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Spur Gear Dimensional Formulas
Module Pitch

Rules and Formulas
For Module (Metric) Spur Gear Calculations

(Module Represents the Amount of Pitch Diameter per Tooth)

To Find	Having	Rule	Formula
Metric Module	Pitch Diameter and Number of Teeth	Divide Pitch Diameter in Millimeters by the Number of Teeth	$M = \frac{PD\ (Millimeters)}{N}$
Metric Module	Circular Pitch in Millimeter	Divide Circular Pitch in Millimeters by Pi (3,1416)	$M = \frac{C\ (Millimeters)}{3,1416}$
Metric Module	Diametral Pitch	Divide 25,4 by Diametral Pitch	$M = \frac{25,4}{DP}$
Metric Module	Outside Diameter and Number of Teeth	Divide Outside Diameter (in Millimeters) by the Number of Teeth plus 2	$M = \frac{OD}{N + 2}$
Pitch Diameter	Module and Number of Teeth	Multiply Module by Number of Teeth	D' (In MM)= M x N
Pitch Diameter	Number of Teeth and Outside Diameter	Divide the product of Outside Diameter and No, of Teeth by No, of Teeth plus 2	$D' = \frac{OD \times N}{N + 2}$
Pitch Diameter	Outside Diameter and the Module	Multiply Module by 2 and Subtract from Outside Diameter	D' = OD - 2M
Outside Diameter	Module and Number of Teeth	Number of Teeth plus 2 Multiplied by Module	OD (In MM) = (N + 2) x M
Diametral Pitch	Module	Divide 25,4 by Module	$DP = \frac{25,4}{M}$
Circular Pitch	Module	Multiply Module by Pi (3,1416)	C' (In MM) = M x 3,1416
Addendum	Module Known	The Addendum equals the Module	A = M
Whole Depth	Module Known	Multiply 2,157 by Module	D" (In MM) = 2,157 x M
Thickness of Tooth	Module and Outside Diameter	Multiply Pitch Diameter (in Millimeters) by the Sine of the Angle of 90 Divided by the Number of Teeth	$t\ (In\ MM) = PD\ (MM) \times Sine\ \frac{90}{N}$
English Module	Pitch Diameter in Inches and Number of Teeth	Divide Pitch Diameter in Inches by Number of Teeth	$M = \frac{PD\ (Inches)}{N}$

NOTE: Rules and Formulas Relating to Tooth Depth and Outside Diameter Apply to Full-Depth, Equal Addendum Gears.

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Module Pitch
Tooth Dimensions

Tooth Dimensions Based Upon Module System

(One millimeter equals 0.03937 inch)

Module DIN Standard Series	Equivalent Diametral Pitch	Circular Pitch		Addendum, Millimeters	Dedendum Millimeters †	Whole Depth, † Millimeters	Whole Depth, ‡ Millimeters
		Millimeters	Inches				
0,3	84,667	0,943	0,0371	0,30	0,35	0,650	0,647
0,4	63,500	1,257	0,0495	0,40	0,467	0,867	0,863
0,5	50,800	1,571	0,0618	0,50	0,583	1,083	1,079
0,6	42,333	1,885	0,0742	0,60	0,700	1,300	1,294
0,7	36,286	2,199	0,0865	0,70	0,817	1,517	1,510
0,8	31,750	2,513	0,0989	0,80	0,933	1,733	1,726
0,9	28,222	2,827	0,1113	0,90	1,050	1,950	1,941
1	25,400	3,142	0,1237	1,00	1,167	2,167	2,157
1,25	20,320	3,927	0,1546	1,25	1,458	2,708	2,697
1,5	16,933	4,712	0,1855	1,50	1,750	3,250	3,236
1,75	14,514	5,498	0,2164	1,75	2,042	3,792	3,774
2	12,700	6,283	0,2474	2,00	2,333	4,333	4,314
2,25	11,289	7,069	0,2783	2,25	2,625	4,875	4,853
2,5	10,160	7,854	0,3092	2,50	2,917	5,417	5,392
2,75	9,236	8,639	0,3401	2,75	3,208	5,958	5,932
3	8,466	9,425	0,3711	3,00	3,500	6,500	6,471
3,25	7,815	10,210	0,4020	3,25	3,791	7,041	7,010
3,5	7,257	10,996	0,4329	3,50	4,083	7,583	7,550
3,75	6,773	11,781	0,4638	3,75	4,375	8,125	8,089
4	6,350	12,566	0,4947	4,00	4,666	8,666	8,628
4,5	5,644	14,137	0,5566	4,50	5,25	9,750	9,707
5	5,080	15,708	0,6184	5,00	5,833	10,833	10,785
5,5	4,618	17,279	0,6803	5,50	6,416	11,916	11,864
6	4,233	18,850	0,7421	6,00	7,000	13,000	12,942
6,5	3,908	20,420	0,8035	6,50	7,583	14,083	14,021
7	3,628	21,991	0,8658	7,00	8,166	15,166	15,099
8	3,175	25,132	0,9895	8,00	9,333	17,333	17,256
9	2,822	28,274	1,1132	9,00	10,499	19,499	19,413
10	2,540	31,416	1,2368	10,00	11,666	21,666	21,571
11	2,309	34,558	1,3606	11,00	12,833	23,833	23,728
12	2,117	37,699	1,4843	12,00	14,000	26,000	25,884
13	1,954	40,841	1,6079	13,00	15,166	28,166	28,041
14	1,814	43,982	1,7317	14,00	16,332	30,332	30,198
15	1,693	47,124	1,8541	15,00	17,499	32,499	32,355
16	1,587	50,266	1,9790	16,00	18,666	34,666	34,512
18	1,411	56,549	2,2263	18,00	21,000	39,000	38,826
20	1,270	62,832	2,4737	20,00	23,332	43,332	43,142
22	1,155	69,115	2,7210	22,00	25,665	47,665	47,454
24	1,058	75,398	2,9685	24,00	28,000	52,000	51,768
27	0,941	84,823	3,339	27,00	31,498	58,498	58,239
30	0,847	94,248	3,711	30,00	35,000	65,000	64,713
33	0,770	103,673	4,082	33,00	38,498	71,498	71,181
36	0,706	113,097	4,453	36,00	41,998	77,998	77,652
39	0,651	122,522	4,824	39,00	45,497	84,497	84,123
42	0,605	131,947	5,195	42,00	48,997	90,997	90,594
45	0,564	141,372	5,566	45,00	52,497	97,497	97,065
50	0,508	157,080	6,184	50,00	58,330	108,330	107,855
55	0,462	172,788	6,803	55,00	64,163	119,163	118,635
60	0,423	188,496	7,421	60,00	69,996	129,996	129,426
65	0,391	204,204	8,040	65,00	75,829	140,829	140,205
70	0,363	219,911	8,658	70,00	81,662	151,662	150,997
75	0,339	235,619	9,276	75,00	87,495	162,495	161,775

† Dedendum and total depth when clearance = 0.1666 x module, or one-sixth module.
‡ Total Depth equivalent to American standard full-depth teeth. (Clearance = 0.157 x Module.)

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