

OVERHUNG LOADS AND THRUST LOADS

An overhung load exists when a force is applied at right angles to a shaft beyond the shaft's outermost bearing. Pulleys, sheaves and sprockets will cause an overhung load when used as a power take-off. The amount of overhung load will vary, depending on the type of power take-off used and its mounting location on the shaft. The LeCentric™ overhung load ratings listed in this catalog and in selection tables are calculated at the centerline of the shaft.

Overhung load ratings are listed for each reducer size and should not be exceeded. If the basic reducer is selected using a service factor, that factor must also be used in the equations below.

Output Shaft OHL =

$$\frac{126000 \times \text{Input HP} \times \text{Overhung Load Factor} \times \text{Efficiency}}{\text{Pitch Diameter (of sprocket, pulley or sheave)} \times \text{Output RPM}}$$

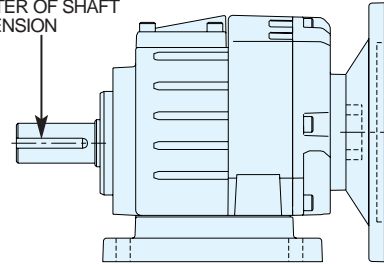
Input Shaft OHL =

$$\frac{126000 \times \text{Input HP} \times \text{Overhung Load Factor}}{\text{Pitch Diameter (of sprocket, pulley or sheave)} \times \text{Input RPM}}$$

Overhung Load Factors—

Sprocket	1.00
Gear Pinion	1.25
V-Belt Sheave or Pulley	1.50
Flat Belt	2.50

OVERHUNG LOAD AT CENTER OF SHAFT EXTENSION



Maximum Overhung Load Capacities

External Load Applied	Drive Size				
	717	727	747	757	
Input Shaft OHL (lbs.)	2-Stage	112	112	180	180
	3-Stage	100	100	135	135
Output Shaft OHL (lbs.)	Refer to Selection Tables for overhung load variable by output RPM.				

NOTE: The overhung load capacities in the catalog are calculated at centerline of shaft extension with no thrust load.

Torque and Horsepower

Torque as it is related to gear reducers is defined as a twisting motion resulting in rotational movement. Horsepower is a measure of the rate of doing work, and depends on speed of rotation and the radius of rotation.

$$\frac{\text{TQ(In-lb)} = (\text{HP} \times 6325)}{\text{RPM}} \qquad \frac{\text{HP(Rotational)} = \text{TQ(In-Lb)} \times \text{RPM}}{63025}$$

$$\frac{\text{TQ(ft-lb)} = (\text{HP} \times 5252)}{\text{RPM}} \qquad \frac{\text{HP(Rotational)} = \text{TQ(ft-lb)} \times \text{RPM}}{5252}$$

$$\text{TQ(In-lb)} = W \times R \qquad \frac{\text{HP(Linear)} = W \times V}{33000}$$

Efficiency

The efficiency of a Worm Gear Speed Reducer is dependent on input speed, lead angle of the worm, type of lubricant, ambient temperature and many other variables. The efficiency for speed reducer can be easily calculated as follows.

$$\text{Efficiency(Total)} = \text{Eff}_1 + \text{Eff}_2 + \text{Eff}_3$$

Additional Engineering Equations and Conversion Factors

$$\text{Velocity(FPM)} = V = .2618 \times D \times \text{RPM}$$

$$\text{Rotational Speed} = \text{RPM} = \frac{V}{(.2618 \times D)}$$

$$\text{Ratio} = \frac{\text{Input RPM}}{\text{Output RPM}} = \frac{\text{No. Teeth in Driver}}{\text{No. Teeth in Driven}} = \frac{\text{Diameter of Driver}}{\text{Diameter of Driven}}$$

$$\text{Ratio(Total)} = R_1 + R_2 + R_3$$

$$1 \text{ inch} = 25.4 \text{ MM}$$

$$1 \text{ lb} = 4.448 \text{ N}$$

$$1 \text{ in-lb} = .11298 \text{ Nm}$$

$$1 \text{ HP} = 746 \text{ Watts} = .746 \text{ kW}$$

$$1 \text{ kW} = 1.34 \text{ HP}$$

$$^{\circ}\text{F} = 9/5 \times ^{\circ}\text{C} + 32$$

$$^{\circ}\text{C} = 5/9 \times (^{\circ}\text{F} - 32)$$

Where:

D = Diameter (inches)

HP = Horsepower

R = Radius (inches)

RPM - Rotational Speed

TQ = Torque

V = linear velocity (FPM)

W = force or tension (lbs)