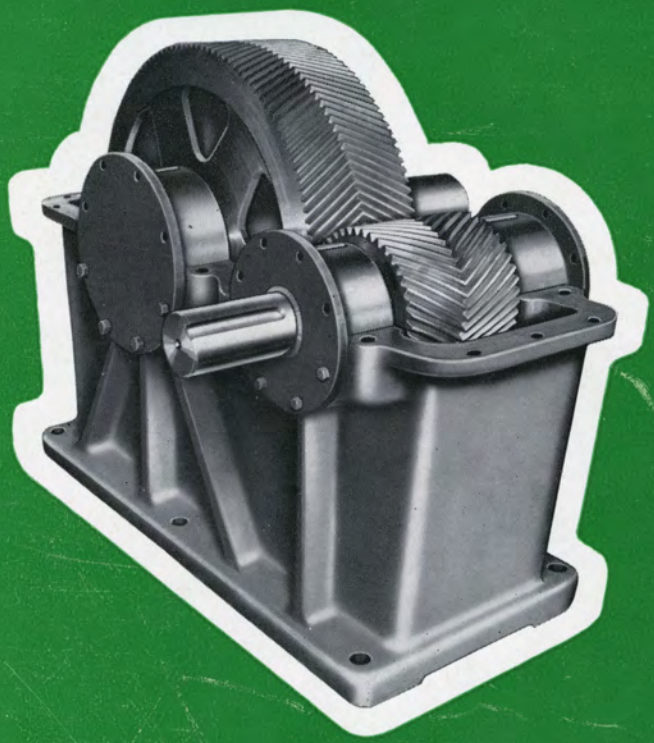
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# LUFKIN GEARS



## HERRINGBONE GEAR SPEED REDUCERS AND SPEED INCREASERS

CATALOG . . . G-4

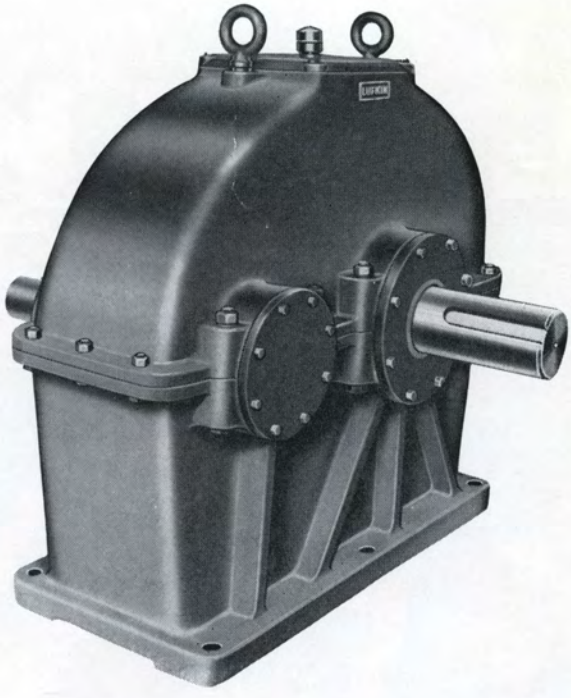
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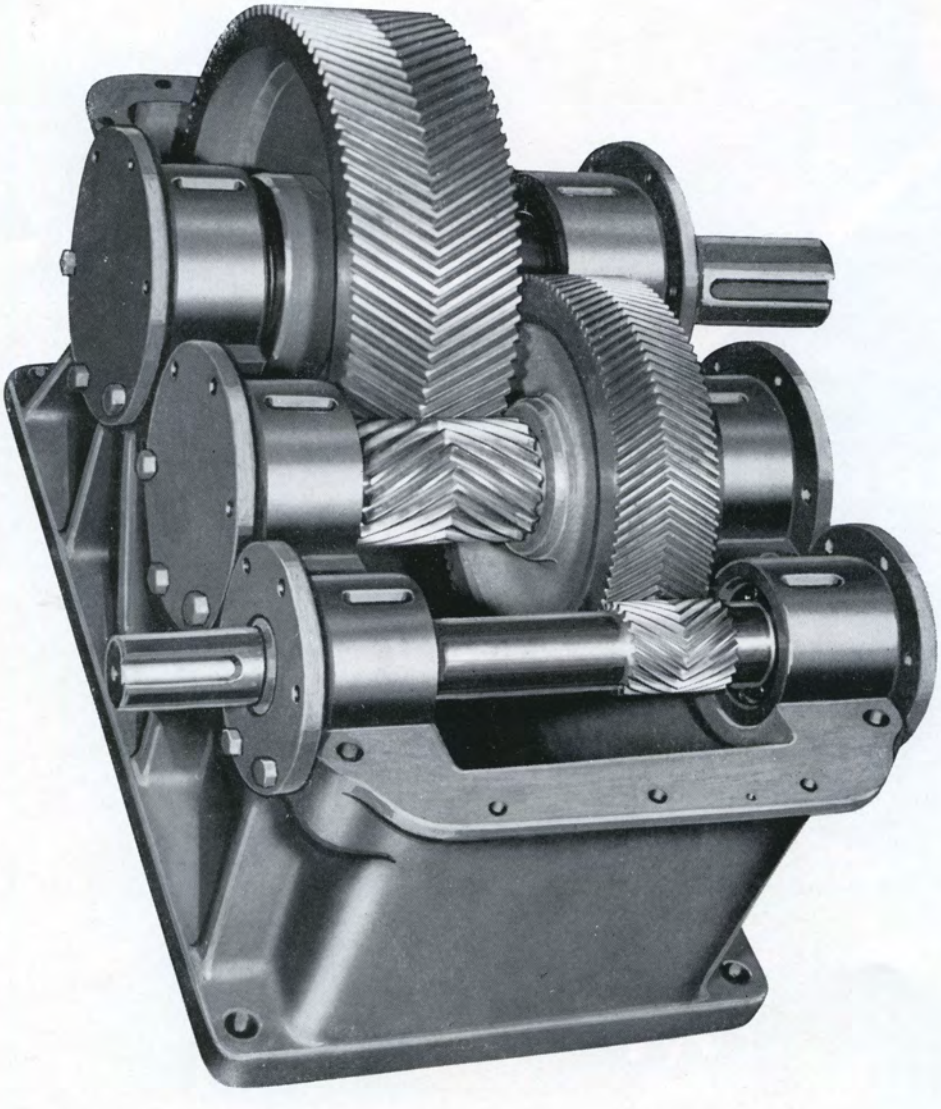
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# TYPE S

LUFKIN SINGLE REDUCTION
HERRINGBONE GEAR REDUCER





# TYPE D

LUFKIN DOUBLE REDUCTION
HERRINGBONE GEAR REDUCER

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# COMMERCIAL *Gear Assemblies* for SPEED REDUCING and SPEED INCREASING SERVICE


I. SINGLE REDUCTION REDUCERS, TYPE S
Ratios 2:1 to 10:1
Pages 2-15

II. DOUBLE REDUCTION REDUCERS, TYPE D
Ratios 10:1 to 75:1
Pages 2-15

III. MEDIUM-SPEED SINGLE REDUCTION REDUCERS AND INCREASERS, TYPE M
Ratios 2:1 to 10:1
Pages 16-19

IV. HIGH SPEED REDUCERS AND SPEED INCREASERS, TYPE N
Ratios 2:1 to 12:1
Pages 20-23



## LUFKIN FOUNDRY & MACHINE CO.

*Factory and Executive Offices*

LUFKIN, TEXAS

**Branch Offices**

DALLAS
1208 Gulf States Bldg.
Phone STerling 5127

DENVER
1423 Mile High Center
Phone Alpine 5-1616

HOUSTON
516 City National Bank Bldg.
Phone CApitol 2-0108

LOS ANGELES
5959 South Alameda
Phone Lafayette 1201

NEW YORK
149 Broadway
Phone Barclay 7-0562

OKLAHOMA CITY
108 Classen Terrace Bldg.
Phone Regent 6-7480

TULSA
605 Thompson Building
Phone 3-0204

CORPUS CHRISTI, TEXAS
1201 Wilson Bldg.
Phone 3-1881

EFFINGHAM, ILLINOIS
210 W. Jefferson St.
Phone 667-W

EL DORADO, ARKANSAS
J. R. Wilson Bldg.
Phone Union 3-7606

LAFAYETTE, LOUISIANA
P. O. Box 785
Phone 4-2846

SEMINOLE, OKLAHOMA
312 Eighth Street
Phone 34

SIDNEY, MONTANA
P. O. Box 551
Phone 861

GREAT BEND, KANSAS
North Main Street
Phone 5622

KILGORE, TEXAS
P. O. Box 871
Phone 3-875

ODESSA, TEXAS
P. O. Box 1632
Phone 6-5662

WICHITA FALLS, TEXAS
727 Oil & Gas Bldg.
Phone 2-1967

BAKERSFIELD, CALIF.
2608 Pine St.
Phone FAirview 7-8564

CASPER, WYOMING
P. O. Box 1849
Phone 3-4670

EDMONTON, ALBERTA, CANADA
14321 108th Avenue
Phone 8-6412

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# GENERAL SPECIFICATIONS

### Types S and D

## HOUSINGS

Housings are made of controlled specification high tensile gray iron castings in two sections, with accurately machined joint at split between base and cover. Interior surfaces are thoroughly sandblasted, cleaned, and painted to insure absolute freedom from core sand and foreign particles. Wall sections are of generous thickness and substantially ribbed for rigidity. Housings are bored in husky cast iron precision-built boring fixtures to assure accuracy and precise duplication of parts.

## GEARS

Gears are continuous tooth herringbone type generated on Sykes Machines. The gear teeth are cut after the gear has been pressed on its shaft and finish-turned, to assure concentricity between pitch circle and shaft. Final cutting of teeth is done slowly with freshly-ground cutter for better finish. Final finish of teeth is done in lapping machine to insure perfect mating contact between the tooth surfaces. Finished gears are carefully balanced. Gears are made of high tensile alloy steel castings and forgings heat treated.

## PINIONS

Except for very low ratios which result in large pinion diameters, pinions are made integral with their shafts. Material is heat treated alloy steel. Pinion shaft extensions are ground to nominal dimensions shown in rating tables with tolerance of plus or minus .0005".

## SHAFTS

All slow speed shafts are made of heat treated alloy steel ground to nominal dimensions shown in table of dimensions with tolerance of plus or minus .0005".

## BEARINGS

Tapered roller bearings are used on the slow speed shaft with the bearing adjusting shims on the side opposite the shaft extensions. On pinion shafts, solid-roll straight type anti-friction bearings are used which permit perfect alignment of the herringbone gears. All anti-friction bearings are mounted in individual bearing carriers. Bearings are designed for long, trouble-free life when properly lubricated.

## LUBRICATION

The slow speed gear runs in a bath of oil in the bottom of the housing and provides constant lubrication to the gear-mesh. This splash also furnishes a generous amount of oil to the troughs on the inside of the cover and from these troughs all bearings are lubricated by gravity flow. Oil seals eliminate oil leakage and the entrance of dirt. A protected glass oil level gauge permits instantaneous determination of oil level by visual inspection. The lubrication system is simple, positive and fool-proof so long as the housing is filled with the correct lubricant to a level which is visible in the glass gauge.

## MOTOR BASES

One-piece structural steel bases are available for mounting both the gear reducer and prime mover. These are fabricated by electric welding using heavy section steel plate and are stress-relieved after welding. All bases are custom-built to suit each individual job. In some cases common bases can be provided to accommodate the driven machine also.

## EFFICIENCY

The mechanical efficiency of single reduction Type S reducers is 98% to 98.5%. Double reduction Type D reducers have an efficiency of 97% to 97.5%.

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# EXPLANATION OF HORSEPOWER RATING TABLES

### Types S and D

The horsepower capacities of all Lufkin Gears are based on the latest Standard Practices of the American Gear Manufacturers Association of which Lufkin has been a member for several years. These ratings for Type S Single Reduction Units are shown on pages 8 and 9, and for Type D Double Reduction Units on pages 10 and 11.

## MECHANICAL RATINGS

The Mechanical Horsepower Ratings listed in the Rating Tables are for a Service Factor of 1 which would be the proper factor for a gear unit being driven by an electric motor 8-10 hours per day and driving a machine classed as a Uniform Load. For any other type of prime mover or driven machine or for any other duration of service the horsepower load would have to be modified by an appropriate Service Factor as explained on the following pages before the proper gear reducer could be selected

The load carrying capacity of a set of gears for a given size housing varies with ratio and speed. Therefore, the Rating Tables show the horsepower ratings for each size reducer at the several standard ratios and motor speeds. The gears will stand 100% overload at starting or momentarily during operation.

## THERMAL RATINGS

The table on page 14 shows the Thermal Horsepower Rating for each Type S reducer. This rating varies with speed and ratio. The Thermal Horsepower Ratings for Type D reducers are shown in the left hand column of the Rating Tables on pages 10 and 11. This rating is constant for each size Double Reduction reducer. The Thermal Horsepower Rating is the average load the unit will deliver continuously without overheating. The actual horsepower transmitted by the gear unit may not be greater than the Thermal Horsepower Rating unless the unit is equipped with an oil pump and cooler.

## SERVICE FACTORS

The selection of a gear unit for a certain job depends upon (1) the type of prime mover, (2) the character of the driven machine and (3) the number of hours per day the unit will operate. These variables enter into the selection of Reducers through the use of Service Factors.

A tabulation of the Character of Load for various types of machinery generally driven by gear units is shown in Table 1, page 7. Table 2, page 7, shows the Service Factors based on the three variables listed above.

In selecting a gear reducer the actual horsepower load to be transmitted is multiplied by the appropriate Service Factor to determine the Equivalent Horsepower. A reducer is then selected from the Rating Tables which has a tabulated rating equal to or greater than the Equivalent Horsepower. Conversely, the tabulated mechanical rating of a reducer divided by the Service Fatcor will give the Service Rating of a reducer. This Service Rating cannot be higher than the Thermal Horsepower unless means for artificially cooling the oil is provided.

## RATIOS

The gear ratios listed in the Rating Tables are standard for each size reducers and these particular ratios are more readily available than any other ratio. The exact ratio required or a very close approximation can be furnished, however, at slight additional cost. The approximate horsepower rating for intermediate ratios not shown in the tables may be determined by interpolation.

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# SELECTION OF GEAR REDUCERS

## Types S and D

In order to accurately select the proper gear reducer it is necessary to know:

(1) Horsepower load to be transmitted;
(2) Speed of both input and output shafts, or the speed of one shaft and the gear ratio;
(3) Type of prime mover;
(4) Type of driven machine; and
(5) Hours per day continuous operation,

Knowing the type of driven machine, determine from Table 1, page 7, whether the character of the load is Uniform, Moderate Shock or Heavy Shock. With this information and knowing the type of prime mover and hours of operation, select the proper Service Factor from Table 2, page 7.

Multiply the actual horsepower load to be transmitted by the Service Factor just selected to arrive at the Equivalent Horsepower. This Equivalent Horsepower is the tabulated or catalog rating as listed in the Rating Tables, pages 8 through 11. If the starting load is high, it should also be used as a check to determine Equivalent Horsepower. To do this, divide starting load by two and if the result is higher than the Equivalent Horsepower just calculated, it should be used as the Equivalent Horsepower in making the selection.

Divide the motor speed by the output speed of the reducer to determine ratio. If the ratio is less than 10:1, use the Single Reduction Type S Rating Tables on pages 8 and 9; if the ratio is between 10:1 and 75:1, use the Double Reduction Type D Rating Tables on pages 10 and 11. If the ratio required is higher than 75:1, consult our home office for recommendations.

Refer to the proper Horsepower Rating Table as specified above. In the column showing a ratio nearest to that required and on a horizontal line with the proper input speed, find a listed horsepower which is equal to or greater than the Equivalent Horsepower required. The size of the reducer is shown at the top of the table in which this horsepower rating is found. For intermediate ratios and speeds between those listed the approximate horsepower rating may be found by interpolation.

The Thermal Horsepower Ratings for Type S reducers are shown on page 14. The Thermal Horsepower Ratings for Type D reducers are shown in the left hand column of the Rating Tables on pages 10 and 11. The reducer selected should have a Thermal Rating equal to or greater than the **actual horsepower load** to be transmitted in order to avoid overheating of the unit during operation. It is often necessary to go to a larger size reducer to obtain satisfactory thermal capacity. It is possible to equip a reducer with an oil cooling system and thus increase the Thermal Rating in some cases when because of space limitations it is desirable to use the smallest possible reducer.

### OVERHUNG LOAD

In the event the output shaft of the reducer drives through a pulley, sprocket or gear, the overhung load capacity of the slow speed shaft should be checked. Although standard reducers are designed primarily for straight line torque drive through a flexible coupling, they will stand moderate overhung loads without difficulty.

The following formula will give the actual overhung load imposed on the shaft:

$$OL = K \times \frac{126{,}000 \times HP}{D \times RPM}$$

Where OL = Overhung load, lbs.
K = Constant for type of external drive
= 1.0 for Sprocket
= 1.25 for pinion
= 1.5 for V-belts
= 2.0 for flat belt
HP = Actual horsepower load
D = Diameter of sprocket, pinion or pulley, inches
RPM = Revolutions per minute of shaft being checked.

If the result of the above calculation shows the overhung load to be higher than the standard reducer will permit as shown by the table of Moderate Overhung Load ratings on page 15, the Heavy Overhung Load type reducer should be specified.

It might be that the actual load is also higher than the heavy overhung load capacity and in such an event it will be necessary to either increase the diameter of the pulley, sprocket or pinion, or go to the Outboard Bearing Type

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# SELECTION OF GEAR REDUCERS (cont'd.)

## Types S and D

Assembly. The Heavy Overhung Load capacities are not listed but are approximately double the ratings listed for Moderate Overhung Load Capacities on page 15.

### OUTBOARD BEARING ASSEMBLY

In the event the external load is excessive, the reducer shaft may be extended to an outboard bearing. The outboard bearing is supported by a pedestal which is generally built integral with the motor and reducer base. The bases for these units are made of fabricated steel plate, electric welded; and are especially built for each application.

When the actual overhung load is more than double the capacities shown in the Moderate Load Table on page 15, the Outboard Bearing Assembly should be specified.

### MOTOR BASES

If a Base for mounting the motor and reducer is desired, it is not necessary to make a selection of a Base. Bases are not made in specified sizes but are custom built for each application. This procedure is economical since the Bases are made of fabricated steel plate.

To obtain the proper Base on an order, it is only necessary that a certified setting plan for the motor be furnished.

# EXAMPLES OF REDUCER SELECTION

## Types S and D

**Example 1**

A gear reducer is required to drive a paper machine press. Electric motor input speed 1150 RPM and reducer output speed 202 RPM. Actual load 250 HP.

Service Factor: Refer to Table 1, Page 7, for Character of Load and note that Press is classified as Moderate Shock. Paper machines operate twenty-four hours per day; so, in Table 2, Page 7, the Service Factor for electric motor operating twenty-four hours per day with a Moderate Shock Load is found to be 1.5.

Equivalent Horsepower = Service Factor $\times$ Actual HP load $= 1.5 \times 250 = 375$ HP

$$\text{Gear Ratio} = \frac{\text{Input Speed, RPM}}{\text{Output Speed, RPM}} = \frac{1150}{202} = 5.69$$

Refer to the Rating Tables for Type S Reducers pages 8 and 9. Follow down the column showing a ratio nearest 5.69 and observe the horsepower ratings listed for 1150 RPM. Note that the reducer showing an Equivalent or Catalog Horsepower rating equal to or greater than the 375 horsepower required is the S2010A which has a rating of 489 horsepower at a ratio of 5.67.

Check the Thermal Horsepower Capacity on page 14 and note that this reducer has a thermal rating of 450 horsepower at this ratio and speed.

The S2010A is, therefore, the proper selection.

**Example 2**

A gear reducer having a ratio of 4:1 is desired to drive a two cylinder reciprocating pump. The prime mover is a 1400 RPM multi-cylinder engine and will deliver 100 horsepower twenty-four hours per day.

Service Factor: From Table 1 the Character of the Load is Heavy Shock and from Table 2 the Service Factor is found to be 2.00.

Equivalent Horsepower $= 2.00 \times 100 = 200$ HP.

Refer to the Rating Tables for Single Reduction units and observe that at a ratio near 4:1, the S126A is the smallest reducer with a Catalog Rating of at least 200 horsepower at the desired ratio and speed. It is obvious that the S105A is not large enough, because at 4.16 ratio and 1750 R.P.M. the Catalog Rating is only 175 horsepower. Since the input speed of 1400 R.P.M. is not listed for the S126A reducer, the approximate Catalog Rating can be found by direct interpolation as follows, observing that at 4.14 ratio it has a rating of 284 horsepower at 1750 R.P.M. and at 1150 R.P.M. it has a rating of 200 horsepower:

$$\frac{1400-1150}{1750-1150} \times (284-200) + 200 = 235 \text{ HP.}$$

Check the Thermal Horsepower Rating on page 14. At

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## EXAMPLES (cont'd.)

4.16 ratio the S126A reducer has a Thermal Rating approximately half-way between 160 and 205 horsepower at 1400 R.P.M.

The S126A at 4.14 ratio is, therefore, the proper selection.

**Example 3**

A gear reducer is required to drive a belt conveyor delivering foundry sand. It is probable that the belt will not be loaded at a uniform rate. The prime mover is a 5 horsepower electric motor running 1150 RPM, but the actual load on the drive will not exceed 4 horsepower. The output gear shaft is to operate at approximately 27 RPM and will be equipped with 7.63" pitch diameter sprocket. The conveyor will operate eight hours per day.

Service Factor: From Table 1 the Character of the Load is Moderate Shock and from Table 2 the Service Factor is 1.25.

Equivalent Horsepower $= 1.25 \times 4 = 5$ horsepower

(Note that the actual load to be transmitted and not the motor rating is multiplied by the Service Factor to get Equivalent Horsepower. However, if there is a possibility that the prime mover can deliver and the driven machine can absorb more horsepower than the actual load as calculated, the possibility of overload should be taken into account in making a reducer selection.)

$$\text{Gear Ratio} = \frac{1150 \text{ RPM}}{27 \text{ RPM}} = 42.6$$

Refer to the Rating Tables for Type D Double Reduction Units on pages 10 and 11 for ratios between 10:1 and 75:1. Under a ratio of 42.1 and at a speed of 1150 RPM it is found that the D120 Reducer has a mechanical rating of 5.6 horsepower which is satisfactory.

Check the overhung load on the slow speed shaft due to the chain drive:

$$OL = K \times \frac{126{,}000 \times HP}{D \times RPM}$$

$$= 1 \times \frac{126{,}000 \times 4}{7.63 \times 27.3} = 2{,}420 \text{ lbs.}$$

Refer to the Overhung Load Table for Double Reduction Reducers on page 15 and note that the capacity of the slow speed shaft on the D120 Reducer is 2510 pounds which is greater than the actual load imposed.

The D120 is, therefore, the proper selection.

## INFORMATION REQUIRED WITH ORDER OR INQUIRY

The following information should be furnished with your request for a quotation or with your purchase order for a gear reducer in order that we may furnish your exact requirement promptly without the delay of having to request additional information:

1. Actual horsepower load to be transmitted.
2. Speed of prime mover and driven machine, or speed of either shaft and gear ratio.
3. Type of prime mover (if engine, give number of cylinders).
4. Type of driven machine.
5. Number of hours per day reducer to be in continuous operation.
6. Direction of rotation (clockwise or counterclockwise, looking at extended end of high speed shaft).
7. Type of shaft connection (coupling, pulley, sprocket or gear).
8. If flexible couplings also purchased from us furnish diameter and key dimensions of connecting shafts.
9. If connection other than direct through coupling, furnish diameter of pulley, sprocket or gear, and give approximate direction of external load.
10. Shaft extensions right hand, left hand or special (see dimension drawings pages 12 and 13 for illustration of hand).
11. If Motor Base required furnish certified bolting layout for motor.
12. Report any unusual conditions of installation or operation.

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# SERVICE FACTORS FOR SPEED REDUCER SELECTION

## Types S and D

Table 1 below is to be used as a guide for determining the Character of Load imposed on a gear reducer by a representative group of machines generally driven by Gear Reducers. It would be impractical, of course, to list here every machine that might conceivably be driven by a Gear Reducer. It is believed, however, that the list is sufficiently complete so that if your particular machine is not listed you will be able to determine, by comparison, the character of the load to be imposed on your drive.

For an explanation of the use of these tables in connection with the selection of a Gear Reducer, see pages 4 and 5.

## Guide for Selecting Character of Load—Table 1

### UNIFORM LOAD

**Agitators**
- Liquid
- Semi-Liquid

**Bleachers**

**Blowers**
- Centrifugal or Vane

**Bottling Machines**

**Can Filling Machines**

**Conveyors**
- (Uniformly Loaded or Fed)
- Apron
- Assembly
- Belt
- Oven
- Screw

**Cookers**
- Cereal

**Elevators, Bucket**
- (Uniformly Loaded or Fed)
- Centrifugal Discharge
- Gravity Discharge
- Continuous Bucket

**Fans (Uniform Speed and Balance)**
- Centrifugal
- Light
- Propeller (Small)

**Feeders**
- Disc Type

**Generators**

**Kettles**
- Brew

**Line Shafts**
- Light

**Machine Tools**
- Light
- Auxiliary Drives

**Mixers**
- Liquid
- Semi-Liquid

**Pumps**
- Centrifugal
- Geared
- Rotary

**Sewage Disposal Equipment**
- Inside Service

**Screens**
- Air Washing
- Traveling Water, Intake

**Stokers**

### MODERATE SHOCK LOAD

**Agitators**
- Variable Density

**Beaters**
- Pulp

**Blowers**
- Lobe

**Cane Knives**

**Car Pullers**

**Compressors**
- Centrifugal or Rotary
- Reciprocating (3 or More Cylinders)

**Conveyors**
- (Heavy Duty or Dual Drive, Not Uniformly Fed)
- Apron
- Belt
- Live Roll
- Screw

**Cranes**
- Travel Motion
- Trolley Motion

**Dredges**
- Cable Reels
- Conveyors
- Stackers
- Utility Winches

**Dryers**
- Rotary

**Elevators**
- Heavy Duty Bucket
- Freight

**Fans**
- Large Mine
- Induced Draft

**Feeders (Pulsating Loads)**
- Apron
- Belt
- Screw

**Kilns**
- Cement
- Lime

**Laundry Machinery**
- Washers
- Tumblers

**Machine Tools**
- Main Drives
- Plate Planers

**Mills (Rotary Type)**
- Ball
- Pebble

**Mixers**
- Dough
- Concrete

**Oil Industry**
- Refineries—Chillers
- Paraffin Filter Press
- Rotary Kiln

**Paper Mills**
- Agitators
- Bleachers
- Calenders
- Couch
- Dryers
- Presses
- Suction Roll
- Conveyors
- Cylinders
- Felt Streachers
- Winders

**Pumps**
- Reciprocating (3 or More Cylinders)

**Screens**
- Rotary—Gravel or Stone

**Textile Machinery**

### HEAVY SHOCK LOAD

**Compressors**
- Reciprocating (Single or Two Cylinder)

**Conveyors**
- Reciprocating
- Shaker

**Crushers**
- Ore
- Stone

**Dredges**
- Cutter Head Drives
- Jig Drives
- Screen Drives

**Feeders**
- Reciprocating

**Machine Tools**
- Punch Press and Shears

**Mills**
- Hammer
- Rod
- Rubber Sheet

**Oil Industry**
- Oil Well Pumping (Not Over 150% Peak Torque)

**Paper Mills**
- Beaters and Pulpers
- Jordans

**Pumps**
- Reciprocating (Single or Two Cylinder)

**Punch Press**

## Service Factors—Table 2

| Prime Mover | DURATION OF SERVICE | Character of Load on Driven Machine | | |
|---|---|---|---|---|
| | | Uniform | Moderate Shock | Heavy Shock |
| **Electric Motor** | 8 to 10 Hours per Day | 1.00 | 1.25 | 1.75 |
| | 24 Hours per Day | 1.25 | 1.50 | 1.75 |
| | Intermittent 3 Hours per Day | 0.80 | 1.00 | 1.50 |
| | *Occasional ½ Hour per Day | 0.50 | 0.80 | 1.25 |
| **Multi-Cylinder Internal Combustion Engine** | 8 to 10 Hours per Day | 1.25 | 1.50 | 2.00 |
| | 24 Hours per Day | 1.50 | 1.75 | 2.00 |
| | Intermittent 3 Hours per Day | 1.00 | 1.25 | 1.75 |
| | Occasional ½ Hour per Day | 0.80 | 1.00 | 1.50 |
| **Single Cylinder Internal Combustion Engine** | 8 to 10 Hours per Day | 1.50 | 1.75 | 2.25 |
| | 24 Hours per Day | 1.75 | 2.00 | 2.25 |
| | Intermittent 3 Hours per Day | 1.25 | 1.50 | 2.00 |
| | Occasional ½ Hour per Day | 1.00 | 1.25 | 1.75 |

* Maximum momentary or starting load must not exceed 140 percent of normal.

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# HORSEPOWER RATING TABLES

## TYPE S—SINGLE REDUCTION UNITS

The Horsepower Ratings listed in the tables below are Mechanical ratings calculated by the A.G.M.A. formula using a Service Factor of 1. See pages 4, 5 and 6 for information on selecting reducers. See page 14 for Thermal Horsepower Ratings.

### Size No. S63A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.22 | 1.50 | 1.84 | 2.24 | 2.72 | 3.00 | 3.36 | 4.14 | 5.00 | 5.67 | 6.20 | 7.00 | 7.73 | 8.60 | 9.29 | 10.29 | |
| 1750 | 134 | 116 | 100 | 84 | 69 | 62 | 55 | 41 | 33 | 27 | 24 | 20 | 17 | 14.2 | 12.8 | 10.8 | .... |
| 1150 | 90 | 79 | 68 | 55 | 48 | 42 | 37 | 28 | 22 | 19 | 16 | 13 | 11 | 9 | 8.1 | 7.5 | .... |
| 870 | 74 | 64 | 55 | 45 | 37 | 34 | 29 | 23 | 18 | 15 | 13 | 10.7 | 9 | 7 | 6.5 | 5.7 | .... |
| 720 | 62 | 54 | 47 | 38 | 31 | 28 | 24 | 19 | 14.5 | 12 | 10.5 | 8.5 | 7.2 | 6.2 | 5.4 | 4.6 | .... |
| 580 | 52 | 45 | 39 | 32 | 26 | 23 | 20 | 16 | 12.2 | 10.2 | 8.5 | 7.3 | 6.1 | 5.2 | 4.7 | 3.7 | .... |
| High Speed Shaft Diameter | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1 | 1 | ⅞ | ⅞ | ⅞ | ⅞ | .... |

### Size No. S84A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.22 | 1.50 | 1.84 | 2.27 | 2.73 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.73 | 8.60 | 9.24 | 10.29 | |
| 1750 | 251 | 251 | 218 | 186 | 153 | 140 | 122 | 92 | 72 | 60 | 52 | 44 | 38 | 32 | 28 | 24 | .... |
| 1150 | 179 | 179 | 155 | 130 | 108 | 98 | 85 | 64 | 50 | 40 | 33 | 29 | 24 | 21 | 19 | 17 | .... |
| 870 | 135 | 135 | 124 | 102 | 83 | 76 | 65 | 50 | 39 | 33 | 26 | 24 | 20 | 17 | 15 | 13 | .... |
| 720 | 112 | 112 | 105 | 86 | 71 | 63 | 55 | 42 | 32 | 27 | 22 | 19 | 16 | 14 | 13 | 11 | .... |
| 580 | 90 | 90 | 88 | 72 | 60 | 53 | 46 | 35 | 26 | 22 | 18 | 16 | 14 | 12 | 10 | 9 | .... |
| High Speed Shaft Diameter | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1½ | 1½ | 1½ | 1¼ | 1 | 1 | .... |

### Size No. S105A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.22 | 1.50 | 1.86 | 2.24 | 2.72 | 3.00 | 3.38 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.47 | 9.00 | 10.43 | |
| 1750 | .... | 400 | 400 | 339 | 282 | 260 | 226 | 175 | 135 | 112 | 98 | 82 | 73 | 61 | 56 | 44 | .... |
| 1150 | 260 | 260 | 260 | 240 | 198 | 175 | 155 | 119 | 90 | 76 | 65 | 55 | 50 | 42 | 38 | 33 | .... |
| 870 | 200 | 200 | 200 | 191 | 157 | 141 | 124 | 95 | 74 | 62 | 53 | 45 | 40 | 33 | 30 | 24 | .... |
| 720 | 166 | 166 | 166 | 164 | 134 | 120 | 105 | 80 | 62 | 51 | 44 | 37 | 33 | 28 | 25 | 20 | .... |
| 580 | 134 | 134 | 134 | 134 | 111 | 100 | 88 | 66 | 51 | 43 | 37 | 31 | 28 | 23 | 21 | 16 | .... |
| High Speed Shaft Diameter | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1¾ | 1½ | 1½ | 1½ | 1½ | .... |

### Size No. S126A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.22 | 1.50 | 1.85 | 2.24 | 2.73 | 3.00 | 3.36 | 4.14 | 5.00 | 5.55 | 6.27 | 7.00 | 7.57 | 8.33 | 9.29 | 10.43 | |
| 1750 | .... | .... | 660 | 554 | 460 | 415 | 362 | 284 | 223 | 192 | 160 | 135 | 120 | 103 | 88 | 73 | .... |
| 1150 | 585 | 540 | 470 | 395 | 320 | 292 | 257 | 200 | 155 | 135 | 110 | 93 | 83 | 69 | 58 | 50 | .... |
| 870 | 451 | 427 | 367 | 309 | 258 | 232 | 206 | 160 | 121 | 104 | 87 | 72 | 65 | 55 | 47 | 39 | .... |
| 720 | 373 | 366 | 312 | 264 | 218 | 198 | 172 | 134 | 102 | 88 | 74 | 62 | 55 | 47 | 39 | 33 | .... |
| 580 | 300 | 300 | 266 | 225 | 183 | 167 | 147 | 110 | 85 | 74 | 61 | 52 | 46 | 40 | 33 | 27 | .... |
| High Speed Shaft Diameter | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2 | 2 | 1¾ | 1¾ | 1½ | .... |

### Size No. S147A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.33 | 1.50 | 1.84 | 2.23 | 2.73 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.26 | 7.00 | 7.62 | 8.33 | 9.18 | 10.20 | |
| 1750 | .... | .... | .... | 835 | 700 | 622 | 554 | 425 | 335 | 284 | 248 | 210 | 183 | 157 | 135 | 115 | .... |
| 1150 | 890 | 810 | 690 | 580 | 490 | 445 | 380 | 295 | 230 | 192 | 162 | 132 | 120 | 105 | 90 | 79 | .... |
| 870 | 675 | 655 | 562 | 468 | 385 | 345 | 302 | 238 | 185 | 152 | 130 | 108 | 95 | 85 | 74 | 62 | .... |
| 720 | 555 | 555 | 480 | 400 | 325 | 295 | 261 | 201 | 157 | 130 | 110 | 94 | 84 | 72 | 63 | 52 | .... |
| 580 | 450 | 450 | 400 | 335 | 275 | 251 | 220 | 168 | 131 | 108 | 93 | 79 | 69 | 59 | 50 | 43 | .... |
| High Speed Shaft Diameter | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2⅝ | 2½ | 2 | 2 | 2 | .... |

### Size No. S168A

| | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.29 | 1.50 | 1.84 | 2.25 | 2.73 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.62 | 8.33 | 9.24 | 10.20 | |
| 1750 | .... | .... | .... | .... | 968 | 865 | 760 | 590 | 475 | 400 | 350 | 298 | 258 | 225 | 194 | 166 | .... |
| 1150 | .... | 1100 | 970 | 828 | 680 | 615 | 542 | 418 | 328 | 280 | 242 | 205 | 175 | 150 | 118 | 95 | .... |
| 870 | 860 | 860 | 803 | 663 | 540 | 489 | 435 | 333 | 265 | 222 | 189 | 160 | 140 | 122 | 103 | 90 | .... |
| 720 | 710 | 710 | 688 | 565 | 460 | 418 | 365 | 286 | 228 | 186 | 161 | 135 | 118 | 102 | 87 | 75 | .... |
| 580 | 570 | 570 | 570 | 480 | 392 | 356 | 311 | 238 | 186 | 156 | 132 | 111 | 96 | 84 | 72 | 63 | .... |
| High Speed Shaft Diameter | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 2¾ | 2¾ | 2 | 2 | .... |

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# HORSEPOWER RATING TABLES (cont'd.)

## TYPE S—SINGLE REDUCTION UNITS

### Size No. S189A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | 1.50 | 1.84 | 2.22 | 2.72 | 3.00 | 3.36 | 4.14 | 5.00 | 5.75 | 6.20 | 7.00 | 7.57 | 8.42 | 9.29 | 9.80 | 10.45 |
| 1750 | .... | .... | .... | .... | .... | .... | 1060 | 816 | 652 | 540 | 480 | 405 | 360 | 300 | 258 | 235 | 215 |
| 1150 | .... | .... | 1340 | 1120 | 920 | 837 | 735 | 565 | 440 | 365 | 330 | 278 | 248 | 208 | 172 | 160 | 140 |
| 870 | .... | 1258 | 1105 | 925 | 740 | 662 | 594 | 460 | 361 | 299 | 268 | 223 | 197 | 167 | 143 | 130 | 119 |
| 720 | .... | 1087 | 940 | 790 | 629 | 568 | 503 | 387 | 308 | 252 | 225 | 186 | 163 | 137 | 121 | 112 | 99 |
| 580 | .... | 880 | 805 | 665 | 533 | 482 | 427 | 335 | 261 | 215 | 189 | 158 | 137 | 115 | 100 | 93 | 83 |
| High Speed Shaft Diameter | .... | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¼ | 2⅝ | 2⅝ | 2⅝ | 2¼ |

### Size No. S2010A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | 1.50 | 1.86 | 2.24 | 2.72 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.60 | 9.37 | 10.43 | .... |
| 1750 | .... | .... | .... | .... | .... | .... | .... | 1069 | 840 | 712 | 620 | 530 | 472 | 390 | 343 | 293 | .... |
| 1150 | .... | .... | .... | 1420 | 1195 | 1090 | 950 | 735 | 582 | 489 | 425 | 369 | 329 | 265 | 221 | 170 | .... |
| 870 | .... | 1320 | 1320 | 1200 | 990 | 880 | 771 | 596 | 471 | 394 | 348 | 296 | 263 | 212 | 185 | 160 | .... |
| 720 | .... | 1090 | 1090 | 1024 | 840 | 755 | 655 | 505 | 400 | 335 | 294 | 250 | 220 | 179 | 152 | 130 | .... |
| 580 | .... | 880 | 880 | 880 | 723 | 651 | 557 | 432 | 339 | 285 | 248 | 207 | 184 | 150 | 130 | 112 | .... |
| High Speed Shaft Diameter | .... | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¼ | 2⅝ | 2⅝ | .... |

### Size No. S2211A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | 1.50 | 1.84 | 2.24 | 2.73 | 3.00 | 3.40 | 4.18 | 5.00 | 5.67 | 6.33 | 7.00 | 7.61 | 8.43 | 9.27 | 10.0 | .... |
| 1150 | .... | .... | .... | .... | 1584 | 1427 | 1220 | 930 | 725 | 625 | 539 | 465 | 411 | 352 | 302 | 265 | .... |
| 870 | .... | .... | 1800 | 1529 | 1250 | 1140 | 975 | 750 | 590 | 500 | 433 | 374 | 331 | 285 | 240 | 210 | .... |
| 720 | .... | 1735 | 1530 | 1300 | 1056 | 965 | 831 | 635 | 500 | 423 | 365 | 318 | 278 | 239 | 203 | 175 | .... |
| 580 | .... | 1500 | 1310 | 1100 | 913 | 835 | 710 | 544 | 427 | 362 | 311 | 271 | 233 | 200 | 170 | 145 | .... |
| High Speed Shaft Diameter | .... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3¾ | 3¾ | 3¾ | .... |

### Size No. S2411A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | 1.50 | 1.85 | 2.24 | 2.73 | 3.00 | 3.36 | 4.19 | 5.00 | 5.67 | 6.27 | 7.00 | 7.62 | 8.60 | 9.29 | 10.08 | 11.00 |
| 1150 | .... | .... | .... | .... | 1840 | 1650 | 1455 | 1100 | 870 | 730 | 640 | 550 | 490 | 410 | 360 | 310 | 260 |
| 870 | .... | .... | 2100 | 1750 | 1440 | 1315 | 1163 | 878 | 703 | 589 | 505 | 434 | 380 | 320 | 280 | 250 | 215 |
| 720 | .... | 1880 | 1770 | 1500 | 1230 | 1120 | 989 | 750 | 595 | 497 | 431 | 368 | 325 | 270 | 240 | 210 | 180 |
| 580 | .... | 1520 | 1450 | 1290 | 1056 | 980 | 837 | 636 | 502 | 423 | 366 | 310 | 270 | 220 | 196 | 170 | 150 |
| High Speed Shaft Diameter | .... | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 3¾ | 3¾ | 3¼ | 3¼ |

### Size No. S2712A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | 1.50 | 1.84 | 2.24 | 2.72 | 3.00 | 3.36 | 4.19 | 5.00 | 5.75 | 6.20 | 7.00 | 7.53 | 8.53 | 9.22 | 10.25 | 11.27 |
| 1150 | .... | .... | .... | .... | .... | .... | 1880 | 1430 | 1130 | 950 | 850 | 710 | 635 | 530 | 470 | 395 | 330 |
| 870 | .... | .... | .... | 2340 | 1918 | 1726 | 1536 | 1168 | 904 | 736 | 683 | 571 | 518 | 428 | 381 | 320 | 270 |
| 720 | .... | .... | 2380 | 2011 | 1650 | 1475 | 1300 | 989 | 771 | 635 | 570 | 480 | 430 | 360 | 310 | 267 | 230 |
| 580 | .... | 2080 | 2028 | 1700 | 1390 | 1260 | 1106 | 847 | 665 | 541 | 492 | 410 | 365 | 300 | 260 | 220 | 190 |
| High Speed Shaft Diameter | .... | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4½ | 4 | 3¾ |

### Size No. S3012A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | 1.83 | 2.24 | 2.75 | 3.00 | 3.36 | 4.17 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.38 | 9.29 | 10.54 | .... |
| 1150 | .... | .... | .... | .... | .... | .... | .... | 1790 | 1400 | 1175 | 1010 | 860 | 765 | 655 | 555 | 450 | .... |
| 870 | .... | .... | .... | .... | 2314 | 2130 | 1873 | 1420 | 1115 | 918 | 809 | 683 | 617 | 526 | 453 | 375 | .... |
| 720 | .... | .... | 2590 | 2400 | 1960 | 1780 | 1577 | 1207 | 957 | 783 | 686 | 585 | 520 | 440 | 380 | 315 | .... |
| 580 | .... | .... | 2080 | 2040 | 1683 | 1530 | 1350 | 1027 | 798 | 675 | 580 | 495 | 438 | 370 | 320 | 262 | .... |
| High Speed Shaft Diameter | .... | .... | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4½ | .... |

Ratios listed are standard but intermediate ratios are available.

Ratings for intermediate ratios and speeds may be found by direct interpolation. When selection falls in the blank space above the ratings listed, see page 16 for Medium Speed Type M Reducers.

All units may be operated at speeds lower than the minimum shown. The selection of a reducer for a lower speed may be accomplished by multiplying the desired horsepower by 580 and dividing by the desired RPM. The result will be the equivalent horsepower at 580 RPM which can be found in the above tables.

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# HORSEPOWER RATING TABLES

## TYPE D — DOUBLE REDUCTION UNITS

The Horsepower Ratings listed in the tables below are mechanical ratings calculated by the A.G.M.A. formula using a Service Factor of 1. See pages 4, 5 and 6 for information on selecting reducers.

### Reducer No. D100

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.7 | 11.8 | 12.9 | 14.2 | 16.5 | 18.3 | 20.3 | 22.7 | 25.5 | 28.7 | 32.5 | 37.0 | 40.5 | 46.1 | 49.0 | ..... | ..... | ..... | ..... | ..... |
| 28 | 1750 | 16.5 | 15.7 | 14.8 | 14.1 | 12.4 | 11.6 | 10.6 | 10.0 | 9.2 | 8.0 | 6.8 | 5.8 | 5.1 | 4.5 | 4.1 | ..... | ..... | ..... | ..... | ..... |
| | 1150 | 11.6 | 10.7 | 10.2 | 9.7 | 8.7 | 8.0 | 7.3 | 6.9 | 6.2 | 5.4 | 4.7 | 3.9 | 3.6 | 3.0 | 2.7 | ..... | ..... | ..... | ..... | ..... |
| | 870 | 8.9 | 8.4 | 8.0 | 7.5 | 6.7 | 6.2 | 5.7 | 5.3 | 4.9 | 4.1 | 3.6 | 3.0 | 2.7 | 2.3 | 2.1 | ..... | ..... | ..... | ..... | ..... |
| | 720 | 7.5 | 7.0 | 6.6 | 6.2 | 5.6 | 5.2 | 4.8 | 4.4 | 4.1 | 3.5 | 3.0 | 2.5 | 2.2 | 1.9 | 1.7 | ..... | ..... | ..... | ..... | ..... |
| | 580 | 6.3 | 6.0 | 5.6 | 5.3 | 4.7 | 4.3 | 3.9 | 3.6 | 3.3 | 2.8 | 2.4 | 2.1 | 1.8 | 1.6 | 1.4 | ..... | ..... | ..... | ..... | ..... |
| High Speed Shaft Diameter | | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ¾ | ¾ | ¾ | ¾ | ¾ | ..... | ..... | ..... | ..... | ..... |

### Reducer No. D120

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.7 | 12.1 | 13.8 | 15.8 | 18.1 | 20.5 | 22.4 | 25.7 | 27.3 | 31.4 | 36.4 | 42.1 | 45.3 | 47.5 | 50.7 | 53.7 | 61.1 | ..... | ..... | ..... |
| 39 | 1750 | 30.5 | 28.6 | 26.7 | 24.6 | 22.6 | 20.4 | 18.6 | 16.0 | 14.5 | 12.3 | 10.4 | 8.4 | 8.0 | 7.2 | 7.0 | 6.2 | 5.1 | ..... | ..... | ..... |
| | 1150 | 21.4 | 20.0 | 18.5 | 16.8 | 15.5 | 13.1 | 12.0 | 9.9 | 9.3 | 8.0 | 6.8 | 5.6 | 5.5 | 5.0 | 4.8 | 4.2 | 3.5 | ..... | ..... | ..... |
| | 870 | 16.6 | 15.5 | 14.4 | 13.2 | 12.0 | 10.5 | 9.6 | 8.2 | 7.4 | 6.2 | 5.3 | 4.6 | 4.2 | 3.8 | 3.6 | 3.2 | 2.7 | ..... | ..... | ..... |
| | 720 | 14.0 | 13.0 | 12.0 | 11.0 | 10.0 | 8.9 | 8.1 | 7.0 | 6.4 | 5.2 | 4.3 | 3.8 | 3.4 | 3.1 | 3.0 | 2.7 | 2.3 | ..... | ..... | ..... |
| | 580 | 11.6 | 10.8 | 10.0 | 9.3 | 8.0 | 7.0 | 6.6 | 5.6 | 5.2 | 4.2 | 3.7 | 3.1 | 2.8 | 2.6 | 2.5 | 2.2 | 1.8 | ..... | ..... | ..... |
| High Speed Shaft Diameter | | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1 | 1 | 1 | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ..... | ..... | ..... |

### Reducer No. D145

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.7 | 11.8 | 13.2 | 14.7 | 16.4 | 19.4 | 22.0 | 25.0 | 28.6 | 30.5 | 32.9 | 37.2 | 42.4 | 45.6 | 49.0 | 52.5 | 60.0 | 64.6 | ..... | ..... |
| 60 | 1750 | 50.0 | 45.1 | 43.0 | 40.0 | 37.7 | 33.0 | 30.6 | 26.8 | 23.5 | 21.5 | 19.6 | 16.8 | 14.0 | 12.8 | 11.6 | 10.7 | 9.5 | 8.3 | ..... | ..... |
| | 1150 | 34.5 | 31.4 | 29.9 | 28.0 | 26.3 | 22.7 | 20.9 | 18.0 | 15.4 | 14.6 | 13.2 | 11.2 | 9.7 | 8.4 | 7.9 | 7.4 | 6.5 | 5.7 | ..... | ..... |
| | 870 | 27.2 | 24.8 | 23.2 | 21.7 | 20.5 | 17.8 | 16.1 | 13.9 | 11.9 | 11.3 | 10.3 | 8.8 | 7.5 | 6.7 | 6.1 | 5.4 | 4.9 | 4.4 | ..... | ..... |
| | 720 | 22.6 | 20.8 | 19.5 | 18.4 | 17.2 | 14.8 | 13.8 | 11.7 | 10.0 | 9.4 | 8.6 | 7.1 | 6.2 | 5.5 | 5.0 | 4.6 | 4.1 | 3.6 | ..... | ..... |
| | 580 | 19.0 | 17.3 | 16.3 | 15.4 | 14.3 | 12.7 | 11.2 | 9.4 | 8.2 | 7.7 | 7.0 | 6.1 | 5.1 | 4.4 | 4.0 | 3.6 | 3.2 | 2.5 | ..... | ..... |
| High Speed Shaft Diameter | | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1¼ | 1¼ | 1¼ | 1¼ | 1 | 1 | 1 | 1 | ..... | ..... |

### Reducer No. D170

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.1 | 13.0 | 14.6 | 16.4 | 18.4 | 21.0 | 23.6 | 26.7 | 30.4 | 32.1 | 36.4 | 41.4 | 47.5 | 50.7 | 53.6 | 57.4 | 64.6 | 69.4 | ..... | ..... |
| 69 | 1750 | 68 | 60 | 56 | 53 | 49.0 | 45.2 | 42.0 | 39.2 | 34.5 | 32.0 | 28.2 | 24.0 | 20.0 | 19.0 | 17.5 | 15.3 | 13.8 | 12.4 | ..... | ..... |
| | 1150 | 48.7 | 41.3 | 40.0 | 36.8 | 34.4 | 31.6 | 29.6 | 27.4 | 23.7 | 22.2 | 19.0 | 16.4 | 13.6 | 12.7 | 12.0 | 10.5 | 9.4 | 8.5 | ..... | ..... |
| | 870 | 37.4 | 32.7 | 30.8 | 28.7 | 26.8 | 24.7 | 23.0 | 21.3 | 18.6 | 17.0 | 14.6 | 12.7 | 10.6 | 9.8 | 9.0 | 8.0 | 7.1 | 6.5 | ..... | ..... |
| | 720 | 31.4 | 27.8 | 25.8 | 24.1 | 22.3 | 20.7 | 19.4 | 17.6 | 15.2 | 14.5 | 12.3 | 10.5 | 8.8 | 8.4 | 7.6 | 6.7 | 6.0 | 5.4 | ..... | ..... |
| | 580 | 26.5 | 23.0 | 21.6 | 20.2 | 18.6 | 17.3 | 16.1 | 14.4 | 12.4 | 11.8 | 10.0 | 8.6 | 7.2 | 6.7 | 6.2 | 5.4 | 4.9 | 4.2 | ..... | ..... |
| High Speed Shaft Diameter | | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1½ | 1½ | 1¼ | 1¼ | 1¼ | 1¼ | 1 | 1 | 1 | 1 | ..... | ..... |

### Reducer No. D195

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.3 | 12.5 | 14.2 | 16.5 | 18.3 | 20.5 | 22.9 | 25.8 | 29.1 | 33.1 | 36.1 | 40.0 | 46.7 | 49.8 | 52.3 | 59.0 | 66.7 | 70.5 | ..... | ..... |
| 85 | 1750 | 101 | 93 | 85 | 76 | 71 | 66 | 62 | 57 | 51 | 44.3 | 40.5 | 34.5 | 29.4 | 26.5 | 25.0 | 21.6 | 18.6 | 17.6 | ..... | ..... |
| | 1150 | 69 | 64 | 59 | 54 | 50 | 46.8 | 43.0 | 40.0 | 35.4 | 30.1 | 27.8 | 23.7 | 20.3 | 18.3 | 17.0 | 14.9 | 12.4 | 11.8 | ..... | ..... |
| | 870 | 55 | 51 | 46.6 | 41.4 | 38.7 | 36.1 | 33.5 | 31.1 | 27.5 | 23.2 | 21.4 | 18.2 | 15.4 | 14.0 | 13.0 | 11.5 | 9.7 | 9.1 | ..... | ..... |
| | 720 | 46.2 | 42.7 | 39.4 | 35.0 | 32.4 | 30.2 | 28.2 | 26.0 | 23.0 | 19.7 | 17.8 | 15.3 | 13.0 | 11.6 | 10.8 | 9.6 | 8.3 | 7.6 | ..... | ..... |
| | 580 | 38.4 | 35.8 | 32.8 | 29.2 | 27.0 | 25.3 | 23.5 | 21.4 | 18.8 | 16.0 | 14.7 | 12.8 | 10.5 | 9.6 | 8.9 | 8.0 | 6.7 | 6.3 | ..... | ..... |
| High Speed Shaft Diameter | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1¾ | 1¾ | 1¾ | 1½ | 1½ | 1½ | 1½ | 1¼ | 1¼ | ..... | ..... |

### Reducer No. D220

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.1 | 12.3 | 13.7 | 15.2 | 17.9 | 20.0 | 22.6 | 26.0 | 30.5 | 34.2 | 38.6 | 43.8 | 46.6 | 51.2 | 53.9 | 58.1 | 61.4 | 65.4 | 70.0 | 74.1 |
| 100 | 1750 | 142 | 133 | 126 | 116 | 104 | 96 | 89 | 78 | 67 | 59 | 50 | 43 | 40 | 35 | 33 | 30 | 28 | 25 | 23 | 21 |
| | 1150 | 100 | 94 | 86 | 80 | 72 | 67 | 62 | 54 | 45 | 40 | 33 | 29 | 28 | 25 | 23 | 21 | 19 | 17 | 15 | 14 |
| | 870 | 77 | 72 | 67 | 62 | 56 | 52 | 49 | 41 | 35 | 30 | 26 | 23 | 22 | 19 | 18 | 16 | 15 | 14 | 12 | 11 |
| | 720 | 65 | 61 | 57 | 53 | 48 | 44 | 41 | 35 | 29 | 25 | 22 | 19 | 18 | 16 | 15 | 14 | 13 | 11 | 10 | 9 |
| | 580 | 54 | 51 | 47 | 44 | 40 | 37 | 34 | 29 | 24 | 21 | 18 | 16 | 15 | 13 | 12 | 11 | 10 | 9 | 8 | 7 |
| High Speed Shaft Diameter | | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 1¾ | 1¾ | 1¾ | 1¾ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ |

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# HORSEPOWER RATING TABLES

## TYPE D — DOUBLE REDUCTION UNITS

The Horsepower Ratings listed in the tables below are mechanical ratings calculated by the A.G.M.A. formula using a Service Factor of 1. See pages 4, 5 and 6 for information on selecting reducers.

### Reducer No. D250

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.3 | 13.1 | 14.6 | 16.0 | 17.7 | 20.5 | 22.7 | 25.5 | 28.5 | 32.1 | 36.4 | 40.8 | 46.2 | 48.3 | 53.7 | 56.4 | 60.2 | 63.3 | 67.8 | 72.0 |
| 120 | 1750 | 179 | 173 | 163 | 154 | 145 | 127 | 119 | 109 | 101 | 90 | 78 | 67 | 57 | 55 | 48 | 45 | 42 | 39 | 35 | 33 |
| | 1150 | 127 | 124 | 115 | 106 | 100 | 88 | 83 | 76 | 71 | 62 | 53 | 45 | 39 | 38 | 33 | 31 | 29 | 27 | 24 | 22 |
| | 870 | 100 | 94 | 88 | 83 | 78 | 68 | 64 | 59 | 56 | 48 | 41 | 36 | 30 | 29 | 25 | 24 | 22 | 21 | 19 | 17 |
| | 720 | 84 | 80 | 75 | 70 | 65 | 58 | 54 | 50 | 46 | 40 | 34 | 30 | 25 | 24 | 21 | 20 | 19 | 18 | 16 | 14 |
| | 580 | 70 | 67 | 63 | 59 | 55 | 49 | 45 | 42 | 39 | 33 | 28 | 24 | 21 | 20 | 18 | 17 | 16 | 15 | 13 | 12 |
| High Speed Shaft Diameter | | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2¼ | 2¼ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1¾ | 1½ |

### Reducer No. D290

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.7 | 13.0 | 14.3 | 16.7 | 19.1 | 22.2 | 24.8 | 27.7 | 29.9 | 33.2 | 37.0 | 41.3 | 46.5 | 51.5 | 55.1 | 58.0 | 62.4 | 65.7 | 68.7 | 72.6 |
| 148 | 1750 | ..... | 263 | 247 | 228 | 206 | 186 | 174 | 150 | 140 | 126 | 108 | 95 | 81 | 74 | 67 | 61 | 56 | 53 | 50 | 47 |
| | 1150 | 196 | 188 | 176 | 163 | 147 | 131 | 120 | 106 | 97 | 86 | 74 | 65 | 55 | 49 | 45 | 43 | 38 | 36 | 34 | 32 |
| | 870 | 155 | 148 | 137 | 127 | 115 | 100 | 93 | 83 | 76 | 65 | 56 | 50 | 44 | 39 | 35 | 33 | 30 | 28 | 26 | 25 |
| | 720 | 131 | 125 | 116 | 108 | 97 | 86 | 78 | 70 | 65 | 56 | 50 | 44 | 37 | 33 | 29 | 28 | 25 | 24 | 22 | 21 |
| | 580 | 110 | 103 | 96 | 90 | 81 | 71 | 65 | 57 | 53 | 46 | 40 | 34 | 29 | 27 | 24 | 23 | 20 | 19 | 18 | 17 |
| High Speed Shaft Diameter | | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2½ | 2½ | 2½ | 2½ | 2¼ | 2¼ | 2¼ | 2¼ | 2 |

### Reducer No. D340

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.4 | 12.9 | 14.7 | 16.0 | 18.3 | 21.2 | 23.3 | 25.5 | 28.7 | 32.1 | 36.0 | 40.1 | 45.0 | 47.5 | 50.7 | 54.9 | 58.7 | 65.7 | 70.1 | 74.0 |
| 192 | 1750 | ..... | ..... | ..... | ..... | 320 | 298 | 279 | 251 | 222 | 198 | 177 | 155 | 133 | 127 | 119 | 104 | 97 | 86 | 77 | 72 |
| | 1150 | 316 | 298 | 271 | 257 | 229 | 214 | 199 | 178 | 156 | 139 | 121 | 104 | 91 | 88 | 79 | 71 | 67 | 58 | 52 | 49 |
| | 870 | 250 | 232 | 211 | 201 | 180 | 165 | 155 | 137 | 126 | 105 | 94 | 82 | 70 | 67 | 60 | 55 | 52 | 45 | 40 | 38 |
| | 720 | 211 | 200 | 180 | 171 | 153 | 141 | 132 | 113 | 102 | 91 | 77 | 68 | 59 | 56 | 50 | 47 | 44 | 38 | 34 | 32 |
| | 580 | 178 | 167 | 152 | 144 | 126 | 118 | 110 | 94 | 84 | 75 | 65 | 57 | 48 | 46 | 41 | 38 | 36 | 31 | 28 | 26 |
| High Speed Shaft Diameter | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2⅝ | 2⅝ | 2⅝ | 2⅜ | 2½ | 2½ | 2½ | 2½ |

### Reducer No. D390

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.5 | 13.5 | 14.6 | 16.6 | 18.9 | 20.7 | 22.7 | 25.0 | 27.6 | 31.5 | 34.7 | 38.4 | 42.8 | 45.5 | 50.3 | 54.8 | 60.8 | 64.5 | 68.6 | 71.6 |
| 234 | 1750 | ..... | ..... | ..... | ..... | ..... | ..... | 392 | 370 | 341 | 297 | 275 | 248 | 215 | 193 | 177 | 159 | 138 | 133 | 120 | 117 |
| | 1150 | 420 | 387 | 364 | 353 | 313 | 294 | 272 | 262 | 245 | 216 | 190 | 170 | 148 | 134 | 120 | 110 | 94 | 89 | 83 | 79 |
| | 870 | 328 | 307 | 288 | 274 | 245 | 232 | 221 | 206 | 192 | 167 | 148 | 130 | 115 | 103 | 95 | 85 | 75 | 71 | 65 | 61 |
| | 720 | 281 | 258 | 244 | 233 | 208 | 196 | 187 | 174 | 160 | 138 | 125 | 108 | 95 | 87 | 79 | 72 | 64 | 60 | 54 | 51 |
| | 580 | 238 | 218 | 205 | 193 | 175 | 165 | 155 | 144 | 132 | 113 | 103 | 91 | 79 | 71 | 63 | 59 | 52 | 48 | 44 | 42 |
| High Speed Shaft Diameter | | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3 | 3 | 3 | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2½ |

### Reducer No. D440

| Thermal Rating H.P. | Motor R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11.7 | 13.0 | 14.5 | 16.2 | 18.2 | 20.6 | 22.4 | 25.4 | 30.4 | 33.4 | 36.7 | 40.6 | 45.2 | 48.6 | 53.3 | 56.5 | 60.0 | 65.2 | 68.9 | 72.0 |
| 270 | 1750 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 413 | 382 | 343 | 300 | 268 | 242 | 220 | 204 | 187 | 173 | 157 | 148 |
| | 1150 | 545 | 520 | 481 | 460 | 422 | 396 | 378 | 340 | 293 | 260 | 234 | 209 | 185 | 167 | 150 | 135 | 129 | 116 | 108 | 98 |
| | 870 | 424 | 411 | 378 | 360 | 334 | 310 | 296 | 266 | 225 | 206 | 184 | 159 | 141 | 127 | 116 | 107 | 97 | 91 | 86 | 81 |
| | 720 | 360 | 348 | 318 | 307 | 281 | 265 | 254 | 226 | 188 | 172 | 148 | 133 | 121 | 106 | 101 | 90 | 82 | 77 | 70 | 67 |
| | 580 | 307 | 297 | 272 | 260 | 237 | 223 | 214 | 190 | 156 | 142 | 129 | 111 | 97 | 89 | 80 | 73 | 68 | 63 | 57 | 55 |
| High Speed Shaft Diameter | | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3 | 3 | 3 |

Ratios listed are standard but intermediate ratios are available.

Ratings for intermediate ratios and speeds may be found by direct interpolation.

All units may be operated at speeds lower than the minimum shown. The selection of a reducer for a lower speed may be accomplished by multiplying the desired horsepower by 580 and dividing by the desired speed. The result will be the equivalent horsepower at 580 RPM which can be found in the above tables.

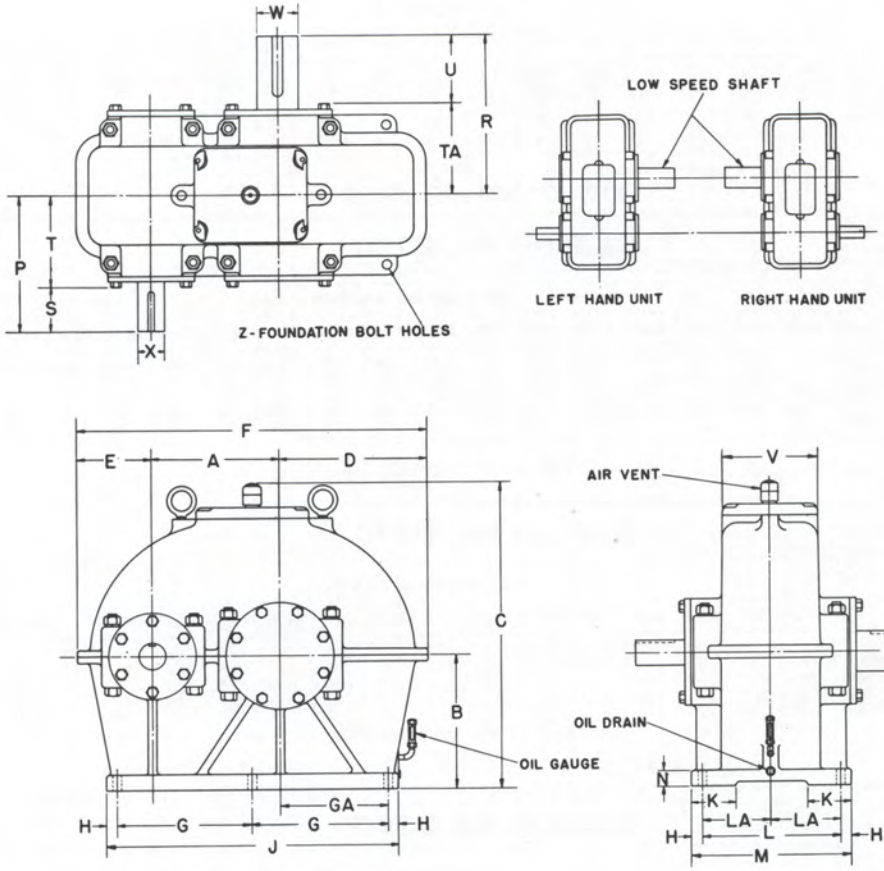
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# GENERAL DIMENSIONS

## Type S

## SINGLE REDUCTION HERRINGBONE GEAR REDUCERS




| Size No. | A | B | C | D | E | F | G | GA | H | J | K | L | LA | M | N | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S63A | 6 | 8 | 17 1/16 | 7½ | 4½ | 18 | 13½ | 5¼ | ¾ | 15 | * | 8½ | 4¼ | 10 | ⅞ | 8⅝ |
| S84A | 8 | 10½ | 21 11/16 | 10 | 5½ | 23½ | 17½ | 7 | 1 | 19½ | * | 9½ | 4¾ | 11½ | 1 | 9½ |
| S105A | 10 | 12½ | 26 1/16 | 12½ | 7 | 29½ | 11 | 8¾ | 1 | 24 | 3½ | 11½ | 5¾ | 13½ | 1½ | 12½ |
| S126A | 12 | 15 | 32¾ | 15 | 8 | 35 | 14 | 11½ | 1 | 30 | 4 | 13 | 6½ | 15 | 1½ | 14½ |
| S147A | 14 | 17 | 36⅝ | 16½ | 8½ | 39 | 15½ | 12½ | 1¼ | 33½ | 4½ | 15½ | 7¾ | 18 | 2 | 16½ |
| S168A | 16 | 19 | 40⅝ | 18½ | 9½ | 44 | 17 | 13½ | 1¼ | 36½ | 4½ | 16 | 8 | 18½ | 1¾ | 16½ |
| S189A | 18 | 21 | 44½ | 20 | 10 | 48 | 19 | 15 | 1½ | 41 | 5 | 17½ | 8¾ | 20½ | 2 | 18 |
| S2010A | 20 | 23 | 48½ | 22½ | 11 | 53½ | 22 | 17¾ | 1½ | 47 | 5 | 19 | 9½ | 22 | 2 | 19 |
| S2411A | 24 | 27 | 56¼ | 26½ | 13½ | 64 | 25½ | 20 | 1¾ | 54½ | 6 | 21 | 10½ | 24½ | 2¾ | 21 |
| S3012A | 30 | 33 | 68¾ | 33 | 14 | 77 | *** | *** | 1¾ | 66 | 7 | 24 | 12 | 27½ | 3 | 22½ |

| Size No. | R | S | T | TA | U | V | W | X** | Y | Slow Speed Shaft Keyway | Bolt Holes Z | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S63A | 9¾ | 3 1/16 | 5 3/16 | 5 3/16 | 4 3/16 | 6 | 2 | For High Speed Shaft Dia. See Table of H.P. Ratings Pages 8 and 9 | 6⅝ | ½x¼x3⅞ | 4—11/16 | 250 |
| S84A | 10¼ | 3⅝ | 6⅛ | 6⅛ | 4⅛ | 6¾ | 2½ | | 8⅞ | ⅝x 3/16x3⅞ | 4—13/16 | 500 |
| S105A | 13¾ | 4¾ | 7¾ | 7⅞ | 5⅞ | 8½ | 3 | | 11 | ¾x⅜x5 | 6—13/16 | 850 |
| S126A | 16¼ | 5 5/16 | 8 11/16 | 8 11/16 | 7 1/16 | 9¾ | 3½ | | 13½ | ⅞x 5/16x5½ | 6—1/16 | 1,350 |
| S147A | 18 | 6½ | 10 | 10 | 8 | 11½ | 4 | | 15 | 1 x½x7½ | 6—1 1/16 | 1,950 |
| S168A | 20 | 5¼ | 11¼ | 11¼ | 8½ | 12 | 5 | | 17 | 1¼x 5/16x7½ | 6—1 1/16 | 2,600 |
| S189A | 22 | 6½ | 11½ | 11½ | 10½ | 13 | 5½ | | 18½ | 1¼x 5/16x9 | 6—1 1/16 | 3,500 |
| S2010A | 24 | 6½ | 12½ | 12½ | 11½ | 14 | 6 | | 20¾ | 1½x½x9 | 6—1 1/16 | 4,500 |
| S2411A | 26 | 8 | 13 | 13½ | 12½ | 15 | 7 | | 24½ | 1¾x⅝x10 | 6—1 1/16 | 6,200 |
| S3012A | 29½ | 8¼ | 14¼ | 14⅞ | 14⅝ | 17 | 8 | | 31 | 2 x¾x12½ | 8—1 1/16 | 8,000 |

All dimensions are in inches.

* S63A and S84A Bases are not recessed on bottom.

** For High Speed Shaft Keyways, see table of Standard Keyways page 24.

*** The S3012 has 8 Foundation Bolt holes spaced 21-20½-21. Above dimensions are not to be used for installation. USE CERTIFIED INSTALLATION PRINT.

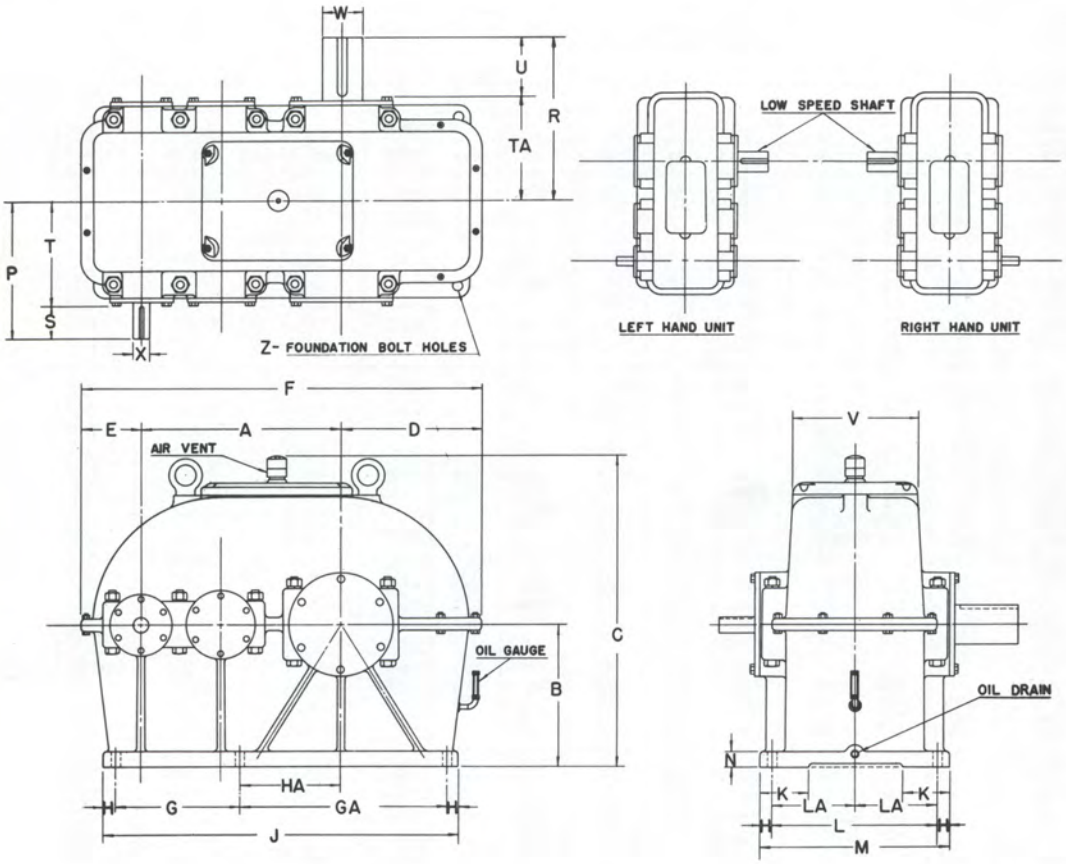
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# GENERAL DIMENSIONS

## Type D

## DOUBLE REDUCTION HERRINGBONE GEAR REDUCERS




| Size No. | A | B | C | D | E | F | G | GA | H | HA | J | K | L | LA | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D100 | 10 | 8 | 17 1/8 | 7 1/2 | 3 3/4 | 21 1/4 | 8 1/4 | 8 1/4 | 3/4 | 3 1/4 | 18 | * | 10 | 5 | 11 1/2 | 1 |
| D120 | 12 | 9 1/2 | 20 1/8 | 9 | 4 1/2 | 25 1/2 | 9 3/4 | 9 3/4 | 7/8 | 3 3/4 | 21 1/4 | 3 1/2 | 12 | 6 | 13 3/4 | 1 |
| D145 | 14 1/2 | 10 1/2 | 24 1/8 | 11 | 6 | 31 1/2 | 12 | 12 | 1 | 4 3/4 | 26 | 4 | 13 1/2 | 6 3/4 | 15 1/2 | 1 1/4 |
| D170 | 17 | 12 1/2 | 27 1/8 | 12 | 6 1/2 | 35 1/2 | 14 | 14 | 1 | 5 3/4 | 30 | 4 | 15 | 7 1/2 | 17 | 1 1/2 |
| D195 | 19 1/2 | 14 | 31 3/8 | 14 | 6 1/2 | 40 | 17 | 15 | 1 1/4 | 5 | 34 1/2 | 4 1/2 | 17 1/2 | 8 3/4 | 20 | 1 1/2 |
| D220 | 22 | 15 | 33 3/8 | 15 | 7 1/2 | 44 1/2 | 14 1/2 | 21 | 1 1/4 | 10 1/2 | 38 | 5 | 19 | 9 1/2 | 21 1/2 | 1 3/4 |
| D250 | 25 | 17 | 37 3/8 | 17 | 8 | 50 | 17 | 23 | 1 1/2 | 11 | 43 | 6 | 21 | 10 1/2 | 24 | 2 |
| D290 | 29 | 20 | 41 3/4 | 19 | 9 | 57 | 20 | 27 | 1 1/2 | 13 | 50 | 6 1/2 | 24 | 12 | 27 | 2 1/2 |
| D340 | 34 | 23 | 47 3/8 | 21 1/2 | 10 | 65 1/2 | 23 | 30 | 2 | 14 3/4 | 57 | 7 | 27 | 13 1/2 | 31 | 2 3/4 |
| D390 | 39 | 26 | 56 3/4 | 26 1/2 | 10 1/2 | 76 | *** | *** | 2 | 19 1/2 | 67 | 8 | 30 | 15 | 34 | 3 |
| D440 | 44 | 30 | 61 7/8 | 29 | 12 | 85 | **** | **** | 2 | 22 | 74 | 9 | 32 | 16 | 36 | 3 1/4 |

| | P | R | S | T | TA | U | V | W | X** | Y | Slow Speed Shaft Keyway | Bolt Holes Z | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D100 | 8 1/2 | 10 3/4 | 2 | 6 1/2 | 6 1/2 | 4 1/4 | 8 | 2 | For High Speed Shaft Dia. See Table of H.P. Ratings Pages 10 and 11 | 6 5/8 | 1/2x1/4x3 1/8 | 6—13/16 | 250 |
| D120 | 9 1/2 | 11 1/2 | 2 3/8 | 7 1/8 | 7 1/8 | 4 7/8 | 9 1/2 | 2 1/2 | | 7 1/8 | 5/8x5/16x3 7/8 | 6—13/16 | 500 |
| D145 | 10 3/4 | 14 | 2 1/4 | 8 1/2 | 8 3/4 | 5 1/4 | 10 1/2 | 2 3/4 | | 9 1/2 | 5/8x5/16x4 7/8 | 6—13/16 | 800 |
| D170 | 13 | 15 1/2 | 3 1/2 | 9 1/2 | 9 3/4 | 5 3/4 | 12 | 3 | | 10 1/2 | 3/4x3/8x5 | 6—13/16 | 1,150 |
| D195 | 14 1/2 | 18 1/2 | 3 3/4 | 10 3/4 | 10 7/8 | 7 5/8 | 14 | 3 1/2 | | 12 1/2 | 7/8x7/16x5 1/2 | 6—1 1/16 | 1,600 |
| D220 | 16 1/2 | 18 1/2 | 4 3/8 | 11 3/8 | 11 3/4 | 6 3/4 | 15 | 4 | | 13 1/2 | 1 x1/2x5 1/2 | 6—1 1/16 | 2,200 |
| D250 | 17 3/4 | 21 1/2 | 4 3/4 | 13 | 13 1/4 | 8 1/4 | 15 | 5 | | 15 1/2 | 1 1/4x7/16x7 1/2 | 6—1 1/16 | 3,000 |
| D290 | 19 1/2 | 24 | 5 1/4 | 14 1/4 | 14 1/2 | 9 1/2 | 18 | 5 1/2 | | 17 1/8 | 1 1/4x7/16x9 | 6—1 1/16 | 4,000 |
| D340 | 21 | 25 1/2 | 5 1/2 | 15 1/2 | 15 3/4 | 9 3/4 | 20 1/2 | 6 | | 19 5/8 | 1 1/2x1/2x9 | 6—1 1/16 | 5,000 |
| D390 | 23 | 28 1/2 | 6 | 17 | 17 1/2 | 11 | 23 | 7 | | 24 1/4 | 1 3/4x5/8x10 | 8—1 1/16 | 6,000 |
| D440 | 24 1/2 | 32 | 6 | 18 1/2 | 19 | 13 | 25 | 8 | | 26 3/4 | 2 x3/4x12 1/2 | 8—1 1/16 | 7,000 |

All dimensions are in inches.
* D100 Base is not recessed on bottom.
** For High Speed Shaft Keyways see Table of Standard Keyways Page 24.

*** The D390 has 8 Foundation Bolt holes spaced 23 1/2-23 1/2-16.
**** The D440 has 8 Foundation Bolt holes spaced 26 1/2-26 1/2-17.
Above dimensions are not to be used for Installation.
USE CERTIFIED INSTALLATION PRINT.

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# THERMAL HORSEPOWER RATINGS

## TYPE S

The Thermal Horsepower Rating listed here for a particular unit at a given ratio and speed must be equal to or higher than the ACTUAL HORSEPOWER DELIVERED.

The Table below must be used to check the selection of a gear unit after the selection has been made on the basis of mechanical rating shown on pages 8 and 9.

| Size Reducer | High Speed Shaft RPM | RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.22 | 1.50 | 1.84 | 2.24 | 2.72 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.60 | 9.29 | 10.29 |
| S63A | 1750 | 42 | 44 | 47 | 49 | 52 | 53 | 55 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | 49 | 51 | 54 | 57 | 61 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 54 | 56 | 59 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 56 | 57 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 57 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S84A | 1750 | 65 | 68 | 73 | 78 | 83 | 86 | 88 | 94 | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | 83 | 87 | 92 | 96 | 101 | 104 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 89 | 92 | 96 | 100 | 106 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 92 | 95 | 98 | 103 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 94 | 97 | 100 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S105A | 1750 | ... | 90 | 95 | 102 | 108 | 112 | 116 | 124 | 131 | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | 113 | 118 | 124 | 130 | 138 | 142 | 146 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 122 | 127 | 133 | 139 | 146 | 150 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 126 | 131 | 137 | 143 | 150 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 130 | 135 | 141 | 147 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S126A | 1750 | ... | ... | 122 | 130 | 140 | 145 | 149 | 160 | 170 | 175 | ... | ... | ... | ... | ... | ... |
| | 1150 | 155 | 161 | 168 | 175 | 185 | 189 | 194 | 205 | 213 | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 168 | 173 | 180 | 187 | 195 | 200 | 205 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 172 | 177 | 185 | 191 | 200 | 205 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 176 | 182 | 190 | 195 | 205 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S147A | 1750 | ... | ... | ... | 155 | 168 | 174 | 181 | 196 | 210 | 219 | 225 | 230 | ... | ... | ... | ... |
| | 1150 | 190 | 200 | 209 | 220 | 230 | 236 | 243 | 259 | 270 | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 207 | 215 | 225 | 235 | 248 | 254 | 260 | 275 | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 216 | 223 | 233 | 242 | 255 | 260 | 269 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 225 | 230 | 240 | 250 | 262 | 268 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S168A | 1750 | ... | ... | ... | ... | 188 | 195 | 203 | 220 | 240 | 250 | 257 | 265 | 270 | ... | ... | ... |
| | 1150 | ... | 235 | 245 | 260 | 270 | 280 | 287 | 303 | 320 | ... | ... | ... | ... | ... | ... | ... |
| | 870 | 250 | 260 | 270 | 280 | 295 | 300 | 310 | 326 | ... | ... | ... | ... | ... | ... | ... | ... |
| | 720 | 260 | 270 | 280 | 290 | 305 | 310 | 320 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | 270 | 280 | 290 | 300 | 315 | 320 | 330 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S189A | 1750 | ... | ... | ... | ... | ... | ... | 230 | 250 | 270 | 283 | 294 | 304 | 310 | 320 | ... | ... |
| | 1150 | ... | ... | 290 | 306 | 320 | 330 | 340 | 360 | 375 | 387 | ... | ... | ... | ... | ... | ... |
| | 870 | ... | 310 | 325 | 340 | 355 | 365 | 373 | 392 | 410 | ... | ... | ... | ... | ... | ... | ... |
| | 720 | ... | 320 | 335 | 350 | 369 | 375 | 384 | 402 | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | ... | 330 | 345 | 360 | 380 | 385 | 395 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| S2010A | 1750 | ... | ... | ... | ... | ... | ... | ... | 275 | 295 | 310 | 320 | 330 | 338 | 347 | 350 | ... |
| | 1150 | ... | ... | ... | 350 | 370 | 380 | 394 | 416 | 435 | 450 | 460 | ... | ... | ... | ... | ... |
| | 870 | ... | 350 | 370 | 390 | 410 | 420 | 434 | 457 | 475 | ... | ... | ... | ... | ... | ... | ... |
| | 720 | ... | 365 | 385 | 405 | 425 | 435 | 450 | 475 | ... | ... | ... | ... | ... | ... | ... | ... |
| | 580 | ... | 380 | 400 | 420 | 440 | 450 | 464 | 488 | ... | ... | ... | ... | ... | ... | ... | ... |
| S2211A | 1750 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | ... | ... | ... | ... | 415 | 429 | 444 | 474 | 500 | 519 | 530 | ... | ... | ... | ... | ... |
| | 870 | ... | ... | 415 | 443 | 470 | 480 | 495 | 524 | 547 | 562 | ... | ... | ... | ... | ... | ... |
| | 720 | ... | 410 | 434 | 464 | 490 | 503 | 517 | 545 | 570 | ... | ... | ... | ... | ... | ... | ... |
| | 580 | ... | 430 | 450 | 480 | 510 | 525 | 540 | 568 | ... | ... | ... | ... | ... | ... | ... | ... |
| S2411A | 1750 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | ... | ... | ... | ... | 425 | 440 | 455 | 485 | 510 | 525 | 540 | ... | ... | ... | ... | ... |
| | 870 | ... | ... | 450 | 475 | 500 | 515 | 530 | 560 | 580 | 600 | ... | .... | ... | ... | ... | ... |
| | 720 | ... | 450 | 470 | 493 | 520 | 537 | 550 | 582 | 610 | ... | ... | ... | ... | ... | ... | ... |
| | 580 | ... | 470 | 490 | 520 | 540 | 560 | 570 | 605 | ... | ... | ... | ... | ... | ... | ... | ... |
| S2712A | 1750 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | ... | ... | ... | ... | ... | ... | 480 | 520 | 550 | 570 | 585 | 600 | 610 | ... | ... | ... |
| | 870 | ... | ... | ... | 530 | 560 | 575 | 595 | 635 | 660 | 680 | 695 | ... | ... | ... | ... | ... |
| | 720 | ... | 510 | 535 | 565 | 595 | 610 | 630 | 670 | 695 | 720 | ... | ... | ... | ... | ... | ... |
| | 580 | ... | 540 | 570 | 600 | 630 | 645 | 665 | 705 | 730 | ... | ... | ... | ... | ... | ... | ... |
| S3012A | 1750 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 1150 | ... | ... | ... | ... | ... | ... | ... | 480 | 510 | 535 | 550 | 565 | 580 | 600 | 605 | ... |
| | 870 | ... | ... | ... | ... | 560 | 580 | 600 | 640 | 680 | 700 | 720 | 730 | ... | ... | ... | ... |
| | 720 | ... | ... | 562 | 587 | 617 | 635 | 655 | 695 | 735 | 750 | 770 | ... | ... | ... | ... | ... |
| | 580 | ... | ... | 620 | 645 | 675 | 690 | 710 | 750 | 790 | ... | ... | ... | ... | ... | ... | ... |

**NOTE:** Where Thermal Horsepower Ratings are not shown at the right hand side of the above tables, the Thermal Horsepower Rating is higher than the Mechanical Rating of the Reducer shown on pages 8 and 9 for that ratio and speed.

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# MODERATE OVERHUNG LOAD CAPACITIES

## SLOW SPEED SHAFTS

The table below shows Moderate Overhung Load Capacities for Standard Type S Reducers. It is assumed that the external load is acting one shaft diameter in from the end of the shaft.

The actual load imposed on a shaft for a given condition of service may be determined by the formula on the bottom of page 4. For unusual conditions or in case of doubt present your problem to us for recommendations.

| Reducer No. | Input R.P.M. | REDUCTION RATIOS 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S63A | 1750 | 1095 | 1195 | 1260 | 1390 | 1500 | 1590 | 1680 | 1770 | 1860 | ..... |
| | 1150 | 1160 | 1250 | 1440 | 1600 | 1740 | 1880 | 1990 | 2000 | 2000 | ..... |
| | 870 | 1195 | 1360 | 1575 | 1740 | 1890 | 2000 | 2000 | 2000 | 2000 | ..... |
| | 720 | 1200 | 1460 | 1690 | 1880 | 2000 | 2000 | 2000 | 2000 | 2000 | ..... |
| | 580 | 1275 | 1580 | 1820 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | ..... |
| S84A | 1750 | 1290 | 1410 | 1470 | 1510 | 1660 | 1790 | 1930 | 2060 | 2180 | ..... |
| | 1150 | 1360 | 1450 | 1510 | 1730 | 1910 | 2080 | 2230 | 2380 | 2400 | ..... |
| | 870 | 1380 | 1440 | 1670 | 1900 | 2120 | 2300 | 2400 | 2400 | 2400 | ..... |
| | 720 | 1370 | 1480 | 1830 | 2080 | 2240 | 2400 | 2400 | 2400 | 2400 | ..... |
| | 580 | 1350 | 1600 | 1920 | 2200 | 2360 | 2400 | 2400 | 2400 | 2400 | ..... |
| S105A | 1750 | 1265 | 1360 | 1430 | 1470 | 1485 | 1600 | 1740 | 1870 | 2000 | ..... |
| | 1150 | 1325 | 1410 | 1440 | 1450 | 1670 | 1860 | 2020 | 2160 | 2310 | ..... |
| | 870 | 1340 | 1390 | 1400 | 1640 | 1870 | 2060 | 2230 | 2380 | 2520 | ..... |
| | 720 | 1330 | 1360 | 1490 | 1770 | 2010 | 2210 | 2380 | 2530 | 2650 | ..... |
| | 580 | 1295 | 1280 | 1590 | 1910 | 2150 | 2340 | 2480 | 2620 | 2750 | ..... |
| S126A | 1750 | 1680 | 1830 | 1920 | 1990 | 2030 | 2060 | 2190 | 2360 | 2530 | ..... |
| | 1150 | 1690 | 1910 | 1980 | 2010 | 2030 | 2330 | 2530 | 2730 | 2930 | ..... |
| | 870 | 1820 | 1920 | 1950 | 2030 | 2330 | 2580 | 2800 | 3000 | 3160 | ..... |
| | 720 | 1830 | 1910 | 1910 | 2200 | 2520 | 2780 | 2990 | 3180 | 3340 | ..... |
| | 580 | 1820 | 1870 | 2040 | 2480 | 2730 | 2950 | 3140 | 3320 | 3480 | ..... |
| S147A | 1750 | 2140 | 2320 | 2470 | 2570 | 2630 | 2665 | 2700 | 2890 | 3090 | ..... |
| | 1150 | 2290 | 2460 | 2570 | 2630 | 2660 | 2810 | 3090 | 3330 | 3560 | ..... |
| | 870 | 2360 | 2510 | 2580 | 2620 | 2820 | 3160 | 3430 | 3660 | 3870 | ..... |
| | 720 | 2390 | 2510 | 2560 | 2540 | 3040 | 3370 | 3650 | 3880 | 4090 | ..... |
| | 580 | 2440 | 2580 | 2575 | 2850 | 3220 | 3550 | 3850 | 4080 | 4270 | ..... |
| S168A | 1750 | 3420 | 3780 | 4050 | 4240 | 4390 | 4520 | 4620 | 4720 | 4960 | ..... |
| | 1150 | 3750 | 4110 | 4350 | 4510 | 4640 | 4740 | 5010 | 5340 | 5710 | ..... |
| | 870 | 3910 | 4270 | 4490 | 4630 | 4720 | 5190 | 5580 | 5930 | 6240 | ..... |
| | 720 | 4030 | 4350 | 4560 | 4670 | 5050 | 5520 | 5890 | 6220 | 6500 | ..... |
| | 580 | 4140 | 4440 | 4580 | 4780 | 5380 | 5860 | 6230 | 6500 | 6500 | ..... |
| S189A | 1750 | 3720 | 4110 | 4400 | 4620 | 4780 | 4900 | 5010 | 5100 | 5170 | ..... |
| | 1150 | 4160 | 4490 | 4720 | 4890 | 5030 | 5130 | 5200 | 5640 | 6070 | ..... |
| | 870 | 4270 | 4640 | 4870 | 5020 | 5120 | 5350 | 5780 | 6180 | 6570 | ..... |
| | 720 | 4390 | 4740 | 4950 | 5070 | 5130 | 5740 | 6170 | 6550 | 6900 | ..... |
| | 580 | 4500 | 4825 | 4990 | 5050 | 5570 | 6070 | 6480 | 6860 | 7230 | ..... |
| S2010A | 1750 | 3970 | 4570 | 4930 | 5170 | 5360 | 5520 | 5660 | 5760 | 5830 | ..... |
| | 1150 | 4530 | 4980 | 5310 | 5540 | 5700 | 5830 | 5920 | 6160 | 6720 | ..... |
| | 870 | 4780 | 5250 | 5510 | 5690 | 5820 | 5920 | 6360 | 6810 | 7200 | ..... |
| | 720 | 4920 | 5370 | 5620 | 5770 | 5870 | 6230 | 6730 | 7360 | 7550 | ..... |
| | 580 | 5070 | 5470 | 5690 | 5810 | 5990 | 6620 | 7100 | 7510 | 7870 | ..... |
| S2411A | 1150 | .... | 5430 | 5770 | 6020 | 6200 | 6340 | 6440 | 6510 | 6750 | 7370 |
| | 870 | .... | 5650 | 5970 | 6220 | 6370 | 6470 | 6510 | 6940 | 7380 | 7800 |
| | 720 | .... | 5840 | 6130 | 6320 | 6430 | 6470 | 6890 | 7380 | 7780 | 8150 |
| | 580 | .... | 5940 | 6200 | 6350 | 6350 | 6670 | 7250 | 7720 | 8110 | 8450 |
| | 400 | .... | 6060 | 6150 | 6020 | 6680 | 7280 | 7770 | 8200 | 8560 | 8920 |
| S3012A | 1150 | .... | 5740 | 6110 | 6360 | 6560 | 6730 | 6850 | 6930 | 6990 | 7090 |
| | 870 | .... | 6020 | 6360 | 6600 | 6770 | 6880 | 6940 | 6960 | 7250 | 7660 |
| | 720 | .... | 6170 | 6500 | 6710 | 6850 | 6910 | 6850 | 7200 | 7640 | 8030 |
| | 580 | .... | 6340 | 6610 | 6760 | 6800 | 6700 | 7000 | 7500 | 7940 | 8340 |
| | 400 | .... | 6460 | 6580 | 6450 | 6310 | 7040 | 7580 | 8020 | 8390 | 8730 |

| Overhung Load | REDUCER NO. D100 | D120 | D145 | D170 | D195 | D220 | D250 | D290 | D340 | D390 | D440 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Moderate | 2140 | 2510 | 3000 | 3500 | 4400 | 5300 | 6600 | 7130 | 7700 | 8350 | 8900 |
| Heavy | 2480 | 4840 | 5000 | 5730 | 8480 | 11250 | 14000 | 15200 | 16400 | 17760 | 18750 |

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# MEDIUM SPEED HERRINGBONE GEAR REDUCERS AND SPEED INCREASERS

## Type M

## APPLICATION

Type M Medium Speed Reducers and Increasers are applicable for:

**Speeds higher than permitted with standard Type S Reducers and lower than required for Type N High Speed Reducers.**

## SPECIFICATIONS

The Type M assembly is a modification of the Type S assembly. The gear case is exactly the same. The specifications covering all other items except the high speed bearings are also the same as for Type S Reducers. The high speed bearings are straight roller anti-friction similar to those used in the slower speed units but are a type which will permit higher speeds. The rotating elements are more carefully balanced and the gear teeth are more accurately finished to accommodate the higher speed.

Except for the diameter of the high speed shaft the dimensions of Type M reducers are identical with the Type S reducers shown on page 12. The high speed shaft diameters are shown with the Type M Rating Tables on pages 18 and 19.

These medium speed units are furnished with an oil pan to prevent excessive splashing of the oil.

## LIMITATIONS

Type M units are applicable for speeds higher than shown in the Type S Rating Tables. The top speed must be less than 3600 R.P.M. and 4000 feet per minute pitch line velocity. If the speed should reach these values, use the Type N assembly.

## SELECTION OF UNITS

The selection of a Type M Gear Reducer for a particular job is done in the same way as outlined for Type S Reducers on pages 4 and 5 using the same Service Factors on page 7.

For Speed Increasing service the selection is made in the same manner.

EXAMPLE: A Speed Reducer is required to deliver 50 HP, driving an Induced Draft Fan at 550 RPM and driven by Steam Turbine at 3480 RPM, operating 24 hours per day.

SOLUTION: From Character of Load Table 1, page 7, it is found that the driven machine is a Moderate Shock Load and from Table 2 on the same page the Service Factor is found to be 1.5.

$$\text{Equivalent Horsepower} = 1.5 \times 50 = 75 \text{ HP.}$$

$$\text{Ratio} = \frac{3480}{550} = 6.33$$

Look in the Rating Tables, page 18, and note that the M84A at 3500 RPM and 6.27 ratio has a Catalog or Equivalent Horsepower Rating of 94 HP. which is more than the 75 HP. required.

Check the Thermal Rating on page 17 and note that for this ratio and speed the M84A has a rating of only 26 HP. which is lower than the 50 HP. required.

The M84A with pump and cooler is, therefore, the proper selection.

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# THERMAL HORSEPOWER RATINGS

## TYPE M—SINGLE REDUCTION UNITS

The Thermal Horsepower Rating listed here for a particular unit at a given ratio and speed must be equal to or higher than the ACTUAL HORSEPOWER DELIVERED.

The Table below must be used to check the selection of a gear unit after the selection has been made on the basis of mechanical rating shown on pages 18 and 19.

| Size Gear Unit | High Speed Shaft RPM | RATIOS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2.24 | 2.72 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.60 | 9.29 | 10.29 | 11.00 | 11.50 |
| M63A | 3500 | 9 | 10 | 11 | 12 | 14 | 16 | 18 | 19 | 20 | 20.5 | 21.3 | 22 | 26 | ... | ... |
| | 3000 | 18 | 20 | 21 | 23 | 26 | 28 | 30 | 32 | 33 | 35 | 36 | 37 | 40 | ... | ... |
| | 2400 | 31 | 34 | 36 | 37 | 41 | 44 | 47 | 49 | 50 | 51 | 52 | 53 | 55 | ... | ... |
| M84A | 3500 | ... | 14 | 15 | 17 | 20 | 23 | 25 | 26 | 28 | 28.2 | 29 | 29 | 29 | ... | ... |
| | 3000 | 28 | 32 | 34 | 36 | 41 | 45 | 48 | 50 | 52 | 54 | 54 | 55 | 58 | ... | ... |
| | 2400 | 48 | 53 | 56 | 59 | 65 | 70 | 70 | 71 | 72 | 73 | 76 | 77 | 81 | ... | ... |
| M105A | 3500 | ... | ... | ... | ... | 24 | 27 | 28 | 29 | 30 | 31 | 32 | 35 | 36 | ... | ... |
| | 3000 | ... | ... | 33 | 38 | 42 | 47 | 50 | 53 | 56 | 58 | 60 | 61 | 62 | ... | ... |
| | 2400 | 57 | 63 | 67 | 71 | 79 | 86 | 92 | 96 | 98 | 99 | 104 | 106 | 111 | ... | ... |
| M126A | 3500 | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | PC | PC | PC | ... | ... |
| | 3000 | ... | ... | ... | ... | 53 | 59 | 64 | 67 | 68 | 70 | 72 | 74 | 79 | ... | ... |
| | 2400 | ... | ... | 90 | 96 | 106 | 114 | 120 | 124 | 129 | 132 | 136 | 138 | 142 | ... | ... |
| | 2000 | 116 | 123 | 130 | 135 | 147 | 156 | 162 | 166 | 171 | 174 | 178 | 180 | 186 | ... | ... |
| M147A | 3500 | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | PC | PC | ... | ... |
| | 3000 | ... | ... | ... | ... | ... | 76 | 81 | 87 | 88 | 90 | 91 | 96 | 102 | ... | ... |
| | 2400 | ... | ... | ... | ... | 117 | 126 | 134 | 140 | 149 | 152 | 157 | 159 | 160 | ... | ... |
| | 2000 | ... | 132 | 140 | 145 | 161 | 173 | 182 | 187 | 192 | 197 | 202 | 205 | 208 | ... | ... |
| M168A | 3500 | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | ... | ... |
| | 3000 | ... | ... | ... | ... | ... | ... | 47 | 50 | 52 | 53 | 55 | 56 | 57 | ... | ... |
| | 2400 | ... | ... | ... | ... | 121 | 135 | 143 | 150 | 155 | 159 | 164 | 165 | 167 | ... | ... |
| | 2000 | ... | ... | ... | 162 | 183 | 197 | 205 | 211 | 218 | 223 | 231 | 235 | 245 | ... | ... |
| M189A | 3500 | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | ... | ... |
| | 3000 | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | PC | ... | ... |
| | 2400 | ... | ... | ... | ... | ... | 154 | 158 | 170 | 172 | 174 | 180 | 185 | 194 | ... | ... |
| | 2000 | ... | ... | ... | ... | 200 | 215 | 225 | 235 | 242 | 247 | 255 | 261 | 268 | ... | ... |
| M2010A | 3500 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | ... | ... |
| | 3000 | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | ... | ... |
| | 2400 | ... | ... | ... | ... | ... | ... | 147 | 155 | 161 | 166 | 175 | 180 | 188 | ... | ... |
| | 2000 | ... | ... | ... | ... | ... | 230 | 240 | 251 | 260 | 266 | 276 | 283 | 291 | ... | ... |
| M2211A | 3000 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | ... |
| | 2400 | ... | ... | ... | ... | ... | ... | ... | 136 | 140 | 141 | 144 | 147 | 163 | 174 | ... |
| | 2000 | ... | ... | ... | ... | ... | 237 | 246 | 268 | 270 | 273 | 293 | 297 | 312 | 315 | ... |
| | 1750 | ... | ... | ... | ... | 280 | 300 | 318 | 330 | 342 | 350 | 365 | 371 | 380 | 386 | ... |
| M2411A | 3000 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | ... |
| | 2400 | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | ... |
| | 2000 | ... | ... | ... | ... | ... | ... | ... | 228 | 230 | 234 | 244 | 250 | 266 | 276 | ... |
| | 1750 | ... | ... | ... | ... | ... | 285 | 300 | 307 | 317 | 325 | 333 | 344 | 368 | 375 | ... |
| M2712A | 2400 | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | PC |
| | 2000 | ... | ... | ... | ... | ... | ... | ... | 175 | 179 | 182 | 186 | 190 | 212 | 224 | 228 |
| | 1750 | ... | ... | ... | ... | ... | ... | ... | 289 | 293 | 296 | 312 | 316 | 334 | 342 | 346 |
| M3012A | 2400 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC |
| | 2000 | ... | ... | ... | ... | ... | ... | ... | ... | ... | PC | PC | PC | PC | PC | PC |
| | 1750 | ... | ... | ... | ... | ... | ... | ... | 219 | 222 | 226 | 240 | 246 | 260 | 269 | 273 |

PC—Pump and Cooler.

PC in above Table means that an oil pump and cooler must be added to the assembly to prevent over-heating, regardless of the horsepower to be delivered.

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# HORSEPOWER RATING TABLES

## TYPE M—SINGLE REDUCTION UNITS

## MEDIUM SPEED HERRINGBONE GEAR REDUCERS AND SPEED INCREASERS

The Horsepower Ratings listed in the tables below are Mechanical Ratings calculated by the A.G.M.A. formula using a Service Factor of 1. See page 16 for information on Selection of Units. See page 17 for Thermal Horsepower Ratings.

### Size No. M63A

| | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 1.22 | 1.50 | 1.84 | 2.24 | 2.72 | 3.00 | 3.36 | 4.19 | 5.00 | 5.67 | 6.20 | 7.00 | 7.73 | 8.60 | 9.29 | 10.29 |
| 3500 | .... | .... | 172 | 145 | 120 | 109 | 95 | 73 | 57 | 47 | 41 | 35 | 30 | 26 | 23 | 20 |
| 3000 | .... | 169 | 149 | 127 | 105 | 94 | 83 | 63 | 51 | 41 | 36 | 30 | 26 | 22 | 20 | 17 |
| 2400 | 135 | 135 | 130 | 110 | 91 | 80 | 70 | 54 | 43 | 36 | 31 | 26 | 22 | 19 | 17 | 14 |
| High Speed Shaft Diameter | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | 1¼ | ⅞ | ⅞ | ⅞ | ⅞ | ¾ |

### Size No. M84A

| | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | .... | .... | 1.84 | 2.26 | 2.73 | 3.00 | 3.36 | 4.16 | 5.00 | 5.67 | 6.27 | 7.00 | 7.53 | 8.14 | 9.24 | 10.29 |
| 3500 | .... | .... | .... | .... | 265 | 242 | 210 | 163 | 131 | 109 | 94 | 79 | 70 | 63 | 51 | 44 |
| 3000 | .... | .... | .... | 279 | 231 | 210 | 184 | 143 | 115 | 94 | 82 | 68 | 62 | 56 | 45 | 38 |
| 2400 | .... | .... | 280 | 236 | 198 | 180 | 156 | 121 | 94 | 79 | 69 | 59 | 52 | 47 | 37 | 32 |
| High Speed Shaft Diameter | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1½ | 1¼ | 1¼ | 1¼ | 1 |

### Size No. M105A

| | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | .... | 2.24 | 2.72 | 3.00 | 3.36 | 4.16 | 4.56 | 5.00 | 5.67 | 6.27 | 7.00 | 7.57 | 8.00 | 8.47 | 9.00 | 10.43 |
| 3500 | .... | .... | .... | .... | .... | 296 | 265 | 234 | 198 | 173 | 147 | 129 | 120 | 110 | 102 | 79 |
| 3000 | .... | .... | .... | 385 | 340 | 256 | 233 | 206 | 174 | 152 | 127 | 114 | 105 | 97 | 89 | 70 |
| 2400 | .... | 417 | 362 | 326 | 288 | 221 | 199 | 178 | 149 | 126 | 109 | 96 | 88 | 81 | 74 | 59 |
| High Speed Shaft Diameter | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1½ | 1½ | 1½ | 1½ | 1 |

### Size No. M126A

| | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | 2.24 | 2.72 | 3.00 | 3.36 | 4.14 | 4.65 | 5.00 | 5.55 | 6.27 | 6.74 | 7.00 | 7.57 | 8.23 | 8.60 | 9.29 | 10.43 |
| 3500 | .... | .... | .... | .... | .... | 425 | 388 | 346 | 283 | 256 | 240 | 216 | 191 | 180 | 158 | 132 |
| 3000 | .... | .... | .... | .... | 428 | 372 | 336 | 292 | 246 | 226 | 211 | 189 | 168 | 153 | 137 | 115 |
| 2400 | .... | .... | 537 | 467 | 364 | 316 | 288 | 246 | 211 | 191 | 182 | 157 | 139 | 132 | 115 | 97 |
| 2000 | 616 | 505 | 454 | 402 | 312 | 269 | 248 | 213 | 181 | 165 | 154 | 138 | 121 | 113 | 100 | 84 |
| High Speed Shaft Diameter | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2¼ | 2 | 2 | 1½ | 1½ |

### Size No. M147A

| | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | .... | .... | 2.73 | 3.00 | 3.36 | 3.67 | 4.16 | 4.60 | 5.00 | 5.67 | 6.26 | 7.00 | 7.62 | 8.33 | 9.18 | 10.20 |
| 3500 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 486 | 425 | 366 | 317 | 277 | 238 | 208 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | 545 | 494 | 425 | 363 | 320 | 276 | 246 | 209 | 178 |
| 2400 | .... | .... | .... | .... | .... | 638 | 544 | 478 | 428 | 364 | 317 | 271 | 241 | 208 | 175 | 152 |
| 2000 | .... | .... | 743 | 682 | 594 | 543 | 455 | 410 | 361 | 312 | 266 | 234 | 202 | 176 | 156 | 131 |
| High Speed Shaft Diameter | .... | .... | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2½ | 2¼ | 2¼ | 2 |

### Size No. M168A

| | STANDARD RATIOS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High Speed Shaft R.P.M. | .... | .... | 3.36 | 3.67 | 4.16 | 4.60 | 5.00 | 5.40 | 6.27 | 7.00 | 7.62 | 8.33 | 8.85 | 9.24 | 9.67 | 10.64 |
| 3500 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 515 | 457 | 399 | 368 | 349 | 317 | 276 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | 650 | 524 | 447 | 396 | 350 | 320 | 298 | 280 | 242 |
| 2400 | .... | .... | .... | .... | 811 | 684 | 615 | 550 | 446 | 384 | 336 | 299 | 271 | 254 | 237 | 201 |
| 2000 | .... | .... | 838 | 766 | 653 | 580 | 511 | 468 | 378 | 330 | 287 | 256 | 233 | 213 | 200 | 177 |
| High Speed Shaft Diameter | .... | .... | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2¾ | 2½ | 2½ | 2¼ |

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# HORSEPOWER RATING TABLES (cont'd.)

## TYPE M—SINGLE REDUCTION UNITS

### Size No. M189A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | 3.80 | 4.14 | 4.60 | 5.00 | 5.63 | 6.20 | 6.64 | 7.00 | 7.57 | 8.00 | 8.60 | 9.29 | 9.67 | 10.45 |
| 3500 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 619 | 575 | 515 | 459 | 429 | 384 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | 714 | 658 | 611 | 540 | 500 | 450 | 394 | 375 | 337 |
| 2400 | .... | .... | .... | .... | .... | 826 | 686 | 616 | 564 | 518 | 465 | 428 | 382 | 340 | 321 | 271 |
| 2000 | .... | .... | 996 | 889 | 875 | 703 | 595 | 521 | 477 | 448 | 392 | 368 | 329 | 290 | 279 | 247 |
| High Speed Shaft Diameter | .... | .... | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 2¾ | 2¾ | 2½ |

### Size No. M2010A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | 4.33 | 4.71 | 5.00 | 5.67 | 6.27 | 6.74 | 7.00 | 7.57 | 8.03 | 8.60 | 9.00 | 9.29 | 9.91 | 10.43 |
| 3500 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 675 | 625 | 605 | 541 | 507 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | .... | 802 | 696 | 650 | 589 | 547 | 529 | 472 | 442 |
| 2400 | .... | .... | .... | .... | .... | 925 | 795 | 723 | 680 | 609 | 556 | 504 | 468 | 450 | 401 | 347 |
| 2000 | .... | .... | 1110 | 1001 | 935 | 780 | 672 | 613 | 580 | 510 | 480 | 433 | 400 | 389 | 347 | 327 |
| High Speed Shaft Diameter | .... | .... | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 3¼ | 2¾ | 2¾ |

### Size No. M2211A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | 4.18 | 4.78 | 5.00 | 5.42 | 6.00 | 6.33 | 6.70 | 7.00 | 7.61 | 8.06 | 8.33 | 9.27 | 10.00 | 10.85 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 664 | 592 | 522 |
| 2400 | .... | .... | .... | .... | .... | .... | .... | 984 | 908 | 852 | 756 | 698 | 665 | 569 | 507 | 447 |
| 2000 | .... | .... | .... | .... | 1150 | 1027 | 905 | 840 | 775 | 725 | 643 | 588 | 560 | 477 | 430 | 381 |
| 1750 | .... | .... | 1330 | 1125 | 1054 | 960 | 835 | 777 | 720 | 671 | 596 | 552 | 525 | 445 | 390 | 330 |
| High Speed Shaft Diameter | .... | .... | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¼ | 3¼ |

### Size No. M2411A

| High Speed Shaft R. P. M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | 5.00 | 5.32 | 5.86 | 6.27 | 6.59 | 7.00 | 7.23 | 7.62 | 8.00 | 8.60 | 9.18 | 9.50 | 10.08 | 10.64 |
| 3000 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 783 | 735 | 666 | 607 |
| 2400 | .... | .... | .... | .... | .... | .... | .... | .... | .... | 887 | 830 | 745 | 675 | 642 | 585 | 533 |
| 2000 | .... | .... | .... | .... | .... | 987 | 905 | 830 | 795 | 740 | 692 | 625 | 567 | 537 | 496 | 452 |
| 1750 | .... | .... | 1250 | 1140 | 1000 | 910 | 855 | 785 | 750 | 688 | 645 | 580 | 525 | 495 | 450 | 410 |
| High Speed Shaft Diameter | .... | .... | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¾ | 3¼ | 3¼ |

### Size No. M2712A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | .... | .... | .... | 6.20 | 6.56 | 7.00 | 7.53 | 8.00 | 8.45 | 8.82 | 9.22 | 9.80 | 10.45 | 11.00 |
| 2400 | .... | .... | .... | .... | .... | .... | .... | .... | 1175 | 1070 | 990 | 930 | 871 | 798 | 725 | 668 |
| 2000 | .... | .... | .... | .... | .... | 1338 | 1230 | 1110 | 1007 | 916 | 850 | 795 | 747 | 672 | 616 | 565 |
| 1750 | .... | .... | .... | .... | .... | 1215 | 1120 | 1025 | 923 | 850 | 790 | 740 | 688 | 630 | 563 | 520 |
| High Speed Shaft Diameter | .... | .... | .... | .... | .... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3¾ |

### Size No. M3012A

| High Speed Shaft R.P.M. | STANDARD RATIOS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .... | .... | .... | .... | .... | 6.27 | 7.00 | 7.57 | 8.00 | 8.33 | 8.73 | 9.29 | 9.71 | 10.54 | 11.00 | 11.50 |
| 2400 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1048 | 982 | 865 | 807 | 753 |
| 2000 | .... | .... | .... | .... | .... | .... | .... | 1206 | 1107 | 1045 | 975 | 890 | 835 | 737 | 688 | 638 |
| 1750 | .... | .... | .... | .... | .... | 1450 | 1225 | 1094 | 1010 | 935 | 883 | 800 | 745 | 660 | 620 | 590 |
| High Speed Shaft Diameter | .... | .... | .... | .... | .... | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

Ratios listed are standard but intermediate ratios are available.

Ratings for intermediate ratios and speeds may be found by direct interpolation. When selection falls in the blank space above the ratings listed, the High Speed Type N Units shown on page 22 must be used. When the selection falls in the blank space below the ratings listed, the Standard Type S Units shown on pages 8 and 9 may be used.

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# LUFKIN HIGH SPEED REDUCERS AND INCREASERS

## Type N

### APPLICATION

Type N High Speed Gear Units are used for both speed Reducing and speed Increasing service. This type assembly must be used when the pinion speed is 3600 R.P.M. and higher or when the pitch line velocity is 4000 feet per minute and higher.

Type N units are sometimes used at operating speeds lower than those stated above especially when extremely quiet operation is essential. They are also used frequently in preference to Medium Speed Type M or Standard Type S Units when the actual horsepower load exceeds the standard Thermal Rating of the Type M or Type S Unit.

### SPECIFICATIONS

HOUSINGS are high tensile gray iron castings. They are very substantially built, with generous wall sections, heavy ribs and wide bases, for rigidity. These castings are all stress-relieved before machining.

GEARS are continuous tooth herringbone type, made of high tensile alloy steel castings and forgings. Finished gears are very carefully and accurately Dynamically Balanced.

PINIONS are heat-treated alloy steel and are also Dynamically Balanced. The pinion shaft extension is ground to a tolerance of ± .0005".

SHAFTS are heat treated alloy steel and are ground to a tolerance of ± .0005".

BEARINGS: The slow speed bearings are self-aligning roller type mounted in bearing carriers. The high speed bearings are precision babbitted type with cast iron shells.

LUBRICATION is accomplished by means of a positive feed rotary pump direct connected to the stub end of the slow speed shaft. Oil under pressure is delivered to the high speed babbitted bearings and to the gear mesh. An oil trough inside the cover above the slow speed bearing catches oil from the spray and lubricates the slow speed bearing. The oil is circulated through an oil cooler of generous size which maintains the oil temperature at only a few degrees higher than that of the cooling water. The oil line is equipped with strainer, flow indicator, pressure gauge and pressure relief valve. The gear housing is sufficiently large for a generous supply of oil below the sweep of the gear. A protected glass oil level gauge permits visual determination of oil level.

**Standard Type N Units permit speeds up to 9,000 RPM and 10,000 feet per minute pitch line velocity. Higher speeds may be obtained, however, at extra cost.**

**Type N Units are built in 47 sizes with a complete range of ratios up to the maximum shown on page 22.**

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# SELECTION OF TYPE N UNITS

## Explanation of Rating Table

The Horsepower Ratings of Type N Gear Units are given in the Rating Table on the following page. For simplicity, these ratings are tabulated in horsepower per 1000 R.P.M. of the high speed shaft.

To select the proper size gear unit, find the Required Tabulated Rating as follows:

$$\text{Required Tabulated Rating} = \frac{\text{HP Load} \times 1000}{\text{RPM of Pinion} \times \text{Service Factor}}$$

Select the proper Service Factor from the table below.

The required ratio is found by dividing the R.P.M. of the high speed shaft by the R.P.M. of the slow speed shaft.

After calculating the Required Tabulated Rating and finding the required ratio, refer to the Rating Table on the following page. In the column under the ratio nearest to the required ratio, find the horsepower which is equal to or greater than the Required Tabulated Rating just calculated. On a horizontal line with this horsepower rating, in the extreme left hand column, will be found the size of the unit required.

The horsepower ratings for intermediate ratios not listed in the table may be found by direct interpolation.

The Ratios shown in the Rating Table do not constitute the entire list of ratios available. Any ratio required, or a very close approximation, will be furnished without extra charge.

### SERVICE FACTORS

| DRIVEN MACHINE | Electric Motor | Steam Turbine | Internal Combustion Engine |
|---|---|---|---|
| Compressor—Centrifugal | .85 | .85 | .63 |
| Compressor—Rotary | .63 | .63 | .55 |
| Compressor—Refrigerant Air Conditioning Service | .90 | ..... | ..... |
| Fan—Forced Draft | .85 | .85 | .70 |
| Fan—Induced Draft | .75 | .75 | .63 |
| Generator | ..... | 1.10 | .63 |
| Pump—Centrifugal Circulating | .95 | .95 | .75 |
| Pump—Descaling (with Surge Tank) | .55 | .55 | ..... |
| Pump—Pipe Line (Centrifugal) | .75 | .75 | .63 |
| Pump—Waterworks (General Purpose) | .75 | .75 | .63 |

### EXAMPLE

REQUIRED: A speed increaser to deliver 550 horsepower driving a centrifugal pipe line pump at 3750 R.P.M., driven by a multi-cylinder engine at 625 R.P.M.

SOLUTION: Required Tabulated Rating =

$$\frac{550 \times 1000}{3750 \times .63} = 233 \text{ Hp.}$$

$$\text{Required Ratio} = \frac{3750}{625} = 6$$

Refer to the Rating Table and follow down the column under a ratio of 6 looking for a Tabulated Rating of at least 233 horsepower. It is found that 234 horsepower is the next higher rating and this is for the size N1811A assembly. The N1811A is, therefore, the proper selection.

To find the Actual Service Rating of this unit under the above conditions:

$$\text{Service Rating} = \frac{\text{Tabulated Rating} \times \text{RPM of Pinion} \times \text{Service Factor}}{1000}$$

$$= \frac{234 \times 3750 \times .63}{1000} = 553 \text{ Hp.}$$

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# HORSEPOWER RATING TABLE

## Type N HIGH SPEED REDUCERS AND SPEED INCREASERS

### Horsepower per 1000 R.P.M. of High Speed Shaft

| | RATIO | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size No. | 1 | 1.25 | 1.5 | 1.75 | 2 | 2.25 | 2.5 | 2.75 | 3 | 3.25 | 3.5 | 3.75 | 4 | 4.25 | 4.5 | 4.75 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | 11 | 12 |
| N64A | 68 | 59 | 52 | 45 | 39 | 35 | 31 | 28 | 26 | 22 | 20 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 9 | 8 | 7 | ... | ... | ... | ... | ... | ... | ... | ... |
| N65A | 84 | 74 | 65 | 57 | 50 | 44 | 39 | 35 | 32 | 28 | 26 | 24 | 21 | 20 | 18 | 17 | 15 | 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N66A | 101 | 89 | 78 | 68 | 60 | 53 | 47 | 43 | 38 | 34 | 31 | 28 | 26 | 24 | 21 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N85A | 150 | 131 | 115 | 101 | 89 | 78 | 70 | 61 | 55 | 51 | 46 | 42 | 38 | 35 | 32 | 30 | 26 | 24 | 20 | 18 | 17 | 14 | ... | ... | ... | ... | ... | ... | ... |
| N86A | 180 | 158 | 138 | 121 | 106 | 93 | 84 | 74 | 67 | 61 | 55 | 51 | 46 | 42 | 39 | 35 | 32 | 28 | 25 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N87A | 210 | 184 | 161 | 141 | 124 | 107 | 96 | 86 | 78 | 72 | 65 | 59 | 53 | 50 | 45 | 41 | 37 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N106A | 281 | 247 | 216 | 189 | 167 | 148 | 131 | 118 | 106 | 94 | 86 | 79 | 72 | 66 | 61 | 57 | 52 | 45 | 40 | 34 | 31 | 26 | 25 | ... | ... | ... | ... | ... | ... |
| N107A | 328 | 288 | 252 | 221 | 194 | 170 | 152 | 136 | 123 | 111 | 102 | 92 | 84 | 77 | 71 | 66 | 60 | 52 | 45 | 40 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N108A | 375 | 329 | 288 | 252 | 222 | 195 | 175 | 156 | 140 | 127 | 116 | 105 | 96 | 89 | 81 | 75 | 70 | 60 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N126A | 405 | 355 | 311 | 272 | 240 | 210 | 189 | 169 | 152 | 137 | 125 | 113 | 104 | 96 | 87 | 81 | 76 | 65 | 57 | 50 | 48 | 39 | 35 | 32 | 29 | 26 | 24 | ... | ... |
| N127A | 472 | 414 | 362 | 318 | 270 | 245 | 218 | 197 | 177 | 159 | 145 | 132 | 120 | 111 | 102 | 94 | 87 | 76 | 66 | 58 | 51 | 46 | 41 | ... | ... | ... | ... | ... | ... |
| N128A | 539 | 473 | 414 | 363 | 320 | 281 | 252 | 225 | 203 | 183 | 161 | 151 | 138 | 127 | 117 | 109 | 100 | 86 | 75 | 66 | 59 | ... | ... | ... | ... | ... | ... | ... | ... |
| N129A | 607 | 533 | 466 | 408 | 360 | 316 | 283 | 254 | 228 | 205 | 188 | 170 | 156 | 143 | 131 | 122 | 113 | 97 | 85 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N147A | 642 | 564 | 493 | 432 | 382 | 334 | 300 | 268 | 241 | 218 | 196 | 179 | 164 | 151 | 138 | 129 | 119 | 103 | 90 | 79 | 71 | 63 | 57 | 51 | 46 | 41 | 38 | ... | ... |
| N148A | 734 | 644 | 564 | 494 | 434 | 381 | 338 | 306 | 275 | 249 | 224 | 205 | 188 | 172 | 159 | 146 | 136 | 118 | 103 | 91 | 80 | 71 | 65 | 58 | ... | ... | ... | ... | ... |
| N149A | 826 | 725 | 634 | 556 | 490 | 430 | 385 | 344 | 310 | 280 | 251 | 231 | 211 | 195 | 178 | 165 | 153 | 132 | 116 | 102 | 90 | 80 | ... | ... | ... | ... | ... | ... | ... |
| N1410A | 918 | 805 | 705 | 618 | 543 | 481 | 427 | 383 | 345 | 310 | 283 | 256 | 235 | 216 | 198 | 183 | 170 | 146 | 129 | 112 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N168A | 959 | 842 | 737 | 646 | 567 | 498 | 446 | 399 | 360 | 324 | 293 | 268 | 248 | 225 | 208 | 191 | 177 | 155 | 133 | 118 | 105 | 93 | 84 | 76 | 67 | 63 | 58 | ... | ... |
| N169A | ... | 947 | 829 | 726 | 638 | 565 | 503 | 450 | 406 | 366 | 329 | 301 | 276 | 254 | 234 | 215 | 199 | 173 | 151 | 132 | 118 | 105 | 95 | 85 | ... | ... | ... | ... | ... |
| N1610A | ... | ... | 921 | 807 | 710 | 628 | 559 | 499 | 451 | 407 | 366 | 335 | 307 | 282 | 260 | 240 | 222 | 192 | 168 | 148 | 131 | 117 | ... | ... | ... | ... | ... | ... | ... |
| N1611A | ... | ... | ... | 888 | 781 | 690 | 615 | 548 | 496 | 447 | 406 | 368 | 337 | 310 | 286 | 263 | 243 | 211 | 184 | 162 | 144 | ... | ... | ... | ... | ... | ... | ... | ... |
| N189A | ... | ... | ... | 919 | 808 | 708 | 637 | 567 | 513 | 462 | 420 | 382 | 349 | 321 | 295 | 274 | 253 | 218 | 191 | 169 | 150 | 132 | 120 | 107 | 99 | 90 | 81 | ... | ... |
| N1810A | ... | ... | ... | ... | 898 | 796 | 707 | 632 | 570 | 514 | 466 | 425 | 388 | 356 | 328 | 304 | 281 | 243 | 212 | 188 | 166 | 148 | 133 | 120 | ... | ... | ... | ... | ... |
| N1811A | ... | ... | ... | ... | 987 | 877 | 779 | 695 | 627 | 567 | 513 | 467 | 427 | 392 | 361 | 335 | 309 | 267 | 234 | 206 | 183 | 163 | 146 | ... | ... | ... | ... | ... | ... |
| N1812A | ... | ... | ... | ... | ... | 954 | 849 | 760 | 683 | 616 | 558 | 508 | 465 | 427 | 394 | 364 | 338 | 292 | 255 | 224 | 200 | ... | ... | ... | ... | ... | ... | ... | ... |
| N1813A | ... | ... | ... | ... | ... | ... | 920 | 820 | 738 | 667 | 604 | 551 | 502 | 462 | 427 | 394 | 366 | 315 | 276 | 243 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| N2110A | ... | ... | ... | ... | ... | ... | 964 | 860 | 775 | 700 | 635 | 577 | 529 | 485 | 450 | 413 | 382 | 330 | 289 | 255 | 226 | 202 | 182 | 164 | 149 | 136 | 124 | ... | ... |
| N2111A | ... | ... | ... | ... | ... | ... | ... | 945 | 852 | 770 | 698 | 633 | 582 | 533 | 492 | 454 | 420 | 363 | 318 | 280 | 248 | 222 | 200 | 179 | 163 | 149 | ... | ... | ... |
| N2112A | ... | ... | ... | ... | ... | ... | ... | ... | 930 | 839 | 762 | 692 | 635 | 582 | 537 | 496 | 458 | 397 | 347 | 306 | 270 | 242 | 218 | 197 | ... | ... | ... | ... | ... |
| N2113A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 908 | 823 | 750 | 687 | 630 | 580 | 537 | 496 | 430 | 375 | 330 | 293 | 261 | ... | ... | ... | ... | ... | ... | ... |
| N2410A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 912 | 830 | 755 | 690 | 633 | 584 | 539 | 500 | 433 | 378 | 333 | 295 | 262 | 237 | 212 | 195 | 177 | 162 | 138 | 118 |
| N2411A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 912 | 830 | 760 | 697 | 642 | 592 | 548 | 477 | 416 | 366 | 324 | 289 | 261 | 236 | 214 | 195 | 177 | 151 | ... |
| N2412A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 995 | 905 | 828 | 760 | 698 | 647 | 598 | 518 | 452 | 399 | 354 | 316 | 284 | 256 | 234 | 212 | 194 | ... | ... |
| N2413A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 980 | 897 | 822 | 758 | 700 | 649 | 561 | 490 | 432 | 384 | 342 | 308 | 277 | 252 | ... | ... | ... | ... |
| N2414A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 966 | 885 | 815 | 753 | 698 | 604 | 527 | 465 | 413 | 368 | 333 | ... | ... | ... | ... | ... | ... |
| N3010A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 992 | 917 | 843 | 781 | 675 | 590 | 519 | 462 | 411 | 371 | 334 | 304 | 276 | 253 | 215 | 184 |
| N3011A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 928 | 859 | 743 | 649 | 572 | 507 | 452 | 407 | 367 | 334 | 303 | 277 | 236 | 202 |
| N3012A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 925 | 810 | 707 | 623 | 554 | 493 | 445 | 402 | 365 | 330 | 303 | 257 | 222 |
| N3013A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 884 | 774 | 680 | 605 | 539 | 485 | 438 | 395 | 359 | 332 | 281 | ... |
| N3014A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 952 | 833 | 732 | 651 | 580 | 522 | 467 | 428 | 390 | 358 | 303 | ... |
| N3312A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 980 | 857 | 754 | 671 | 598 | 537 | 487 | 442 | 403 | 368 | ... | ... |
| N3313A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 927 | 816 | 726 | 648 | 580 | 527 | 478 | 435 | 399 | ... | ... |
| N3314A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 879 | 782 | 698 | 627 | 567 | 515 | 472 | 429 | ... | ... |
| N3315A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 943 | 838 | 746 | 671 | 608 | 551 | 502 | 460 | ... | ... |
| N3316A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 895 | 797 | 715 | 647 | 583 | 537 | 491 | ... | ... |
| N3317A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 950 | 845 | 761 | 688 | 625 | 570 | ... | ... | ... |
| N3318A | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 897 | 805 | 728 | 662 | ... | ... | ... | ... |

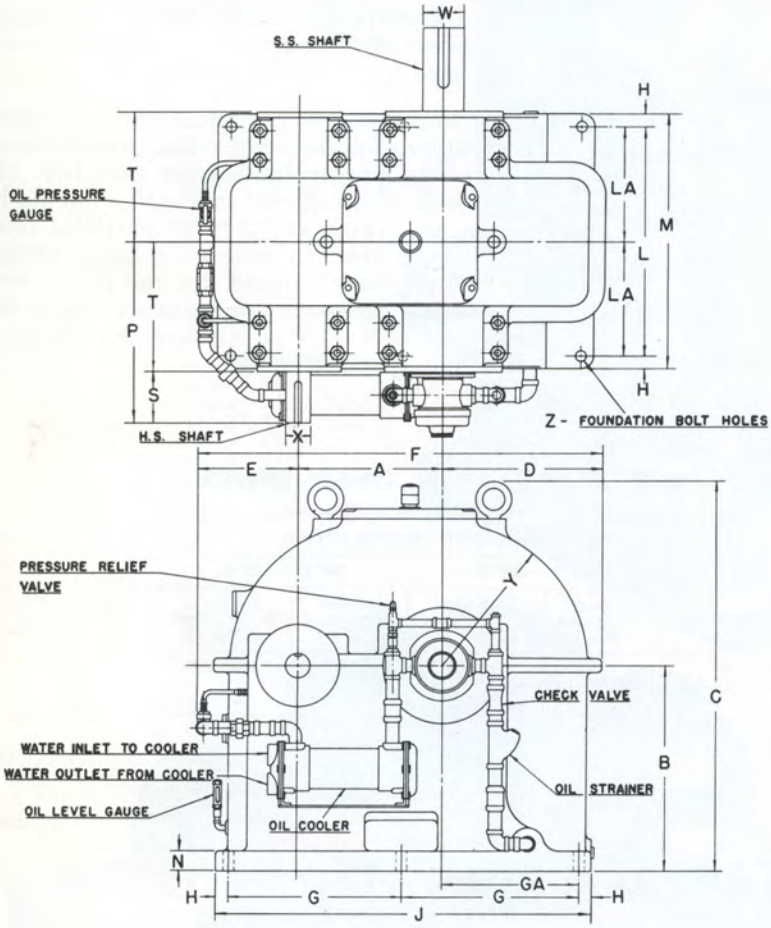
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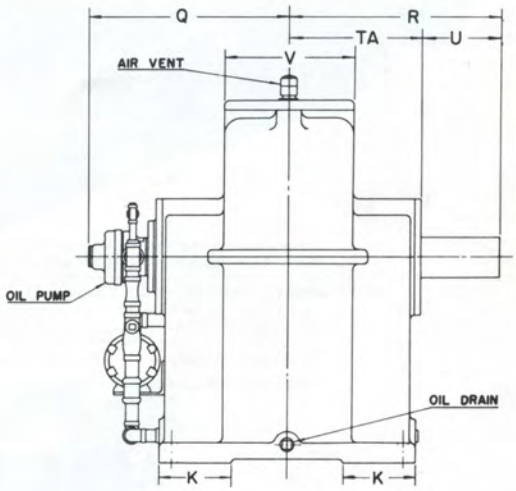
# GENERAL DIMENSIONS

## Type N

## HIGH SPEED REDUCERS AND SPEED INCREASERS




RIGHT HAND ASSEMBLY SHOWN




| Size No. | A | B | C | D | E | F | G | GA | H | J | K | L | LA | M | N | P | Q | R | S | T | TA | U | V | W | X | Y | Slow Speed Shaft Keyway | Z Bolt Holes | Wts. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N6 | 6 | 12½ | 22¼ | 8½ | 7⅛ | 21⅝ | 17 | 6¾ | 1 | 19 | 5½ | 15 | 7½ | 17 | 1½ | 12½ | 15 | 14 | 3¼ | 9¼ | 9¼ | 4¾ | 9½ | 2 | | 7⅜ | ½x¼x3⅞ | 4—$\frac{13}{16}$ | 675 |
| N8 | 8 | 14 | 25⅜ | 10 | 8⅝ | 26⅝ | 21 | 7¾ | 1¼ | 23½ | 6 | 17½ | 8¾ | 20 | 1¾ | 15 | 17$\frac{7}{16}$ | 16½ | 4¼ | 10¾ | 10¾ | 5¾ | 11 | 2½ | | 8⅝ | ⅝x$\frac{7}{16}$x5 | 4—1$\frac{1}{16}$ | 800 |
| N10 | 10 | 17 | 30$\frac{13}{16}$ | 12½ | 9⅛ | 31⅝ | 26½ | 10¼ | 1¼ | 29 | 6½ | 19½ | 9¾ | 22 | 2 | 16½ | 18$\frac{13}{16}$ | 17½ | 4¾ | 11¾ | 11¾ | 5¾ | 12 | 3 | | 11 | ¾x⅜x5 | 4—1$\frac{1}{16}$ | 1,050 |
| N12 | 12 | 20 | 36⅝ | 14 | 9⅝ | 35⅝ | 30 | 11½ | 1½ | 33 | 7 | 21 | 10½ | 24 | 2 | 19 | 20$\frac{7}{16}$ | 20 | 6 | 13 | 13 | 7 | 12½ | 3¾ | | 12½ | ⅞x$\frac{7}{16}$x5½ | 4—1$\frac{1}{16}$ | 1,950 |
| N14 | 14 | 22 | 39½ | 16 | 10¾ | 40¾ | 35 | 13¾ | 1½ | 38 | 7½ | 22 | 11 | 25 | 2¼ | 19½ | 20$\frac{13}{16}$ | 20½ | 6 | 13½ | 13½ | 7 | 13½ | 4 | | 14⅝ | 1x½x5½ | 4—1$\frac{1}{16}$ | 2,800 |
| N16 | 16 | 24 | 45⅜ | 18 | 11¾ | 45¾ | 20 | 15¾ | 1½ | 43 | 8 | 25 | 12½ | 28 | 2½ | 21 | 22$\frac{7}{16}$ | 23½ | 6 | 15 | 15¼ | 8¼ | 14½ | 4½ | | 16⅝ | 1x½x7½ | 6—1$\frac{1}{16}$ | 3,600 |
| N18 | 18 | 26 | 49⅝ | 20 | 12¼ | 50¼ | 22 | 17¼ | 1½ | 47 | 9 | 29 | 14½ | 32 | 2½ | 23 | 24$\frac{7}{16}$ | 26½ | 6 | 17 | 17¼ | 9¼ | 16 | 5 | | 18⅛ | 1¼x$\frac{7}{16}$x7½ | 6—1$\frac{1}{16}$ | 4,650 |
| N21 | 21 | 28 | 54⅞ | 23½ | 13½ | 58 | 25 | 20 | 2 | 54 | 9 | 29 | 14½ | 33 | 2¾ | 24½ | 25$\frac{7}{16}$ | 27½ | 7 | 17½ | 17¾ | 9¾ | 17 | 5¾ | | 21¼ | 1½x½x8¾ | 6—1$\frac{3}{16}$ | 5,900 |
| N24 | 24 | 30 | 59½ | 27 | 17¼ | 68¼ | 28¼ | 23¼ | 2 | 60½ | 8 | 24 | 12 | 28 | 3 | 23 | 22$\frac{7}{8}$ | 25½ | 8 | 15 | 15¼ | 10¼ | 17 | 6⅜ | | 24¼ | 1½x½x9 | 6—1$\frac{1}{16}$ | 7,350 |
| N30 | 30 | 36 | 71⅝ | 33 | 19¾ | 82¾ | 25 | 29¾ | 2 | 79 | 11 | 36 | 18 | 40 | 3½ | 29½ | 28$\frac{13}{16}$ | 32½ | 8½ | 21 | 21¼ | 11¼ | 18½ | 6⅞ | | 30¾ | 1¾x⅝x10 | 8—1$\frac{1}{16}$ | 11,700 |

All dimensions are in inches.
The external dimensions shown are the same for each Housing Assembly regardless of the face width of gears.
For units having four foundation bolts the dimension under G is the distance between bolts.
N30 units have eight foundation bolts spaced 25-25-25.
The above dimensions are not to be used for installation.
USE CERTIFIED INSTALLATION PRINT.

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# LUBRICATION INSTRUCTIONS

The lubricating oils used in Lufkin Gear Units should be high grade, high quality, well refined petroleum oils. It is essential that the oils be clean; they must also be non-corrosive to gears and bearings. They must be neutral in reaction and possess good defoaming properties. When operating temperature is high the oil must have good resistance to oxidation.

Straight mineral type lubricants are to be used under ordinary operating conditions. The tabulation below shows the viscosity of oil to use for all types of Lufkin Gear Units. When operating in the range of 0 to 40° F. ambient temperature, the lubricant should be carefully selected to make certain that the pour point is below the lowest anticipated temperature.

When a new Gear Unit is started in operation the oil should be drained at the end of two weeks and the case thoroughly flushed. The original oil may be used for refilling only if it has been filtered. Under ordinary operating conditions the oil should be changed every 2500 hours of operation or every six months, whichever occurs first.

It is very important to the successful and satisfactory operation of a Gear Unit that careful attention be given to proper lubrication and that the lubricant be kept clean. Every precaution should be taken to prevent water and foreign particles from entering the gear case. In unusually dusty atmospheres and where there is rapid rise and fall in temperatures causing excessive condensation inside the case, it will be necessary to change the oil more frequently than specified above.

## RECOMMENDED LUBRICANTS FOR LUFKIN GEAR UNITS

| GEAR UNIT NUMBER | AMBIENT TEMPERATURE | | | |
|---|---|---|---|---|
| | 15° F.—60° F. | | 50° F.—125° F. | |
| | AGMA Lubricant No. | Viscosity S.U.V. Secs. at 100° F. | AGMA Lubricant No. | Viscosity S.U.V. Secs. at 100° F. |
| S63A Through S2010A; D100 and D120 | 2 | 280–360 | 3 | 490–700 |
| S2211A—S3012A; D145 Through D440 | 3 | 490–700 | 4 | 700–1000 |
| All Type M Units | 2 | 280–360 | 3 | 490–700 |
| All Type N Units | 1 | 180–240 | 2 | 280–360 |

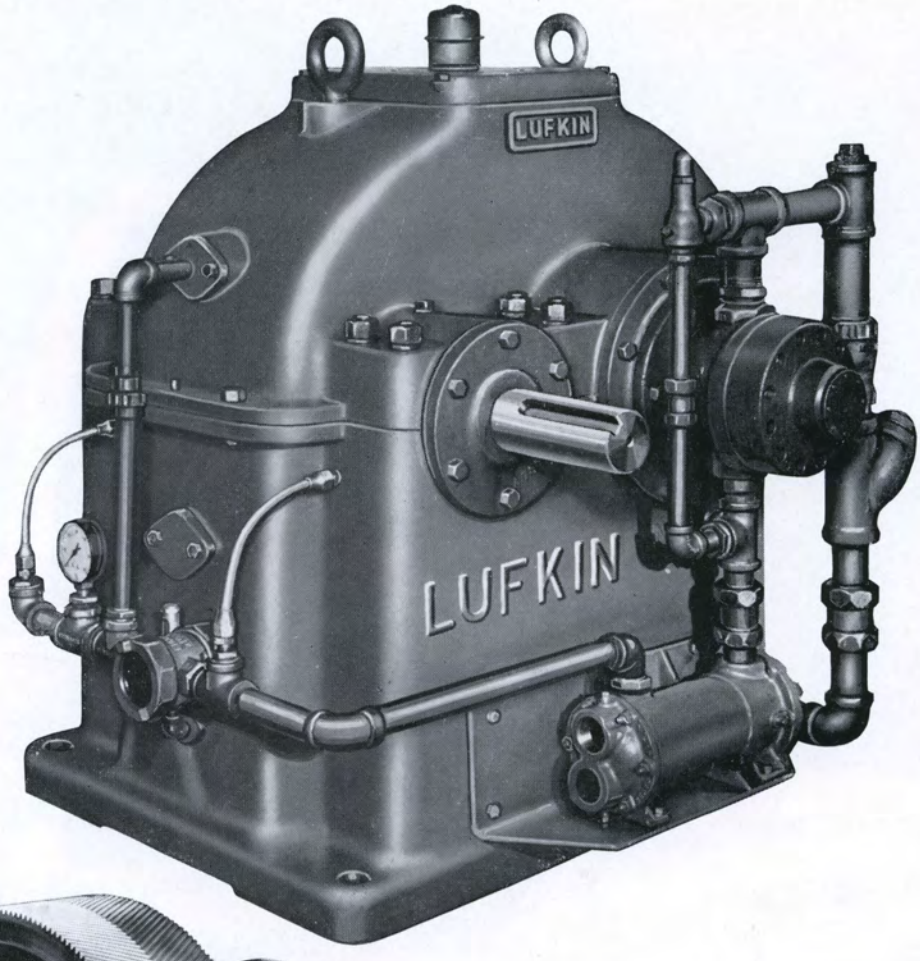
# AGMA STANDARD KEYWAYS

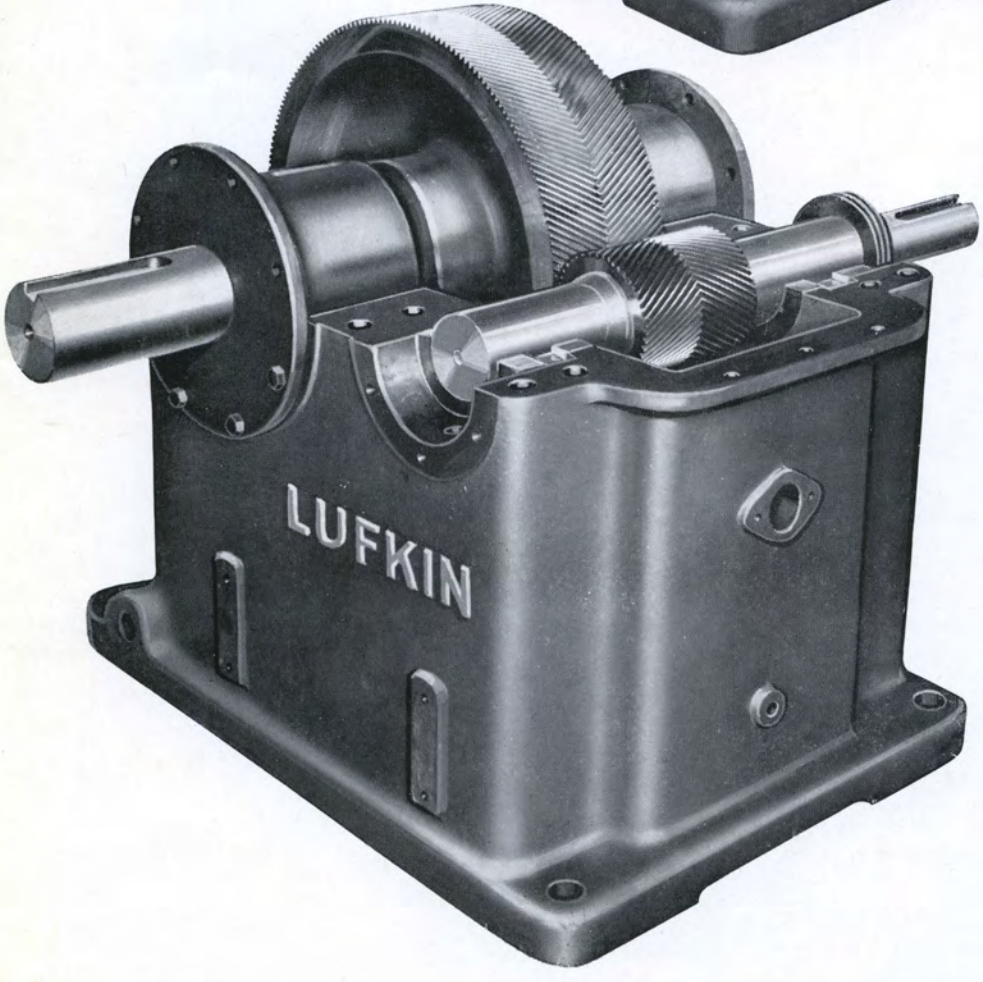
| Diameter of Shafts, Inclusive | RECOMMENDED STANDARD KEYWAYS | | |
|---|---|---|---|
| | Width | Depth | Key Stock |
| 5/16 to 7/16" | 3/32 | 3/64 | 3/32 x 3/32 |
| 1/2 to 9/16" | 1/8 | 1/16 | 1/8 x 1/8 |
| 5/8 to 7/8" | 3/16 | 3/32 | 3/16 x 3/16 |
| 15/16 to 1 1/4" | 1/4 | 1/8 | 1/4 x 1/4 |
| 1 5/16 to 1 3/8" | 5/16 | 5/32 | 5/16 x 5/16 |
| 1 7/16 to 1 3/4" | 3/8 | 3/16 | 3/8 x 3/8 |
| 1 13/16 to 2 1/4" | 1/2 | 1/4 | 1/2 x 1/2 |
| 2 5/16 to 2 3/4" | 5/8 | 5/16 | 5/8 x 5/8 |
| 2 13/16 to 3 1/4" | 3/4 | 3/8 | 3/4 x 3/4 |
| 3 5/16 to 3 3/4" | 7/8 | 7/16 | 7/8 x 7/8 |
| 3 13/16 to 4 1/2" | 1 | 1/2 | 1 x 1 |
| 4 9/16 to 5 1/2" | 1 1/4 | 7/16 | 1 1/4 x 7/8 |
| 5 9/16 to 6 1/2" | 1 1/2 | 1/2 | 1 1/2 x 1 |
| 6 9/16 to 7 1/2" | 1 3/4 | 5/8 | 1 3/4 x 1 1/4 |
| 7 9/16 to 8 13/16" | 2 | 3/4 | 2 x 1 1/2 |

Lufkin Commercial Gear Reducers and Increasers are furnished with the above standard keyways in the low speed and high speed shafts. The depth of the keyway in the coupling, pulley or sprocket is the same as the depth of the keyway in the shaft: that is, the depth is one-half of the key height measured from the edge of the keyway.

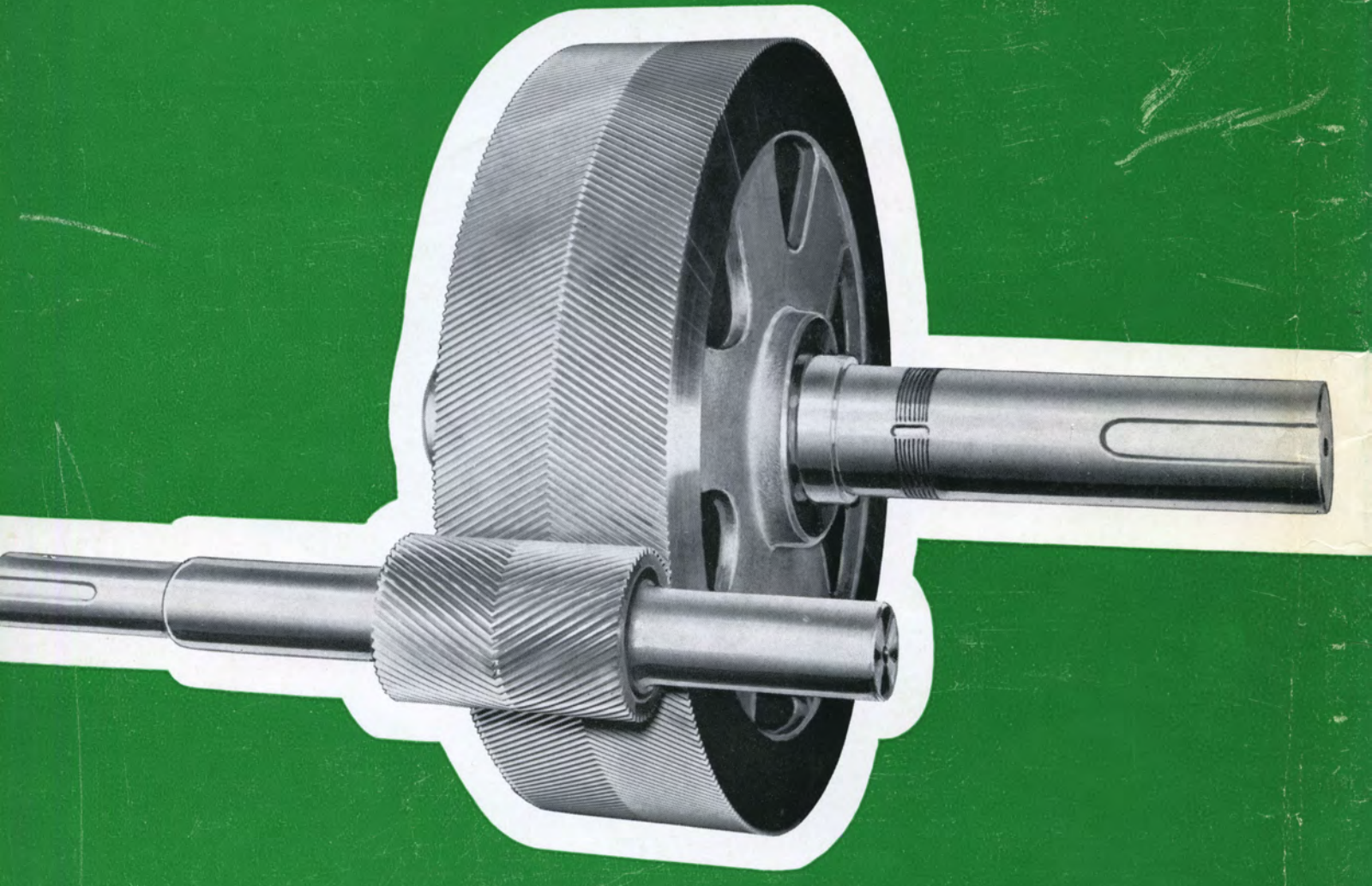
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# TYPE N SPEED INCREASERS



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# LUFKIN

## HIGHEST QUALITY SINCE 1900