GEAR MAKING INFO

THE TABLES BELOW PROVIDE THE BASIC FORMULAS USED IN FIGURING THE DIAMETERS OF GEAR BLANKS, BE THEY FOR SPUR OR WORM GEARS. SIMPLY FOLLOW THE VISUAL INTRUCTIONS SHOWN ON THE VIDEO AND APPLY THESE UNIVERSAL FORMULAS TO COMPUTE THE BASIC DIMENSIONS FOR GEARS OF ANY PITCH AND NUMBER OF TEETH. ALSO INCLUDED IS A CHART WITH THE # FOR TEETH CAPACITIES FOR COMMON INVOLUTE CUTTERS FROM #1 TO # 8. A SECOND TABLE CAN BE FOUND ON MY WEB SITE'S HOME PAGE " WWW.HOMESTEAD.COM/TOOL20895/JOSE7X10TAIG.HTML **"**

Involute gear teeth number chart (any DP)

CUTTER#	RANGE # OF TEETH		
#1	135	TO	RACK
#2	55	TO	134
#3	35	TO	54
#4	25	TO	34
#5	21	TO	24
#6	17	TO	20
#7	14	TO	16
#8	12	TO	13

FIGURING BLANK DIAMETERS FOR WORM GEARS

.3183 X gear pitch X # of teeth desired + 2 x depth of tooth

FACE DIAMETER

2.38 x thread pitch + .25

SOME COMMON GEAR DATA

PITCH	# TEETH	PITCH DIA	OUT DIA
24	12	.500"	.583"
24	16	.666"	.750"
24	18	.750"	.833"
24	22	.916"	1.000"
32	12	.375"	.437"
32	14	.438"	.500"
32	16	.500"	.562"
32	18	.563"	.625"
32	20	.625"	.688"
32	22	.750"	.813"

TO ARRIVE AT THE DIAMETER OF ANY GEAR BLANK, YOU WILL NEED TO KNOW THE PITCH OR DIAMETRAL PITCH AS IT IS KNOWN IN THE REAL WORD OF GEAR CUTTING, AS WELL AS THE NUMBER OF TEETH YOU DESIRE.

The formula is a s follows:

NUMBER OF TEETH + 2 DIVIDED BY THE DP OF THE GEAR = THE DIAMETER OF THE BLANK. SO IF YOU NEED A 60 TOOTH GEAR OF A 32 DP - TAKE THE # OF THEETH (60) ADD THE CONSTANT 2 TO ARRIVE AT 62. DIVIDE BY THE DP WHICH IN THIS EXAMPLE IS 32. THE FINAL BLANK DIAMETER WITH THEN BE 1.9375" WHICH CAN BE SAFELY ROUNDED OFF TO 1.938". This formula is all you need to figure out any gear blank diameter for any spur gear of any number of teeth. Worm gear will require a slightly different approach but not any more difficult than the spur gear formula.

In the video, we use hobs of two different styles to create spur gears without having to resort to individual involute cutters. Our example hob has a CIRCULAR pitch of 10. That is, it has cutting teeth that are spaced .100: apart from the center of each tooth. Knowing this, you can apply the same theory to find out the blank diameter for a 10-pitch hob. To figure out the equivalent DP for our 10-pitch hob, or any other pitch – divide the constant of Pi by the pitch of the hob. Since the pitch of our hob is .100" the DP is 31.461, which can be rounded off to the nearest hundredth to make things easier. Let do another example using the hob's DP. Say you need a 32-tooth gear and all you have is the 10 pitch hob. Take the # of teeth and add the constant 2 and divide by the DP. 32+2 and divide by 31.461 = 1.08". That's all there is to that!!

Table 1
Summary of Calculations Relating to Involute Spur Gears

Value to be found	Symbol	Rule for Calculation	Formula
1. Diametral pitch	DP	1a. Divide the number of teeth by the pitch diameter	$DP = \frac{N}{PD}$
		1b. Divide the number of teeth plus 2 by the outside diameter	$DP = \frac{N + 2}{OD}$
		1c. Divide π by the circular pitch	$DP = \frac{3.1416}{CP}$
2. Pitch diameter	PD	2a. Divide the number of teeth by the diametral pitch	$PD = \frac{N}{DP}$
		2b. Subtract 2 over the diametral pitch from the outside diameter	$PD = OD - \frac{2}{DP}$
3. Number of teeth	N	3a. Multiply the diametral pitch by the pitch diameter	$N = DP \times PD$
		3b. Multiply the outside diameter by the diametral pitch and subtract 2	$N = OD \times DP - 2$
4. Circular pitch	CP	4. Divide π by the diametral pitch	$CP = \frac{3.1416}{DP}$
5. Circular thickness	CT	5. Divide the circular pitch by 2	$CT = \frac{CP}{2}$
6. Addendum	A	6. Divide 1 by the diametral pitch	$A = \frac{1}{DP}$
7. Clearance	C	7. Divide .157 by the diametral pitch	$C = \frac{.157}{DP}$
8. Dedendum	D	8a. Add the clearance to the addendum	$D = C + A$
		8b. Divide 1.157 by the diametral pitch	$D = \frac{1.157}{DP}$
9. Whole depth	W	9a. Add the addendum to the dedendum	$W = A + D$
		9b. Divide 2.157 by the diametral pitch	$W = \frac{2.157}{DP}$
10. Outside diameter	OD	10a. Divide the number of teeth plus 2 by the diametral pitch	$OD = \frac{N + 2}{DP}$
		10b. Add the pitch diameter to 2 divided by the diametral pitch	$OD = PD + \frac{2}{DP}$