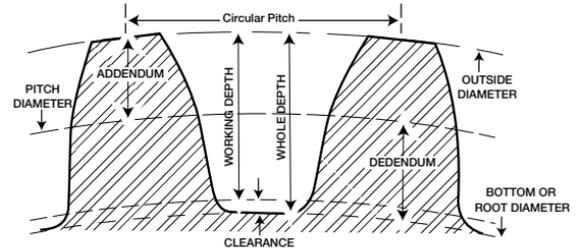
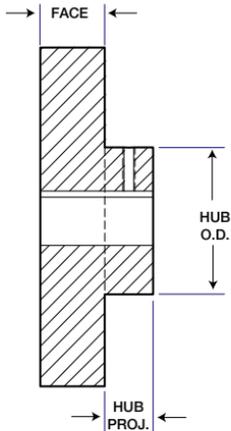




Martin's
Pocket Guide to Gears

INFORMATION NEEDED TO QUOTE GEARS

1. Type of Gear
2. Pitch (3DP, 4CP, 2MOD, etc.)
3. Number of teeth
4. Pressure angle ($14\frac{1}{2}^\circ$, 20°)
5. Face width
6. Material (1144, 1040, 4140, etc.)
7. Hardened teeth?
8. Style of gear (A, B, C)
9. Hub outside diameter
10. Length through bore or hub projection
11. Bore
12. Keyway size
13. Number and size of setscrew(s)
14. Special features



COMMON FORMULAS

$$OD = \frac{N + 2}{DP}$$

$$DP = \frac{N}{PD}$$

$$CP = \frac{3.1416}{DP}$$

$$DP = \frac{N + 2}{OD}$$

$$CD = \frac{PD(Dr) + PD(Dn)}{2}$$

$$PD = \frac{N}{DP}$$

$$\text{Module Pitch} = \frac{25.4}{DP} \quad \text{Ratio} = \frac{N \text{ Large}}{N \text{ Small}}$$

$$\text{Distance Traveled (Inches) By Rack Pinion in One Revolution} = \frac{3.1416}{DP} \times N$$

$$\text{Worm Ratio} = \frac{N \text{ in Worm Gear}}{\# \text{ Leads}}$$

CP= Circular Pitch
 N = Number of Teeth
 DP= Diametral Pitch
 PD= Pitch Diameter
 OD= Outside Diameter
 CD= Center Distance
 Dr = Driver
 Dn = Driven

SIZING EXAMPLE:
 Gear with 46 teeth has an OD of 6"

$$DP = \frac{46 + 2}{6} \quad DP = 8$$

SAMPLE IDENTIFICATION HINTS

- Use *Martin* Gear Gauges to determine pitch and pressure angle. Available for diametral, circular and modular pitches.
- **Spur** gear teeth are cut straight across the face of the gear and run together or on rack.
- **Worm** gears have teeth cut at an angle to the axis.
- Threads of a right hand **worm** or **worm gear** lean to the right when placed on a flat surface, and lean to the left for left hand.
- The tooth portion of **bevel** and **miter** gears is in the shape of a section of a cone.
- **Bevel** gear pairs have a different number of teeth on each mating gear, while **miter** gears have the same number (1:1 ratio).
- Find *Martin*'s online gear part number interchange at <https://btweb.martinsprocket.com/customermenu/>.
- Contact *Martin* for help with those hard to identify samples!

GEAR TROUBLESHOOTING

- **Excessive gear wear** can be caused by improper lubrication, environmental contaminants or the application H.P. being too high. Always check H.P. and speed to ensure safe operation.
- **Gear breakage** normally is caused by shock or overload conditions. Also check for adequate cover for drive from surrounding environmental materials.
- **Excessive drive noise** is caused by improper backlash, a misaligned drive, worn gears or too high a drive speed.
- Additional gear strength to correct wear & breakage can be achieved through hardening, changing pressure angle, increasing face width, increasing pitch and changing materials.

And remember, 14.5° and 20° gears will not run together.

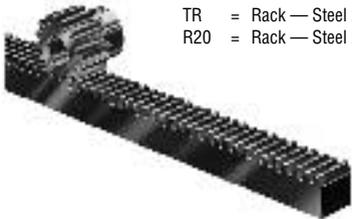
Martin GEAR NOMENCLATURE

T S 3 24 H 2 KW SS
 20° STEEL DP # OF TEETH HT BORE KW SET SCREW

(Typical Spur Gear Nomenclature)

Rack

R = Rack — Steel
 RA = Rack — Steel Heavy Backing
 TR = Rack — Steel 20° Heavy Backing
 R20 = Rack — Steel 20° Wide Face



Examples

R6X2 (141/2° STD Backing 6PX2' Long)
 RA6X4 (141/2° Heavy Backing 6PX4' Long)
 TR6X6 (20° STD Width 6PX6' Long)
 R206X6 (20° Wide Face 6PX6' Long)

Bevel Gears

B = Bevel — Cast Iron Gears
 B = Bevel — Steel Pinions
 BS = Bevel — Steel Gears
 BS = Bevel — Steel Pinions
 Note: B steel pinions may run with BS gears of same ratio



Examples

B1040-2 (Cast 10P 40T 2:1 Ratio)
 B1020-2 (Steel 10P 20T 2:1 Ratio)
 BS1040-2 (Steel 10P 40T 2:1 Ratio)
 BS1020-2 (Steel 10P 20T 2:1 Ratio)

ANY RATIO OTHER THAN 1:1

(Pinion and driven gear have different number of teeth.)

Spur Gears

S = Steel
 TS = Steel 20°
 C = Cast
 TC = Cast 20°
 H = Hardened Teeth
 NM = Non-Metallic



Examples

S620 (Steel 6P 20T-141/2°PA)
 TS620 (Steel 6P 20T-20°PA)
 C660 (Cast 6P 60T-141/2°PA)
 S620H (Steel 6P 20T-Hardened 141/2°PA)
 NM620 (Non-Metallic 6P 20T-141/2°PA)
 S612BS1 (Steel 6P 12T 1" Bore KW SS)
 TS816BS7/8 (Steel 8P 16T 20°PA .875 Bore KW SS)

Miter Gears

M = Miter — Steel Gears
 A or B = Larger Bore (Suffix)
 HM = Miter-Hardened Teeth
 K = KW & SS



ALWAYS 1: 1 RATIO

(Same number of teeth on each mating gear.)

Examples

M824 (Steel 8P 24T)
 M824A (Steel 8P 24T Larger Bore)
 M2424BR (Brass 24P 24T)
 HM1020 (Steel-Hardened Teeth 10P 20T)
 HMK1020 (Steel-Hardened 10P 20T With KW & SS)

Worm

W = Worm — Steel
 WH = Worm — Steel With Hub Projection
 WG = Worm — Steel Hardened Ground Threads
 WHG = Worm — Steel Hardened Ground Threads With Hub Projection
 D or Q = (Suffix) Double or Quadruple Thread



Examples

W6 (Steel 6P Right Hand)
 WH6 (Steel with Hub Projection 6P Right Hand)
 WG6 (Steel-Hardened Ground Threads 6P Right Hand)
 WHG6 (Steel with Hub Projection Hardened Ground Threads 6P Right Hand)
 W6D (Steel 6P Double Thread Right Hand)

Worm Gears

W = Worm Gear — Cast Iron
 WB = Worm Gear — Bronze
 D or Q = Double or Quadruple Thread (Suffix)



Examples

W660 (Cast Iron 6P 60T Right Hand)
 WB660 (Bronze 6P 60T Right Hand)
 W660D (Cast Iron 6P 60T Double Thread Right Hand)

NOTE: Worms and worm gears come standard as right hand. If left hand is needed, it must be specified.



Martin Gear Gauges

available in DP, CP & Modular pitches.

Martin on

line Gear Part Number Interchange

<https://btweb.martinsprocket.com/customermenu/>

Call *Martin* for the
gears you need, in stock, Now!

**Same Day / Next Day Rebores,
MTO's in Days, Not Weeks!**