282	303	...	...	...	...	338	338	...
		Torque	203	251	...	...	317	...	...	396	450	493	...	...	...	...	617	718	...
125	13.95	Mechanical HP	419	518	...	...	643	...	...	782	889	1007	...	...	...	...	1238	1440	...
		Thermal HP	189	189	...	...	253	...	...	293	293	315	...	...	...	...	351	351	...
		Torque	209	258	...	...	322	...	...	408	464	511	...	...	...	...	611	711	...
100	17.09	Mechanical HP	350	432	...	...	527	...	...	655	744	846	...	...	...	...	1060	1233	...
		Thermal HP	195	195	...	...	260	...	...	302	302	325	...	...	...	...	362	362	...
		Torque	215	265	...	...	333	...	...	405	460	527	...	...	...	...	629	731	...
84	20.93	Mechanical HP	299	369	...	...	447	...	...	510	579	731	...	...	...	...	866	1007	...
		Thermal HP	201	201	...	...	269	...	...	311	311	334	...	...	...	...	372	372	...
		Torque	219	270	...	...	341	...	...	381	433	539	...	...	...	...	651	757	...
68	25.63	Mechanical HP	246	304	...	...	365	...	...	421	478	579	...	621	...	...	728	847	856
		Thermal HP	206	206	...	...	276	...	...	319	319	343	...	343	...	...	382	382	382
		Torque	225	278	...	...	343	...	...	392	446	515	...	552	...	...	658	765	777
56	31.39	Mechanical HP	...	241	...	...	281	342	369	....	395	427	477	...	518	601	....	624	709
		Thermal HP	...	212	...	...	...	280	280	....	326	351	330	...	360	360	....	391	391
		Torque	...	264	...	...	318	387	417	....	457	472	540	...	568	659	....	700	798
45	38.44	Mechanical HP	...	...	171	212	232	282	302	....	....	363	389	...	426	490	....	502	...
		Thermal HP	...	...	...	...	...	...	290	....	....	....	345	...	375	375	....	398	...
		Torque	...	...	244	301	325	397	427	....	....	506	554	...	587	676	....	713	...
37	47.08	Mechanical HP	...	...	144	178	192	238	253	....	....	298	324	...	358	409	....	417	...
		Thermal HP	...	...	...	...	...	...	...	....	....	....	...	...	...	390	....	....	...
		Torque	...	...	250	309	331	410	435	....	....	517	564	...	604	689	....	729	...

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotation.

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1750 Rpm Input – (9.30-47.08 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size										
			T25H	T25L	D28F	D28H	D28L	D30H	T28H	D30L	T30H	T30L	T31H
			Capacities: Torque in 1000 Inch-Lbs.										
190	**9.30**	**Mechanical HP**	...	...	2507	2817	....	....	....	....	....	....	..
		Thermal HP	...	...	410	410	....	....	....	....	....	....	..
		Torque	...	...	870	977	....	....	....	....	....	....	..
155	**11.39**	**Mechanical HP**	...	...	2151	2417	....	2784	....	....	....	....	..
		Thermal HP	...	...	429	429	....	450	....	....	....	....	..
		Torque	...	...	900	1011	....	1143	....	....	....	....	..
125	**13.95**	**Mechanical HP**	...	...	1815	2039	....	2387	....	....	....	....	③
		Thermal HP	...	...	446	446	....	467	....	....	....	....	③
		Torque	...	...	932	1047	....	1181	....	....	....	....	③
100	**17.09**	**Mechanical HP**	...	...	1478	1661	1701	2012	....	....	....	....	③
		Thermal HP	...	...	460	460	460	481	....	....	....	....	③
		Torque	...	...	941	1057	1083	1222	....	....	....	....	③
84	**20.93**	**Mechanical HP**	...	...	1201	1349	1440	1661	....	....	....	....	③
		Thermal HP	...	...	472	472	472	494	....	....	....	....	③
		Torque	...	...	904	1016	1115	1250	....	....	....	....	③
68	**25.63**	**Mechanical HP**	...	...	1015	1140	1186	1281	....	1415	....	....	③
		Thermal HP	....	...	485	485	485	507	....	507	....	....	③
		Torque	...	...	929	1044	1135	1170	....	1296	....	....	③
56	**31.39**	**Mechanical HP**	774	813	....	948	....	959	1046	....	....	....	③
		Thermal HP	400	400	....	496	....	520	500	....	....	....	③
		Torque	875	918	....	1074	....	1080	1244	....	....	....	③
45	**38.44**	**Mechanical HP**	654	680	....	691	....	....	868	....	1030	1075	③
		Thermal HP	410	410	....	505	....	....	515	....	530	530	③
		Torque	903	939	....	975	....	....	1275	....	1440	1538	③
37	**47.08**	**Mechanical HP**	524	560	....	574	....	....	745	....	863	930	..
		Thermal HP	420	420	....	515	....	....	540	....	540	540	..
		Torque	898	961	....	998	....	....	1299	....	1470	1580	..

② For exact gear ratios, refer to page 22.
③ Refer to Westinghouse.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotation.

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1750 Rpm Input – (57.66-291.9 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T7H	T7L	T9H	T9L	T11H	T11L	T12H	T12L	T15H	T15L	T18F	T18H	T18L
			Capacities: Torque in 1000 Inch-Lbs.												
30	57.66	Mechanical HP	16	..	32	..	60	75	91	113	125	155	176	198	208
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	33	..	67	..	124	154	184	228	254	315	375	421	443
25	70.62	Mechanical HP	15	..	32	..	47	59	77	95	103	127	143	161	176
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	37	..	77	..	118	146	187	231	260	321	364	409	449
20	86.50	Mechanical HP	12	14	26	29	37	45	61	76	89	110	118	133	147
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	38	46	79	88	112	138	185	233	263	325	367	412	455
16.5	105.9	Mechanical HP	10	12	22	25	30	37	48	59	71	87	97	109	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	39	48	80	94	114	140	174	215	266	329	372	418	...
13.5	129.7	Mechanical HP	8.9	11	18	21	25	30	41	50	60	74	82	92	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	39	48	81	94	115	142	176	217	269	332	376	422	...
11.0	158.9	Mechanical HP	7.3	9	14	17	20	24	33	40	48	59	68	76	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	40	49	78	96	116	143	178	220	272	336	380	427	...
9.0	194.6	Mechanical HP	6.1	7	11	14	17	21	28	34	41	50	56	63	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	40	49	79	97	117	144	179	221	275	340	384	432	...
7.5	238.4	Mechanical HP	4.9	6	9.5	12	13	16	22	27	33	40	45	51	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	40	49	79	97	118	145	181	222	277	342	388	436	...
6.0	291.9	Mechanical HP	..	..	..	..	10	12	16	20	24	29	33	37	...
		Thermal HP	..	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	..	..	..	..	107	132	161	197	247	305	350	393	...

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T20F	T20H	T20L	T22H	T22L	T25F	T25H	T25L	T28F	T28H	T30H	T30L
			Capacities: Torque in 1000 Inch-Lbs.											
30	57.66	Mechanical HP	249	280	...	300	353	385	438	465	538	605	661	763
		Thermal HP	...	...	...	...	...	...	...	450	....	538	550	550
		Torque	510	573	...	596	700	787	894	980	1183	1329	1400	1630
25	70.62	Mechanical HP	206	232	...	242	290	321	365	395	433	487	552	612
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	560
		Torque	518	582	...	615	704	802	911	996	1147	1289	1450	1535
20	86.50	Mechanical HP	159	179	191	203	...	264	300	...	360	405	476	496
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	494	555	592	630	...	817	928	...	1113	1250	1480	1567
16.5	105.9	Mechanical HP	125	140	162	176	...	218	248	...	291	327	390	417
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	476	535	599	640	...	829	942	...	1139	1280	1540	1591
13.5	129.7	Mechanical HP	102	115	...	146	...	185	210	...	245	275	330	343
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	482	542	...	655	...	840	954	...	1155	1298	1550	1617
11.0	158.9	Mechanical HP	84	94	...	121	...	150	170	...	201	226	273	....
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	489	549	...	670	...	852	968	...	1171	1316	1590	....
9.0	194.6	Mechanical HP	71	80	...	103	...	126	143	...	169	190	232	....
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	493	554	...	680	...	862	979	...	1185	1331	1620	....
7.5	238.4	Mechanical HP	56	63	...	82	...	101	115	...	139	156	192	....
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	499	561	...	690	...	872	991	...	1199	1347	1650	....
6.0	291.9	Mechanical HP	43	48	...	57	...	70	80	...	100	112	....	....
		Thermal HP	...	...	...	...	...	...	...	...	....	....	....	....
		Torque	459	516	...	617	...	769	874	...	1075	1208	....	....

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than listed, refer to Westinghouse for quotations.

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1170 Rpm Input – (1.84-7.59 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S7H	D7H	S9H	D9H	S11F	S11H	S12F	S12H	S15F	S15H	S18F	S18H
			Capacities: Torque in 1000 Inch-Lbs.											
640	**1.84**	**Mechanical HP**	242	..	469	...	654	777	835	992	1271	1510	2079	2470
		Thermal HP	160	..	211	...	212	212	262	262	328	328	385	385
		Torque	24	..	46	...	64	77	82	98	125	149	204	243
520	**2.25**	**Mechanical HP**	208	..	410	...	564	610	720	856	1103	1310	1802	2140
		Thermal HP	161	..	213	...	215	215	266	266	333	333	393	393
		Torque	25	..	50	...	68	81	87	104	133	159	218	259
420	**2.76**	**Mechanical HP**	179	..	349	...	460	546	607	722	943	1120	1532	1820
		Thermal HP	164	..	217	...	218	218	269	269	338	338	400	400
		Torque	27	..	52	...	69	82	90	108	141	168	229	273
350	**3.38**	**Mechanical HP**	141	..	300	...	367	436	526	625	837	995	1305	1550
		Thermal HP	...	..	227	...	234	234	285	285	360	360	423	423
		Torque	26	..	56	...	69	82	94	112	150	179	234	279
280	**4.13**	**Mechanical HP**	112	..	241	...	288	343	443	527	651	774	998	1186
		Thermal HP	...	..	...	...	243	243	300	300	382	382	446	446
		Torque	25	..	53	...	65	78	99	118	149	177	229	272
230	**5.06**	**Mechanical HP**	86	..	177	...	215	256	343	408	505	600	767	911
		Thermal HP	...	..	...	...	...	...	313	313	397	397	466	466
		Torque	23	..	49	...	60	72	92	110	138	165	213	253
190	**6.20**	**Mechanical HP**	64	..	136	...	165	197	252	300	370	440	571	679
		Thermal HP	...	..	...	...	...	...	...	...	....	....	486	486
		Torque	21	..	45	...	55	66	84	100	126	150	197	234
155	**7.59**	**Mechanical HP**	...	56	...	116	...	145	185	220	271	323	415	494
		Thermal HP	...	..	...	85	...	...	...	...	....	....	....	....
		Torque	...	23	...	48	...	60	77	92	114	136	176	216

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S20H	S22H	S25F	S25H
			Capacities: Torque in 1000 Inch-Lbs.			
640	**1.84**	**Mechanical HP**	3000	3460	4117	4890
		Thermal HP	419	470	490	490
		Torque	295	340	405	481
520	**2.25**	**Mechanical HP**	2560	3020	3604	4280
		Thermal HP	423	481	502	502
		Torque	310	366	436	518
420	**2.76**	**Mechanical HP**	2200	2620	3124	3710
		Thermal HP	426	492	513	513
		Torque	330	393	468	556
350	**3.38**	**Mechanical HP**	1920	2300	2728	3240
		Thermal HP	454	523	549	549
		Torque	345	414	490	583
280	**4.13**	**Mechanical HP**	1525	1901	2169	2576
		Thermal HP	482	554	585	585
		Torque	350	423	491	584
230	**5.06**	**Mechanical HP**	1129	1454	1703	2023
		Thermal HP	505	580	619	619
		Torque	324	398	466	554
190	**6.20**	**Mechanical HP**	892	1044	1224	1454
		Thermal HP	527	607	652	652
		Torque	304	360	422	502
155	**7.59**	**Mechanical HP**	676	773	907	1078
		Thermal HP	543	630	680	680
		Torque	277	328	383	456

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown,

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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1170 Rpm Input – (9.30-47.08 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D7H	T7H	D7L	D9H	T9H	D9L	D11H	D11L	T11H	T11L	D12H	D12L	T12H	T12L
			Capacities: Torque in 1000 Inch-Lbs.													
125	9.30	Mechanical HP	66	..	..	137	..	...	197	244	...	...	299	370	...	...
		Thermal HP	56	..	..	85	..	...	125	125	...	...	163	163	...	...
		Torque	32	..	..	68	..	...	100	124	...	...	151	188	...	...
100	11.39	Mechanical HP	55	..	68	115	..	142	166	206	...	...	250	310	...	...
		Thermal HP	..	..	..	89	..	89	135	135	...	...	166	166	...	...
		Torque	32	..	40	69	..	85	102	127	...	...	156	193	...	...
84	13.95	Mechanical HP	43	..	53	95	..	117	137	170	...	...	213	264	...	...
		Thermal HP	..	..	..	...	..	95	...	137	...	...	170	170	...	...
		Torque	31	..	43	69	..	85	105	130	...	...	156	193	...	...
68	17.09	Mechanical HP	33	..	41	74	..	91	113	141	...	...	166	205	...	...
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	185	...	...
		Torque	30	..	37	66	..	81	103	128	...	...	148	183	...	...
56	20.93	Mechanical HP	28	..	35	58	..	72	85	105	...	...	138	170	...	...
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	...
		Torque	31	..	38	66	..	81	97	120	...	...	151	186	...	...
45	25.63	Mechanical HP	23	..	28	49	..	60	71	88	...	...	114	140	...	...
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	...
		Torque	31	..	38	67	..	82	99	122	...	...	154	190	...	...
37	31.39	Mechanical HP	19	..	23	40	..	49	59	...	73	91	...	...	108	134
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	...
		Torque	31	..	38	68	..	84	101	...	122	151	...	...	182	225
30	38.44	Mechanical HP	13	..	16	30	..	37	47	...	61	76	...	...	89	111
		Thermal HP	..	..	..	...	..	...	...	...	...	...	...	...	...	...
		Torque	27	..	33	63	..	78	99	...	123	153	...	...	184	228
25	47.08	Mechanical HP	..	10	..	...	21	...	37	...	51	63	...	...	77	96
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...	...
		Torque	..	27	..	...	55	...	93	...	125	155	...	...	186	231

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D15H	D15L	T15H	T15L	D18H	T18H	T18L	D20F	D20H	D22H	T20H	D22L	T22H	T22L
			Capacities: Torque in 1000 Inch-Lbs.													
125	9.30	Mechanical HP	376	465	...	...	610	...	...	799	908	1025	...	...	...	...
		Thermal HP	212	212	...	...	284	...	...	329	329	354	...	...	...	...
		Torque	191	236	...	...	310	...	...	407	462	510	...	...	...	...
100	11.39	Mechanical HP	324	400	...	...	524	...	...	656	746	856	...	...	...	...
		Thermal HP	216	216	...	...	290	...	...	336	336	362	...	...	...	...
		Torque	202	249	...	...	327	...	...	420	477	526	...	...	...	...
84	13.95	Mechanical HP	278	343	...	...	447	...	...	549	624	702	...	...	...	...
		Thermal HP	221	221	...	...	296	...	...	342	342	368	...	...	...	...
		Torque	213	263	...	...	341	...	...	431	490	543	...	...	...	...
68	17.09	Mechanical HP	241	298	...	...	364	...	...	468	532	588	...	...	...	...
		Thermal HP	230	230	...	...	302	...	...	350	350	373	...	...	...	...
		Torque	225	278	...	...	350	...	...	435	494	557	...	...	...	...
56	20.93	Mechanical HP	206	254	...	...	308	...	...	362	412	506	...	...	...	...
		Thermal HP	...	240	...	...	...	...	...	360	360	383	...	...	...	...
		Torque	230	284	...	...	357	...	...	407	463	568	...	...	...	...
45	25.63	Mechanical HP	168	207	...	...	255	...	...	290	329	408	...	428	...	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	234	289	...	...	365	...	...	411	467	553	...	580	...	...
37	31.39	Mechanical HP	...	168	...	...	197	241	255	...	271	300	330	...	365	417
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	281	...	...	338	409	434	...	477	504	563	...	602	688
30	38.44	Mechanical HP	...	...	119	148	158	201	208	...	...	249	268	...	299	339
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	...	256	317	337	428	443	...	...	527	575	...	620	703
25	47.08	Mechanical HP	...	...	100	124	131	167	174	...	...	203	223	...	250	282
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	...	261	324	343	430	449	...	...	537	584	...	636	715

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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1170 Rpm Input – (9.30-47.08) Gear Ratios

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size													
			D25F	D25H	D25L	T25H	T25L	D28F	D28H	D28L	D30H	T28H	D30L	T30H	T30L	T31H
			Capacities: Torque in 1000 Inch-Lbs.													
125	9.30	**Mechanical HP**	1346	1565	...	...	...	1792	2013	....	2354	....	....	....	....	....
		Thermal HP	394	394	...	...	...	500	500	....	524	....	....	....	....	....
		Torque	670	779	...	...	...	934	1049	....	1185	....	....	....	....	....
100	11.39	**Mechanical HP**	1094	1272	...	...	...	1531	1720	....	1965	....	....	....	....	....
		Thermal HP	403	403	...	...	...	512	512	....	535	....	....	....	....	....
		Torque	672	781	...	...	...	962	1081	....	1228	....	....	....	....	....
84	13.95	**Mechanical HP**	867	1008	...	...	...	1286	1445	....	1678	....	....	....	....	1870
		Thermal HP	410	410	...	...	...	525	525	....	545	....	....	....	....	770
		Torque	651	757	...	...	...	991	1114	....	1264	....	....	....	....	1338
68	17.09	**Mechanical HP**	740	860	...	...	...	1067	1199	....	1408	....	....	....	....	1557
		Thermal HP	419	419	...	...	...	540	540	....	556	....	....	....	....	789
		Torque	667	776	...	...	...	1020	1146	....	1301	....	....	....	....	1466
56	20.93	**Mechanical HP**	600	698	...	...	...	795	893	1012	1168	....	....	....	....	1300
		Thermal HP	427	427	...	...	...	542	542	542	567	....	....	....	....	808
		Torque	688	800	...	...	...	912	1025	1176	1339	....	....	....	....	1506
45	25.63	**Mechanical HP**	508	591	...	...	...	657	738	839	911	....	996	....	....	1080
		Thermal HP	435	435	...	...	...	552	552	552	578	....	578	....	....	823
		Torque	703	817	...	...	...	923	1038	1206	1269	....	1370	....	....	1544
37	31.39	**Mechanical HP**	....	440	488	549	566	....	609	....	679	729	....	....	....	917
		Thermal HP	....	....	...	435	435	....	561	....	587	540	....	....	....	847
		Torque	....	753	836	931	960	....	1050	....	1170	1302	....	....	....	1576
30	38.44	**Mechanical HP**	....	345	...	461	472	....	475	....	....	602	....	670	761	....
		Thermal HP	....	....	...	450	450	....	....	....	....	550	....	560	560	....
		Torque	....	744	...	957	979	....	1020	....	....	1330	....	1440	1636	....
25	47.08	**Mechanical HP**	....	285	...	375	387	....	393	....	....	515	....	576	656	....
		Thermal HP	....	....	...	...	...	....	....	....	....	....	....	570	570	....
		Torque	....	758	...	966	998	....	1040	....	....	1351	....	1470	1675	....

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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1170 Rpm Input – (57.66-291.9 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T7H	T7L	T9H	T9L	T11H	T11L	T12H	T12L	T15H	T15L	T18F	T18H	T18L
			Capacities: Torque in 1000 Inch-Lbs.												
20	57.66	Mechanical HP	10	...	21	...	41	51	62	77	86	107	122	137	143
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	33	...	68	...	127	157	189	234	265	329	391	439	456
16.5	70.62	Mechanical HP	10	...	20	...	34	42	52	65	70	85	104	117	121
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	38	...	77	...	123	153	191	237	271	330	398	447	461
13.5	86.50	Mechanical HP	8.6	11	18	21	25	30	42	52	58	74	84	94	100
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	39	48	80	95	115	142	193	239	270	332	391	439	467
11.0	105.9	Mechanical HP	7.1	8.8	15	16	20	24	33	41	48	59	65	73	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	39	48	80	96	116	143	182	225	273	337	381	428	...
9.0	129.7	Mechanical HP	6	7.4	12	14	17	21	27	33	40	49	55	62	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	80	97	117	144	179	221	275	340	384	432	...
7.5	158.9	Mechanical HP	4.8	5.9	9.5	12	14	17	22	27	32	39	45	51	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	79	97	118	145	181	223	278	343	388	436	...
6.0	194.6	Mechanical HP	4.1	5	7.8	9.6	11	14	18	22	27	33	37	42	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	80	98	119	147	182	225	280	346	392	440	...
4.7	238.4	Mechanical HP	3.3	4.1	6.3	7.8	9.3	12	15	18	22	27	30	34	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	80	98	119	147	183	226	282	348	394	443	...
4.0	291.9	Mechanical HP	...	...	...	...	7	8.6	10	12	16	20	22	25	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	...	...	...	108	133	163	201	250	309	355	399	...

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T20F	T20H	T20L	T22H	T22L	T25F	T25H	T25L	T28F	T28H	T30H	T30L
			Capacities: Torque in 1000 Inch-Lbs.											
20	57.66	Mechanical HP	171	192	...	209	243	269	306	320	371	417	488	536
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	526	591	...	621	724	853	969	1015	1226	1378	1569	1734
16.5	70.62	Mechanical HP	142	159	...	167	201	218	248	272	309	347	417	....
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	....
		Torque	521	585	...	646	734	829	942	1028	1231	1383	1592	....
13.5	86.50	Mechanical HP	113	127	...	139	...	179	203	....	245	275	337	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	524	589	...	660	...	842	957	....	1155	1298	1620	....
11.0	105.9	Mechanical HP	84	94	111	120	...	147	167	....	197	221	283	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	489	549	637	670	...	853	969	....	1173	1318	1641	....
9.0	129.7	Mechanical HP	69	78	...	100	...	124	141	....	166	186	232	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	494	555	...	682	...	862	980	....	1186	1333	1663	....
7.5	158.9	Mechanical HP	56	63	...	82	...	100	114	....	135	152	195	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	499	561	...	694	...	872	991	....	1201	1349	1681	....
6.0	194.6	Mechanical HP	48	54	...	70	...	84	96	....	114	128	145	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	503	565	...	703	...	880	1000	....	1212	1362	1536	....
4.7	238.4	Mechanical HP	37	42	...	55	...	68	77	....	93	105	131	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	508	571	...	713	...	890	1011	....	1224	1375	1716	....
4.0	291.9	Mechanical HP	28	32	...	38	...	48	54	....	67	75	....	....
		Thermal HP	...	...	...	...	...	...	...	....	....	....	....	....
		Torque	467	525	...	628	...	783	890	....	1096	1231	....	....

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.
Units larger than indicated, refer to Westinghouse for quotations.

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870 Rpm Input – (1.84-7.59 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S7H	D7H	S9H	D9H	S11F	S11H	S12F	S12H	S15F	S15H	S18F	S18H
			Capacities: Torque in 1000 Inch-Lbs.											
470	1.84	Mechanical HP	195	..	390	..	533	634	665	790	1010	1200	1658	1970
		Thermal HP	172	..	229	..	236	236	291	291	372	372	442	442
		Torque	26	..	52	..	71	85	89	106	135	161	222	264
390	2.25	Mechanical HP	173	..	348	..	437	520	589	700	901	1070	1469	1745
		Thermal HP	...	..	234	..	240	240	295	295	377	377	449	449
		Torque	28	..	56	..	72	86	95	113	145	173	237	282
320	2.76	Mechanical HP	141	..	293	..	364	433	505	600	778	925	1267	1505
		Thermal HP	...	..	236	..	243	243	300	300	382	382	455	455
		Torque	28	..	58	..	71	85	99	118	153	182	249	296
260	3.38	Mechanical HP	111	..	239	..	290	345	416	495	688	818	1042	1238
		Thermal HP	...	..	...	..	256	256	315	315	402	402	479	479
		Torque	27	..	58	..	72	86	101	120	164	195	254	302
210	4.13	Mechanical HP	88	..	190	..	228	271	350	416	516	613	793	942
		Thermal HP	...	..	...	..	...	...	330	330	422	422	502	502
		Torque	26	..	55	..	68	81	103	123	155	185	240	285
175	5.06	Mechanical HP	67	..	139	..	170	202	271	322	399	474	607	722
		Thermal HP	...	..	...	..	...	...	...	...	....	442	509	509
		Torque	23	..	51	..	63	75	96	115	145	173	223	266
140	6.20	Mechanical HP	50	..	107	..	129	154	197	235	292	347	451	536
		Thermal HP	...	..	...	..	...	...	...	...	....	....	....	....
		Torque	21	..	46	..	58	69	87	104	132	157	205	244
115	7.59	Mechanical HP	...	43	...	89	...	113	145	173	213	254	328	390
		Thermal HP	...	..	...	..	...	...	...	...	....	....	....	....
		Torque	...	24	...	49	...	62	80	95	118	141	183	218

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size S20H	S22H	S25F	S25H
			Capacities: Torque in 1000 Inch-Lbs.			
470	1.84	Mechanical HP	2360	2760	3284	3900
		Thermal HP	483	557	602	602
		Torque	316	370	440	523
390	2.25	Mechanical HP	2085	2465	2938	3490
		Thermal HP	490	567	610	610
		Torque	337	398	475	564
320	2.76	Mechanical HP	1825	2170	2581	3065
		Thermal HP	496	574	619	619
		Torque	357	427	508	604
260	3.38	Mechanical HP	1597	1855	2248	2670
		Thermal HP	524	605	653	653
		Torque	385	450	547	650
210	4.13	Mechanical HP	1214	1516	1733	2058
		Thermal HP	551	637	687	687
		Torque	369	446	519	617
175	5.06	Mechanical HP	896	1157	1357	1612
		Thermal HP	572	661	717	717
		Torque	340	419	490	583
140	6.20	Mechanical HP	707	828	972	1155
		Thermal HP	593	685	745	745
		Torque	318	378	443	527
115	7.59	Mechanical HP	534	611	719	854
		Thermal HP	....	....	765	765
		Torque	289	343	402	478

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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870 Rpm Input – (9.30-47.08 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D7H	T7H	D7L	D9H	T9H	D9L	D11H	D11L	T11H	T11L	D12H	D12L	T12H	T12L
			Capacities: Torque in 1000 Inch-Lbs.													
95	9.30	Mechanical HP	43	...	..	89	..	...	152	189	...	...	231	286	...	...
		Thermal HP	..	...	..	..	..	...	120	120	...	...	154	154	...	...
		Torque	29	...	..	60	..	...	103	128	...	...	157	195	...	...
77	11.39	Mechanical HP	42	...	52	89	..	110	127	158	...	...	193	239	...	...
		Thermal HP	..	...	..	..	..	90	125	125	...	...	166	166	...	...
		Torque	33	...	41	72	..	89	101	125	...	...	160	199	...	...
62	13.95	Mechanical HP	33	...	41	73	..	91	106	131	..	...	166	206	...	...
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	175	...	...
		Torque	33	...	41	73	..	90	107	133	...	...	162	201	...	...
50	17.09	Mechanical HP	26	...	34	56	..	70	88	109	...	...	128	158	...	...
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	33	...	44	68	..	85	107	133	...	...	152	187	...	...
42	20.93	Mechanical HP	22	...	28	45	..	55	66	81	...	...	107	132	...	...
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	33	...	43	67	..	82	100	123	...	...	155	191	...	...
34	25.63	Mechanical HP	18	...	22	37	..	45	55	68	...	...	88	108	...	...
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	33	...	43	68	..	84	101	125	...	...	157	194	...	...
28	31.39	Mechanical HP	14	...	17	31	..	38	45	...	55	69	...	...	82	102
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	32	...	39	69	..	85	103	...	124	154	...	...	185	230
22	38.44	Mechanical HP	11	...	14	23	..	28	37	...	46	58	...	...	68	85
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	29	...	35	63	..	78	102	...	126	156	...	...	188	233
18.5	47.08	Mechanical HP	..	7.9	..	..	16	...	28	...	38	48	...	...	59	73
		Thermal HP	..	...	..	..	..	...	...	...	...	...	...	...	...	...
		Torque	..	27	..	..	56	...	94	...	127	158	...	...	190	235

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size D15H	D15L	T15H	T15L	D18H	T18H	T18L	D20F	D20H	D22H	T20H	D22L	T22H	T22L
			Capacities: Torque in 1000 Inch-Lbs.													
95	9.30	Mechanical HP	328	405	...	...	519	...	...	621	706	807	...	...	...	...
		Thermal HP	231	231	...	...	309	...	...	358	358	386	...	...	...	...
		Torque	217	268	...	...	359	...	...	423	481	531	...	...	...	...
77	11.39	Mechanical HP	274	338	...	...	432	...	...	509	578	673	...	...	...	...
		Thermal HP	...	245	...	...	314	...	...	364	364	392	...	...	...	...
		Torque	222	274	...	...	360	...	...	436	496	546	...	...	...	...
62	13.95	Mechanical HP	226	279	...	...	349	...	...	425	483	550	...	...	...	...
		Thermal HP	...	260	...	...	...	...	...	369	369	397	...	...	...	...
		Torque	227	280	...	...	352	...	...	447	508	562	...	...	...	...
50	17.09	Mechanical HP	188	232	...	...	284	...	...	365	415	459	...	...	...	...
		Thermal HP	...	...	...	...	...	...	...	...	375	...	...	...	...	...
		Torque	232	286	...	...	361	...	...	455	517	575	...	...	...	...
42	20.93	Mechanical HP	160	197	...	...	240	...	...	282	321	395	...	...	...	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	236	291	...	...	368	...	...	426	484	585	...	...	...	...
34	25.63	Mechanical HP	130	160	...	...	198	...	...	224	255	310	...	333	...	...
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	240	296	...	...	375	...	...	422	479	576	...	596	...	...
28	31.39	Mechanical HP	...	132	...	...	154	185	195	...	210	232	253	...	282	320
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	291	...	...	352	423	445	...	489	524	578	...	625	707
22	38.44	Mechanical HP	...	...	92	114	122	152	159	...	...	193	205	...	231	259
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	...	264	327	345	434	452	...	...	540	588	...	641	720
18.5	47.08	Mechanical HP	...	...	76	95	101	127	132	...	...	157	170	...	183	215
		Thermal HP	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Torque	...	...	269	333	350	443	459	...	...	549	596	...	654	731

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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870 Rpm Input – (9.30-47.08 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size												
			D25F	D25H	D25L	T25H	D28F	D28H	D28L	D30H	T28H	D30L	T30H	T30L	T31H
			Capacities: Torque in 1000 Inch-Lbs.												
95	**9.30**	**Mechanical HP**	1050	1221	...	....	1400	1573	....	1864	....	....	....	....	....
		Thermal HP	430	430	...	....	545	545	....	571	....	....	....	....	....
		Torque	700	814	...	....	977	1098	....	1240	....	....	....	....	....
77	**11.39**	**Mechanical HP**	863	1003	...	....	1193	1340	....	1551	....	....	....	....	....
		Thermal HP	437	437	...	....	555	555	....	580	....	....	....	....	....
		Torque	710	825	...	....	1004	1128	....	1281	....	....	....	....	....
62	**13.95**	**Mechanical HP**	703	818	...	....	998	1122	....	1320	....	....	....	....	1456
		Thermal HP	442	442	...	....	562	562	....	587	....	....	....	....	1232
		Torque	696	809	...	....	1032	1159	....	1315	....	....	....	....	1390
50	**17.09**	**Mechanical HP**	579	673	...	....	827	929	....	1105	....	....	....	....	1166
		Thermal HP	450	450	...	....	571	571	....	598	....	....	....	....	1270
		Torque	691	803	...	....	1059	1190	....	1350	....	....	....	....	1470
42	**20.93**	**Mechanical HP**	469	545	...	....	652	733	781	914	....	....	....	....	956
		Thermal HP	455	455	...	....	578	578	582	605	....	....	....	....	1290
		Torque	710	825	...	....	989	1111	1217	1386	....	....	....	....	1506
34	**25.63**	**Mechanical HP**	396	461	...	....	548	616	646	722	....	769	....	....	819
		Thermal HP	....	....	...	....	....	....	600	612	....	612	....	....	1309
		Torque	723	841	...	....	1010	1135	1244	1330	....	1416	....	....	1550
28	**31.39**	**Mechanical HP**	....	347	379	426	....	509	....	536	560	635	....	....	677
		Thermal HP	....	....	...	....	....	....	....	....	....	....	....	....	1328
		Torque	....	785	859	969	....	1159	....	1223	1340	1447	....	....	1580
22	**38.44**	**Mechanical HP**	....	267	...	358	....	369	....	....	462	....	517	590	....
		Thermal HP	....	....	...	....	....	....	....	....	....	....	....	....	....
		Torque	....	763	...	993	....	1047	....	....	1365	....	1440	1702	....
18.5	**47.08**	**Mechanical HP**	....	220	...	293	....	304	....	....	394	....	431	508	....
		Thermal HP	....	....	...	....	....	....	....	....	....	....	....	....	....
		Torque	....	776	...	1012	....	1066	....	....	1384	....	1470	1737	....

② For exact gear ratios, refer to page 22.
Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.
Units larger than listed, refer to Westinghouse for quotations.

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870 Rpm Input – (57.66-291.9 Gear Ratios)

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T7H	T7L	T9H	T9L	T11H	T11L	T12H	T12L	T15H	T15L	T18F	T18H	T18L
			Capacities: Torque in 1000 Inch-Lbs.												
15.0	57.66	Mechanical HP	7.9	..	16	...	31	39	47	58	66	82	93	105	108
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	33	..	68	...	129	160	192	238	273	338	402	452	465
12.5	70.62	Mechanical HP	8.1	..	16	...	26	32	39	49	53	65	79	89	92
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	39	..	78	...	127	158	194	240	278	335	409	459	470
10.0	86.50	Mechanical HP	6.6	8.2	13	16	19	23	33	41	44	56	64	72	76
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	39	48	78	96	116	143	195	242	278	337	405	455	475
8.3	105.9	Mechanical HP	5.5	6.8	10	12	15	19	26	33	37	45	50	56	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	79	97	117	144	198	245	276	341	386	434	...
6.8	129.7	Mechanical HP	4.6	5.7	8.8	11	13	16	21	26	31	38	42	47	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	79	97	118	146	181	224	278	343	390	438	...
5.5	158.9	Mechanical HP	3.7	4.6	7.3	9.0	10	12	16	19	25	30	35	39	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	80	98	119	147	183	226	281	347	392	441	...
4.5	194.6	Mechanical HP	3.1	3.8	6.0	7.4	8.8	11	14	17	21	25	28	32	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	40	49	80	98	120	148	184	227	282	348	396	445	...
3.8	238.4	Mechanical HP	2.5	3.1	4.8	5.9	7.1	8.8	11	14	17	21	23	26	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	41	50	81	100	120	148	185	228	284	351	399	448	...
3.0	291.9	Mechanical HP	..	..	..	...	5.3	6.5	8.3	10	12	15	17	19	...
		Thermal HP	..	..	..	...	...	...	...	...	...	...	...	...	...
		Torque	..	..	..	...	109	134	165	204	252	311	358	402	...

Nominal L.S. Shaft Rpm	Std. Gear Ratios②	Type of Ratings	Gear Unit Size T20F	T20H	T20L	T22H	T22L	T25F	T25H	T25L	T28F	T28H	T30H	T30L
			Capacities: Torque in 1000 Inch-Lbs.											
15.0	57.66	Mechanical HP	130	146	...	166	185	210	239	245	284	319	347	414
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	537	603	...	664	739	891	1012	1037	1254	1409	1450	1783
12.5	70.62	Mechanical HP	108	121	...	130	153	168	191	207	238	267	322	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	543	610	...	664	748	846	961	1049	1270	1427	1625	....
10.0	86.50	Mechanical HP	86	97	...	108	...	137	156	168	189	212	260	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	548	616	...	677	...	857	974	1064	1177	1322	1651	....
8.3	105.9	Mechanical HP	64	72	84	93	...	113	128	....	151	170	218	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	496	557	623	686	...	867	985	....	1193	1340	1670	....
6.8	129.7	Mechanical HP	53	59	...	77	...	95	108	....	126	142	178	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	500	562	...	697	...	875	994	....	1205	1354	1690	....
5.5	158.9	Mechanical HP	43	48	...	63	...	77	88	....	103	116	150	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	505	567	...	708	...	884	1005	....	1218	1368	1705	....
4.5	194.6	Mechanical HP	36	41	...	54	...	64	73	....	87	98	113	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	508	571	...	714	...	891	1013	....	1228	1380	1592	....
3.8	238.4	Mechanical HP	28	32	...	42	...	52	59	....	71	80	100	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	513	576	...	721	...	899	1022	....	1239	1392	1738	....
3.0	291.9	Mechanical HP	22	25	...	29	...	36	41	....	51	57	....	....
		Thermal HP	...	...	...	...	...	...	....	....	....	....	....	....
		Torque	472	530	...	634	...	791	899	....	1107	1244	....	....

② For exact gear ratios, refer to page 22.

Note: Thermal horsepower exceeds mechanical horsepower if no value is shown.

For additional thermal rating, refer to Price List 2980-3, page 1.

Units larger than indicated, refer to Westinghouse for quotations.

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Overhung Load Capacities

When a pulley, sprocket or pinion is to be mounted on the input or output shaft of a reducer, the overhung load capacity of the reducer must be checked. The magnitude of the overhung load varies with the type of connection and its location from the shaft bearing. Use the following overhung load formula after selecting appropriate L_c and L_f factors from the tables below.

Overhung Load Formula

$$\text{OHL (lbs)} = \frac{\text{Motor Hp} \times 126{,}000 \times L_c}{\text{Shaft Rpm} \times \text{Pitch Diameter (Inches)} \times L_f}$$

Compare the calculated overhung load with the overhung load table applicable to the reducer type, size and shaft. If the calculated overhung load is greater than that listed for standard overhung load units, refer to the table for heavy overhung load units. In the infrequent cases which cannot be satisfied by a heavy overhung load unit, an outboard bearing must be considered. The outboard bearing will double the overhung load capacity.

Load Connection Factor • L_c

Type of Load Connection	Factor, L_c
Sprocket	1.00
Pinion	1.25
V-belt	1.50
Flat Belt	2.50

Load Location Factor • L_f

See table below for low speed shafts. For high speed shaft use L_f of 1.00 unless load location is outboard of shaft mid-point, then refer to Westinghouse.

Example 1

A belt conveyor requiring 100 hp is driven by a D12H reducer at 68 rpm. A 12 inch pitch diameter sprocket is mounted on the low speed shaft. The centerline of the pinion is mounted 4 inches from the reducer end cap.

Calculate the overhung load:

L_c =1.00 from table
L_f =1.02 from table for standard OHL unit

$$\text{OHL} = \frac{100 \times 126{,}000 \times 1.00}{68 \times 12 \times 1.02} = 15{,}138 \text{ lbs.}$$

Refer to the overhung load capacity table, page 21, for standard overhung load units low speed shaft. From the table, the capacity of a standard overhung load D12H reducer is 15,800 lbs. The selection of the D12H standard overhung load reducer is correct.

Example 2

Same as example 1 except that a 12 inch pitch diameter pinion is to be mounted on the low speed shaft 6 inches from the reducer end cap.

L_c =1.25 from table
L_f = .79 from table for standard OHL units

$$\text{OHL} = \frac{100 \times 126{,}000 \times 1.25}{68 \times 12 \times .79} = 24{,}432 \text{ lbs.}$$

Since this is greater than the 15,800 lbs. allowed for standard OHL reducers, we must recalculate based on heavy overhung load reducers.

L_c =1.25 from table
L_f = .85 from table on heavy overhung load reducers

$$\text{OHL} = \frac{100 \times 126{,}000 \times 1.25}{68 \times 12 \times .85} = 22{,}708 \text{ lbs.}$$

Refer to the overhung load capacity table, page 21, for heavy overhung load units low speed shaft. From the table, the capacity of a D12H heavy overhung load reducer is 21,500 lbs. The capacity of the heavy overhung load reducer is still not sufficient for the application. An outboard bearing must be used which doubles the overhung load capacity. A standard OHL reducer with outboard bearing has a capacity of 31,600 lbs. which is sufficient for the application.

Load Location Factors Table • L_f • Low Speed Shaft

L② In	Standard OHL • Unit Size												Heavy OHL • Unit Size									
	7	9	11	12	15	18	20	22	25	28	30	31	11	12	15	18	20	22	25	28	30	31
Type S																						
2	1.03	1.10	1.11	1.14	1.14	1.14	1.14	1.16	1.19	....	....	....	....	1.16	1.18	1.19	1.19	1.20	1.23	....	....	....
3	.88	1.03	1.04	1.08	1.09	1.10	1.10	1.11	1.15	....	....	....	....	1.10	1.12	1.14	1.15	1.15	1.18	....	....	....
4	.69	.88	.97	1.02	1.03	1.05	1.06	1.08	1.11	....	....	....	....	1.04	1.06	1.09	1.10	1.10	1.14	....	....	....
5	.58	.74	.85	.90	.96	1.02	1.02	1.03	1.06	....	....	....	....	.96	1.01	1.04	1.05	1.06	1.10	....	....	....
6	....	.64	.75	.79	.85	.92	.95	1.00	1.03	....	....	....	....	.85	.91	1.00	1.02	1.03	1.05	....	....	....
8	....	....	.60	.64	.68	.74	.78	.81	.88	....	....	....	....	.69	.73	.81	.85	.88	.95	....	....	....
10	....	....	....	....	.57	.62	.65	.69	.75	....	....	....	....	.57	.61	.69	.71	.74	.80	....	....	....
12	....	....	....	....	....	....	.56	.59	.64	....	....	....	....	....	....	.59	.62	.64	.69	....	....	....
14	....	....	....	....	....	....	....	....	.56	....	....	....	....	....	....	....	....	.57	.61	....	....	....
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.54	....	....	....
Types D and T																						
2	1.03	1.10	1.11	1.11	1.11	1.11	1.11	....	....	....	....	....	1.10	1.11	1.13	1.15	1.14	....	....	....	....	....
3	.88	1.03	1.05	1.05	1.07	1.08	1.08	....	....	....	....	....	1.06	1.06	1.09	1.09	1.11	....	....	....	....	....
4	.69	.88	.99	1.02	1.03	1.05	1.05	1.06	1.09	1.11	1.11	1.11	.99	1.02	1.05	1.06	1.08	1.08	1.09	1.12	1.13	1.13
5	.58	.74	.85	.89	.96	1.00	1.00	1.03	1.06	1.09	1.09	1.09	.85	.95	1.02	1.03	1.04	1.05	1.07	1.10	1.11	1.11
6	....	.64	.74	.79	.85	.91	.95	1.00	1.03	1.06	1.06	1.06	.74	.85	.91	1.00	1.00	1.02	1.04	1.07	1.08	1.08
8	....	....	....	.63	.68	.74	.76	.82	.88	.95	.99	.99	....	.68	.74	.81	.83	.88	.94	1.01	1.03	1.03
10	....	....	....	....	....	.63	.65	.69	.75	.81	.84	.84	....	....	.62	.69	.70	.76	.80	.87	.92	.92
12	....	....	....	....	....	....	....	.61	.64	.70	.73	.73	....	....	....	.59	.61	.64	.69	.76	.80	.80
14	....	....	....	....	....	....	....	....	.58	.62	.64	.64	....	....	....	....	....	.57	.61	.67	.71	.71
16	....	....	....	....	....	....	....	....	....	....	.59	.59	....	....	....	....	....	....	.55	.59	.63	.63

② L is distance from reducer end cap, in inches.

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Overhung Load Capacities, Continued

Type S, High Speed Shaft Overhung Load, Pounds

Total Ratio	Unit Size 7	9	11	12	15	18	20	22	25	Unit Size 7	9	11	12	15	18	20	22	25
	1170 Rpm Input									**870 Rpm Input**								
1.84	450	1150	700	400	750	500	800	600	600	50	1000	700	400	750	500	800	600	600
2.25	450	1150	700	400	750	500	800	600	600	400	1000	700	400	750	500	800	600	600
2.76	450	1150	1050	400	750	1250	800	600	600	1100	1000	2550	400	750	1250	800	600	600
3.38	1050	1150	2200	650	750	2300	2700	600	600	1550	2300	3450	1250	750	2300	2700	600	600
4.13	1450	2250	3350	650	750	2400	2750	1000	1500	1700	2900	3850	2600	3000	5300	6300	2600	2900
5.06	1550	2750	3650	3400	3900	6000	6500	4000	4300	1850	3200	4150	4800	6100	7200	9800	7800	9100
6.20	1750	2960	3670	4600	5800	6800	9700	8100	9600	1775	3010	3740	4880	6500	7900	10,800	10,700	12,500
7.59	....	....	2680	3500	4650	6300	7750	8900	10,950	....	....	2720	3550	4750	6400	7930	9100	11,200

Type S, Low Speed Shaft Overhung Load, Pounds

Output Rpm	Unit Size 7	9	11	12	15	18	20	22	25
Standard Overhung Load									
780	2750	3500	5000	5100	5100	4000	.....	.....	.....
640	3150	4050	5800	6200	6300	5400	8900	12,000	11,000
520	3500	4500	6500	7200	7900	6600	9600	12,800	12,200
420	3800	5100	7250	8100	8900	8200	11,200	14,500	14,800
350	4200	5600	8100	8950	9800	9500	12,500	16,000	16,800
280	4750	6300	9000	10,000	11,000	11,000	14,500	18,000	19,500
230	5200	6900	9800	10,500	12,100	12,600	16,300	20,000	22,200
190	5600	7600	10,800	12,000	13,250	14,400	18,000	21,700	24,800
155	6200	8300	11,800	13,300	14,750	16,300	20,000	23,700	27,800
115	7000	9500	13,500	15,100	16,800	19,000	23,000	27,000	32,300
77	8300	11,200	16,000	18,000	20,000	23,700	27,900	32,000	39,800
Heavy Overhung Load									
780	....	.....	.....	9000	11,500	10,000	.....	.....	.....
640	....	.....	.....	9900	12,700	11,500	15,200	18,200	24,800
520	....	.....	.....	10,700	13,750	12,750	16,000	19,200	26,000
420	....	.....	.....	11,700	15,000	14,250	17,600	21,500	28,600
350	....	.....	.....	13,000	16,250	15,600	19,500	23,500	31,200
280	....	.....	.....	14,000	17,800	17,250	21,600	26,000	34,000
230	....	.....	.....	15,200	19,400	19,000	23,500	28,200	37,000
190	....	.....	.....	16,600	20,800	20,800	25,800	30,500	40,000
155	....	.....	.....	18,000	22,700	22,700	28,300	33,400	43,400
115	....	.....	.....	19,800	25,500	25,500	31,600	37,500	49,000
77	....	.....	.....	23,000	29,600	30,300	37,000	43,800	57,000

Note: Overhung loads are based on maximum torque rating of unit at speed indicated and most unfavorable direction of loading. For higher allowable OHL consider an outboard bearing or refer complete data to Westinghouse.

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Overhung Load Capacities, Continued

Types D and T, High Speed Shaft Overhung Load, Pounds

Total Ratio	Unit Size 7	9	11	12	15	18	20	22	25	28	30	31	Unit Size 7	9	11	12	15	18	20	22	25	28	30	31
	1170 Rpm Input												**870 Rpm Input**											
7.59	181	335	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
9.30	340	630	250	1250	300	400	1150	400	1400	3900	700	....	470	810	725	1725	300	1150	2250	1700	3800	5200	3700	....
11.39	375	700	525	1450	400	500	1750	500	2500	4300	1800	....	505	880	975	1875	850	1750	2550	2400	4500	5600	4200	....
13.95	415	760	800	1625	500	1200	2250	1100	3700	4700	3000	3000	550	930	1200	2025	1500	2350	2900	3100	5200	6000	4600	4600
17.09	460	820	975	1750	900	1700	2500	1900	4250	5100	3600	3600	590	1000	1325	2150	1750	2650	3100	3500	5500	6300	5100	5100
20.93	500	890	1150	1850	1150	2200	2700	2650	4750	5500	4100	4100	630	1070	1450	2225	1950	3000	3350	3850	5800	6700	5500	5500
25.63	550	960	1300	1000	2200	1700	3800	3350	5150	5800	4500	4500	680	1140	1525	1550	2700	3250	4500	4250	6300	7100	5900	5900
31.39	600	1020	1315	1100	2300	2100	4000	3350	5150	7500	5900	5900	650	1020	1540	1625	2800	3700	4600	4250	6300	8500	7300	7300
38.44	540	845	1330	1200	2820	3880	4570	5700	4820	7500	8300	8300	540	845	1555	1675	2820	3880	4570	3640	4820	7500	8800	8800
47.08 & Higher	440	690	1340	1740	2310	3190	3760	4130	4700	6180	7200	....	440	690	1340	1740	2310	3190	3760	4130	5350	6180	7200	....

Types D and T, Low Speed Shaft Overhung Load, Pounds

Output Rpm	Unit Size 7H	7L	9H	9L	11H	11L	12H	12L	15H	15L	18	20	22	25	28	30	31
Standard Overhung Load																	
190	3800	3500	5800	5300	10,000	9200	11,000	10,100	12,000	11,000	16,000	19,000	22,000	27,000	.....	.....	.....
155	4150	3800	6400	5900	11,000	10,100	12,000	11,000	13,000	12,000	17,500	21,000	24,000	24,000	40,500	41,500	.....
125	4500	4150	6900	6350	11,800	10,900	13,000	12,000	14,000	12,900	19,000	22,500	26,000	31,000	44,000	45,000	45,000
100	4950	4550	7600	7000	12,800	11,800	14,000	12,900	15,000	13,800	20,500	24,000	28,000	33,500	48,000	50,000	50,000
84	5300	4900	8200	7550	13,700	12,600	15,000	13,800	16,000	14,700	22,000	25,500	30,000	36,000	51,000	53,500	53,500
68	5800	5300	8900	8200	14,000	12,900	15,800	14,500	17,700	16,300	23,500	27,000	32,500	38,500	56,000	58,500	58,500
56	6300	5800	9700	8900	14,000	12,900	17,500	16,100	18,500	17,000	25,000	28,500	35,000	41,000	56,000	64,000	64,000
45	6900	6350	10,500	9700	14,000	12,900	18,500	17,000	19,500	18,000	25,000	31,000	38,000	45,000	56,000	64,000	64,000
37 & Below	7500	6900	11,500	10,600	14,000	12,900	19,500	18,000	21,000	19,300	25,000	33,000	40,000	45,000	56,000	64,000	64,000
Heavy Overhung Load																	
190	....	....	.....	.....	12,500	11,500	15,000	13,800	18,000	16,600	23,000	29,000	35,000	51,000	.....	.....	.....
155	....	....	.....	.....	13,500	12,400	16,000	14,700	19,500	18,000	24,500	31,200	37,000	54,000	45,000	48,500	.....
125	....	....	.....	.....	14,500	13,300	17,000	15,600	21,000	19,300	26,500	33,500	40,000	58,000	48,500	53,000	53,000
100	....	....	.....	.....	15,700	14,400	18,500	17,000	22,500	20,700	29,000	36,800	43,000	62,000	52,500	58,000	58,000
84	....	....	.....	.....	16,800	15,400	20,000	18,400	24,000	22,100	31,000	38,000	46,000	66,000	56,000	62,500	62,500
68	....	....	.....	.....	18,000	16,600	21,500	19,800	26,500	24,400	33,500	40,500	50,000	70,000	61,000	68,000	68,000
56	....	....	.....	.....	19,000	17,500	23,000	21,200	28,500	26,200	36,000	43,000	54,000	70,000	65,500	73,000	73,000
45	....	....	.....	.....	19,000	17,500	25,000	23,000	31,000	28,500	40,000	46,000	58,000	70,000	71,500	80,000	80,000
37 & Below	....	....	.....	.....	19,000	17,500	25,000	23,000	33,000	30,400	40,000	50,000	60,000	70,000	76,500	86,000	86,000

Note: Overhung loads are based on maximum torque rating of unit at speed indicated and most unfavorable direction of loading. For higher allowable OHL consider an outboard bearing or refer complete data to Westinghouse.

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Backstops

Application

Backstops are required for applications in which rotation in one direction must be prevented – for example on conveyor drives. The instant the shaft attempts to change direction, the backstop sprags grip, thereby preventing reverse rotation. This action is fully automatic.

A backstop is generally located on one end of the speed reducer high speed shaft opposite the motor. Consult Westinghouse for mounting dimensions. If space limitations prevent normal mounting, the backstop can be mounted on the motor shaft.

Selection

1. Calculate the required torque. Use the formula

$$T = \frac{63{,}000 \times \text{motor hp}}{\text{input speed}}$$

Backstops are used as a safety device – no more than 10 cycles per day. When backstops are used functionally in a mechanism with frequent loadings, refer to Westinghouse.

2. Refer to the backstop selection table and read down the column until the listed torque rating is equal to or greater than the required torque calculated in step 1. Read to the left to determine the model number of the required backstop.

3. The maximum allowable backstop speed must be equal to or greater than the reducer input speed. If this is not the case, refer to Westinghouse.

4. Specify the direction of rotation of the reducer output shaft when ordering a backstop (clockwise or counter clockwise when facing the end of the output shaft).

Example

Select a backstop for a size D12H reducer driving a uniformly loaded bucket elevator 24 hours per day. Input speed 1750 rpm, output speed 68 rpm. Prime mover is a 125 hp motor. Backstop to be used as a safety device, no more than 10 cycles per day. Output shaft rotation counterclockwise when facing shaft.

1. $T = \frac{63{,}000 \times \text{motor hp}}{\text{input speed}}$

$$T = \frac{63{,}000 \times 125}{1750} = 4500 \text{ in. lbs.}$$

2. Refer to the backstop selection table. The second rating is 10,200 in. lbs. Since this is greater than the 4500 in. lbs. required, this is the correct selection. Read left to determine the backstop model number B500.

3. Compare the 1750 reducer input speed with the maximum allowable backstop speed. A B500 backstop has a maximum allowable speed of 2650 rpm. The selection is correct.

4. Specify that the reducer output shaft rotates counterclockwise when facing the end of the output shaft.

Backstop Selection Table

Backstop Model Number	Max. Allowable Backstop Speed Rpm	Torque Rating In-Lbs	Torque Rating Ft.-Lbs
B300	**3600**	3,000	250
B400	**2900**	3,600	300
B500	**2650**	12,000	1000
B600	**2300**	26,400	2,200
B700	**2000**	48,000	4,000
B750	**1800**	81,600	6,800
B800	**1400**	138,000	11,500
B900	**1300**	216,000	18,000
B1027	**1050**	324,000	27,000

Exact Gear Ratios

Nominal Ratio	Unit Size S7	S9	S11	S12	S15	S18	S20	S22	S25
			Single Reduction						
1.84	1.805	1.812	1.866	1.815	1.806	1.837	1.853	1.837	1.857
2.25	2.258	2.214	2.307	2.242	2.222	2.281	2.250	2.281	2.243
2.76	2.740	2.750	2.739	2.821	2.741	2.750	2.774	2.705	2.750
3.38	3.391	3.379	3.448	3.458	3.296	3.375	3.333	3.323	3.363
4.13	4.050	4.040	4.160	4.095	4.178	4.185	4.200	4.068	4.142
5.06	4.947	5.047	5.142	4.944	5.041	5.086	5.240	5.000	5.000
6.20	6.062	6.055	6.166	6.133	6.250	6.291	6.222	6.304	6.304
7.59	.....	.....	7.600	7.636	7.700	7.750	7.478	7.750	7.727

Nominal Ratio	Unit Size D7	D9	D11	D12	D15	D18	D20	D22	D25	D28	D30
			Double Reduction								
7.59	7.341	7.414	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.30	8.910	9.258	9.394	9.499	9.138	9.658	9.555	9.390	9.206	9.640	9.190
11.39	10.904	11.158	11.401	11.564	11.164	11.464	11.760	11.375	11.359	11.621	11.405
13.95	13.635	13.635	14.108	13.645	13.865	13.934	14.154	14.000	13.710	14.262	13.750
17.09	16.641	16.545	16.848	16.354	17.037	17.541	17.346	16.850	16.481	17.686	16.875
20.93	20.050	20.671	20.829	20.012	20.368	21.162	20.790	20.650	20.893	21.496	20.925
25.63	24.476	24.958	25.444	24.750	25.448	26.161	25.938	24.750	25.208	26.587	25.435
31.39	29.993	30.817	31.179	29.437	30.530	31.370	32.226	30.750	31.250	31.458	31.460
38.44	37.380	37.990	38.420	38.035	.....	38.799	.....	38.770	39.402	39.202	.....
47.08	.....	.....	46.069	.....	.....	47.817	.....	48.440	48.543	48.288	.....

Exact Gear Ratios

Nominal Ratio	Unit Size T7	T9	T11	T12	T15	T18	T20	T22	T25	T28	T30	T31
			Triple Reduction									
13.95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.285
17.09	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17.566
20.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21.609
25.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.663
31.39	.....	.....	30.723	31.308	.....	31.435	31.726	30.736	31.377	33.013	.....	32.054
38.44	.....	.....	37.066	38.171	39.547	39.314	39.896	38.651	38.332	40.813	39.769	.....
47.08	45.083	43.946	45.360	44.750	48.210	47.717	48.706	47.188	47.606	48.444	47.204	.....
57.66	55.936	53.780	56.671	56.454	56.526	59.044	57.311	55.523	56.641	60.985	59.425	.....
70.62	67.744	67.191	68.279	67.725	69.783	70.512	70.130	70.725	69.196	73.573	69.666	.....
86.50	83.732	82.969	83.942	85.241	81.821	86.136	86.730	86.346	85.938	86.168	87.699	.....
105.9	101.406	103.657	104.873	101.237	103.221	106.384	106.475	101.598	105.603	108.477	105.809	.....
129.7	121.640	124.890	126.355	119.400	123.816	121.047	130.290	124.322	126.250	130.867	130.812	.....
158.9	151.467	152.463	154.252	150.279	155.864	155.197	161.130	153.750	157.738	161.786	156.857	.....
194.6	181.725	186.828	189.020	178.480	185.089	190.178	191.648	182.870	189.236	193.993	202.248	.....
238.4	228.283	232.840	235.571	221.548	229.779	234.349	247.625	236.283	238.095	239.083	242.517	.....
291.9	.....	.....	282.468	275.256	284.850	289.848	294.030	297.905	300.207	297.935	.....	.....

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