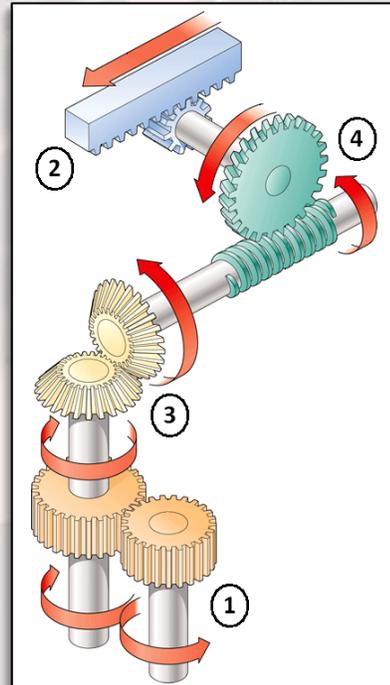


# Training: Issue 1, Gears

PIC Design was the first company to capitalize on the need for pre-designed gears. For over 60 years PIC has offered a selection of 26,000 standard parts for the Engineer to choose from. While gears vary greatly in size and precision, PIC Design's standard offerings are focused on high precision products with diameters under 5 inches, although our manufacturing capabilities are much broader.

## What types of gears can PIC Design make?

- Spur
- Anti-Backlash
- Cluster
- Helical
- Miter and Bevel
- Internal
- Worm & Wheel
- Racks
- Pinion Shafts



1. Spur
2. Rack
3. Miter and Bevel
4. Worm

## How do I talk gears?

- Know the different gear types: the preceding list. Each type is a different way gear teeth are configured; along a cylinder, along a line, along a cone, along a helix and so on.
- Understand Pitch: short for Diametral Pitch, this number determines the tooth size and spacing. A higher number is a finer gear (smaller tooth); a lower number is a coarser gear (larger tooth). Meshing gears have to be the same pitch.
  - **The number is actually a value.** Pitch is the number of teeth on a gear per inch in diameter. A **64 Pitch** spur gear that is **½" diameter** has **32 teeth**.  
A **64 Pitch** spur gear that is **1" diameter** has **64 teeth**.
- Gear Ratio: divide the number of teeth of two mating gears. This fraction dictates the speed and torque relationship between the mating pair. The calculation is different for worm gearing, gear racks and some angle drives.
- How gears are made: the methods below are used at PIC.
  - **Hobbing**: High precision, most common method used, CNC and Manual  
<http://www.youtube.com/watch?v=zt7GfAt0210>
  - **Broaching/Shaping**: Used on Racks, Internal and some Sector Gears  
<http://www.youtube.com/watch?v=fmTSXNE8OVw>