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HELICAL GEARS

TO GET	HAVING	RULE	FORMULA
Normal D.P.	Transverse D.P. and helix angle	Divide the transverse D.P. by the cosine of the helix angle	$P_{nd} = P_d / \cos \Psi$
Transverse D.P.	Normal D.P. and helix angle	Multiply normal D.P. by the cosine of the helix angle	$P_d = P_{nd} / \cos \Psi$
Normal P.A.	Transverse P.A. and helix angle of gear	Multiply the tan of the transverse P.A. by the cosine of the helix angle = INV/tan normal P.A.	$\tan \Phi_t \cos \Psi = \text{inv} / \tan \Phi_n$
Transverse P.A.	Normal P.A. and helix angle of gear	Divide the tan of NPA by the cosine of the helix angle = TAN trans. P.A.	$\tan \Phi_t = \tan \Phi_n / \cos \Psi$
Pitch diameter	Number of teeth, normal pitch and tooth angle	Divide the number of teeth by the product of the normal pitch and the cosine of the tooth angle.	$D = N G / P_{nd} \cos \gamma$
Pitch diameter	Number of teeth plus transverse diameter pitch	Divide the number of teeth in the gear by	$D = N / P_d$

		the transverse diametral pitch	
Normal circular pitch	Transverse CP and helix angle	Multiply the transverse CP by the cosine of the helix angle	$P_n = P_t \cos \Psi$
Lead of helical gear	Pitch circumference and helix angle	Divide the pitch circumference by the tangent of the helix angle	$L = \pi * D_w / \tan \Psi$
	Normal CP, number of teeth and helix angle	Divide the product of the number of teeth times the norm. CP by the sine of the helix angle.	$L = N * P_n / \sin \Psi$
Helix angle	Normal CP and transverse circular pitch	Divide the normal CP by the transverse circular pitch; the quotient will be the cosine of the helix angle.	$\cos \Psi = P_n / P_t$
	Pitch diameter plus lead	Multiply the pitch diameter by π divide the results by the lead	$\cos \Psi = D - \pi / L$
	Normal and trans P.A.	Divide the tangent of the normal P.A. by the tangent of the trans. P.A. = $\cos HA$	$\cos \Psi = \tan \Phi / \tan \Phi_t$
Outside diameter	Pitch diameter and addendum	Add twice the addendum to the pitch diameter	$D_o = 2 * a + D$

Center distance	Pitch diameters of both gears	Add together the pitch diameter of the two gears and divide the sum by 2	$C = (D_1 + D_2) / 2$
Number of teeth for which to select form cutter	Number of teeth and tooth angle	Divide the number of teeth in the gear by the cube of the cosine of the tooth angle	$N_c = N / (\cos \gamma)^3$
Lead of tooth helix	Pitch diameter and helix angle	Multiply the pitch diameter by π times the cotangent of the tooth angle	$L = \pi * D \cotan \Psi$
Addendum	Normal D.P.	Divide 1 by the normal diametral pitch	$\alpha = 1 / P_{nd}$
Whole depth of tooth	Normal D.P.	Divide 2.157 (or 2.25) by the normal diametral pitch	$ht = 2.15 / P_{nd}$
Normal tooth thickness at pitch line	Normal D.P.	Divide 1.571 by the normal diametral pitch	$T_n = 1.571 / P_{nd}$
Operating transverse diametral pitch	Number of teeth in both gears plus operating center distance	Add the number of teeth in both gears together, divide by two, then divide by the operating center distance	$P_{od} = [(N_1 + N_2) / 2] / C_o$
Operating center distance	Number of teeth in both gears plus the operating transverse diametral pitch	Add the number of teeth in both gears together, divide by two, then divide by the operating	$C_o = [(N_1 + N_2) / 2] / P_{od}$

		transverse diametral pitch	
Number of teeth in gear	Pitch diameter plus transverse diametral pitch	Multiply the pitch diameter by the transverse diametral pitch	$N = D * Pd$
Transverse DP	Pitch diameter and number of teeth	Divide TPD by number of teeth	$Pd = N / D$
Base diameter	Pitch diameter and trans. P.A.	Multiply the Pd by trans. PA	$Db = D * \cos. \Phi_t$

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