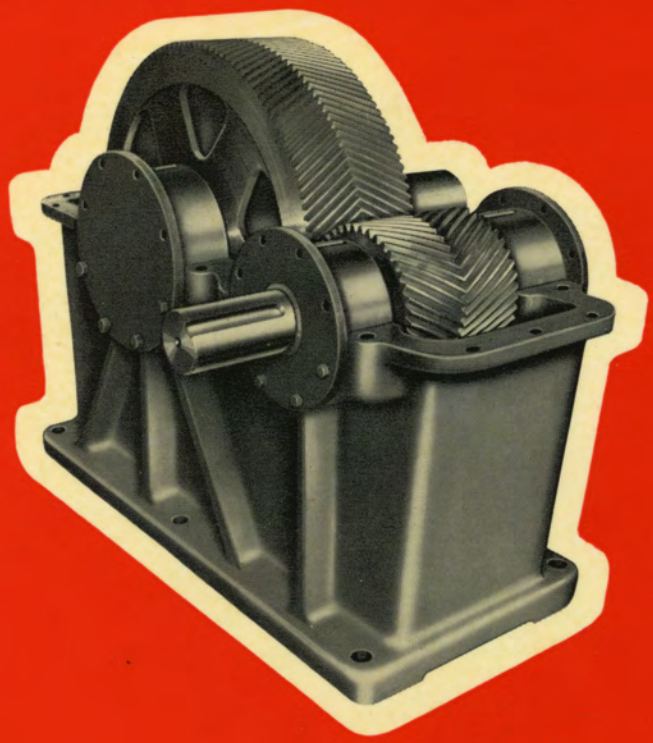
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LUFKIN GEARS



HERRINGBONE GEAR SPEED REDUCERS AND SPEED INCREASERS

CATALOG . . . G-1

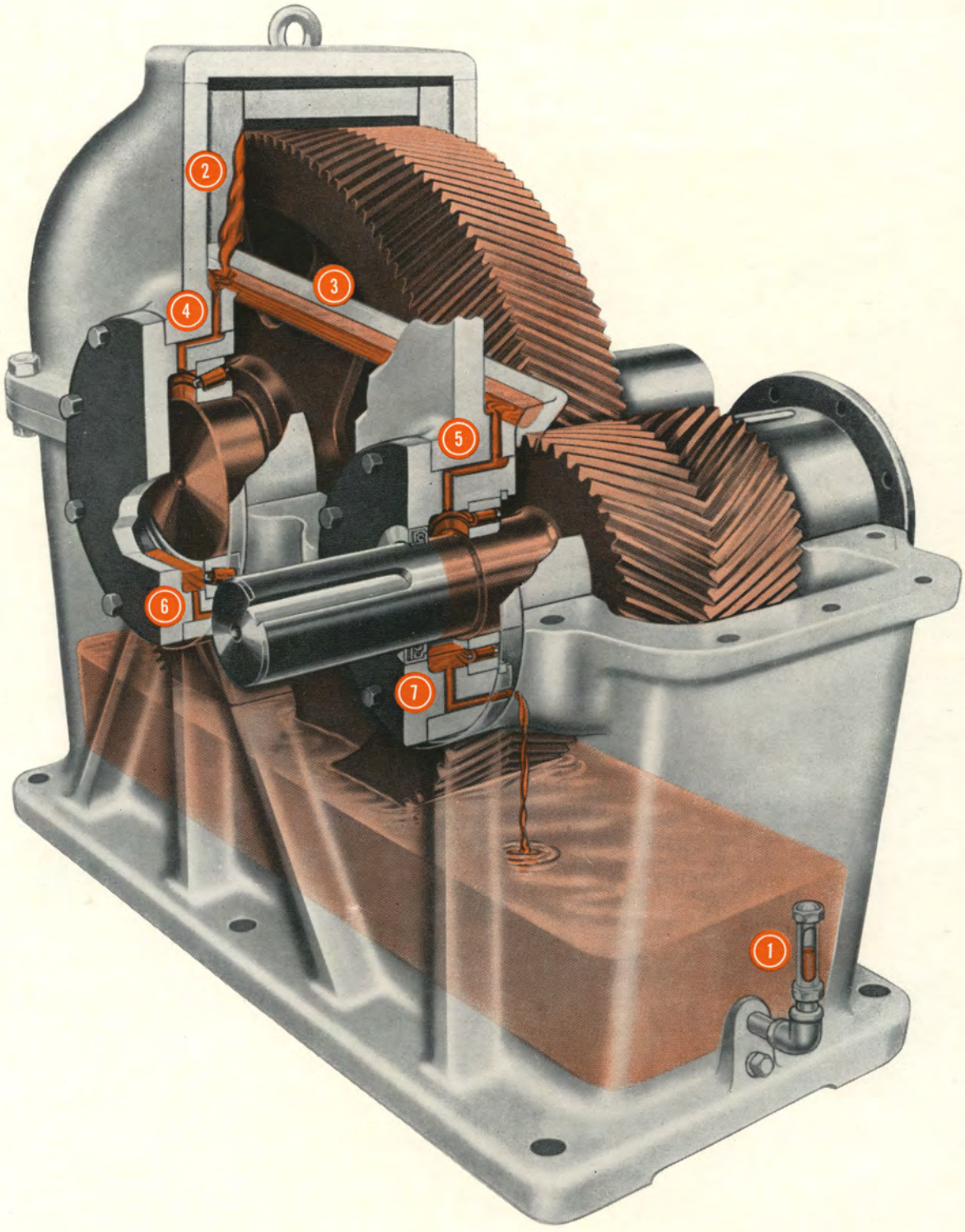
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LUFKIN FOUNDRY & MACHINE COMPANY LUFKIN TEXAS

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TYPES S AND D SPEED REDUCERS

Lubrication System



The housing is filled with oil until the level is visible in glass gage 1. The gear dips in the bath of oil, lubricating the gear teeth. The film of oil which adheres to the side of the gear rim is deflected by wiper 2 into oil trough 3 which is cast integral with the cover. Oil flows by gravity from the trough through oil passages 4 and 5 into all bearings and returns to the sump by oil-return passages 6 and 7.

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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 10-29

II. DOUBLE REDUCTION REDUCERS, TYPE D
Ratios 10:1 to 75:1
Pages 10-29

III. MEDIUM-SPEED SINGLE REDUCTION REDUCERS AND INCREASERS, TYPE M
Ratios 2:1 to 10:1
Pages 30-33

IV. HIGH SPEED REDUCERS AND SPEED INCREASERS, TYPE N
Ratios 2:1 to 12:1
Pages 34-40

LUFKIN FOUNDRY & MACHINE CO.

Factory and Executive Offices

LUFKIN, TEXAS

Branch Offices

DALLAS
1317 Magnolia Bldg.
Phone Central 5834

HOUSTON
2106 Second Nat'l. Bank Bldg.
Phone Capitol 0108

TULSA, OKLA.
719 Thompson Building
Phone 3-0204

LOS ANGELES, CAL.
5959 South Alameda
Phone Lafayette 1201

NEW YORK, N. Y.
149 Broadway
Phone Barclay 7-0562

OKLAHOMA CITY
537 Commerce Exchange Bldg.
Phone 7-7480

CORPUS CHRISTI
434 Nixon Bldg.
Phone 6145

KILGORE
P. O. Box 871
Phone 875

WICHITA FALLS
P. O. Box 2465
Phone 2-1967

CASPER, WYO.
P. O. Box 1849
Phone 3438-W

GREAT BEND, KAN.
P. O. Box 82
Phone 1044

ODESSA
P. O. Box 1632
Phone 5662

SEMINOLE, OKLA.
312 8th Street
Phone 34

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LUFKIN HERRINGBONE GEARS

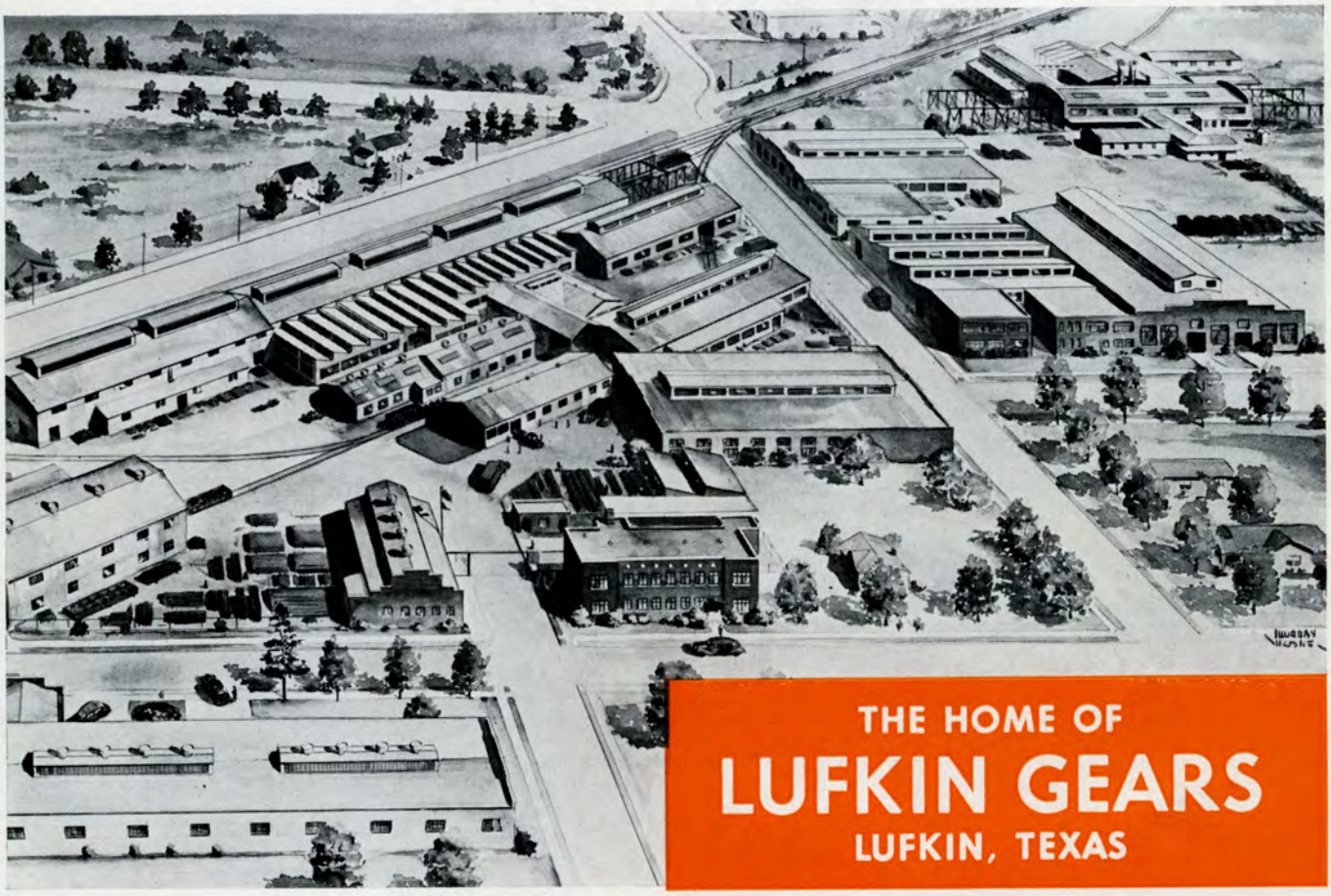
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MANUFACTURERS OF

LUFKIN EQUIPMENT OF ADVANCED DESIGN



THE LUFKIN FOUNDRY AND MACHINE COMPANY was established in 1900 in the heart of the Southwestern Timber Belt for the purpose of repairing, designing and building sawmills and sawmill machinery. As the original gray iron foundry, forge shop and machine shop facilities were expanded the company became interested in the manufacture of refinery equipment.

In 1924 Lufkin pioneered the development of the gear-driven pumping unit to replace the old and cumbersome standard rig in the production of oil. This product grew in volume until it now supports a plant of one thousand employees. The heart of an oil field pumping unit is the gear reducer and this service is generally considered to be one of the toughest applications for gears. Lufkin's total output of gear reducers of this class is now far in excess of twenty thousand units.

For several years before the recent World War II Lufkin built many special industrial gear reducers and increasers, especially for paper mills, refineries, pipe lines and chemical plants. During the war Lufkin was one of the major sources of supply for final drive Herringbone Gears for Medium Tanks and produced almost 50,000 pair. Also produced were 1,000 horsepower forward and reversing propulsion gear units for LST's, 500 horsepower drives for Army Cargo boats and 10,000 R.P.M. Reducers for Destroyer Escorts.

Out of this vast storehouse of experience gathered over a period of many years Lufkin has developed a complete line of horizontal parallel shaft Herringbone Gear Reducers and Increasers. Already there are hundreds of this new line of units in operation.

If you do not find your exact requirements tabulated in the following pages, present your gear problem to our nearest representative or to our home office at Lufkin, Texas.

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LUFKIN PLANT FACILITIES

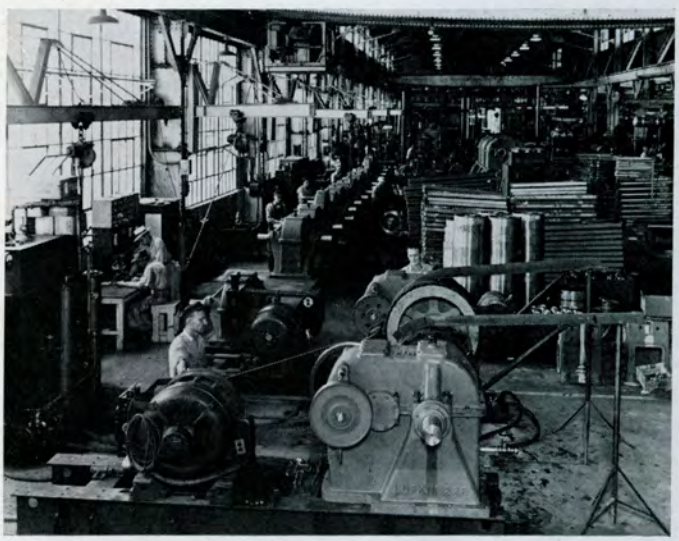
LUFKIN GEARS are built in one of the largest and most modern manufacturing plants in the South. During the past few years the plant has been almost completely re-equipped with new high-production machine tools. A new 150-ton daily capacity gray iron foundry started production in March, 1947.

As an aid to production and to insure precise duplication of parts every item is produced with the assistance of gage, jig, template or fixture. This practice has not only reduced the losses due to "human error" but also has considerably increased production and has made possible the manufacture of interchangeable parts. The Inspection Department is fully equipped with every possible aid for the selection of acceptable material.

The manufacturing facilities at Lufkin consist of a very diversified Machine Shop, Structural Shop, new Gray Iron Foundry, Forge Shop and Trailer Plant. As a supplement to these Departments there are also a new Pattern Shop, Heat-Treating Department, a Physical and Chemical Laboratory, X-ray Laboratory, and a well staffed Engineering Department.



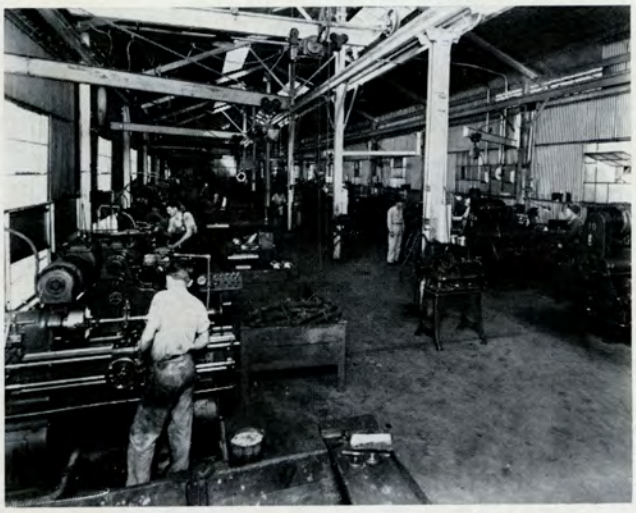
ABOVE: Main Bay of Machine Shop, looking North from Battery of Horizontal Boring Machines toward Assembly Floor, Test Block and Shipping Department.



RIGHT: Main Bay Machine Shop, looking South from Test Block toward Reducer Assembly Line with Horizontal Boring Machines in background. All Gear Units receive full-speed run-in test for several hours before acceptance by Inspection Dept.

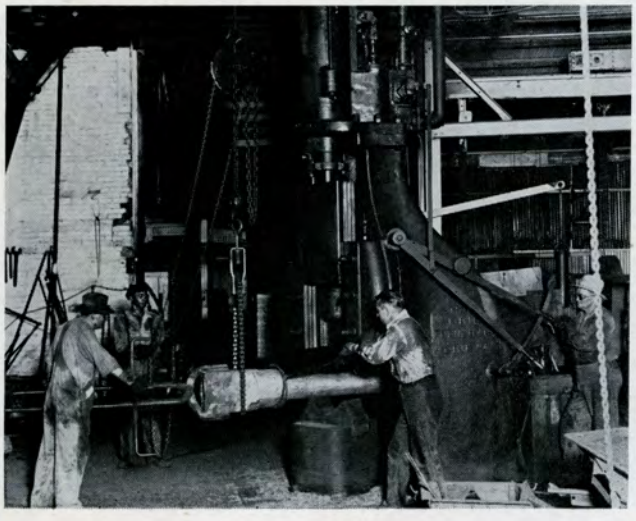
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THE LUFKIN MANUFACTURING PLANT AND FACILITIES have been built around the manufacture of Gear Assemblies. Our supervisory personnel and our skilled craftsmen have, for the most part, been affiliated with this organization for many years and there exists an excellent spirit of friendly cooperation among the employees, each man seriously interested in doing his part toward keeping the name LUFKIN unexcelled as a manufacturer of Quality Machinery.



ABOVE: Partial view of Lathe Shop with Grinders and Hobbing Machines in far background.

BELOW: Section of Forge Shop with large pinion being forged from square billet.





ABOVE: Gear Reducer Assembly Floor. Units in foreground are for Oil Field pumping service.

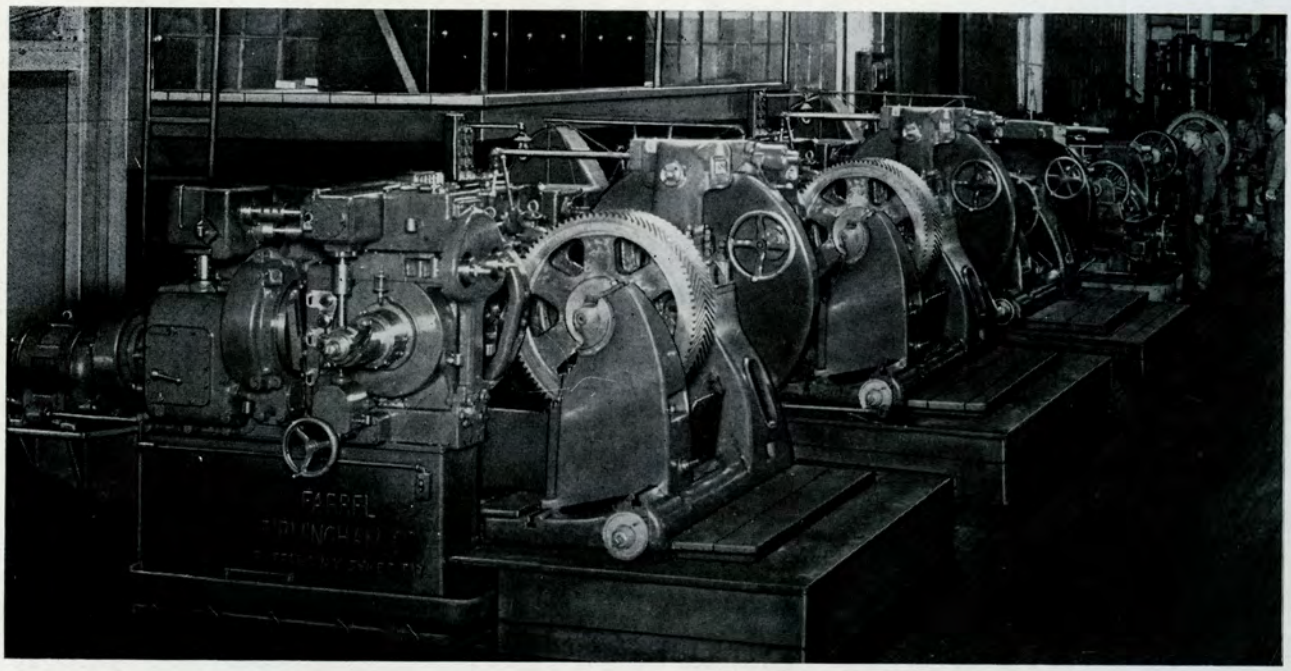
BELOW: Section of Gear Production Dept.



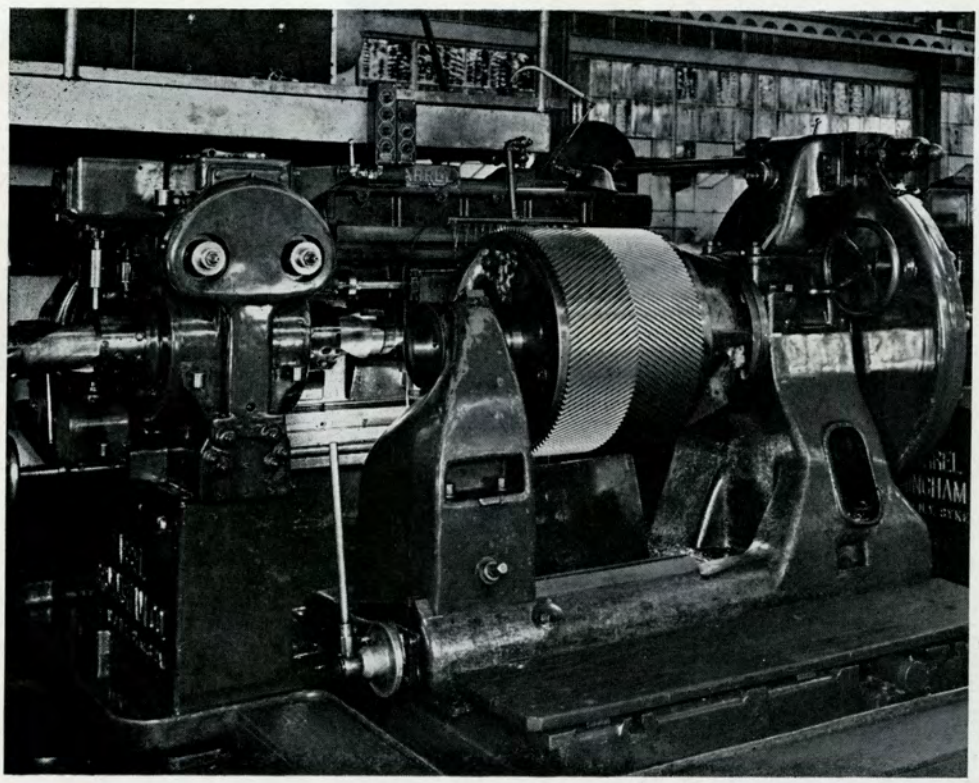
As an efficient and economical war-time manufacturer of Tank Gears, Ship Gears, Gun Carriages, Trailers, etc., Lufkin received the Army-Navy award for Excellence four times.

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LUFKIN HERRINGBONE GEAR CUTTING FACILITIES



A section of a battery of eleven Sykes Herringbone Gear Generators.



A 21" face gear being cut in gear generator having capacity of 60" diameter. All Commercial and High Speed gears are cut after being pressed on their shafts to insure the pitch circle being concentric with the bearing journals. Gears are carefully lapped for final finish.

ALL LUFKIN GEARS and Pinions are made of heat-treated alloy steel. Each Gear and Pinion is individually checked for hardness.

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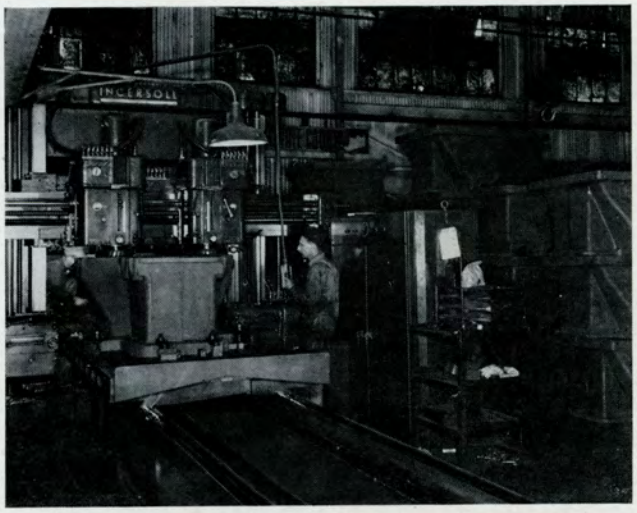
LUFKIN MACHINE SHOP VIEWS

RIGHT: Planer Type Milling Machine finishing joint surface on gear housing while Machinist's Helper sets up next housing on far end of table.



RIGHT: Bronze worm wheel for Lufkin Tractor Winch being hobbed. Material is special quality heat-treated alloy bronze.





LEFT: Horizontal Boring Machines finishing gray iron castings for Louisiana chemical plant. These machines are used for boring gear housings.

The housings are very accurately finished using rigid and precise boring fixtures. The boring is done with a special Boring Bar for each housing using cutters which are ground to specified dimensions in the Tool Room. This permits the machine operator to obtain high volume production with the assurance of extreme accuracy.



LEFT: Hobbing Helical gears for Lufkin-Cooper-Bessemer Engine auxiliary drive.

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LUFKIN GRAY IRON CASTING FACILITIES



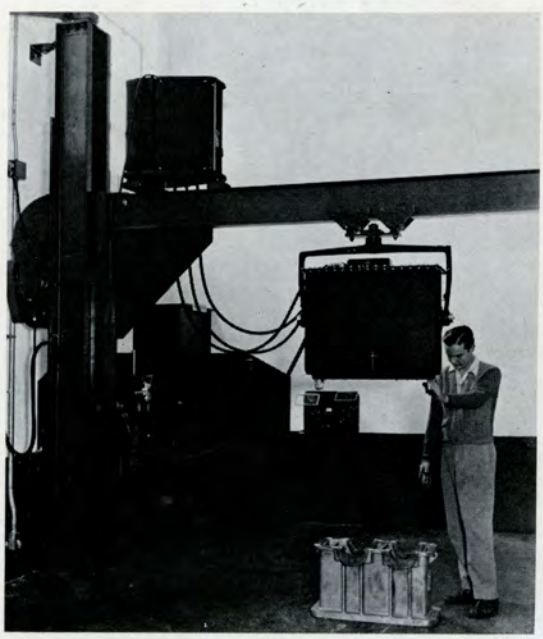
Lufkin's new gray iron Foundry. Daily capacity 150 tons. Crane-way through main bay extends at both ends of building, total length 760 feet.



Pattern Shop



Metallurgical Laboratory



X-Ray Machine

Reducer castings are made of "Controlled Specification" Gray Iron. The control at the cupola combined with exhaustive daily checks in the Laboratory insure highest quality castings from every heat.

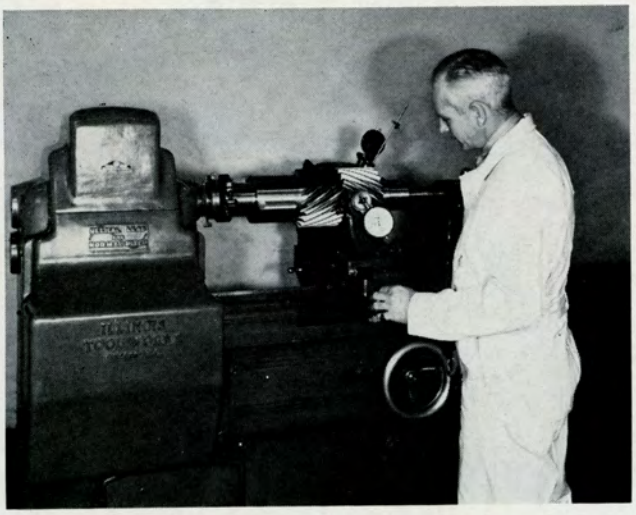


Tensile Testing Machine

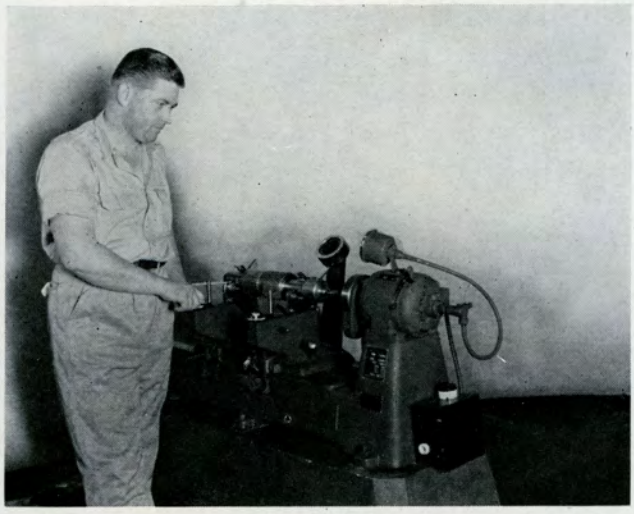
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GEAR INSPECTION

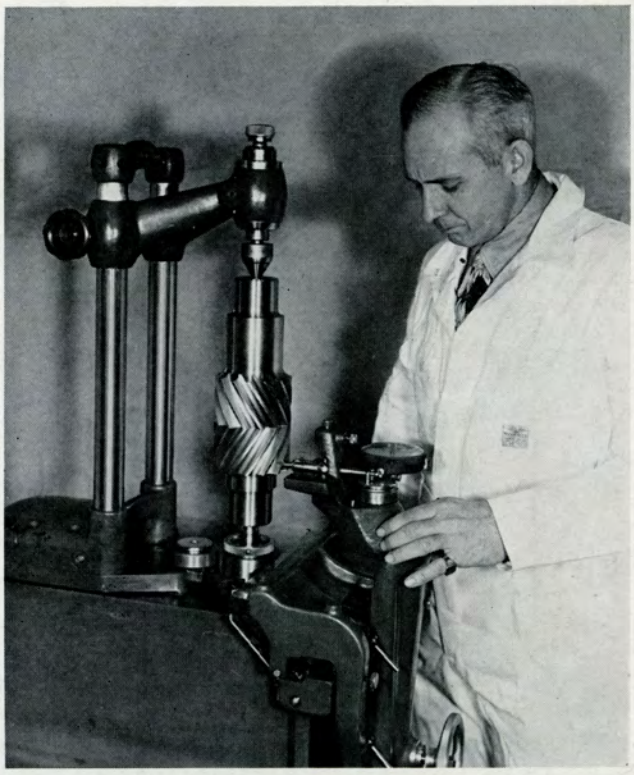
All cutters for Lufkin Herringbone Gear Generators are carefully inspected before being released to the Production Department. Finished pinions are checked regularly to insure continued maintenance of Lufkin high quality.



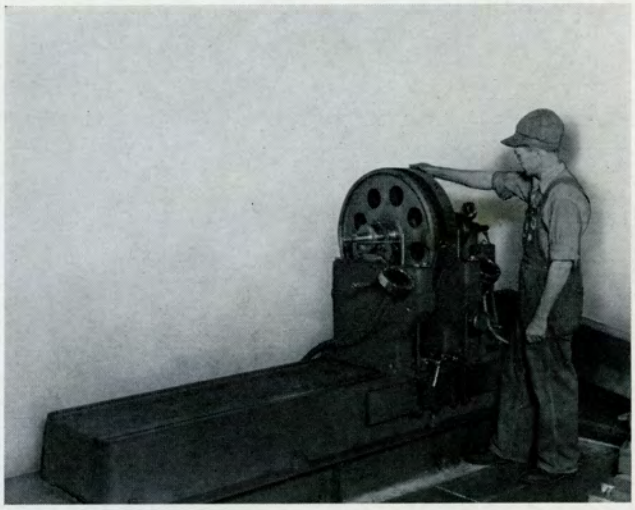
Checking lead of helix angle. This machine also checks tooth spacing.



High Speed pinions are also Dynamically Balanced.



Checking involute and tip relief.

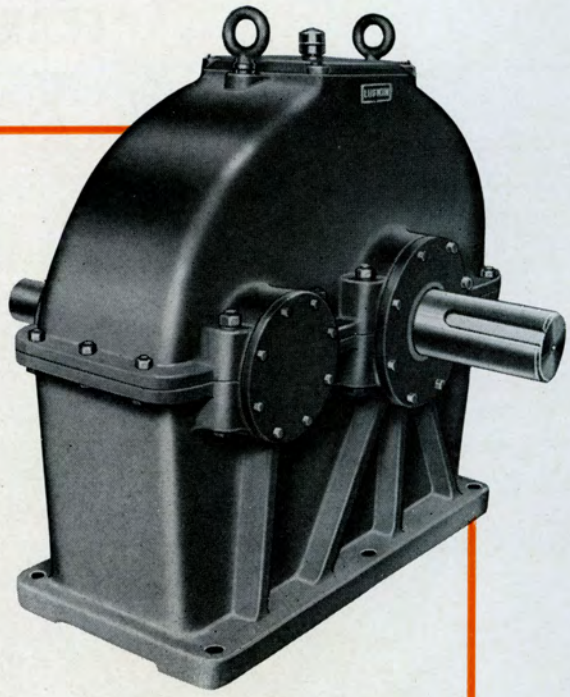


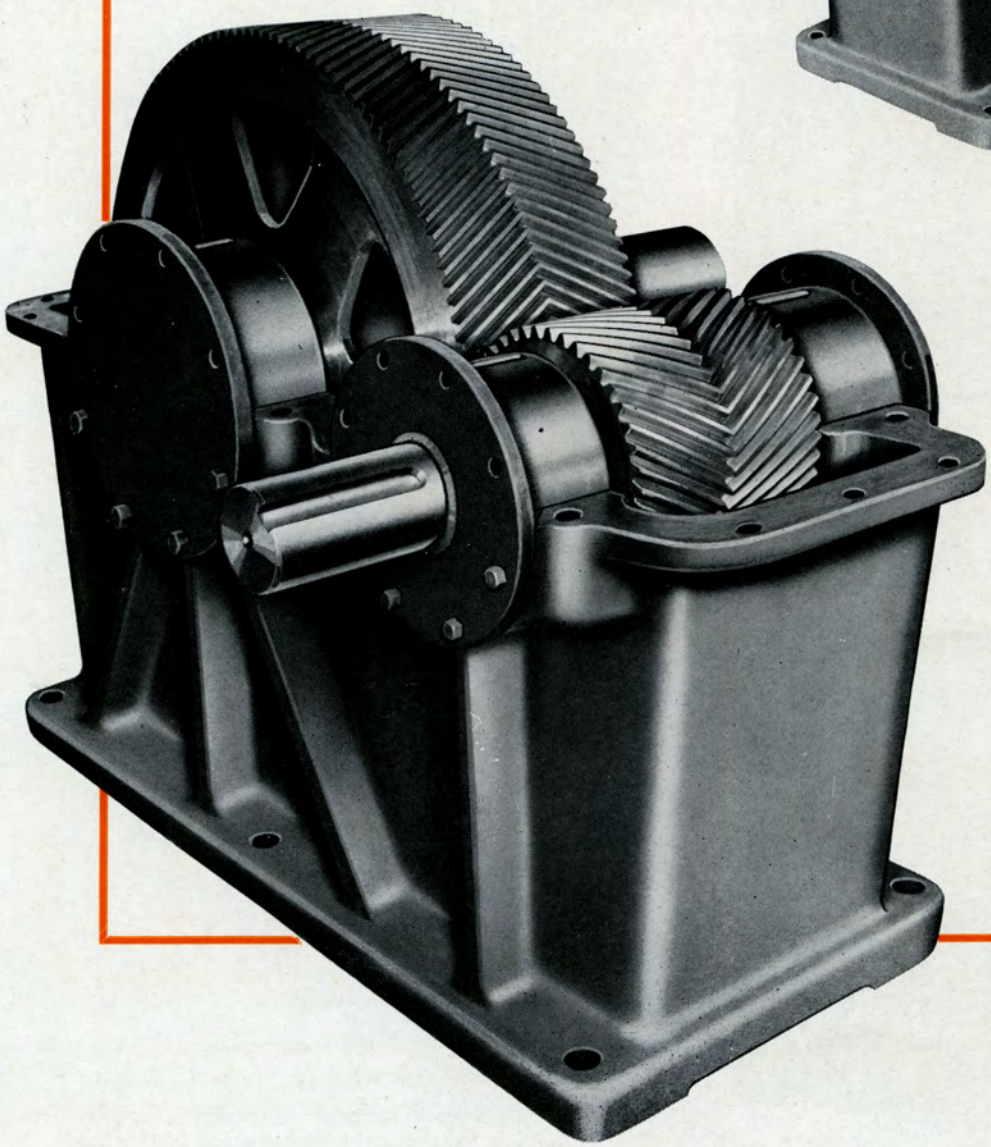
All High Speed and Medium Speed Gears are carefully checked for Dynamic Balance at operating speed. This procedure is essential for satisfactory performance at higher speeds.

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Type S

LUFKIN SINGLE REDUCTION
HERRINGBONE GEAR REDUCER

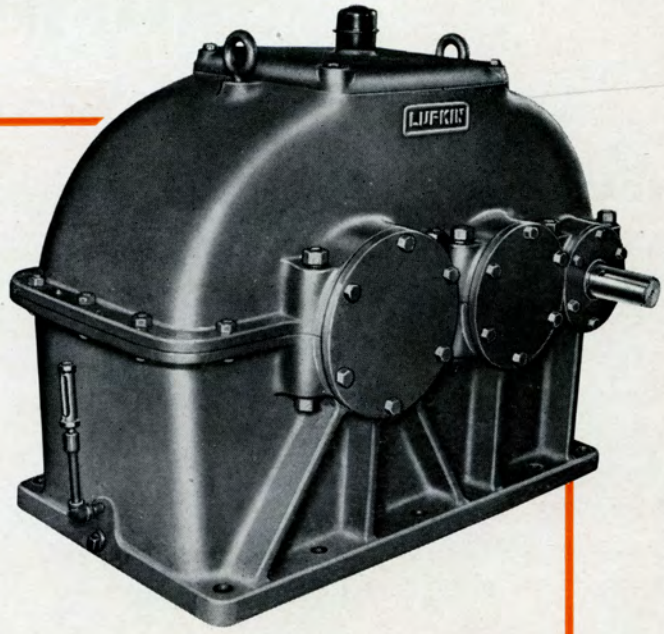


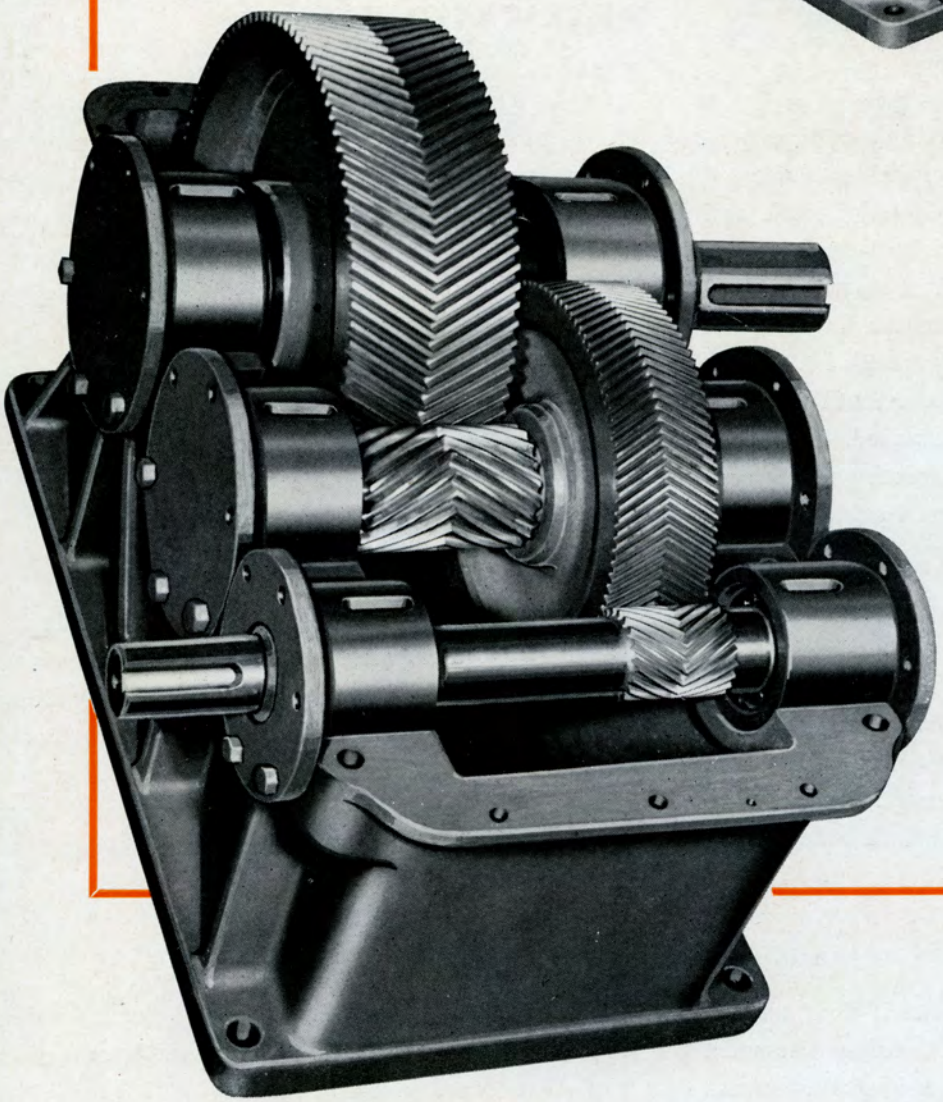


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Type D

LUFKIN DOUBLE REDUCTION
HERRINGBONE GEAR REDUCER





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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 to a minimum hardness of 210 Brinell.

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 18 and 19, and for Type D Double Reduction Units on pages 20 and 21.

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 Rating Tables show a Thermal Horsepower Rating for each unit. This rating depends upon the heat dissipating capacity of the gear case and is, therefore, constant for a given size reducer. The Thermal Horsepower Rating is the average load the unit will deliver continuously without overheating. The Thermal Rating may be exceeded only when some means of artificial cooling is provided.

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 17. Table 2, page 17, 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 17, 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 17.

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 18 through 21. 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 18 and 19; if the ratio is between 10:1 and 75:1, use the Double Reduction Type D Rating Tables on pages 20 and 21. 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 Rating of each reducer is shown in the left hand column of the Rating Tables. 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, but this practice is not generally recommended as the most economical.

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 24 or 25, 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 as shown by the table on page

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SELECTION OF GEAR REDUCERS (cont'd.)

Types S and D

25 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 Assembly.

OUTBOARD BEARING ASSEMBLY

In the event the external load is excessive, the reducer shaft may be extended to an outboard bearing. A typical Outboard Bearing Assembly is shown on page 26. 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 exceeds the allowable load shown in the Heavy Load Table on page 25, 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 17, 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 17, 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 18 and 19. Follow down the left hand column of Thermal Horsepower Ratings and note that the S2010 with 258 Thermal Horsepower is the smallest reducer having sufficient Thermal Rating; so the reducer selected must be this size or larger. Starting with the S2010, then, the nearest ratio is 5.67 and at 1150 RPM this reducer has a mechanical rating of 469 horsepower which is well above the 375 horsepower desired. Since this unit has a Thermal Rating of 258 horsepower, the S2010 is the proper selection.

Notice that the next smaller size reducer, the S189, at the same ratio and speed has a mechanical rating of 355 horsepower which is lower than the 375 desired, and the Thermal Rating is only 220 horsepower which is lower than the 250 required. The S189 is, therefore, too small.

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 2.25.

Equivalent Horsepower = $2.25 \times 100 = 225$ HP.

Refer to the Rating Tables for Single Reduction units and find the smallest reducer which has a Thermal Rating of at least 100 horsepower. This is found to be the S126 with a Thermal Rating of 118 horsepower. An input speed of 1400 RPM is not shown for this reducer, but it appears that it probably has sufficient mechanical rating at that speed. At a ratio of 4:1 and a speed of 1750 RPM the tabulated mechanical rating is 273 horsepower and at the same ratio and at 1150 RPM it is 197 horsepower. By direct interpolation between these two speeds, find the approximate mechanical rating at 1400 RPM as follows:

$$\frac{1400 - 1150}{1750 - 1150} \times (273 - 197) + 197 = 229 \text{ Horsepower}$$

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EXAMPLES (cont'd.)

The S126 is, therefore, the proper selection as the Thermal Rating is above the 100 HP actual load and the mechanical rating is above the 225 Equivalent Horsepower required.

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 × 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 20 and 21 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:

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

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

Refer to the Overhung Load Table for Double Reduction Reducers on page 25 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 slow 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 22 and 23 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 14 and 15.

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	2.00
	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	2.25
	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	2.50
	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 14, 15 and 16 for information on selecting reducers.

Reducer No. S63

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.00	2.33	2.75	3.00	3.29	3.62	4.00	4.45	5.00	5.32	5.67	6.06	6.50	7.00	7.73	8.14	8.60	9.67	10.29	.....	.....	.....
	1750	87.2	75.0	62.2	56.0	51.1	45.9	40.3	35.3	30.0	27.7	25.3	22.8	20.5	18.4	15.7	14.4	13.3	10.4	9.2	.....	.....	.....
	1150	63.2	51.0	43.7	40.0	36.0	32.1	28.1	24.6	20.6	18.6	17.0	15.8	14.1	12.6	10.8	9.9	9.0	7.5	6.1	.....	.....	.....
38	870	46.9	40.0	34.1	31.1	28.0	24.7	22.0	19.1	16.1	14.8	13.4	12.1	11.0	9.9	8.4	7.7	7.1	5.8	4.8	.....	.....	.....
	720	40.0	34.0	28.8	26.0	23.5	20.8	18.4	15.9	13.3	12.3	11.2	10.0	9.2	8.1	6.9	6.3	5.8	4.8	4.0	.....	.....	.....
	580	33.1	29.0	24.2	21.6	19.7	17.4	15.2	13.2	11.2	10.2	9.4	8.5	7.7	6.8	5.8	5.3	4.8	4.0	3.3	.....	.....	.....
High Speed Shaft Diameter		1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1	1	1	⅞	⅞	⅞	⅞	¾	.....	.....	.....

Reducer No. S84

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.00	2.50	2.73	3.00	3.57	4.12	4.57	5.10	5.40	5.74	6.11	6.53	7.00	7.42	7.89	8.41	9.00	9.67	10.29	.....	.....	.....
	1750	.....	155	140	128	105	85.6	75.7	65.2	60.0	55.4	50.9	46.2	41.3	37.5	34.6	31.2	28.2	23.6	20.2	.....	.....	.....
	1150	134	111	99.0	88.6	73.0	59.0	53.4	45.4	42.0	38.3	34.6	31.4	28.9	26.6	23.6	21.7	19.1	16.2	14.0	.....	.....	.....
63	870	107	86.0	76.0	69.1	56.0	46.6	41.2	35.6	33.0	29.8	27.5	24.7	22.2	20.3	18.4	16.6	14.9	12.6	11.0	.....	.....	.....
	720	90.0	72.0	64.0	58.5	47.2	39.0	34.5	29.6	27.5	25.2	22.9	20.0	18.0	16.6	15.3	13.7	12.4	10.4	9.0	.....	.....	.....
	580	75.0	60.0	54.0	48.7	39.8	33.2	29.1	24.7	23.0	20.7	19.3	17.5	15.5	14.0	12.8	11.6	10.4	8.6	7.5	.....	.....	.....
High Speed Shaft Diameter		1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1½	1½	1½	1½	1½	1¼	1¼	1	1	.....	.....	.....

Reducer No. S105

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.00	2.33	2.75	3.00	3.44	4.00	4.22	4.71	5.00	5.36	5.67	6.00	6.37	6.78	7.00	7.42	7.89	8.09	9.00	9.43	10.43	.....
	1750	.....	.....	.....	233	195	167	158	136	125	112	103	96	88	80	76	70	63	61	52	47.0	36.0	.....
	1150	250	216	183	166	142	115	107	93	86	78	73	67	62	56	53	49.0	43.7	42.8	36.5	32.3	24.3	.....
88	870	198	170	143	130	109	90	84	73	66	61	57	52	47.6	43.0	41.8	38.2	34.1	33.4	28.0	25.0	19.2	.....
	720	165	143	120	108	92	76	70	62	57	51	48.0	43.5	40.1	36.0	34.8	32.0	28.3	27.5	23.4	20.5	16.2	.....
	580	137	122	101	91	78	64	60	52	47	43.2	39.4	36.6	33.2	30.3	29.1	27.4	23.8	23.0	19.5	17.2	13.5	.....
High Speed Shaft Diameter		2	2	2	2	2	2	2	2	2	2	2	2	1¾	1¾	1¾	1½	1½	1½	1½	1½	1½	.....

Reducer No. S126

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.00	2.33	2.75	3.00	3.44	3.80	4.00	4.54	5.00	5.26	5.55	6.00	6.30	6.64	7.00	7.40	8.14	8.60	9.00	9.43	10.43	.....
	1750	.....	.....	.....	.....	.....	293	273	232	202	190	175	156	145	136	126	115	101	92	86	78	61	.....
	1150	.....	359	301	270	232	210	197	164	146	133	124	120	103	95	88	82	70	64	60	53	41	.....
118	870	320	281	238	214	183	162	152	126	111	103	96	86	80	75	69	63	53	49	45	41	33	.....
	720	269	234	201	178	154	135	128	108	94	88	80	72	67	63	58	53	46	42	39	35	27	.....
	580	228	198	170	154	130	114	106	89	78	73	67	60	56	52	48	45	38	35	33	29	23	.....
High Speed Shaft Diameter		2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2	2	2	2	1¾	1¾	1¾	1½	.....

Reducer No. S147

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.04	2.50	3.00	3.38	3.67	4.00	4.38	4.60	5.00	5.46	5.72	6.00	6.30	6.64	7.00	7.40	7.91	8.33	8.80	9.67	10.20	.....
	1750	.....	.....	.....	.....	.....	.....	363	343	307	275	257	242	225	211	193	178	158	145	134	110	98	.....
	1150	.....	.....	408	360	327	291	260	243	218	195	180	170	158	143	132	121	111	102	94	76	66	.....
150	870	467	389	320	281	251	228	204	192	171	148	139	130	121	111	104	96	86	79	73	60	53	.....
	720	395	326	270	235	215	190	169	158	141	127	118	110	102	95	88	80	72	66	61	50	45	.....
	580	337	278	230	202	183	163	143	134	120	106	99	93	86	79	73	67	60	56	51	41	37	.....
High Speed Shaft Diameter		3	3	3	3	3	3	3	3	3	3	3	3	3	2⅝	2⅝	2⅝	2	2	1¾	1¾	1¾	.....

Ratios listed are standard but intermediate ratios are available at slight extra cost. Special ratios lower than minimum shown, down to 1.25 in some cases, are also available. For lower ratios the Horsepower Rating may not be higher than that listed for the lowest ratio in the above Tables.

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 30 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 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 14, 15 and 16 for information on selecting reducers.

Reducer No. S168

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																				
		2.05	2.56	3.00	3.44	3.71	4.00	4.52	5.15	5.40	5.67	5.96	6.28	6.62	7.00	7.35	7.73	8.14	8.60	9.18	9.67	10.20	.....
182	1750	.....	.....	.....	.....	.....	.....	.....	417	394	370	345	321	298	275	255	235	217	202	178	160	139	.....
	1150	.....	.....	.....	494	453	407	355	300	284	263	244	228	208	196	176	163	150	140	125	109	94	.....
	870	670	538	456	387	350	324	277	236	220	206	191	174	161	145	137	127	118	108	98	87	77	.....
	720	570	460	385	328	299	275	234	200	187	171	160	148	137	125	116	108	99	91	82	73	64	.....
	580	480	390	326	278	251	234	201	165	154	144	134	123	115	104	97	90	83	76	68	63	53	.....
High Speed Shaft Diameter		3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	2⅝	2⅝	2⅝	2⅝	2	2	2	.....

Reducer No. S189

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																				
		2.00	2.51	3.00	3.50	3.80	4.00	4.29	4.63	5.00	5.43	5.67	5.92	6.20	6.50	7.00	7.31	8.00	8.82	9.29	9.80	10.45	.....
220	1750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	470	444	416	375	348	308	265	242	220	193	.....
	1150	.....	.....	.....	.....	593	560	510	462	417	380	355	336	318	296	266	250	215	182	168	154	135	.....
	870	.....	.....	612	520	465	438	400	368	331	297	280	265	247	232	204	189	165	141	131	122	106	.....
	720	794	625	525	440	395	372	340	313	282	253	237	224	206	193	172	162	140	120	111	102	89	.....
	580	675	545	446	371	333	314	290	266	238	212	199	186	173	162	144	135	118	101	93	85	74	.....
High Speed Shaft Diameter		3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¼	3¼	2⅝	2⅝	2⅝	2	.....

Reducer No. S2010

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.04	2.50	3.00	3.44	3.71	4.00	4.33	4.71	5.15	5.45	5.67	6.14	6.69	7.00	7.33	7.70	8.09	8.60	9.00	9.43	10.43	
258	1750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	520	486	458	426	396	360	339	309	249	.....
	1150	.....	.....	.....	.....	.....	.....	660	597	530	490	469	418	371	348	330	300	281	254	240	215	166	.....
	870	.....	.....	825	688	630	573	517	467	411	383	367	326	292	271	254	236	215	196	181	163	130	.....
	720	.....	850	694	586	535	490	440	396	352	328	312	277	247	230	211	197	183	165	153	142	110	.....
	580	865	711	592	502	450	412	371	337	298	276	264	233	205	189	177	165	152	138	129	119	92	.....
High Speed Shaft Diameter		3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¼	3¼	2⅝	2⅝	.....

Reducer No. S2411

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		2.51	3.00	3.42	3.67	4.05	4.33	4.65	5.00	5.40	5.86	6.11	6.50	7.00	7.57	7.89	8.23	8.60	9.00	9.67	10.08	11.00	
325	1150	.....	.....	.....	.....	.....	.....	.....	.....	736	658	615	570	513	458	430	407	381	356	317	300	248	.....
	870	.....	.....	.....	951	836	768	705	641	578	518	487	449	403	358	338	321	297	279	250	221	185	.....
	720	.....	1038	874	812	720	658	598	546	491	435	416	379	344	305	287	271	250	231	207	190	158	.....
	580	1070	882	748	692	610	560	515	461	414	372	350	324	290	256	240	225	208	194	172	167	132	.....
	400	766	640	542	500	440	402	368	334	303	271	255	230	208	185	172	162	153	142	130	122	94	.....
High Speed Shaft Diameter		4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	3¾	3¾	3¾	3¼	3¼	.....

Reducer No. S3012

Thermal Rating H.P.	Motor R.P.M.	STANDARD RATIOS																					
		3.00	3.50	3.74	4.00	4.53	4.83	5.00	5.56	6.00	6.50	6.74	7.00	7.57	8.89	8.23	8.60	9.00	9.71	10.11	10.54	11.00	11.50
420	1150	.....	.....	.....	.....	.....	.....	.....	.....	.....	898	840	813	722	688	638	605	560	500	466	440	412	388
	870	.....	.....	.....	.....	1170	1080	1022	868	790	705	662	634	567	533	496	470	439	390	368	347	320	302
	720	.....	.....	1264	1166	992	913	867	745	672	603	568	540	482	455	425	397	375	332	312	294	275	253
	580	1300	1160	1070	990	850	782	744	640	575	508	476	452	407	382	360	340	316	279	261	243	224	210
	400	1020	860	785	723	610	556	528	454	410	368	348	327	297	278	260	238	224	200	184	174	161	151
High Speed Shaft Diameter		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4½	4½	4½	3¾	3¾

Ratios listed are standard but intermediate ratios are available at slight extra cost. Special ratios lower than minimum shown, down to 1.25 in some cases, are also available. For lower ratios the Horsepower Rating may not be higher than that listed for the lowest ratio in the above Tables.

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 30 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 14, 15 and 16 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	.....	.....	.....	.....
13	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	.....	.....
18	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	.....
28	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	.....
42	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	.....
53	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
67	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 14, 15 and 16 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
89	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
116	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	35	34	32
	870	155	148	137	127	115	100	93	83	76	65	56	50	44	39	35	33	30	28	25	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
160	1750	.....	.....	.....	.....	320	298	279	251	222	198	177	155	133	127	119	104	97	83	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	25
High Speed Shaft Diameter		3	3	3	3	3	3	3	3	3	3	3	3	2⅝	2⅝	2⅝	2⅝	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
208	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
246	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 at slight extra cost.

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

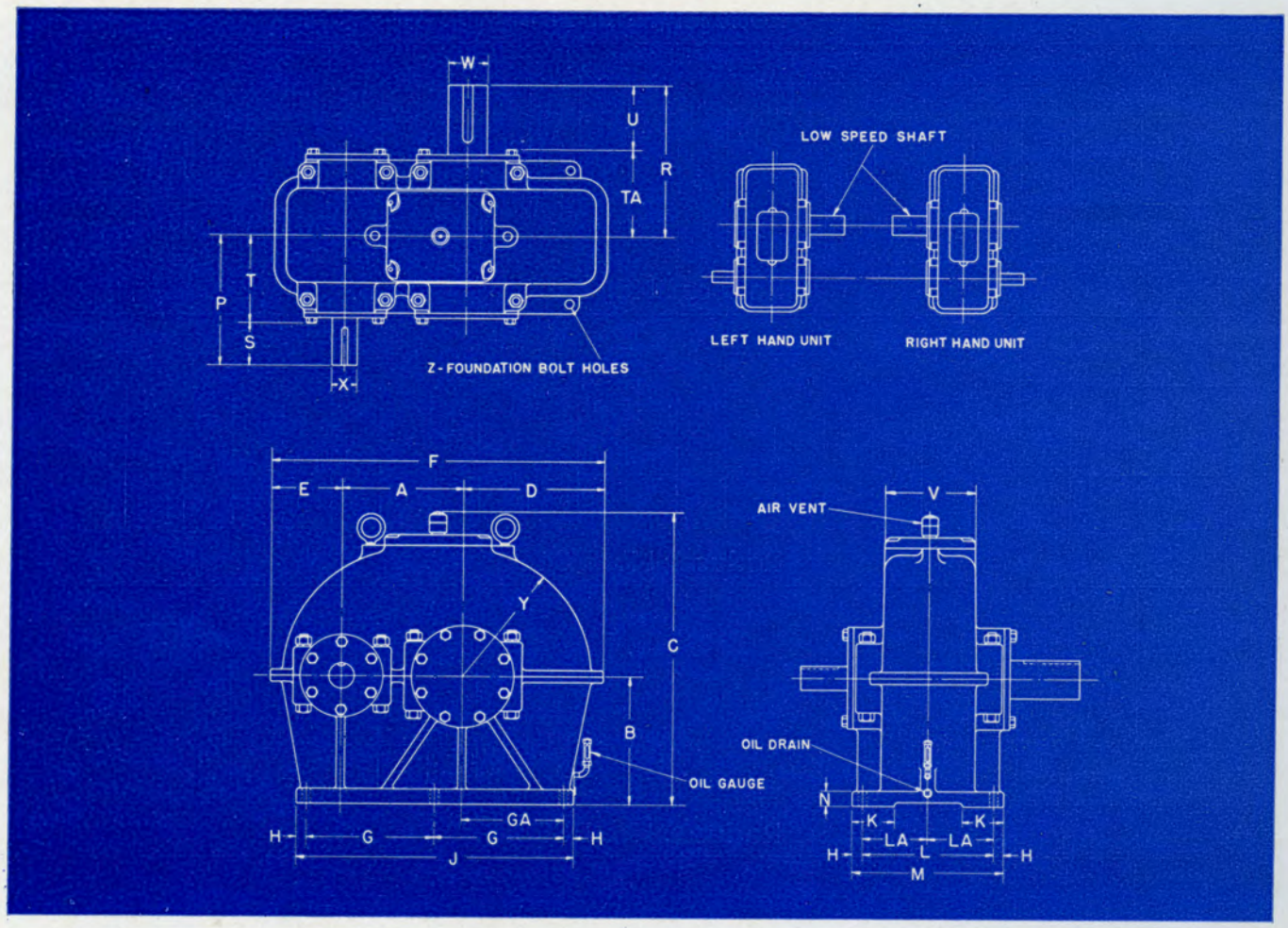
All units may be operated at speeds lower than the minimum shown. The selection of a reducer for a lower speed may be accomplished by multiplying the desired horsepower by 580 and dividing by the desired speed. The result will be the equivalent horsepower at 580 RPM which can be found in the above tables.

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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
S63	6	8	17 1/16	7½	4½	18	13½	5¼	¾	15	*	8½	4¼	10	⅞	8⅝
S84	8	10½	21 11/16	10	5½	23½	17½	7	1	19½	*	9½	4¾	11½	1	9½
S105	10	12½	26 3/16	12½	7	29½	11	8¾	1	24	3½	11½	5¾	13½	1½	12½
S126	12	15	32¾	15	8	35	14	11½	1	30	4	13	6½	15	1½	14½
S147	14	17	36⅜	16½	8½	39	15½	12½	1¼	33½	4½	15½	7¾	18	2	16½
S168	16	19	40⅝	18½	9½	44	17	13½	1¼	36½	4½	16	8	18½	1¾	16½
S189	18	21	44½	20	10	48	19	15	1½	41	5	17½	8¾	20½	2	18
S2010	20	23	48½	22½	11	53½	22	17¾	1½	47	5	19	9½	22	2	19
S2411	24	27	56¼	26½	13½	64	25½	20	1¾	54½	6	21	10½	24½	2¾	21
S3012	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
S63	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 18 and 19	6⅝	½x¼x3⅞	4—11/16	250
S84	10¼	3⅜	6⅛	6⅛	4⅛	6¾	2½		8⅞	⅝x⅜x3⅞	4—13/16	500
S105	13¾	4¾	7¾	7⅞	5⅞	8½	3		11	¾x⅝x5	6—13/16	850
S126	16¼	5 7/16	8 13/16	8 13/16	7 7/16	9¾	3½		13½	⅞x1/4x5½	6—13/16	1,350
S147	18	6½	10	10	8	11½	4		15	1 x½x7½	6—1 1/16	1,950
S168	20	5¼	11¼	11½	8½	12	5		17	1¼x¼x7½	6—1 1/16	2,600
S189	22	6½	11½	11½	10½	13	5½		18½	1¼x¼x9	6—1⅛	3,500
S2010	24	6½	12½	12½	11½	14	6		20¾	1½x½x9	6—1⅛	4,500
S2411	26	8	13	13½	12½	15	7		24½	1¾x⅝x10	6—1 3/16	6,200
S3012	29½	8¼	14¼	14⅞	14⅝	17	8		31	2 x¾x12½	8—1 3/16	8,000

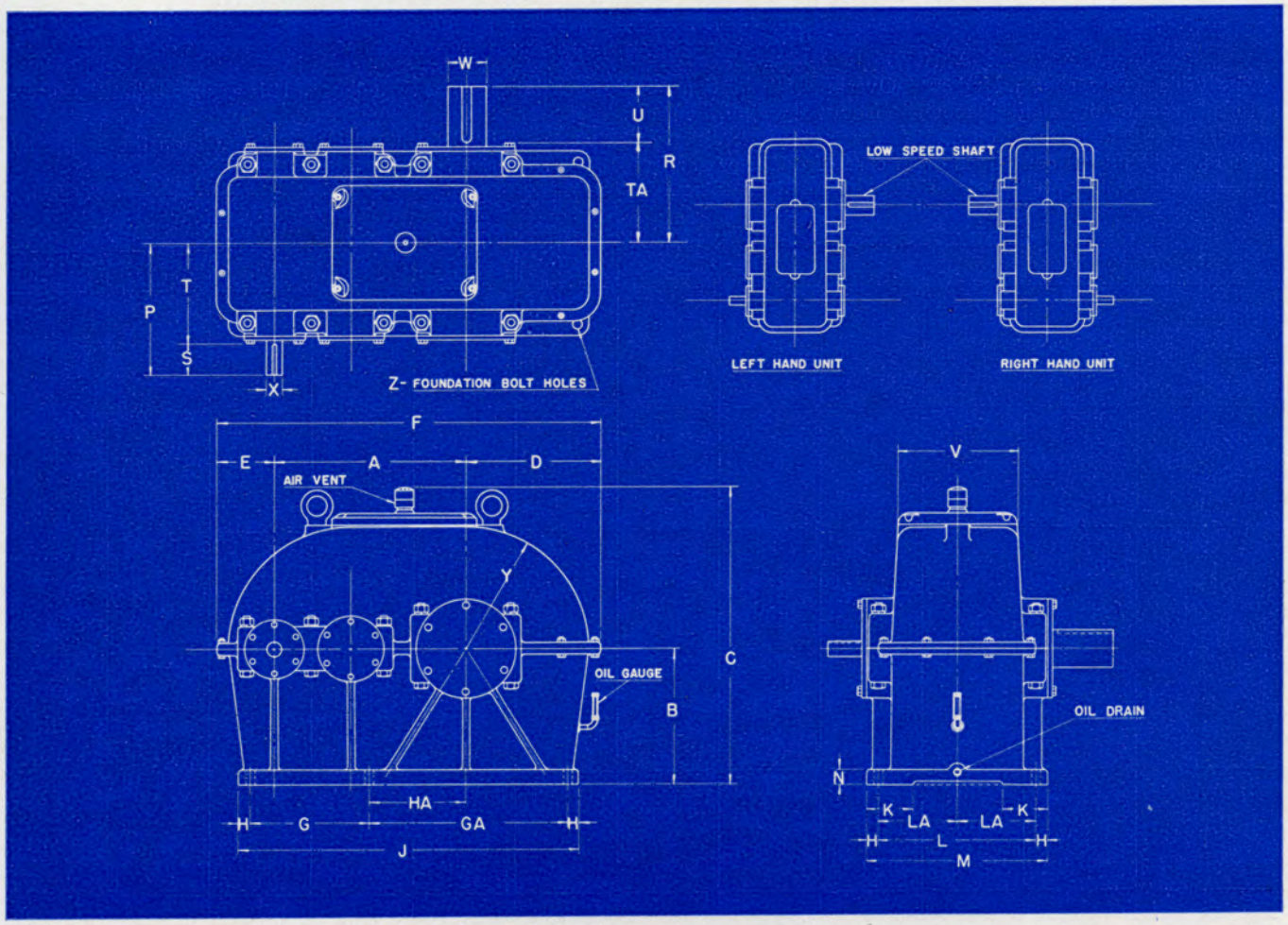
All dimensions are in inches.
* S63 and S84 Bases are not recessed on bottom.
** For High Speed Shaft Keyways, see table of Standard Keyways page 46.
*** The S3012 has 8 Foundation Bolt holes spaced 21-20½-21. Above dimensions are not to be used for installation. USE CERTIFIED INSTALLATION PRINT.

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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 1/4	1
D120	12	9 1/2	20 3/16	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 7/8	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 5/8	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 5/8	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 5/8	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 20 and 21	6 5/8	1/2x1/4x3 7/8	6—13/16	250
D120	9 1/2	11 1/2	2 3/16	7 5/16	7 5/16	4 3/16	9 1/2	2 1/2		7 7/8	5/8x5/16x3 7/8	6—1 1/2	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—1 1/2	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—1 1/2	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 7/8	11 5/8	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 1/4x5/8x7 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 1/4x1/4x9	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 46.

*** 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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Catalog G-1 Part 1 of 2

MODERATE OVERHUNG LOAD CAPACITIES

Type S

SINGLE REDUCTION HERRINGBONE GEAR REDUCERS
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 14. 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
S63	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	.....
S84	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	.....
S105	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	.....
S126	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	.....
S147	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	.....
S168	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	.....
S189	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	.....
S2010	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	.....
S2411	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
S3012	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