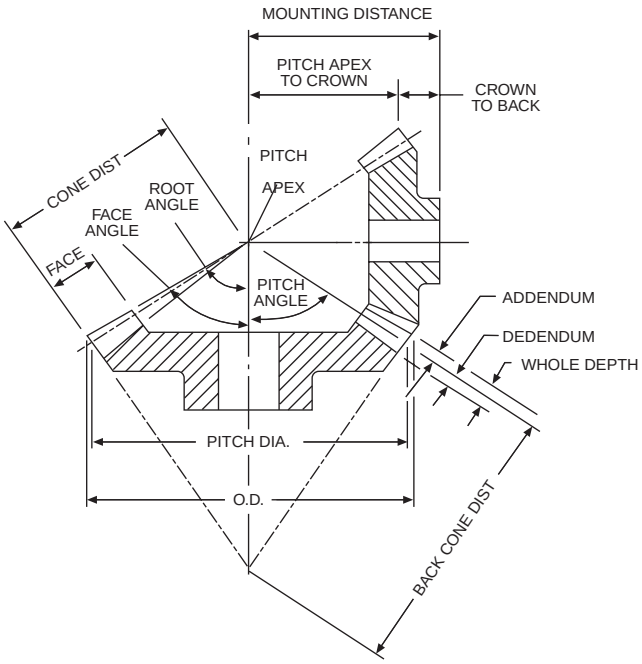
MITER AND BEVEL GEARS

Gear geometry for both straight and spiral tooth Miter and Bevel gears is of a complex nature and this text will not attempt to cover the topic in depth.

The basic tooth form is a modification to the involute form and is the common form used in production today. All Boston standard stock Miter and Bevel gears are manufactured with a 20° Pressure Angle. Bevel gears are made in accordance with A.G.M.A. specifications for long and short Addendum system for gears and pinions (pinion is cut long Addendum) which serves to reduce the amount of pinion tooth undercut and to nearly equalize the strength and durability of the gear set.

NOMENCLATURE

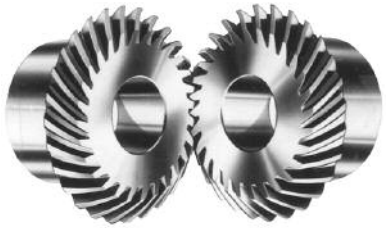
Nomenclature may best be understood by means of graphic representation depicted below:



Stock gears are cut to operate on an exact Mounting Distance with the following average backlash:

Diametral Pitch	Backlash (Inches)
4	.008
5	.007
6	.006
8	.005
10	.004
12-20	.003
24-48	.002

Similar in nature to Helical gearing, Spiral Miters and Bevels must be run with a mating pinion or gear of opposite hand.



The teeth of a Left Hand gear lean to the left when the gear is placed on a horizontal surface.

The teeth of a Right Hand gear lean to the right when the gear is placed flat on a horizontal surface.

All Boston Spiral Miter and Bevel gears are made with 35° spiral angles with all pinions cut left hand.

Straight Tooth Miter and Bevel Gear Formulas

To Obtain	Having	Formula	
		Pinion	Gear
Pitch Diameter (D,d)	No. of Teeth and Diametral Pitch (P)	$d = \frac{n}{P}$	$D = \frac{n}{P}$
Whole Depth (h_T)	Diametral Pitch (P)	$h_T = \frac{2.188}{P} + .002$	$h_T = \frac{2.188}{P} + .002$
Addendum (a)	Diametral Pitch (P)	$a = \frac{1}{P}$	$a = \frac{1}{P}$
Dedendum (b)	Whole Depth (h_T) & Addendum (a)	$b = h_T - a$	$b = h_T - a$
Clearance	Whole Depth (n_T) & Addendum (a)	$c = h_T - 2a$	$c = h_T - 2a$
Circular Tooth Thickness (τ)	Diametral Pitch (P)	$\tau = \frac{1.5708}{P}$	$\tau = \frac{1.5708}{P}$
Pitch Angle	Number of Teeth In Pinion (N_p) and Gear (N_G)	$L_p = \tan^{-1}\left(\frac{N_p}{N_G}\right)$	$L_G = 90 - L_p$
Outside Diameter (D_o, d_o)	Pinion & Gear Pitch Diameter ($D_p + D_G$) Addendum (a) & Pitch Angle ($L_p + L_G$)	$d_o = D_p + 2a(\cos L_p)$	$D_o = D_G + 2a(\cos L_G)$