

Table 2 – Diametral pitch, standard tooth proportions and formulas (inch system)

Tooth proportions	
Item	Spur Helical
Addendum, $a$	$\frac{1.000}{P_d}$
Dedendum, $b$	$\frac{1.200}{P_d} + 0.002$
Working depth, $h_k$	$\frac{2.000}{P_d}$
Whole depth, $h_t$	$\frac{2.200}{P_d} + 0.002$
Clearance, $c$ (standard)	$\frac{0.200}{P_d} + 0.002$
Fillet radius, maximum, $r_{fmax}$ (see 4.9)	$\frac{c}{1 - \sin \phi}$
Tooth thickness, transverse, $t$ , $t_n$ at standard pitch diameter	$t = \frac{\pi}{2 P_d}$
<b>Formulas</b>	
Circular pitch, $p$ , $p_h$	$p = \frac{\pi D}{N} = \frac{\pi}{P_d}$
Pitch diameter, $D$ (standard)	$\frac{N}{P_d}$
Outside diameter, $D_o$	$\frac{N + 2}{P_d}$
Root diameter, $D_r$	$\frac{N - 2.4}{P_d} - 0.004$
Center distance, $C$ (standard)	$\frac{N_P + N_G}{2 P_d}$
where	
$P_d$ is transverse diametral pitch;	$p_h$ is normal circular pitch;
$P_{nd}$ is normal diametral pitch;	$\psi$ is helix angle;
$t$ is transverse tooth thickness at standard pitch diameter;	$N$ is number of teeth;
$t_n$ is normal tooth thickness at standard pitch diameter;	$N_P$ is number of pinion teeth;
$p$ is transverse circular pitch;	$N_G$ is number of gear teeth;
	$\phi$ is profile angle;
	$\phi_n$ is normal profile angle.

#### 4.3 Working depth, $h_k$

The basic working depth is:

$$h_k = \frac{2.000}{P_{nd}} \quad (1)$$

Teeth with this depth are commonly referred to as full depth teeth.

#### 4.4 Addendum, $a$

Standard addendum tooth proportions shown in tables 2 and 3 are used for applications where the number of teeth are equal to or exceed the minimum numbers shown in annex C, table C.1.

Enlarged and reduced addendum proportions are used to avoid objectionable undercut or for consid-

erations of tooth strength, contact ratio or center distance. Table 4 gives recommended tooth proportions to avoid undercut problems in a mesh with a pinion of a small number of teeth. Generally, as the total number of teeth in gear and pinion gets smaller, the contact ratio diminishes. Special attention must be given to avoid contact ratios below 1.2.

#### 4.5 Clearance, $c$

Standard clearance for the diametral pitch system is:

$$c = \frac{0.200}{P_{nd}} + 0.002 \quad (2)$$

Greater clearance than given in table 3 may be required if teeth are to be finished by a secondary operation. While the required clearance may vary