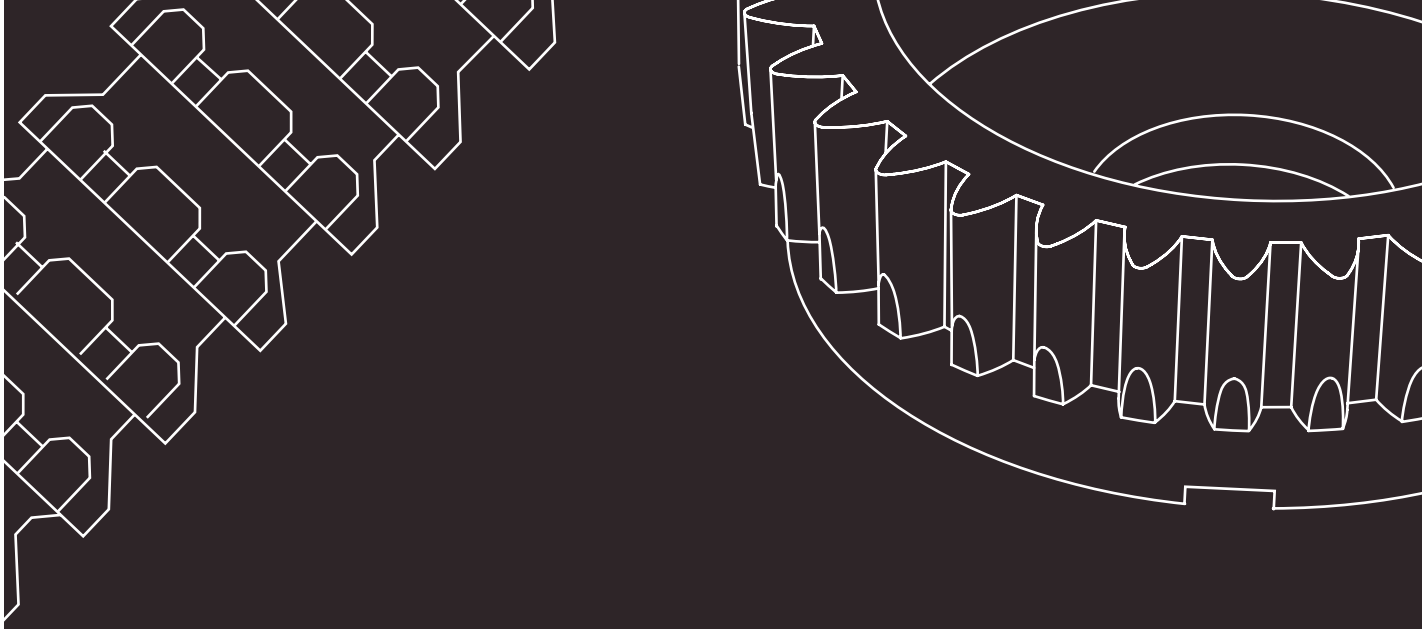
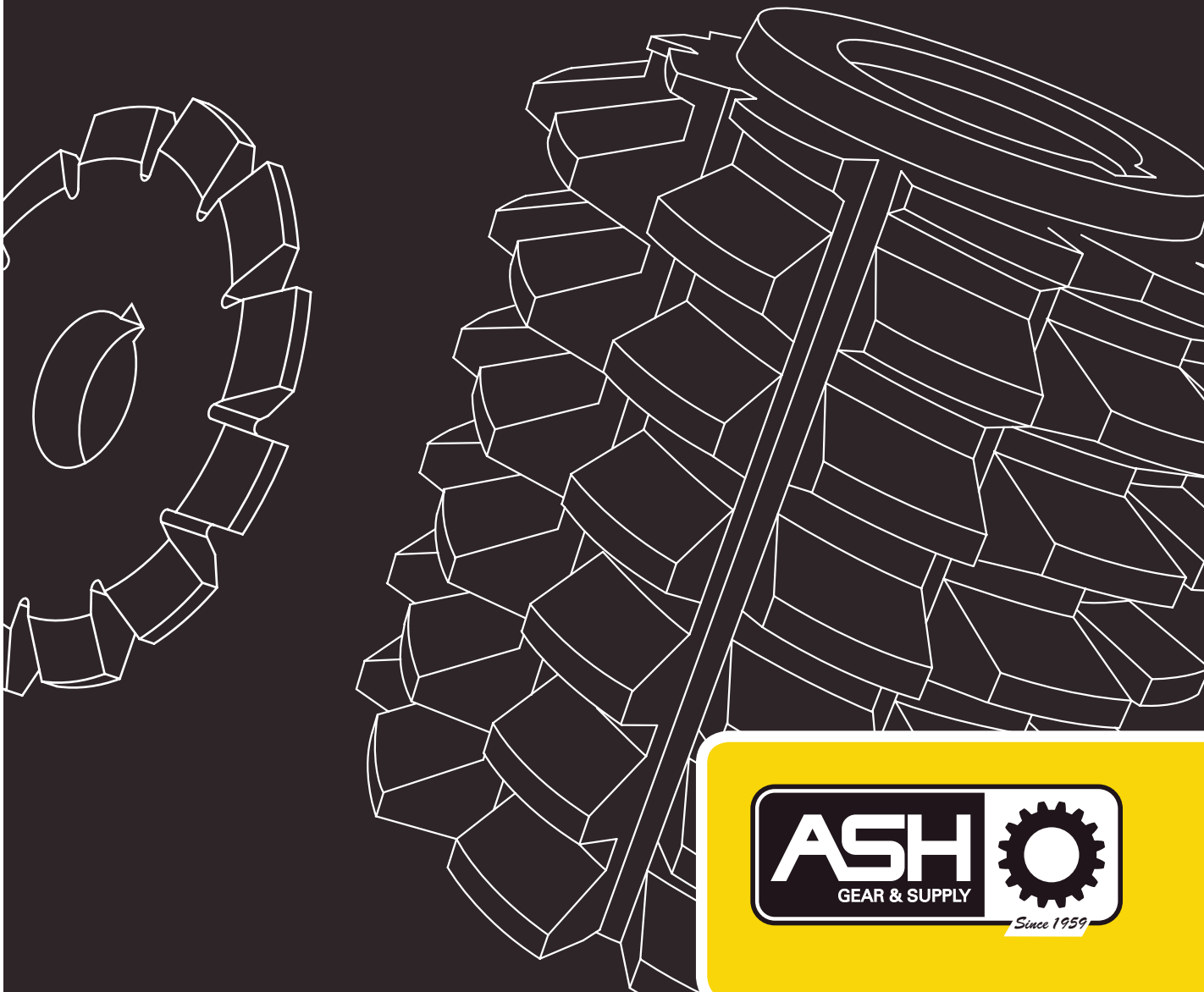


ASH GEAR AND SUPPLY - 2017 EDITION

PRODUCT CATALOG



ASH GEAR & SUPPLY

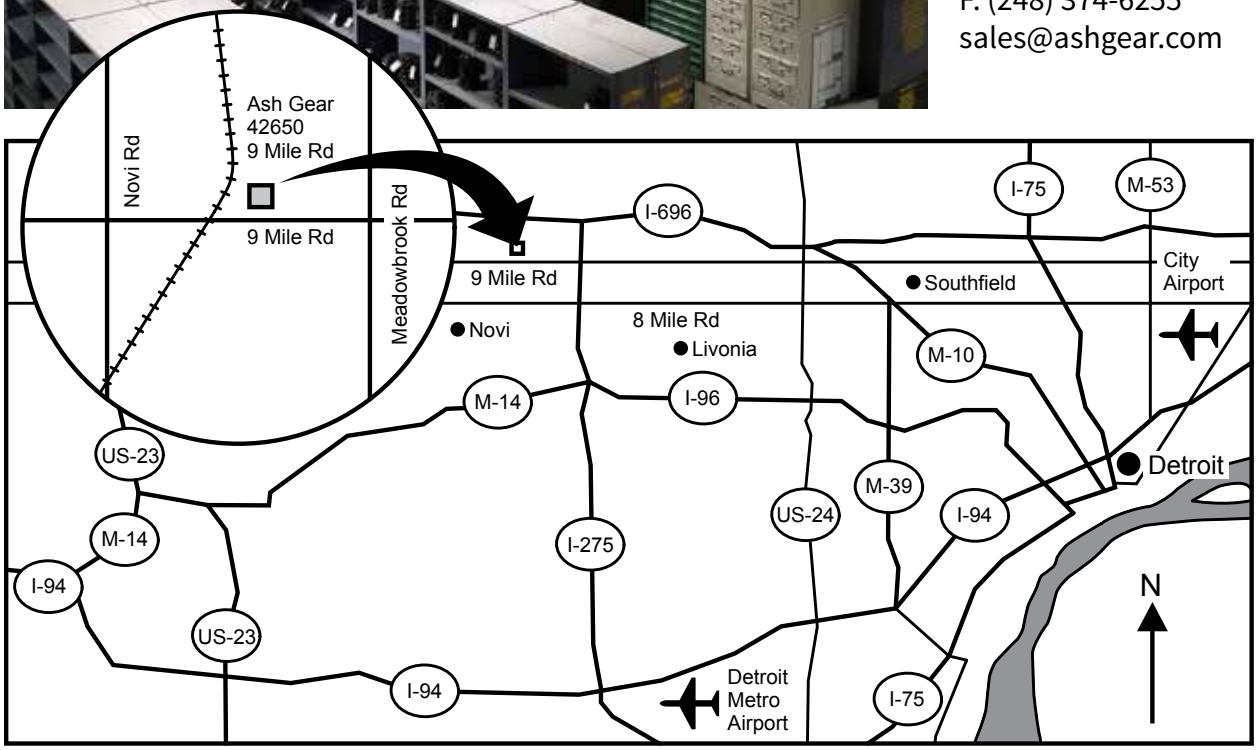
Since 1959

ASH GEAR & SUPPLY

Ash Gear & Supply Inc.

42650 Nine Mile Rd.
Novi, MI 48375

P. (248) 374-6155
F. (248) 374-6255
sales@ashgear.com



To our valued customers,

For over fifty years Ash Gear & Supply has been serving the gear cutting industry worldwide. Our goal is to provide you with the highest quality products with outstanding service. Our catalog has become a staple in the industry. We are pleased to provide you with our latest catalog, the year 2017 version. This catalog includes product information, services offered and technical information.

Ash Gear is pleased to announce its expansion with the acquisition of Gear Tools Inc. and relocation to modernized headquarters. We continue to have the largest stock of gear cutting tools in the world. Our expansive inventory includes new and used tools either for purchase or rent. We pride ourselves on customer service and satisfaction. Our knowledgeable staff will be able to meet your every request.

Products In Stock:
Hobs, Shaper Cutters, Broaches, Milling Cutters, Inspection Tools, Machine Parts, Bevel Gear Cutters, Shaving Cutters, Computer Software, Literature, Technical Information

Brand Name Manufacturers:
Star Cutter, Gleason, Dathan Tool & Gauge, True-Volute, Interstate Tool Company, Invo Spline

Services:
Special Orders, Rental Cutters, Engineering, Same Day Shipment, Gearing Service Directory

HOW TO ORDER - Rent tools from most any area of our stock.

1. By Phone: Call in your order, 248-374-6155.
One of our experienced sales representatives will be happy to assist you.

2. By Fax: Send your order via fax, 248-374-6255.
Your order will be handled immediately.

3. By Mail: Send your order through the mail. Your order will be placed immediately and acknowledged upon your request.
42650 Nine Mile Road, Novi MI, 48375

4. By email: Send your order request to sales@ashgear.com

New Customers:

All in-stock tools ordered before 3:00 pm EST will be shipped same day. Ash Gear welcomes new business and will ship immediately on open account upon approval of a credit application. (Back of this catalog) If immediate shipment is necessary before references can be checked, we can ship your order C.O.D. or you may use Visa or Mastercard.

Ash Gear Accepts:

TERMS AND CONDITIONS

PRICES - Prices are quoted for acceptance within 30 days.

TERMS - 1 % 10 net 30 days. FOB Our plant, Novi, Michigan

PAYMENT - Account, credit card, bank transfer, or COD.

CREDIT - New Accounts must be applied for in writing by forwarding a list of (at least) three current suppliers. Please use the form found in the back of this catalog. No verbal requests will be accepted. To maintain satisfactory open account status you must pay on a net 30 day basis. Any account that exceeds 45 days will be transferred to a COD status.

BLANKET ORDERS - Blanket orders are welcomed. You can lock in your price for up to a 1 year period and receive split shipments throughout the year to accommodate your production schedule. Terms of contract can be structured to meet your individual needs.

DAMAGED SHIPMENTS - If an item arrives damaged due to shipment, follow these easy steps:

1. Sign the delivery receipt "package received damaged." Inspect the contents of the parcel and keep all damaged containers for inspection until the carrier notifies you to dispose of them.
2. Contact Ash Gear and you will be advised regarding the proper procedures to follow. We will reship the merchandise if necessary.

INCOMPLETE SHIPMENTS - If your order arrives incomplete, please check the contents of the package against the packing slip for any backorder items. If you find discrepancies, please contact customer service immediately so that we may resolve the problem.

ACTS OF GOD - Ash Gear shall not be liable for any delay in or impairment of performance resulting in whole or in part from Acts of God, labor disruptions, shortages, inability to procure product, supplies or raw materials, severe weather conditions, or any other circumstances or cause beyond the control of Ash Gear in the conduct of it's business.

CANCELLATION - Any cancellation must be approved by Ash Gear, and may be subject to restocking and other charges.

WARRANTY -NEW TOOLS - Each new tool is guaranteed by the manufacture to be of the highest quality and to be free of any defects. We will replace or credit (at our option) any tool that is proved to be defective, provided that we are notified within 30 days. Modifications and coatings void manufacturer warranty.

USED TOOLS - We will describe the tool as carefully as possible according to the markings on the tool and general appearance. It is required that you inspect the tool upon receipt and cut a sample to prove acceptability before putting the tool in to production. We will replace or credit any used tool that is not acceptable provided that we are notified within 30 days.

RETURNS - WITHIN 30 DAYS for any unused tools. Please call for a return authorization number giving us the sales order number and tool number and the reason for return. AFTER 30 DAYS No returns will be accepted.

ENGINEERING DESIGN - We may furnish design or modification data (paid or unpaid) using our software programs. It will be your responsibility to verify acceptability of all data with respect to your specific requirements.

CLAIMS - We will not be liable for loss of blueprints, drawings, or customer material. We will not be responsible for incorrect design data or machining other than to the extent of the actual cost of the specific service provided to you.

PATENT RIGHTS - It is understood that you (the buyer) guarantee that no patent rights are violated or infringed by manufacturing or furnishing tools in accordance with your design requests - and agree to indemnify the seller against any damage it may suffer as a result of any such infringement.

OUR CATALOG - Ash Gear has attempted to provide current and accurate information herein; however, Seller makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage or injury of any kind which may result from or arise out of the use of or reliance on the information by any person.

WARNING - You are responsible for safe and prudent use of tools furnished. High Speed Cutting Tools contain Chromium, Vanadium, Molybdenum, Iron, Nickel, Cobalt, Manganese, and some grades may contain Carbon, Silicon or Tungsten. If TiN coating has been requested, this product also contains Titanium Nitride.

MACHINE SHOP CAPABILITIES

At Ash Gear, we have machine shop capabilities to sharpen and resharpen hobs, shaper cutters, broaches and herringbone cutters.

As well as reconditioning tools and making modifications or alterations to existing tooling.

Ash Gear also has capabilities to regrind hobs, including topping and modification.

RENTAL POLICY - Rent tools from most any area of our stock.

Customers are responsible for returning the tool within 20 days. Tools held longer than 30 days will result in additional charge of 20% for every 10 day increment, (ie, A $75.00 rental held from 31 to 40 days would be $75.00 plus $15.00 = $90.00)

Customers are responsible for excessive use. Rentals are offered for that occasional small job where you only have a few pieces to cut, NOT for production. You may sharpen the tool to finish your job, you are allowed 10% of the original tool life per rental - if you exceed 10% you will be charged accordingly.

Customers are responsible for broken or damaged tools. Any tool that is broken or damaged becomes your tool at current face value.

"COD" customers - Pay COD for the current face value of the tool at the time of delivery. Upon return to Ash Gear - we will inspect, and authorize our Accounts Payable to refund the difference in charges. This process takes 10 to 14 days.
Customers are responsible for all shipping charges and any applicable taxes.

If you decide that you wish to purchase the "rental" tool - simply notify our Accounts Receivable department for charges.

If you do not return the tool within 60 days - the tool becomes your property at the Face Value shown on the invoice.

Tools returned “unused” after 5 days will still incur a rental fee.

– THE RENTAL TIME CANNOT EXCEED 60 DAYS –

SPECIAL ORDERS - Please provide the following data for special order inquiries not listed in our stock.

1. Type/Style of tool:
Hob, Shaper, Broach, Single Cutter, etc.

2. Functional Characteristics:
Pitch (DP, Mod, or CP)
Pressure Angle
Accuracy (Class AA, A, B, C, D, etc.)
Number of Starts & Hand
Topping/Non-Topping
Size Preferences
Pitch Diameter

3. Part Data:
Major/Minor
MOW/MBW
# of Teeth
Please supply a part print with request.

4. Other data pertinent to your job:
Special Material, Coatings

Delivery dates are approximate and will be a product of our best efforts. We will not be responsible for any penalties incurred by the buyer. Cancellation on special orders will be charged our actual cost plus a 15% handling fee. Any material involved will become your property.

When data is not furnished we will design to typical industry standards. Print approval may be requested.

Ash Gear Product Codes:
How to read and decipher them

Series Code: HS20-600 = **HS** + **20** + **600**

- **HS** — Hob Standard Form
- **20** — Pressure Angle 20 Degree
- **600** — 6 Diametral Pitch

Series Code: SFF30-B = **SFF** + **30** + **B**

- **SFF** — Shaper Full Fillet
- **30** — Pressure Angle 30 Degree
- **B** — Button Type

Series Code: BF30-12-014 = **BF** + **30** + **12** + **014**

- **BF** — Broach Fillet Root
- **30** — Pressure Angle 30 Degree
- **12** — Diametral Pitch 12/24
- **014** — Number of Teeth

SPECIAL COATINGS

Ideal for the long-running production job or for the recurring short run. The decrease in down time and the increase in parts per sharpening will make a big difference in your overall cost. Titanium Nitride, “Gold Coat” tools are carried in-stock for quick delivery.

PREMIUM STEEL & CARBIDE STEEL

Many tools “on the shelf” with premium, grade, ASP30, M45, Rex & Carbide.
Don’t let tough material stop you from quoting, check with us first.

USED & SURPLUS TOOLS

We have a large stock of surplus and used tools for that small job that won’t cover the cost of new tooling.
Please ask the salesman to check our used stock. We will be happy to locate a partial life tool at a very low cost to you.

PURCHASING PROGRAM

Ash Gear will buy your surplus tooling. If you have tools that you no longer need - turn them into cash!

SOFTWARE - Ash Gear offers several software programs for your calculation needs.

GCP4 - Gear Calculation Program: GCP4 is a seven program package for use with: Internal Spur, External Spur, Internal Helical, External Helical, Worm Gears, Rack & Worm threads and Straight sided splines.

Calculates your gear data even when you have a limited amount of information. GCP4 calculates all your gear data: Pitch, Pressure Angle at P.D. , Base Pitch, Minor, Major, Add/Dedendum, Tooth Thickness, MOW/MBW for wire diameter and more.

All the GCP4 programs share a common trait, field integration. Data fields are updated when another related field is modified.

CPC-24 Bevel Generator Setup Software: This setup program is for Gleason No’s. 12, 14, & 24 Machine. These machines use two planer-style cutters having specified rack form pressure angle and point width. Setup includes A & B dial settings for pattern control

CPC-26 - Spiral Bevel Generator: This setup program is for Gleason No. 26 spiral bevel machine. The basic No. 26 may be used in several processes: roughing, finishing, grinding, production, and in “jobber” (Small Job Fixed Blade) mode. High production requires the fixed-blade setup method which requires special cutters/bodies specific to the job.

CPC-HOB - For all Gear Hobbing Machines: CPC-HOB is a simple and painless way to set up all types of gear hobbers. You select a machine, enter gear specs, and CPCHOB creates a complete set of change gears - for differential or non differential machines. You easily control table feed. Easily sets up machines without differentials to cut helical gears. Maintains a customized list of your hobbing machines. Enter machine constants once and only once. If you have difficulty finding out what your hob machine constants are, we can do it for you. This is the only time you need to consider what a machine constant is.

Ash Gear has developed our own signature Gear Calculation program , now on sale GCP4.
The program operates on machines running windows 7 and higher.

For more information on our Gear Calculation Software programs available:

Look in the *Misc*. Section of this catalog for full detailed write-ups on each programs capabilities as well as examples of use.

Plus additional resources for industry standards and reputable online data sources.

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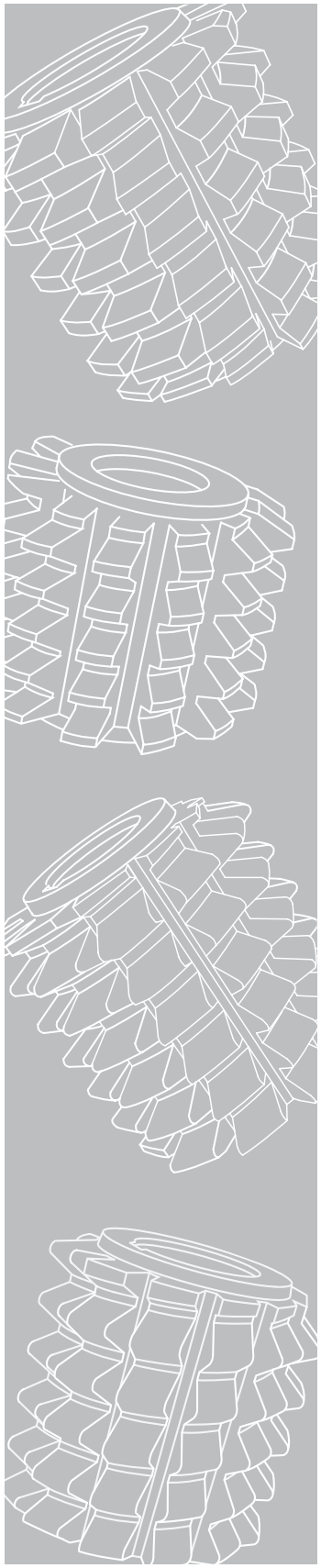

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- 14.5° 11
- 20° 17
- 22.5° 32
- 25° 34
- 30° 37
- 37.5° 43
- 45° 44

Normal Module Pitch
- 14.5° 45
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- 30° 55
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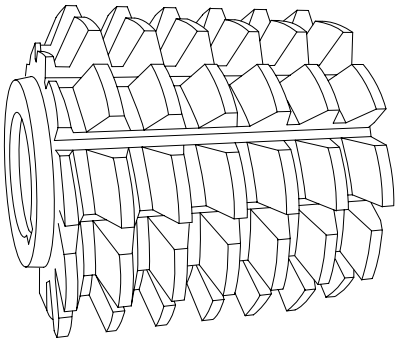
HS14, CHS14, HD14, HL14 Series

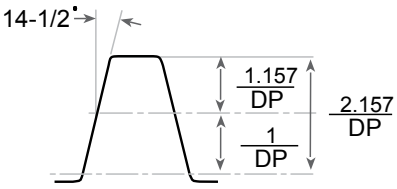
DP 14.5° PA° GEAR HOBS

Finishing Non-Topping
Right and Left Thread
Single Thread

DP	PA	OD	Length	Bore	# of Leads	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1	14.5°	10-3/4	15	2-1/2	1	2.157	HS14-100	-
1	14.5°	10	12-1/2	2	1	2.157	CHS14-100	-
1-1/4	14.5°	8-3/4	12	2	1	1.726	HS14-125	-
1-1/4	14.5°	8-1/4	10-1/2	1-1/2	1	1.726	CHS14-125	-
1-1/4	14.5°	9	10-1/2	2	1	1.800	HD14-125	-
1-1/2	14.5°	8	10	2	1	1.438	HS14-150	-
1-1/2	14.5°	7-1/2	7-3/4	1-1/2	1	1.438	CHS14-150	-
1-1/2	14.5°	8	9-1/4	1-1/2	1	1.500	HD14-150	-
1-3/4	14.5°	7-1/4	9	2	1	1.233	HS14-175	-
1-3/4	14.5°	6-3/4	8	1-1/2	1	1.233	CHS14-175	-
2	14.5°	5-3/4	8	1-1/2	1	1.079	HS14-200	-
2	14.5°	5-1/4	6	1-1/4	1	1.079	CHS14-200	-
2	14.5°	6-1/2	8	1-1/2	1	1.125	HD14-200	-
2-1/4	14.5°	5-1/2	7-1/2	1-1/2	1	.959	HS14-225	HL14-225
2-1/4	14.5°	5-1/4	6	1-1/2	1	.959	CHS14-225	-
2-1/2	14.5°	5	7	1-1/2	1	.863	HS14-250	HL14-250
2-1/2	14.5°	4-3/4	5	1-1/4	1	.863	CHS14-250	-
2-1/2	14.5°	6	7	1-1/2	1	.900	HD14-250	-
2-3/4	14.5°	5	6	1-1/2	1	.784	HS14-275	HL14-275
2-3/4	14.5°	4-3/4	5	1-1/4	1	.784	CHS14-275	-
3	14.5°	4-1/2	5	1-1/4	1	.719	HS14-300	HL14-300
3	14.5°	4	4	1-1/4	1	.719	CHS14-300	-
3	14.5°	4-1/2	5	1-1/4	1	.750	HD14-300	-
3-1/2	14.5°	4-1/4	4-3/4	1-1/4	1	.616	HS14-350	HL14-350
4	14.5°	4	4	1-1/4	1	.539	HS14-400	HL14-400
4	14.5°	4-1/2	5	1-1/4	1	.563	HD14-400	-
4-1/2	14.5°	3-1/2	3-1/2	1-1/4	1	.479	HS14-450	HL14-450
5	14.5°	3-1/2	3-1/2	1-1/4	1	.431	HS14-500	HL14-500
5	14.5°	3-1/2	3-1/2	1-1/4	1	.450	HD14-500	-
5-1/2	14.5°	3-1/2	3-1/2	1-1/4	1	.392	HS14-550	HL14-550
6	14.5°	3-1/2	3-1/2	1-1/4	1	.360	HS14-600	HL14-600
6	14.5°	4-1/2	4-1/2	1-1/2	1	.375	HD14-600E	-
6-1/2	14.5°	3-1/2	3-1/2	1-1/4	1	.332	HS14-650	HL14-650
7	14.5°	3-1/2	3-1/2	1-1/4	1	.308	HS14-700	HL14-700
8	14.5°	3	3	1-1/4	1	.270	HS14-800	HL14-800
8	14.5°	3	3	1-1/4	1	.281	HD14-800	-
8	14.5°	3	3	1-1/4	2	.270	HS14-800-2	-
8-1/2	14.5°	3	3	1-1/4	1	.254	HS14-850	HL14-850
9	14.5°	3	3	1-1/4	1	.240	HS14-900	HL14-900
10	14.5°	3	3	1-1/4	1	.216	HS14-010	HL14-010
10	14.5°	3	3	1-1/4	1	.225	HD14-010	-
10	14.5°	3	3	1-1/4	2	.216	HS14-010-2	-
11	14.5°	2-3/4	2-3/4	1-1/4	1	.196	HS14-011	HL14-011
12	14.5°	2-3/4	2-3/4	1-1/4	1	.180	HS14-012	HL14-012
12	14.5°	2-3/4	2-3/4	1-1/4	1	.188	HD14-012	-
13	14.5°	2-3/4	2-3/4	1-1/4	1	.166	HS14-013	HL14-013
14	14.5°	2-1/2	2-1/2	1-1/4	1	.154	HS14-014	HL14-014
14	14.5°	2-1/2	2-1/2	1-1/4	1	.161	HD14-014	-
16	14.5°	2-1/2	2-1/2	1-1/4	1	.135	HS14-016	HL14-016
18	14.5°	2-1/2	2-1/2	1-1/4	1	.120	HS14-018	HL14-018
20	14.5°	2-1/2	2	1-1/4	1	.112	HS14-020	HL14-020
24	14.5°	2-1/2	2	1-1/4	1	.094	HS14-024	HL14-024
26	14.5°	2-1/2	2	1-1/4	1	.087	HS14-026	-
28	14.5°	2-1/2	2	1-1/4	1	.081	HS14-028	-
30	14.5°	2-1/2	2	1-1/4	1	.075	HS14-030	-
32	14.5°	2-1/2	2	1-1/4	1	.071	HS14-032	-
40	14.5°	2-1/2	2	1-1/4	1	.057	HS14-040	-
48	14.5°	2-1/2	2	1-1/4	1	.048	HS14-048	-

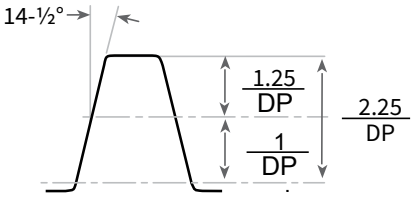


HS14, CHS14, HL14
Rack Profile



For 20DP and finer,
WD = 2.20/DP+.002

HD14 Rack Profile



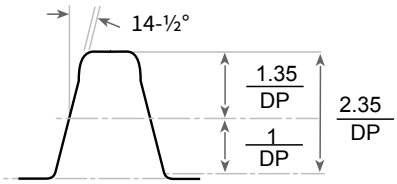
For 3/4" bore see series HFS14.
For 1/2" bore see series HFH14.
For 8mm bore see series HM814

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
						Pre-Shave	Pre-Grind
3	14.5°	4-1/2	5	1-1/4	.783	HP14-300	-
4	14.5°	4	4	1-1/4	.588	HP14-400	-
5	14.5°	3-1/2	3-1/2	1-1/4	.470	HP14-500	-
6	14.5°	3-1/2	3-1/2	1-1/4	.392	HP14-600	HPG14-600
8	14.5°	3	3	1-1/4	.294	HP14-800	HPG14-800
10	14.5°	3	3	1-1/4	.235	HP14-010	HPG14-010
12	14.5°	2-3/4	2-3/4	1-1/4	.196	HP14-012	HPG14-012
14	14.5°	2-1/2	2-1/2	1-1/4	.168	HP14-014	-
16	14.5°	1-7/8	1-7/8	3/4	.147	HP14-016S	-
16	14.5°	2-1/2	2-1/2	1-1/4	.147	HP14-016	HPG14-016
18	14.5°	2-1/2	2	1-1/4	.131	HP14-018	-
20	14.5°	2-1/2	2	1-1/4	.122	HP14-020	HPG14-020
24	14.5°	1-7/8	1-7/8	3/4	.102	HP14-024S	HPG14-024S
24	14.5°	2-1/2	2	1-1/4	.102	HP14-024	HPG14-024

HP14 & HPG14 Series

DP 14.5° PA GEAR HOBS

Pre-Shave & Pre-Grind
Non-Topping, Single Thread
Right Hand



For 20DP and finer,
WD = 2.40/DP+.002

Pre-Shave cutters 16DP and coarser have protuberance, cutters 20 DP and finer do not have protuberance.

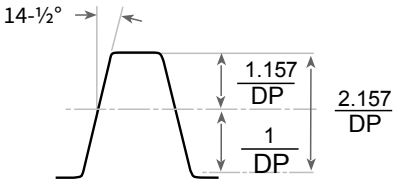
When designing for 20DP and finer, the pressure angle will be modified slightly to aid the shaving cutter, rather than incorporating a protuberance feature.

DP	PA	OD	Length	Bore	WD	Specify Class AA, A, B, C	
						Right Hand	Left Hand
8	14.5°	2	2	3/4	.270	HFS14-800	HFSL14-800
10	14.5°	1-7/8	1-7/8	3/4	.216	HFS14-010	HFSL14-010
11	14.5°	1-7/8	1-7/8	3/4	.196	HFS14-011	-
12	14.5°	1-7/8	1-7/8	3/4	.180	HFS14-012	HFSL14-012
13	14.5°	1-7/8	1-7/8	3/4	.166	HFS14-013	-
14	14.5°	1-7/8	1-7/8	3/4	.154	HFS14-014	HFSL14-014
14	14.5°	1-7/8	1-7/8	#1 Taper	.154	HFS1-14-014	-
15	14.5°	1-7/8	1-7/8	3/4	.144	HFS14-015	-
16	14.5°	1-7/8	1-7/8	3/4	.135	HFS14-016	HFSL14-016
18	14.5°	1-7/8	1-7/8	3/4	.120	HFS14-018	HFSL14-018
20	14.5°	1-7/8	1-7/8	3/4	.112	HFS14-020	-
22	14.5°	1-7/8	1-7/8	3/4	.102	HFS14-022	-
24	14.5°	1-7/8	1-7/8	3/4	.094	HFS14-024	HFSL14-024
26	14.5°	1-7/8	1-7/8	3/4	.087	HFS14-026	-
28	14.5°	1-7/8	1-7/8	3/4	.081	HFS14-028	-
30	14.5°	1-7/8	1-7/8	3/4	.075	HFS14-030	-
32	14.5°	1-7/8	1-7/8	3/4	.071	HFS14-032	-
34	14.5°	1-7/8	1-7/8	3/4	.067	HFS14-034	-
36	14.5°	1-7/8	1-7/8	3/4	.063	HFS14-036	-
36	14.5°	1-7/8	1-7/8	#1 Taper	.063	HFS1-14-036	-
38	14.5°	1-7/8	1-1/2	3/4	.060	HFS14-038	HFSL14-038
38	14.5°	1-7/8	1-1/2	#1 Taper	.060	HFS1-14-038	-
40	14.5°	1-7/8	1-1/2	3/4	.057	HFS14-040	HFSL14-040
42	14.5°	1-7/8	1-1/2	3/4	.054	HFS14-042	-
42	14.5°	1-7/8	1-1/2	#1 Taper	.054	HFS1-14-042	-
48	14.5°	1-7/8	1-1/2	3/4	.048	HFS14-048	HFSL14-048
48	14.5°	1-7/8	1-1/2	#1 Taper	.048	HFS1-14-048	-
50	14.5°	1-7/8	1-1/2	#1 Taper	.046	HFS1-14-050	-
64	14.5°	1-5/8	1-1/2	3/4	.036	HFS14-064	-
64	14.5°	1-5/8	1-1/2	#1 Taper	.036	HFS1-14-064	-
72	14.5°	1-5/8	1-1/2	#1 Taper	.033	HFS1-14-072	-
96	14.5°	1-5/8	1-1/2	3/4	.025	HFS14-096	-
96	14.5°	1-1/2	1	#1 Taper	.025	HFS1-14-096	-
120	14.5°	1-1/2	3/4	3/4	.020	HFS14-120	-
120	14.5°	1-1/2	1	#1 Taper	.020	HFS1-14-120	-

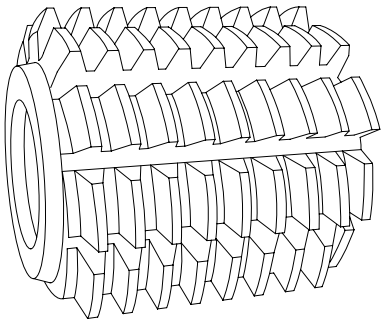
HFS14, HFS1-14 & HFSL14 Series

DP 14.5° PA GEAR HOBS

Finishing , Non-Topping
Single Lead
Right & Left Hand
3/4" Bore & #1 Taper Bore



For 20DP and finer, depth is 2.20/DP + .002

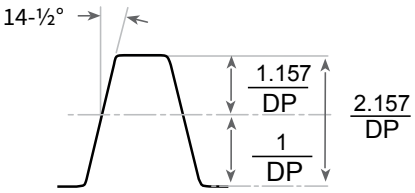


HT14, HFT14, HFT1-14, HTL14 & HFTL14 Series

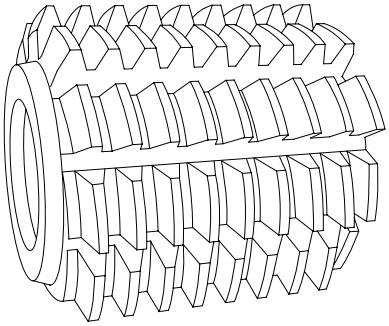
DP 14.5° PA GEAR HOBS

Finishing, Topping
Right & Left Hand

DP	PA	OD	Length	Bore	WD	Specify Class AA, A, B, C		
						1-RH	2-RH	1-LH
3	14.5°	4-1/2	5	1-1/4	.719	HT14-300	-	-
3 1/2	14.5°	4-1/4	4-3/4	1-1/4	.616	HT14-350	-	-
4	14.5°	4	4	1-1/4	.539	HT14-400	-	-
5	14.5°	3-1/2	3-1/2	1-1/4	.431	HT14-500	-	-
6	14.5°	3-1/2	3-1/2	1-1/4	.360	HT14-600	-	HTL14-600
8	14.5°	3	3	1-1/4	.270	HT14-800	-	HTL14-800
8	14.5°	3-3/4	3-3/4	1-1/4	.270	-	HT14-800-2	-
10	14.5°	3	3	1-1/4	.216	HT14-010	-	-
10	14.5°	3-1/2	3-1/2	1-1/4	.216	-	HT14-010-2	-
10	14.5°	1-7/8	1-7/8	3/4	.216	HFT14-010	-	-
12	14.5°	2-3/4	2-3/4	1-1/4	.180	HT14-012	-	-
12	14.5°	1-7/8	1-7/8	3/4	.180	HFT14-012	-	-
14	14.5°	2-1/2	2-1/2	1-1/4	.154	HT14-014	-	-
16	14.5°	2-1/2	2-1/2	1-1/4	.135	HT14-016	-	-
16	14.5°	1-7/8	1-7/8	3/4	.135	HFT14-016	-	-
18	14.5°	1-7/8	1-7/8	3/4	.124	HFT14-018	-	-
20	14.5°	1-7/8	1-7/8	3/4	.112	HFT14-020	-	-
24	14.5°	1-7/8	1-7/8	3/4	.094	HFT14-024	-	-
26	14.5°	1-7/8	1-7/8	3/4	.087	HFT14-026	-	HFTL14-026
28	14.5°	1-7/8	1-7/8	3/4	.081	HFT14-028	-	-
30	14.5°	1-7/8	1-7/8	3/4	.075	HFT14-030	-	-
32	14.5°	1-7/8	1-7/8	3/4	.071	HFT14-032	-	-
32	14.5°	1-7/8	1-7/8	#1 Taper	.071	HFT1-14-032	-	-
34	14.5°	1-7/8	1-1/2	3/4	.067	HF14-034	-	-
36	14.5°	1-7/8	1-7/8	3/4	.063	HFT14-036	-	-
36	14.5°	1-7/8	1-1/2	#1 Taper	.063	HFT1-14-036	-	-
40	14.5°	1-7/8	1-1/2	3/4	.057	HFT14-040	-	-
42	14.5°	1-7/8	1-1/2	3/4	.054	HFT14-042	-	-
44	14.5°	1-7/8	1-1/2	3/4	.052	HFT14-044	-	-
48	14.5°	1-7/8	1-1/2	3/4	.048	HFT14-048	-	-
48	14.5°	1-7/8	1-1/2	#1 Taper	.048	HFT1-14-048	-	-
50	14.5°	1-7/8	1-1/2	3/4	.046	HF14-050	-	-
56	14.5°	1-7/8	1-1/2	3/4	.041	HFT14-056	-	-
64	14.5°	1-5/8	1-1/2	3/4	.036	HFT14-064	-	-
64	14.5°	1-5/8	1-1/2	#1 Taper	.036	HFT1-14-064	-	-
72	14.5°	1-5/8	1-1/2	3/4	.033	HFT14-072	-	-
72	14.5°	1-5/8	1-1/2	#1 Taper	.033	HFT1-14-072	-	-
80	14.5°	1-5/8	1-1/8	#1 Taper	.030	HFT1-14-080	-	-
96	14.5°	1-1/2	1	3/4	.025	HFT14-096	-	-
120	14.5°	1-1/2	3/4	3/4	.020	HFT14-120	-	-
120	14.5°	1-1/2	1	#1 Taper	.020	HFT1-14-120	-	-



Root of Hob will form O.D. of part.
18 DP and finer WD = 2.2/DP+.002



DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
5	10°	3-1/2	3-1/2	1-1/4	.431	HS10-500	-

HS10 Series

DP 10° PA GEAR HOBS

Finishing, Non-Topping
Right Hand, Single Thread

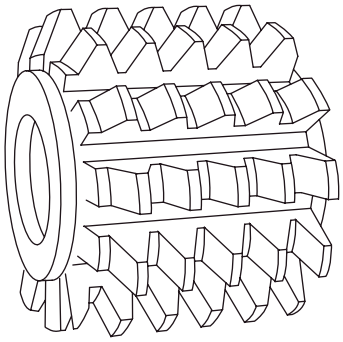
DP	PA	OD	Length	Bore	WD	Specify Class AA, A, B, C	
						Non-Topping	Topping
20	14.5°	1-1/4	1-1/4	1/2	.112	HFH14-020	HTH14-020
22	14.5°	1-1/4	1-1/4	1/2	.102	HFH14-022	HTH14-022
24	14.5°	1-1/4	1-1/4	1/2	.094	HFH14-024	HTH14-024
26	14.5°	1-1/4	1-1/4	1/2	.087	HFH14-026	HTH14-026
28	14.5°	1-1/4	1-1/4	1/2	.081	HFH14-028	HTH14-028
30	14.5°	1-1/8	1-1/8	1/2	.075	HFH14-030	HTH14-030
32	14.5°	1-1/8	1-1/8	1/2	.071	HFH14-032	HTH14-032
34	14.5°	1-1/8	1-1/8	1/2	.067	HFH14-034	HTH14-034
36	14.5°	1-1/8	1-1/8	1/2	.063	HFH14-036	HTH14-036
40	14.5°	1-1/8	1-1/8	1/2	.057	HFH14-040	HTH14-040
42	14.5°	1-1/8	1-1/8	1/2	.054	HFH14-042	HTH14-042
44	14.5°	1-1/8	1-1/8	1/2	.052	HFH14-044	HTH14-044
46	14.5°	1-1/8	1-1/8	1/2	.050	HFH14-046	HTH14-046
48	14.5°	1-1/8	1-1/8	1/2	.048	HFH14-048	HTH14-048
50	14.5°	1-1/8	1-1/8	1/2	.046	HFH14-050	HTH14-050
52	14.5°	1-1/8	1-1/8	1/2	.044	HFH14-052	HTH14-052
54	14.5°	1-1/8	1-1/8	1/2	.043	HFH14-054	HTH14-054
56	14.5°	1-1/8	1-1/8	1/2	.041	HFH14-056	HTH14-056
60	14.5°	1-1/8	1-1/8	1/2	.039	HFH14-060	HTH14-060
62	14.5°	1-1/8	1-1/8	1/2	.038	HFH14-062	HTH14-062
64	14.5°	1-1/8	1-1/8	1/2	.036	HFH14-064	HTH14-064
66	14.5°	1-1/8	1-1/8	1/2	.035	HFH14-066	HTH14-066
70	14.5°	1-1/8	1-1/8	1/2	.033	HFH14-070	HTH14-070
72	14.5°	1-1/8	1-1/8	1/2	.033	HFH14-072	HTH14-072
80	14.5°	1-1/8	1-1/8	1/2	.030	HFH14-080	HTH14-080
96	14.5°	1-1/8	1-1/8	1/2	.025	HFH14-096	HTH14-096
100	14.5°	1-1/8	1-1/8	1/2	.024	HFH14-100	HTH14-100
120	14.5°	1-1/8	1-1/8	1/2	.020	HFH14-120	HTH14-120
160	14.5°	1-1/8	1-1/8	1/2	.016	HFH14-160	HTH14-160
180	14.5°	1-1/8	1-1/8	1/2	.014	HFH14-180	HTH14-180

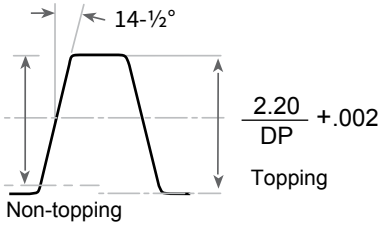
HFH14 & HTH14 Series

DP 14.5° PA GEAR HOBS

Finishing, Non-Topping & Topping
Right Hand, Single Thread
1/2" Bore

For left hand hob - Inquire HFHL14 Series



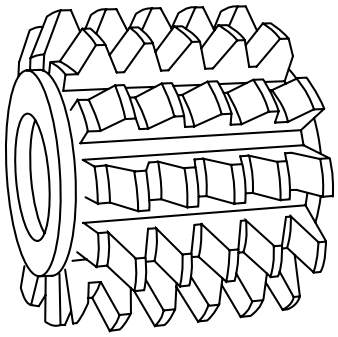


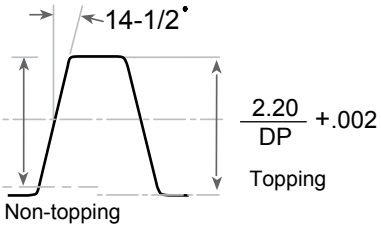
HM814 & HMT814 Series

DP 14.5° PA GEAR HOBS

Finishing,
Non-Topping & Topping
Right Hand
Single Thread
8mm Bore

DP	PA	OD	Approx. Length	Bore (mm)	WD	Specify Class AA, A, B, C	
						Non- Topping	Topping
24	14.5°	1	1	8	.094	-24-10	HMT814-24-10
32	14.5°	3/4	3/4	8	.071	HM814-32-75	HMT814-32-75
34	14.5°	5/8	1/2	8	.067	HM814-34-62	HMT814-34-62
36	14.5°	5/8	13/32	8	.063	HM814-36-62	HMT814-36-62
36	14.5°	3/4	1/2	8	.063	HM814-36-75	-
38	14.5°	15/16	19/32	8	.060	-	HMT814-38-93
40	14.5°	1	3/4	8	.057	HM814-40-10	HMT814-40-10
42	14.5°	15/16	19/32	8	.054	HM814-42-93	-
42	14.5°	1	1/2	8	.054	HM814-42-10	-
44	14.5°	3/4	1/2	8	.052	HM814-44-75	-
48	14.5°	1	1	8	.048	HM814-48-10	HMT814-48-10
48	14.5°	5/8	11/16	8	.048	HM814-48-62	HMT814-48-62
50	14.5°	3/4	1/2	8	.046	HM814-50-75	HMT814-50-75
52	14.5°	15/16	19/32	8	.044	HM814-52-93	HMT814-52-93
54	14.5°	15/16	5/8	8	.043	HM814-54-93	-
56	14.5°	3/4	5/8	8	.041	HM814-56-75	HMT814-56-75
58	14.5°	15/16	19/32	8	.040	HM814-58-93	HMT814-58-93
60	14.5°	15/16	19/32	8	.039	-	HMT814-60-93
62	14.5°	15/16	19/32	8	.037	HM814-62-93	-
64	14.5°	3/4	1/2	8	.036	HM814-64-75	HMT814-64-75
64	14.5°	15/16	19/32	8	.036	HM814-64-93	HMT814-64-93
64	14.5°	5/8	11/16	8	.036	HM814-64-62	-
72	14.5°	3/4	11/16	8	.033	HM814-72-75	HMT814-72-75
72	14.5°	5/8	3/4	8	.033	HM814-72-62	HMT814-72-62
80	14.5°	5/8	1/2	8	.030	HM814-80-62	HMT814-80-62
80	14.5°	3/4	1/2	8	.030	HM814-80-75	HMT814-80-75
82	14.5°	15/16	19/32	8	.029	HM814-82-93	HMT814-82-93
88	14.5°	15/16	13/32	8	.027	HM814-88-93	HMT814-88-93
90	14.5°	15/16	13/32	8	.026	HM814-90-93	HMT814-90-93
92	14.5°	15/16	13/32	8	.026	HM814-92-93	HMT814-92-93
94	14.5°	15/16	13/32	8	.025	HM814-94-93	-
96	14.5°	3/4	1/2	8	.025	HM814-96-75	HMT814-96-75
96	14.5°	5/8	13/32	8	.025	HM814-96-62	HMT814-96-62
100	14.5°	3/4	11/16	8	.024	HM814-100-75	-
100	14.5°	15/16	13/32	8	.024	HM814-100-93	HMT814-100-93
120	14.5°	1/2	1/2	8	.020	HM814-120-50	-
120	14.5°	3/4	1/2	8	.020	HM814-120-75	HMT814-120-75
120	14.5°	1	1/2	8	.020	HM814-120-10	-
120	14.5°	15/16	13/32	8	.020	HM814-120-93	HMT814-120-93
125	14.5°	15/16	5/16	8	.020	HM814-125-93	HMT814-125-93
126	14.5°	5/8	13/32	8	.019	-	HMT814-126-62
127	14.5°	15/16	5/16	8	.019	HM814-127-93	-
132	14.5°	15/16	5/16	8	.019	HM814-132-93	HMT814-132-93
134	14.5°	15/16	5/16	8	.018	HM814-134-93	-
150	14.5°	15/16	5/16	8	.017	HM814-150-93	HMT814-150-93
156	14.5°	15/16	5/16	8	.016	HM814-156-93	HMT814-156-93
157	14.5°	15/16	5/16	8	.016	HM814-157-93	-
160	14.5°	15/16	5/16	8	.016	HM814-160-93	-
175	14.5°	15/16	5/16	8	.015	HM814-175-93	HMT814-175-93
176	14.5°	15/16	5/16	8	.015	HM814-176-93	HMT814-176-93
180	14.5°	5/8	1/2	8	.014	HM814-180-62	-
180	14.5°	3/4	5/8	8	.014	HM814-180-75	-
180	14.5°	15/16	5/16	8	.014	HM814-180-93	HMT814-180-93
200	14.5°	15/16	5/16	8	.013	HM814-200-93	HMT814-200-93



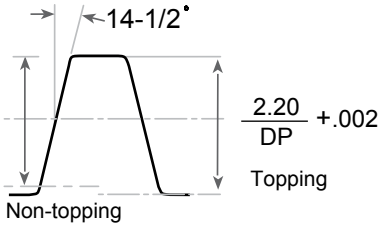


HM114 & HMT114 Series

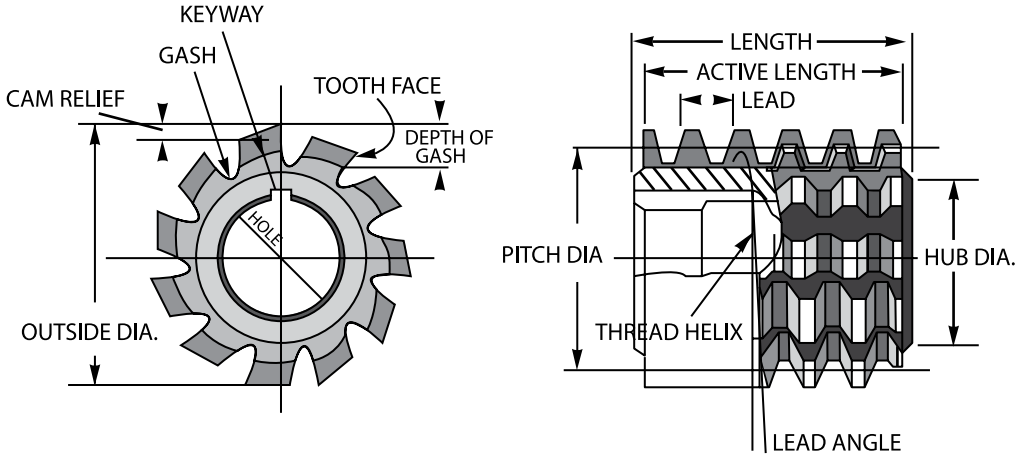
DP 14.5° PA GEAR HOBS

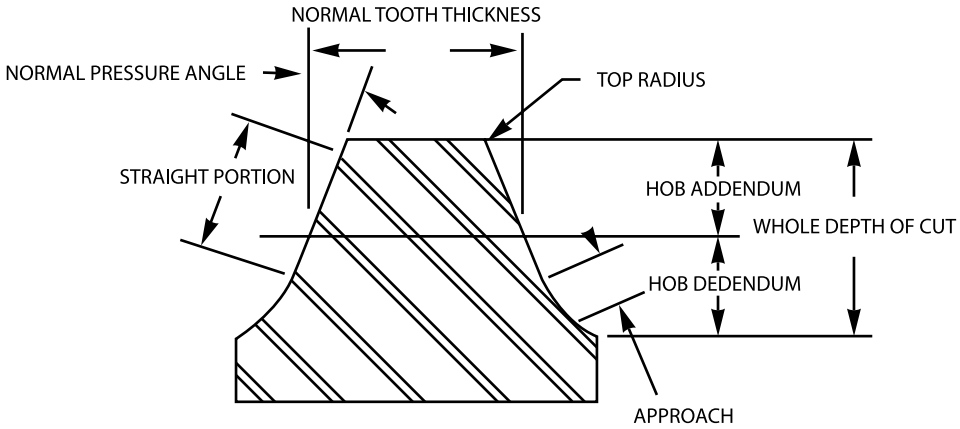
Finishing
Non-Topping & Topping
Right Hand, Single Thread
10mm Bore

DP	PA	OD	Approx. Length	Bore (mm)	WD	Specify Class AA, A, B, C	
						Non-Topping	Topping
24	14.5°	1-1/4	7/8	8	.094	-	HMT114-24-12
36	14.5°	1-1/4	1	8	.063	-	HMT114-36-12
40	14.5°	1-1/4	1	8	.057	-	HMT114-40-12
48	14.5°	1-1/4	1	8	.048	-	HMT114-48-12
50	14.5°	1-1/4	25/32	8	.046	-	HMT114-50-12
60	14.5°	1-1/4	11/16	8	.039	HM114-60-12	HMT114-60-12
64	14.5°	1-1/4	3/4	8	.036	HM114-64-12	-
80	14.5°	1-1/4	3/4	8	.030	HM114-80-12	-
96	14.5°	1-1/4	3/4	8	.025	HM114-96-12	HMT114-96-12
100	14.5°	1-1/4	13/32	8	.024	HM114-100-12	HMT114-100-12
120	14.5°	1-1/4	13/32	8	.020	HM114-120-12	HMT114-120-12
126	14.5°	1-1/4	3/4	8	.019	HM114-126-12	-
200	14.5°	1-1/4	13/32	8	.013	HM114-200-12	HMT114-200-12



HOB NOMENCLATURE:



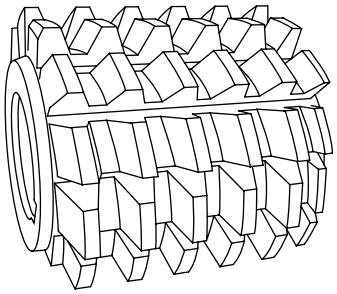


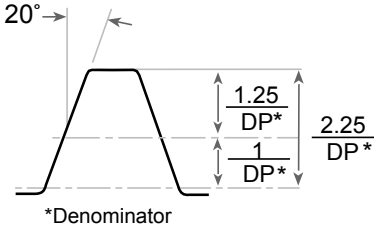
HF20 & HFL20 Series

DP 20° PA STUB

Combination Pitch
Right Hand & Left Hand
Finishing Non-Topping
Right Hand
Left Hand

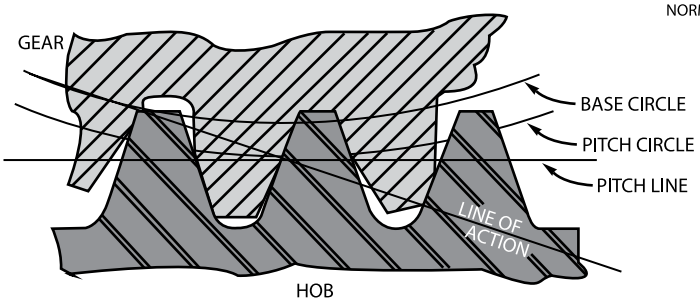
DP	PA	OD	Length	Bore	# of Leads	WD	Specify Class A, B, C	
							Right Hand	Left Hand
2/2.5	20°	5	6	1-1/4	1	.900	HF20-200	-
2.5/3	20°	4-1/2	5	1-1/4	1	.750	HF20-250	-
3/4	20°	4	4	1-1/4	1	.563	HF20-300	HFL20-300
4/5	20°	3-1/2	3-1/2	1-1/4	1	.450	HF20-400	HFL20-400
5/7	20°	3-1/4	3-1/4	1-1/4	1	.321	HF20-500	HFL20-500
6/8	20°	3	3	1-1/4	1	.281	HF20-600	HFL20-600
6/8	20°	3	3	1-1/4	2	.281	HF20-600-2	-
7/9	20°	3	3	1-1/4	1	.250	HF20-700	-
8/10	20°	2	2	3/4	1	.225	HF20-800S	-
8/10	20°	3	3	1-1/4	1	.225	HF20-800	HFL20-800
9/11	20°	2	2	3/4	1	.205	HF20-900S	-
9/11	20°	2-3/4	2-3/4	1-1/4	1	.205	HF20-900	HFL20-900
10/12	20°	1-7/8	1-7/8	3/4	1	.188	HF20-010S	-
10/12	20°	2-3/4	2-3/4	1-1/4	1	.188	HF20-010	HFL20-010
12/14	20°	1-7/8	1-7/8	3/4	1	.161	HF20-012S	HFL20-012S
12/14	20°	2-1/2	2	1-1/4	1	.161	HF20-012	HFL20-012
12/14	20°	3	3	1-1/4	2	.161	HF20-012-2	-
12/14	20°	3-1/4	3-1/4	1-1/4	3	.161	HF20-012-3	-
14/18	20°	2-1/2	2	1-1/4	1	.125	HF20-014	HFL20-014
16/21	20°	1-7/8	1-7/8	3/4	1	.107	HF20-016S	HFL20-016S
16/21	20°	2-1/2	2-1/2	1-1/4	1	.107	HF20-016	HFL20-016

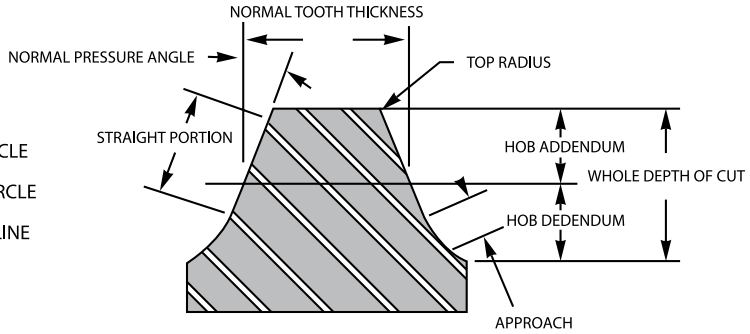


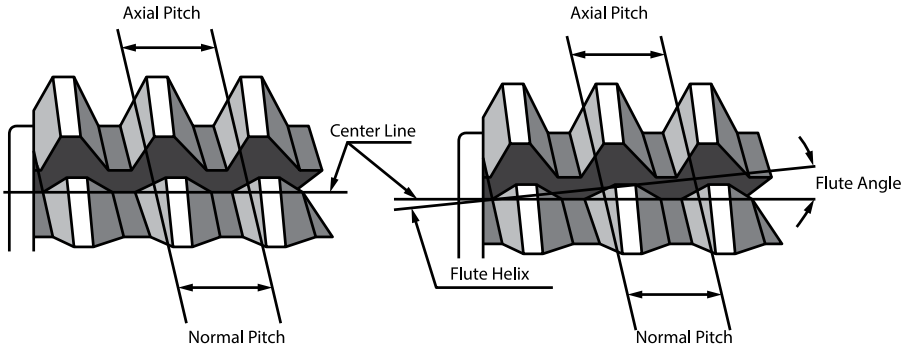


The combination pitch (stub tooth) has a shorter addendum and dedendum. The pitch is expressed as a fraction. The numerator of the fraction is used to determine the pitch diameter, circular pitch and the tooth thickness. The denominator determines the addendum, dedendum, clearance and depth of the tooth.

THE HOBBING PROCESS:





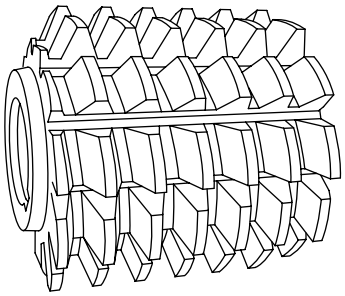


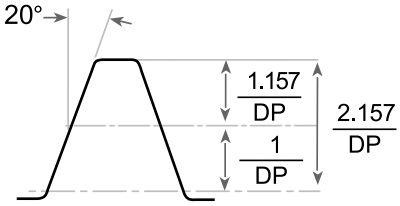
HS20, CHS20, HD20, CHD20, CHLS20, HLS20, HLD20, & CHLD20 Series

DP 20° PA GEAR HOBS

Finishing
Non Topping
Full Size & Cut Down

DP	PA	OD	Length	Bore	# of Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
3/4	20°	12-1/2	16	2-1/2	1	2.876	HD20-075	-
3/4	20°	12	16	2-1/2	1	2.876	CHS20-075	-
3/4	20°	13	16	2-1/2	1	3.000	HD20-075	-
7/8	20°	11-1/2	15	2-1/2	1	2.571	CHD20-087	-
1	20°	10-3/4	15	2-1/2	1	2.157	HS20-100	-
1	20°	10	12-1/4	2	1	2.157	CHS20-100	CHLS20-100
1	20°	10-3/4	15	2-1/2	1	2.250	HD20-100	HLD20-100
1	20°	10-1/2	12-1/2	2	1	2.250	CHD20-100	CHLD20-200
1-1/4	20°	8-3/4	12	2	1	1.726	HS20-125	-
1-1/4	20°	8-1/4	10-1/2	1-1/2	1	1.726	CHS20-125	CHSL20-125
1-1/4	20°	8-3/4	12	2	1	1.800	HD20-125	HLD20-125
1-1/4	20°	8-1/2	10-3/4	1-1/2	1	1.800	CHD20-125	-
1-1/2	20°	8	10	2	1	1.438	HS20-150	HLS20-150
1-1/2	20°	7-1/2	7-3/4	1-1/2	1	1.438	CHS20-150	CHLS20-150
1-1/2	20°	8	10	2	1	1.500	HD20-150	HLD20-150
1-1/2	20°	7-1/2	8	1-1/2	1	1.500	CHD20-150	-
1-3/4	20°	7-1/4	9	2	1	1.233	HS20-175	HLS20-175
1-3/4	20°	6-3/4	8	1-1/2	1	1.233	CHS20-175	CHLS20-175
1-3/4	20°	7-1/4	9	2	1	1.286	HD20-175	HLD20-175
1-3/4	20°	7	8	1-1/2	1	1.286	CHD20-175	-
2	20°	5-3/4	8	1-1/2	1	1.079	HS20-200	HLS20-200
2	20°	5-1/4	6	1-1/4	1	1.079	CHS20-200	CHLS20-200
2	20°	5-3/4	8	1-1/2	1	1.125	HD20-200	HLD20-200
2	20°	5-1/2	6	1-1/4	1	1.125	CHD20-200	CHLD20-200
2-1/4	20°	5-1/2	7-1/2	1-1/2	1	.959	HS20-225	-
2-1/4	20°	5-1/4	6	1-1/4	1	.959	CHS20-225	-
2-1/4	20°	5-1/2	7-1/2	1-1/2	1	1.000	HD20-225	HLD20-225
2-1/4	20°	5-1/4	6	1-1/4	1	1.000	CHD20-225	-
2-1/2	20°	5	7	1-1/2	1	.863	HS20-250	HLS20-250
2-1/2	20°	4-3/4	5	1-1/4	1	.863	CHS20-250	CHLS20-250
2-1/2	20°	5	7	1-1/2	1	.900	HD20-250	HLD20-250
2-1/2	20°	4-3/4	5	1-1/4	1	.900	CHD20-250	-
2-3/4	20°	5	6	1-1/2	1	.784	HS20-275	-
2-3/4	20°	4-3/4	5	1-1/4	1	.784	CHS20-275	-
2-3/4	20°	5-1/4	6	1-1/2	1	.818	HD20-275	HLD20-275
2-3/4	20°	4-3/4	5	1-1/4	1	.818	CHD20-275	-
3	20°	4-1/2	5	1-1/4	1	.719	HS20-300	HLS20-300
3	20°	4-1/4	4-1/4	1-1/4	1	.719	CHS20-300	-
3	20°	4-1/2	5	1-1/4	1	.750	HD20-300	HLD20-300
3	20°	4	4	1-1/4	1	.750	CHD20-300	-
3-1/2	20°	4-1/4	4-3/4	1-1/4	1	.616	HS20-350	HLS20-350
3-1/2	20°	4-1/4	4 3/4	1-1/4	1	.643	HD20-350	HLD20-350
3-3/4	20°	4	4	1-1/4	1	.575	HS20-375	-
4	20°	4	4	1-1/4	1	.539	HS20-400	HLS20-400
4	20°	4	4	1-1/4	1	.563	HD20-400	HLD20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	1	.479	HS20-450	-
4-1/2	20°	3 1/2	3 1/2	1-1/4	1	.500	HD20-450	HLD20-450
5	20°	3-1/2	3-1/2	1-1/4	1	.431	HS20-500	HLS20-500
5	20°	3-1/2	3-1/2	1-1/4	1	.450	HD20-500	HLD20-500
5-1/2	20°	3-1/2	3-1/2	1-1/4	1	.392	HS20-550	-
5-1/2	20°	3-1/2	3-1/2	1-1/4	1	.409	HD20-550	HLD20-550
6	20°	3-1/2	3-1/2	1-1/4	1	.360	HS20-600	HLS20-600

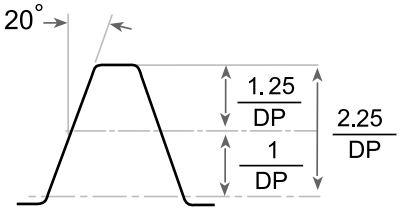




For 20 DP and finer, depth is 2.20/DP + .002

For 3/4" bore, see HFS20 Series
For 1/2" bore, see HFH20 Series

For topping hob,
inquire on HT20 Series



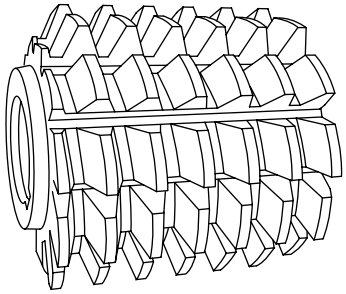
SERIES CONTINUED ON NEXT PAGE ->

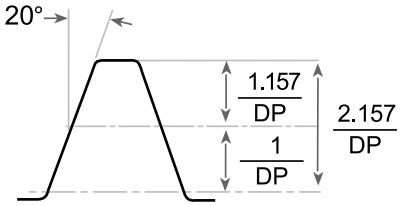
HS20, CHS20, HD20, CHD20, CHLS20 & HLD20 Series

DP 20° PA GEAR HOBS

Finishing
Non Topping
Full Size & Cut Down

DP	PA	OD	Length	Bore	# of Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
6	20°	3-1/2	3-1/2	1-1/4	1	.375	HD20-600	HLD20-600
6-1/2	20°	3-1/4	3-1/4	1-1/4	1	.332	HS20-650	-
6-1/2	20°	3-1/4	3-1/4	1-1/4	1	.346	HD20-650	HLD20-650
7	20°	3-1/4	3-1/4	1-1/4	1	.308	HS20-700	HLS20-700
7	20°	3-1/4	3-1/4	1-1/4	1	.321	HD20-700	HLD20-700
7-1/2	20°	3	3	1-1/4	1	.288	HS20-750	-
7-1/2	20°	3	3	1 1/4	1	.300	HD20-750	HLD20-750
8	20°	3	3	1-1/4	1	.270	HS20-800	HLS20-800
8	20°	3 1/4	3 1/4	1-1/4	2	.270	HS20-800-2	-
8	20°	3	3	1-1/4	1	.281	HD20-800	HLD20-800
8-1/2	20°	3	3	1-1/4	1	.254	HS20-850	-
8-1/2	20°	3	3	1-1/4	1	.265	HD20-850	HLD20-850
9	20°	3	3	1-1/4	1	.240	HS20-900	HLS20-900
9	20°	3	3	1-1/4	1	.250	HD20-900	HLD20-900
10	20°	3	3	1-1/4	1	.216	HS20-010	HLS20-010
10	20°	3 -1/2	3 1/2	1 1/4	3	.216	HS20-010-3	-
10	20°	3	3	1-1/4	1	.225	HD20-010	HLD20-010
10	20°	3	3	1-1/4	2	.225	HD20-010-2	-
11	20°	2-3/4	2-3/4	1-1/4	1	.196	HS20-011	-
11	20°	2-3/4	2-3/4	1-1/4	1	.205	HD20-011	HLD20-011
12	20°	2-3/4	2-3/4	1-1/4	1	.180	HS20-012	HLS20-012
12	20°	2-3/4	2-3/4	1-1/4	1	.188	HD20-012	HLD20-012
12	20°	2-3/4	2-3/4	1-1/4	2	.188	HD20-012-2	-
13	20°	2-1/2	2-1/2	1-1/4	1	.166	HS20-013	-
13	20°	2-1/2	2-1/2	1-1/4	1	.173	HD20-013	HLD20-013
14	20°	2-1/2	2-1/2	1-1/4	1	.154	HS20-014	HLS20-014
14	20°	2-1/2	2-1/2	1-1/4	1	.161	HD20-014	HLD20-014
15	20°	2-1/2	2-1/2	1-1/4	1	.144	HS20-015	-
15	20°	2-1/2	2-1/2	1-1/4	1	.150	HD20-015	HLD20-015
16	20°	2-1/2	2-1/2	1-1/4	1	.135	HS20-016	HLS20-016
16	20°	2-1/2	2-1/2	1-1/4	1	.141	HD20-016	HLD20-016
17	20°	2-1/2	2	1-1/4	1	.127	HS20-017	-
17	20°	2-1/2	2	1-1/4	1	.132	HD20-017	HLD20-017
18	20°	2-1/2	2	1-1/4	1	.120	HS20-018	-
18	20°	2-1/2	2	1-1/4	1	.125	HD20-018	HLD20-018
19	20°	2-1/2	2	1-1/4	1	.114	HS20-019	-
20	20°	2-1/2	2	1-1/4	1	.112	HS20-020	HLS20-020
20	20°	2-1/2	2	1-1/4	1	.113	HD20-020	HLD20-020
21	20°	2-1/2	2	1-1/4	1	.107	HS20-021	-
22	20°	2-1/2	2	1-1/4	1	.102	HS20-022	-
24	20°	2-1/2	2	1-1/4	1	.094	HS20-024	HLS20-024
24	20°	2-1/2	2	1-1/4	1	.094	HD20-024	HLD20-024
24	20°	2-1/2	2	1-1/4	2	.094	HD20-024-2	-
26	20°	2-1/2	2	1-1/4	1	.087	HS20-026	-
28	20°	2-1/2	2	1-1/4	1	.081	HS20-028	HLS20-028
30	20°	2-1/2	2	1-1/4	1	.075	HS20-030	-
30	20°	2-1/2	2	1-1/4	1	.075	HD20-030	-
34	20°	2-1/2	2	1-1/4	1	.067	HS20-034	-
36	20°	2-1/2	2	1-1/4	1	.063	HS20-036	-
40	20°	2-1/2	2	1-1/4	1	.057	HS20-040	-
42	20°	2-1/2	2	1-1/4	1	.054	HS20-042	-
48	20°	2-1/2	2	1-1/4	1	.048	HS20-048	-





For 20 DP and finer, depth is 2.20/DP + .002

For 3/4" bore, see HFS20 Series
For 1/2" bore, see HFH20 Series

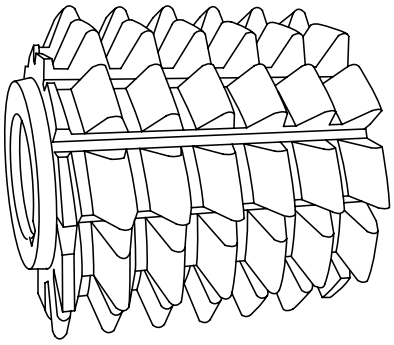
For topping hob, inquire on HT20 Series

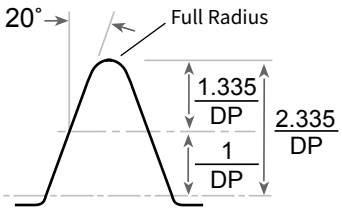
HR20, CHR20 & HLR20 Series

DP 20° PA GEAR HOBS

Single Thread
Finishing Non-Topping
Full Fillet

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
1	20°	11-1/4	15	2-1/2	2.335	HR20-100	-
1	20°	10-1/2	12-1/2	2	2.335	CHR20-100	-
1-1/4	20°	9-1/4	12	2	1.868	HR20-125	-
1-1/4	20°	8-1/2	11	1-1/2	1.868	CHR20-125	-
1-1/2	20°	8-1/4	10	2	1.557	HR20-150	HLR20-150
1-1/2	20°	7-3/4	8	1-1/2	1.557	CHR20-150	-
1-3/4	20°	7-1/2	9	2	1.334	HR20-175	HLR20-175
1-3/4	20°	7	8	1-1/2	1.334	CHR20-175	-
2	20°	6-1/4	8	1-1/2	1.168	HR20-200	HLR20-200
2	20°	5-3/4	6	1-1/4	1.168	CHR20-200	-
2-1/4	20°	5-3/4	7-1/2	1-1/2	1.038	HR20-225	-
2-1/4	20°	5-1/2	6	1-1/4	1.038	CHR20-225	-
2-1/2	20°	5-1/4	7	1-1/2	.934	HR20-250	HLR20-250
2-1/2	20°	5	6	1-1/4	.934	CHR20-250	-
2-3/4	20°	5-1/4	6	1-1/2	.849	HR20-275	-
3	20°	4-1/2	5	1-1/4	.778	HR20-300	HLR20-300
3-1/2	20°	4-1/2	4-3/4	1-1/4	.667	HR20-350	HLR20-350
4	20°	4	4	1-1/4	.584	HR20-400	HLR20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.519	HR20-450	HLR20-450
5	20°	3-1/2	3-1/2	1-1/4	.467	HR20-500	HLR20-500
5-1/2	20°	3-1/2	3-1/2	1-1/4	.425	HR20-550	-
6	20°	3-1/2	3-1/2	1-1/4	.389	HR20-600	HLR20-600
6-1/2	20°	3-1/4	3-1/4	1-1/4	.359	HR20-650	HLR20-650
7	20°	3-1/4	3-1/4	1-1/4	.334	HR20-700	HLR20-700
8	20°	2	2	3/4	.292	HR20-800S	-
8	20°	3	3	1-1/4	.292	HR20-800	HLR20-800
9	20°	2	2	3/4	.259	HR20-900S	-
9	20°	3	3	1-1/4	.259	HR20-900	-
10	20°	1-7/8	1-7/8	3/4	.234	HR20-010S	HLR20-010S
10	20°	3	3	1-1/4	.234	HR20-010	HLR20-010
11	20°	2-3/4	2-3/4	1-1/4	.212	HR20-011	-
12	20°	1-7/8	1-7/8	3/4	.195	HR20-012S	-
12	20°	2-3/4	2-3/4	1-1/4	.195	HR20-012	HLR20-012
14	20°	1-7/8	1-7/8	3/4	.167	HR20-014S	-
14	20°	2-1/2	2-1/2	1-1/4	.167	HR20-014	HLR20-014
16	20°	1-7/8	1-7/8	3/4	.146	HR20-016S	-
16	20°	2-1/2	2-1/2	1-1/4	.146	HR20-016	-
18	20°	1-7/8	1-7/8	3/4	.130	HR20-018S	-
18	20°	2-1/2	2	1-1/4	.130	HR20-018	-
20	20°	1-7/8	1-7/8	3/4	.117	HR20-020S	-
20	20°	2-1/2	2	1-1/4	.117	HR20-020	-
24	20°	1-7/8	1-7/8	3/4	.097	HR20-024S	-
24	20°	2-1/2	2	1-1/4	.097	HR20-024	-
32	20°	1-7/8	1-7/8	3/4	.073	HR20-032S	-



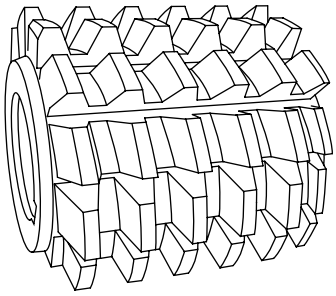


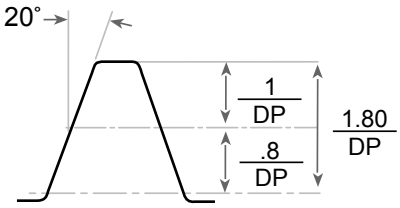
HG20 & CHG20 Series

DP 20° PA STUB

Full Fillet AGMA Stub
Right Hand & Left Hand
Single Thread
Finishing Non-Topping

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
1	20°	10-3/4	15	2-1/2	1.800	HG20-100	-
1	20°	10	12-1/2	2	1.800	CHG20-100	-
1-1/4	20°	8-3/4	12	2	1.440	HG20-125	-
1-1/4	20°	7-1/2	10	1-1/2	1.440	CHG20-125	-
1-1/2	20°	8	10	2	1.200	HG20-150	-
1-1/2	20°	7	8	1-1/2	1.200	CHG20-150	-
1-3/4	20°	7	9	2	1.029	HG20-175	-
1-3/4	20°	6-1/2	8	1-1/2	1.029	CHG20-175	-
2	20°	5-3/4	8	1-1/2	.900	HG20-200	HGL20-200
2	20°	5	6	1-1/4	.900	CHG20-200	-
2-1/4	20°	5-1/2	7	1-1/2	.800	HG20-225	-
2-1/2	20°	5	7	1-1/2	.720	HG20-250	-
2-1/2	20°	4-1/2	5	1-1/4	.720	CHG20-250	-
2-3/4	20°	5	7	1-1/2	.655	HG20-275	-
3	20°	4-1/2	5	1-1/4	.600	HG20-300	HGL20-300
3	20°	4	4	1-1/4	.600	CHG20-300	-
3-1/2	20°	4-1/4	4-3/4	1-1/4	.514	HG20-350	HGL20-350
4	20°	4	4	1-1/4	.450	HG20-400	HGL20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.400	HG20-450	-
5	20°	3-1/2	3-1/2	1-1/4	.360	HG20-500	HGL20-500
6	20°	3-1/2	3-1/2	1-1/4	.300	HG20-600	HGL20-600
7	20°	3-1/4	3-1/4	1-1/4	.257	HG20-700	HGL20-700
8	20°	3	3	1-1/4	.225	HG20-800	-
9	20°	3	3	1-1/4	.200	HG20-900	-
10	20°	3	3	1-1/4	.180	HG20-010	-
12	20°	1-7/8	1-7/8	3/4	.150	HG20-012S	-
12	20°	2-3/4	2-3/4	1-1/4	.150	HG20-012	-
14	20°	1-7/8	1-7/8	3/4	.129	HG20-014S	-
16	20°	1-7/8	1-7/8	3/4	.113	HG20-016S	-
16	20°	2-1/2	2-1/2	1-1/4	.113	HG20-016	-
28	20°	2-1/2	2 1/2	1-1/4	.064	HG20-028	-



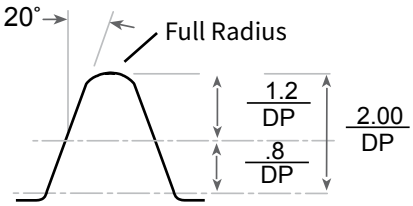


HGR20 & CHGR20 Series

DP 20° PA

Full Fillet AGMA Stub
Right Hand, Single Thread
Finishing Non-Topping

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C
1-1/4	20°	8-3/4	12	2	1.600	HGR20-125
1-1/4	20°	8	10-3/4	1-1/2	1.600	CHGR20-125
1-1/2	20°	8	9	2	1.333	HGR20-150
2	20°	5-3/4	7	1-1/2	1.000	HGR20-200
2-1/4	20°	5-3/4	7	1 1/2	.889	HGR20-225
2-1/2	20°	5	6	1-1/2	.800	HGR20-250
3	20°	4-1/2	5	1-1/4	.667	HGR20-300
4	20°	4	4	1-1/4	.500	HGR20-400
5	20°	3-1/4	3-1/4	1-1/4	.400	HGR20-500
6	20°	3	3	1-1/4	.333	HGR20-600
8	20°	3	3	1-1/4	.250	HGR20-800
10	20°	2-3/4	2-3/4	1-1/4	.200	HGR20-010
12	20°	2-1/2	2-1/2	1-1/4	.167	HGR20-012
16	20°	2-1/2	2	1-1/4	.125	HGR20-016



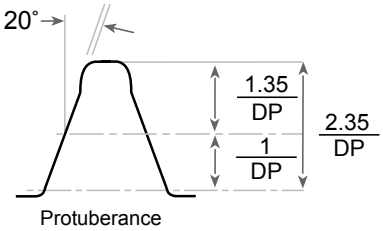
For left hand inquire on HGRL20 Series.
For cut down size inquire on CHGR20 Series.

HP20, HPN20, HPL20 & HPNL20 Series

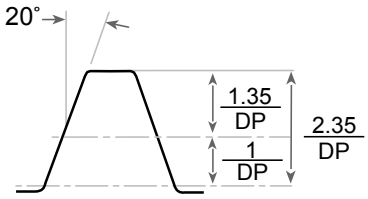
DP 20° PA GEAR HOBS

Pre-Shave
Right Hand & Left Hand
Single Thread
Non-Topping

DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
2	20°	6	8	1-1/2	1.175	.006	.005	HP20-200	-
2-1/2	20°	5	6	1-1/2	.940	.005	.004	HP20-250	HPL20-250
3	20°	4-1/2	5	1-1/4	.783	.004	.003	HP20-300	HPL20-300
3	20°	4-1/2	5	1-1/4	.783	.004	No	HPN20-300	-
3-1/2	20°	4-1/4	4-3/4	1-1/4	0.000	.004	.003	HP20-350	HPL20-350
4	20°	4	4	1-1/4	.588	.004	.003	HP20-400	HPL20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.522	.004	.003	HP20-450	HPL20-450
5	20°	3-1/2	3-1/2	1-1/4	.470	.004	.003	HP20-500	HPL20-500
5	20°	3-1/2	3-1/2	1-1/4	.470	.004	No	HPN20-500	-
5-1/2	20°	3-1/2	3 1/2	1-1/4	.427	.003	.002	HP20-550	-
6	20°	3-1/2	3-1/2	1-1/4	.392	.003	.002	HP20-600	HPL20-600
6	20°	3-1/2	3-1/2	1-1/4	.392	.003	No	HPN20-600	HPLN20-600
7	20°	3	3	1-1/4	.336	.003	.002	HP20-700	HPL20-700
7	20°	3-1/4	3-1/4	1-1/4	.336	.003	No	HPN20-700	-
8	20°	3	3	1-1/4	.294	.003	.002	HP20-800	HPL20-800
8	20°	3	3	1-1/4	.294	.003	No	HPN20-800	HPNL20-800
9	20°	3	3	1-1/4	.261	.003	.002	HP20-900	HPL20-900
10	20°	1-7/8	1-7/8	3/4	.235	.003	.002	HP20-010S	HPL20-010S
10	20°	3	3	1-1/4	.235	.003	.002	HP20-010	HPL20-010
10	20°	3	3	1-1/4	.240	.003	No	HPN20-010E	HPNL20-010E
11	20°	2-3/4	2-3/4	1-1/4	.214	.003	.002	HP20-011	HPL20-011
12	20°	1-7/8	1-7/8	3/4	.196	.003	.002	HP20-012S	HPL20-012S
12	20°	2	2	3/4	.200	.003	.002	HPN20-012SE	-
12	20°	2-3/4	2-3/4	1-1/4	.196	.003	.002	HP20-012	HPL20-012
14	20°	2-1/2	2-1/2	1-1/4	.168	.003	.002	HP20-014	HPL20-014
16	20°	1-7/8	1-7/8	3/4	.147	.003	.002	HP20-016S	HPL20-016S
16	20°	2-1/2	2-1/2	1-1/4	.147	.003	.002	HP20-016	HPL20-016
16	20°	2-1/2	2-1/2	1-1/4	.150	.003	No	HPN20-016E	-
18	20°	1-7/8	1-7/8	3/4	.131	.002	.002	HP20-018S	HPL20-018S
18	20°	2-1/2	2	1-1/4	.131	.002	.002	HP20-018	HPL20-018
20	20°	1-7/8	1-7/8	3/4	.122	.002	.001	HP20-020S	HPL20-020S
20	20°	1-7/8	1-7/8	3/4	.125	.002	No	HPN20-020SE	-
20	20°	2-1/2	2	1-1/4	.122	.002	.001	HP20-020	HPL20-020
22	20°	2-1/2	2	1-1/4	.111	.002	.001	HP20-022	HPL20-022
24	20°	1-7/8	1-7/8	3/4	.102	.002	.001	HP20-024S	HPL20-024S
24	20°	1-1/2	1-7/8	3/4	.108	.002	No	HPN20-024SE	-
24	20°	2-1/2	2	1-1/4	.102	.002	.001	HP20-024	HPL20-024
32	20°	1-7/8	1-7/8	3/4	.077	.001	No	HP20-032S	-



HP20 + HPL20



HPN20 + HPNL20

For 20 DP and finer, depth is 2.40/DP +.002

Pre-Shave cutters 18DP and coarser have protuberance, cutters 20 DP and finer do not have protuberance.

When designing for 20DP and finer, the pressure angle will be modified slightly to aid the shaving cutter, rather than incorporating a protuberance feature.

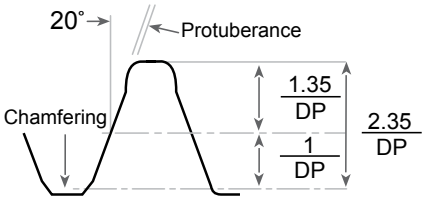
Protuberance is generally required for parts with 16 teeth or more, to produce an undercut for shaving.

DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx"	Specify Class A, B, C	
								Right Hand	Left Hand
3	20°	4-1/2	5	1-1/4	.783	.005	.003	HPCH20-300	-
5	20°	3-1/2	3-1/2	1-1/4	.470	.004	.003	HPCH20-500	-
6	20	3-1/2	3-1/2	1-1/4	.392	.004	.003	HPCH20-600	HPCHL20-600
8	20°	3	3	1-1/4	.294	.003	.002	HPCH20-800	HPCHL20-800
10	20°	3	3	1-1/4	.235	.003	.002	HPCH20-010	HPCHL20-010
12	20°	2-3/4	2-3/4	1-1/4	.196	.003	.002	HPCH20-012	HPCHL20-012
16	20°	2-1/2	2-1/2	1-1/4	.147	.003	.002	HPCH20-016	-
18	20°	2-1/2	2	1-1/4	.131	.002	.002	HPCH20-018	-

HPCH20 & HPCHL20 Series

DP 20° PA GEAR HOBS

Pre-Shave
Semi-Topping. Single Thread
Right Hand & Left Hand

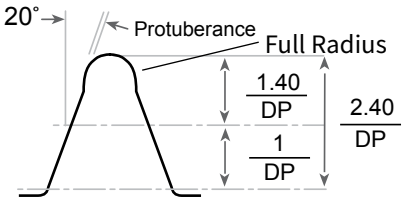


DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
4	20°	4	4	1-1/4	.600	.004	.003	HPR20-400	-
4-1/2	20°	3-1/2	3-1/2	1-1/4	.533	.004	.003	HPR20-450	
5	20°	3-1/2	3-1/2	1-1/4	.480	.004	.003	HPR20-500	HPRL20-500
6	20°	3-1/2	3-1/2	1-1/4	.400	.003	.002	HPR20-600	HPRL20-600
7	20°	3	3	1-1/4	.343	.003	.002	HPR20-700	HPRL20-700
8	20°	3	3	1-1/4	.300	.003	.002	HPR20-800	HPRL20-800
9	20°	3	3	1-1/4	.267	.003	.002	HPR20-900	-
10	20°	3	3	1-1/4	.240	.003	.002	HPR20-010	HPRL20-010
11	20°	2-3/4	2-3/4	1-1/4	.218	.003	.002	HPR20-011	-
12	20°	2-3/4	2-3/4	1-1/4	.200	.003	.002	HPR20-012	-
12	20°	2-3/4	2-3/4	1-1/4	.200	.003	No	HPRN20-012	-
12	20°	1-7/8	1-7/8	3/4	.200	.003	No	HPRN20-012S	-
14	20°	2-1/2	2-1/2	1-1/4	.171	.002	.002	HPR20-014	-
15	20°	2-1/2	2-1/2	1-1/4	.160	.002	.002	HPR20-015	
16	20°	2-1/2	2-1/2	1-1/4	.150	.002	.002	HPR20-016	HPRL20-016
18	20°	1-7/8	1-7/8	3/4	.132	.002	No	HPRN20-018S	-
20	20°	2-1/2	2-1/2	1-1/4	.124	.002	.002	HPR20-020	
20	20°	2-1/2	2-1/2	1-1/4	.124	.002	No	HPRN20-020	-
32	20°	2-1/2	2	1-1/4	.080	.001	No	HPRN20-032	-
32	20°	1-7/8	1-7/8	3/4	.080	.001	No	HPRN20-032S	-

HPR20 Series

DP 20° PA GEAR HOBS

Pre-Shave
Full Fillet
Non-Chamfering
Right Hand & Left Hand



DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Pre -Shave	Pre-Grind
4/5	20°	3-1/2	3-1/2	1-1/4	.470	.004	.003	HFP20-400	-
4/5	20°	3-1/2	3-1/2	1-1/4	.450	.013	.007	-	HFPG20-4000E
5/7	20°	3-1/4	3-1/4	1-1/4	.336	.004	.003	HFP20-500	-
5/7	20°	3-1/4	3-1/4	1-1/4	.336	.011	.006	-	HFPG20-500
6/8	20°	3	3	1-1/4	.294	.004	.002	HFP20-600	-
6/8	20°	3	3	1-1/4	.294	.011	.007	-	HFPG20-600
8/10	20°	3	3	1-1/4	.235	.003	.002	HFP20-800	-
8/10	20°	3	3	1-1/4	.235	.011	.006	-	HFPG20-800
10/12	20°	2-3/4	2-3/4	1-1/4	.196	.003	.002	HFP20-010	-

HFP20 & HFPG20 Series

DP 20° PA GEAR HOBS

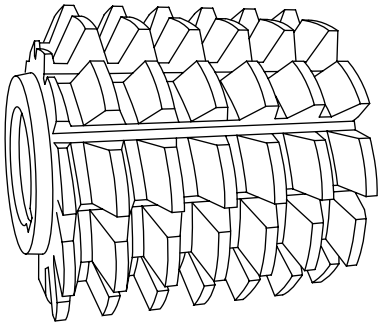
Combination Pitch Stub
Pre-Grind & Pre-Shave
Non-Topping, Right Hand
Single Thread

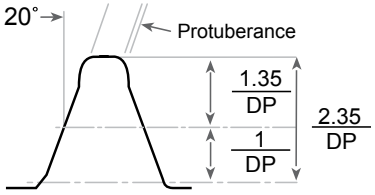
HPG20 & HPGL20 Series

DP 20° PA GEAR HOBS

Pre-Grind
Non Topping
Single Thread

DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
1	20°	11	15	2-1/2	2.350	.024	.015	HPG20-100	-
1-1/4	20°	9	12	2	1.880	.022	.014	HPG20-125	-
1-1/2	20°	8	10	2	1.567	.018	.012	HPG20-150	-
1-3/4	20°	7-1/4	8-1/2	2	1.343	.018	.012	HPG20-175	-
2	20°	6	8	1-1/2	1.175	.017	.010	HPG20-200	-
2-1/4	20°	5 1/2	7-1/2	1-1/2	1.044	.016	.010	HPG20-225	-
2-1/2	20°	5	6	1-1/2	.940	.014	.010	HPG20-250	HPGL20-250
2-3/4	20°	5	6	1-1/2	.855	.015	.009	HPG20-275	-
3	20°	4-1/2	5	1-1/4	.783	.013	.007	HPG20-300	HPGL20-300
3-1/2	20°	4-1/4	4-3/4	1-1/4	.671	.013	.007	HPG20-350	HPGL20-350
4	20°	4	4	1-1/4	.588	.013	.007	HPG20-400	HPGL20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.522	.012	.006	HPG20-450	-
5	20°	3-1/2	3-1/2	1-1/4	.470	.011	.006	HPG20-500	HPGL20-500
6	20°	3-1/2	3-1/2	1-1/4	.392	.011	.006	HPG20-600	HPGL20-600
6-1/2	20°	3	3	1-1/4	.362	.011	.006	HPG20-650	-
7	20°	3	3	1-1/4	.336	.011	.006	HPG20-700	HPGL20-700
8	20°	3	3	1-1/4	.294	.011	.006	HPG20-800	HPGL20-800
9	20°	3	3	1-1/4	.261	.011	.006	HPG20-900	HPGL20-900
10	20°	1-7/8	1-7/8	3/4	.235	.010	.006	HPG20-010S	-
10	20°	3	3	1-1/4	.235	.010	.006	HPG20-010	HPGL20-010
11	20°	2-3/4	2-3/4	1-1/4	.214	.010	.005	HPG20-011	-
12	20°	1-7/8	1-7/8	3/4	.196	.010	.005	HPG20-012S	-
12	20°	2-3/4	2-3/4	1-1/4	.196	.010	.005	HPG20-012	HPGL20-012
14	20°	1-7/8	1-7/8	3/4	.168	.009	.005	HPG20-014S	-
14	20°	2-1/2	2-1/2	1-1/4	.168	.009	.005	HPG20-014	HPGL20-014
16	20°	1-7/8	1-7/8	3/4	.147	.008	.005	HPG20-016S	HPGL20-016S
16	20°	2-1/2	2-1/2	1-1/4	.147	.008	.005	HPG20-016	HPGL20-016
18	20°	1-7/8	1-7/8	3/4	.131	.008	.004	HPG20-018S	-
18	20°	2-1/2	2	1-1/4	.131	.008	.004	HPG20-018	-
20	20°	1-7/8	1-7/8	3/4	.122	.007	.004	HPG20-020S	-
20	20°	2-1/2	2	1-1/4	.122	.007	.004	HPG20-020	-
24	20°	1-7/8	1-7/8	3/4	.102	.005	.003	HPG20-024S	HPGL20-024S
24	20°	2-1/2	2	1-1/4	.102	.005	.003	HPG20-024	-



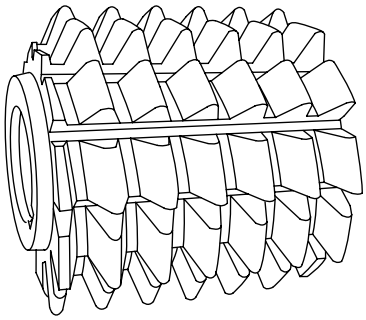


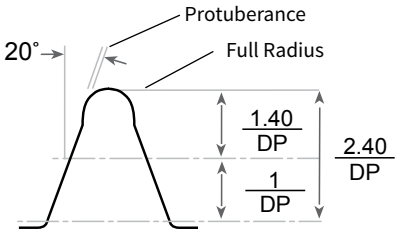
HPGR20, HPGRL20 HPGN20 & HPGNL20 Series

DP 20° PA GEAR HOBS

Pre-Grind
Non-Topping
Single Thread

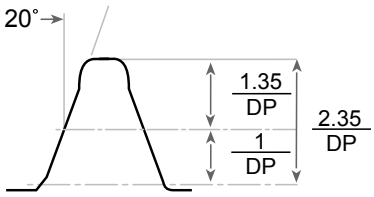
DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
1	20°	11-1/4	15	2-1/2	2.400	.024	.015	HPGR20-100	-
1-1/4	20°	9-1/4	12	2	1.920	.022	.014	HPGR20-125	-
1-1/2	20°	8-1/2	10	2	1.600	.018	.011	HPGR20-150	-
1-3/4	20°	7-1/2	8-1/2	2	1.371	.018	.011	HPGR20-175	-
2	20°	6-1/4	8	1-1/2	1.200	.017	.010	HPGR20-200	-
2-1/4	20°	5-1/2	7-1/2	1-1/2	1.067	.016	.010	HPGR20-225	-
2-1/2	20°	5-1/4	6	1-1/2	.960	.014	.010	HPGR20-250	-
3	20°	4-1/2	5	1-1/4	.800	.013	.009	HPGR20-300	-
3	20°	4-1/2	5	1-1/4	.800	.013	None	HPGN20-300	HPGNL20-300
3-1/2	20°	4-1/4	4-3/4	1-1/4	.686	.013	.009	HPGR20-350	HPGRL20-350
4	20°	4	4	1-1/4	.600	.013	.008	HPGR20-400	HPGRL20-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.533	.013	.008	HPGR20-450	-
5	20°	3-1/2	3-1/2	1-1/4	.480	.011	.006	HPGR20-500	HPGRL20-500
5	20°	3-1/2	3-1/2	1-1/4	.480	.011	None	HPGN20-500	HPGNL20-500
6	20°	3-1/2	3-1/2	1-1/4	.400	.011	.006	HPGR20-600	HPGRL20-600
6	20°	3-1/2	3-1/2	1-1/4	.400	.011	None	HPGN20-600	-
7	20°	3	3	1-1/4	.343	.011	.006	HPGR20-700	HPGRL20-700
7	20°	3	3	1-1/4	.343	.011	None	HPGN20-700	-
8	20°	3	3	1-1/4	.300	.011	.006	HPGR20-800	-
8	20°	3	3	1-1/4	.300	.011	None	HPGN20-800	-
9	20°	3	3	1-1/4	.267	.011	.006	HPGR20-900	-
10	20°	3	3	1-1/4	.240	.010	.006	HPGR20-010	-
10	20°	3	3	1-1/4	.240	.010	None	HPGN20-010	-
12	20°	2	2	3/4	.200	.010	.005	HPGR20-012S	-
12	20°	2-3/4	2-3/4	1-1/4	.200	.010	.005	HPGR20-012	-
12	20°	2-3/4	2-3/4	1-1/4	.200	.010	None	HPGN20-012	-
14	20°	2-1/2	2-1/2	1-1/4	.171	.010	.006	HPGR20-014	-
14	20°	1-7/8	1-7/8	3/4	.171	.010	None	HPGN20-014S	-
16	20°	2-1/2	2-1/2	1-1/4	.150	.006	.004	HPGR20-016	-
16	20°	2-1/2	2-1/2	1-1/4	.150	.006	None	HPGN20-016	-
20	20°	2-1/2	2	1-1/4	.122	.007	.004	HPGR20-020	-
20	20°	2-1/2	2	1-1/4	.122	.007	None	HPGN20-020	-
24	20°	2-1/2	2	1-1/4	.102	.005	.003	HPGR20-024	-
24	20°	1-7/8	1-7/8	3/4	.102	.005	None	HPGN20-024S	-
28	20°	1-7/8	1-7/8	3/4	.088	.005	.003	HPGR20-028S	-
28	20°	1-7/8	1-7/8	3/4	.088	.005	None	HPGN20-028S	-
30	20°	1-7/8	1-7/8	3/4	.082	.005	None	HPGN20-030S	-
32	20°	1-7/8	1-1/2	3/4	.077	.005	None	HPGN20-032S	-
48	20°	1-7/8	1-1/2	3/4	.052	.005	.002	HPGR20-048S	-
48	20°	1-7/8	1-1/2	3/4	.052	.005	None	HPGN20-048S	-





Protuberance and Radius
20DP and finer WD =2.4/DP + .002

HPGR20 + HPGRL20
Rack Profile



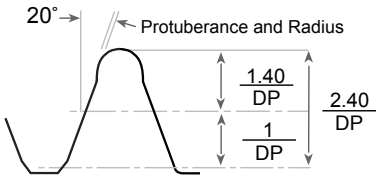
HPGN20 + HPGNL20
Rack Profile

DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
1	20°	11-1/4	15	2-1/2	2.400	.024	.015	HPGRCH20-100	-
3	20°	4-1/2	5	1-1/4	.800	.013	.009	HPGRCH20-300	-
4	20°	4	4	1-1/4	.600	.013	.008	HPGRCH20-400	-
5	20°	3-1/2	3-1/2	1-1/4	.480	.011	.006	HPGRCH20-500	-
6	20°	3-1/2	3-1/2	1-1/4	.400	.011	.006	HPGRCH20-600	-
8	20°	3	3	1-1/4	.300	.011	.006	HPGRCH20-800	HPGRCHL20-800
10	20°	3	3	1-1/4	.240	.010	.006	HPGRCH20-010	HPGRCHL20-010
12	20°	2-3/4	2-3/4	1-1/4	.200	.010	.005	HPGRCH20-012	-
14	20°	2-1/2	2-1/2	1-1/4	.171	.010	.006	HPGRCH20-014	-
16	20°	2-1/2	2-1/2	1-1/4	.150	.006	.004	HPGRCH20-016	-

HPGRCH & HPGRCHL Series

DP 20° PA GEAR HOBS

Combination Pitch Stub
Pre-Grind with Protuberance
Semi-Topping
Single Thread



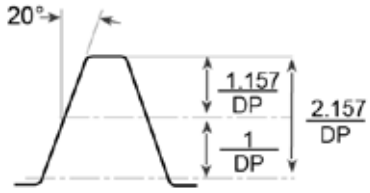
For 20DP and finer,
WD = 2.40/DP+.002

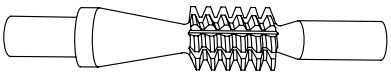
Normal Pitch	PA	OD	WD	Specify Class A, B, C
8	20	7-7/8	.270	HSK20-08
10	20	1-5/8	.216	HSK20-10
12	20	1-1/4	.180	HSK20-12
14	20	1	.154	HSK20-14
16	20	1	.135	HSK20-16
20	14.5	1	.112	HSK14-20
20	20	7/8	.112	HSK20-20
24	20	7/8	.094	HSK20-24
32	20	7/8	.071	HSK20-32
48	20	3/4	.048	HSK20-48
64	20	5/8	.036	HSK20-64
120	20	1/2	.020	HSK20-120

HSK20 & HSK14 Series

DP 20° & 14°PA GEAR HOBS

Single Thread
Finishing, Non-Topping
Shank Type
5/8" Straight Shanks





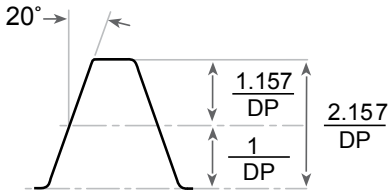
For 16 DP and coarser, depth is 2.157/DP
For 20DP and finer, depth is 2.2/DP = .002
5/8" diam. Drive end

DP	PA	OD	Length	Bore	# Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
4	20°	4	4	1-1/4	1	.539	HT20-400	-
5	20°	3-1/2	3-1/2	1-1/4	1	.431	HT20-500	-
6	20°	3-1/2	3-1/2	1-1/4	1	.360	HT20-600	-
7	20°	3-1/4	3-1/4	1-1/4	1	.308	HT20-700	-
8	20°	3	3	1-1/4	1	.270	HT20-800	-
10	20°	3	3	1-1/4	1	.216	HT20-010	-
10	20°	1-7/8	1-7/8	3/4	1	.225	HFT20-010	-
12	20°	2-3/4	2-3/4	1-1/4	1	.180	HT20-012	-
12	20°	2	2	3/4	1	.188	HFT20-012	-
14	20°	2-1/2	2-1/2	1-1/4	1	.154	HT20-014	-
14	20°	1-7/8	1-7/8	3/4	1	.161	HFT20-014	-

HT20 & HFT20 Series

DP 20° PA GEAR HOBS

Topping & Finishing
Right & Left Hand



For 20DP and finer, depth is 2.20/DP + +.002
For 1/2" bore topping see HTH20 Series

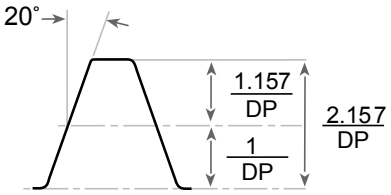
SERIES CONTINUED ON NEXT PAGE ->

HT20 & HFT20 Series

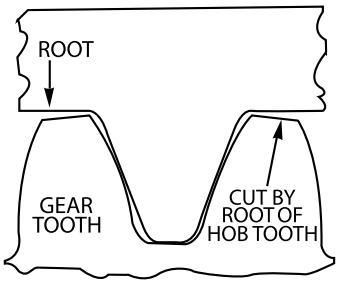
DP 20° PA GEAR HOBS

Topping & Finishing
Right & Left Hand

DP	PA	OD	Length	Bore	# Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
15	20°	2-1/2	2-1/2	1-1/4	1	.144	HT20-015	-
16	20°	2-1/2	2-1/2	1 1/4	1	.135	HT20-016	-
16	20°	1-7/8	1-7/8	3/4	1	.141	HFT20-016	HFTL20-016
18	20°	2-1/2	2	1 1/4	1	.120	HT20-018	-
18	20°	1-7/8	1-7/8	3/4	1	.125	HFT20-018	-
20	20°	2-1/2	2	1 1/4	1	.112	HT20-020	-
20	20°	1-7/8	1-7/8	3/4	1	.113	HFT20-020	HFTL20-020
20	20°	1-7/8	1-7/8	#1 Taper	1	.112	HFT1-20-020	-
22	20°	1-7/8	1-7/8	3/4	1	.102	HFT20-022	-
24	20°	2-1/2	2	1 1/4	1	.094	HT20-024	-
24	20°	1-7/8	1-7/8	3/4	1	.094	HFT20-024	-
24	20°	1-7/8	1-7/8	# 1 Taper	1	.094	HFT1-20-024	-
26	20°	2-1/2	2	1 1/4	1	.866	HT20-026	-
26	20°	1-7/8	1-7/8	3/4	1	.087	HFT20-026	-
26	20°	1-7/8	1-7/8	3/4	3	.087	HFT20-026-3	-
28	20°	1-7/8	1-7/8	3/4	1	.080	HFT20-028	-
28	20°	1-7/8	1-1/2	#1 Taper	1	.081	HFT1-20-028	-
30	20°	1-7/8	1-1/2	3/4	1	.075	HFT20-030	-
30	20°	1-7/8	1-1/2	#1 Taper	1	.075	HFT1-20-030	-
32	20°	2-1/2	2	1 1/4	1	.071	HT20-032	-
32	20°	1-7/8	1-7/8	3/4	1	.070	HFT20-032	-
32	20°	1-7/8	1-7/8	#1 Taper	1	.071	HFT1-20-032	-
34	20°	1-7/8	1-7/8	3/4	1	.066	HFT20-034	-
36	20°	1-7/8	1-7/8	3/4	1	.063	HFT20-036	-
36	20°	1-3/4	1-3/4	3/4	1	.063	-	HFTL20-036
36	20°	1-7/8	1-1/2	#1 Taper	1	.063	HFT1-20-036	-
38	20°	1-7/8	1-7/8	3/4	1	.059	HFT20-038	-
40	20°	1-7/8	1-7/8	3/4	1	.056	HFT20-040	-
40	20°	1-7/8	1-1/2	3/4	2	.056	HFT20-040-2	-
42	20°	1-7/8	1-7/8	3/4	1	.054	HFT20-042	-
42	20°	1-7/8	1-1/2	#1 Taper	1	.054	HFT1-20-042	-
44	20°	1-7/8	1-7/8	3/4	1	.052	HFT20-044	-
46	20°	1-7/8	1-7/8	3/4	1	.050	HFT20-046	-
48	20°	1-7/8	1-1/2	3/4	1	.048	HFT20-048	-
48	20°	1-7/8	1-7/8	3/4	2	.048	HFT20-048W-2	-
48	20°	1-7/8	1-1/2	#1 Taper	1	.048	HFT1-20-048	-
50	20°	1-7/8	1-1/2	3/4	1	.046	HFT20-050	-
50	20°	1-7/8	1-1/2	#1 Taper	1	.046	HFT1-20-050	-
52	20°	1-7/8	1-1/2	3/4	1	.044	HFT20-052	-
52	20°	1-7/8	1-7/8	3/4	1	.044	HFT20-052W	-
52	20°	1-7/8	1-1/2	#1 Taper	1	.044	HFT1-20-052	-
56	20°	1-7/8	1-7/8	3/4	1	.041	HFT20-056	-
56	20°	1-7/8	1-1/2	#1 Taper	1	.041	HFT1-20-056	-
60	20°	1-7/8	1-1/2	3/4	1	.039	HFT20-060	-
64	20°	1-5/8	1-1/2	3/4	1	.036	HFT20-064	-
64	20°	1-7/8	1-5/8	3/4	1	.036	HFT20-064E	-
64	20°	1-5/8	1-1/2	3/4	3	.036	HFT20-064-3	-
64	20°	1-7/8	1-1/2	#1 Taper	1	.036	HFT1-20-064	-
72	20°	1-7/8	1-1/2	3/4	1	.033	HFT20-072	-
72	20°	1-5/8	1-1/2	#1 Taper	1	.033	HFT1-20-072	-
85	20°	1-5/8	1-1/2	#1 Taper	1	.028	HFT1-20-085	-
96	20°	1-5/8	1-1/2	3/4	1	.025	HFT20-096	-
96	20°	1-1/2	1	#1 Taper	1	.025	HFT1-20-096	-
120	20°	1-1/2	3/4	3/4	1	.020	HFT20-120	-
120	20°	1-1/2	1	#1 Taper	1	.020	HFT1-20-120	-



For 20DP and finer, depth is 2.20/DP + +.002
For 1/2" bore topping see HTH20 Series



TOPPING: Hobs with Topping cut the outside diameter of the gear blank at the same time the gear tooth is generated.

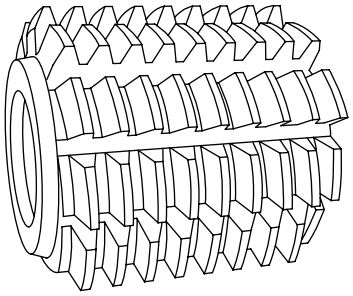
HFS20, HFSL20 HFS1-20 & HD20 Series

DP 20° PA GEAR HOBS

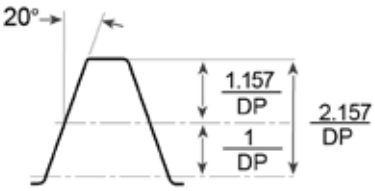
3/4" Bore & #1 Taper Bore
Finishing
Non Topping

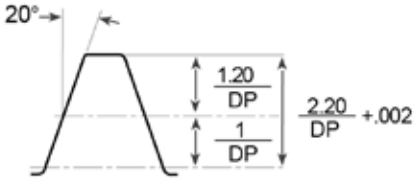
DP	PA	OD	Length	Bore	WD	Leads	Specify Class AA. A. B. C	
							Right Hand	Left Hand
8	20°	2	2	3/4	.270	1	HFS20-800	HFSL20-800
8	20°	1-7/8	1-7/8	3/4	.281	1	HD20-800S	-
10	20°	1-7/8	1-7/8	3/4	.216	1	HFS20-010	HFSL20-010
10	20°	1-7/8	1-7/8	3/4	.225	1	HD20-010S	-
11	20°	1-7/8	1-7/8	3/4	.196	1	HFS20-011	-
12	20°	1-7/8	1-7/8	3/4	.180	1	HFS20-012	HFSL20-012
12	20°	2	2	3/4	.188	1	HD20-012S	-
13	20°	1-7/8	1-7/8	3/4	.166	1	HFS20-013	-
14	20°	1-7/8	1-7/8	3/4	.161	1	HFS20-014	HFSL20-014
14	20°	1-7/8	1-7/8	3/4	.161	1	HD20-014S	-
15	20°	1-7/8	1-7/8	3/4	.144	1	HFS20-015	-
16	20°	1-7/8	1-7/8	3/4	.141	1	HFS20-016	-
16	20°	1-7/8	1-7/8	3/4	.135	1	-	HFSL20-016
16	20°	1-7/8	1-7/8	3/4	.141	1	HD20-016S	-
17	20°	1-7/8	1-7/8	3/4	.127	1	HFS20-017	-
18	20°	1-7/8	1-7/8	3/4	.120	1	HFS20-018	HFSL20-018
20	20°	1-7/8	1-7/8	3/4	.112	1	HFS20-020	HFSL20-020
20	20°	1-7/8	1-7/8	3/4	.112	1	HD20-020S	-
22	20°	1-7/8	1-7/8	3/4	.102	1	HFS20-022	-
23	20°	1-7/8	1-7/8	3/4	.098	1	HFS20-023	-
24	20°	1-7/8	1-7/8	3/4	.094	1	HFS20-024	-
24	20°	1-7/8	1-7/8	3/4	.094	2	HFS20-024-2	-
24	20°	1-7/8	1-7/8	3/4	.094	3	HFS20-024-3	-
26	20°	1-7/8	1-7/8	3/4	.087	1	HFS20-026	-
28	20°	1-7/8	1-7/8	3/4	.081	1	HFS20-028	-
30	20°	1-7/8	1-7/8	3/4	.075	1	HFS20-030	-
32	20°	1-7/8	1-7/8	3/4	.071	1	HFS20-032	HFSL20-032
32	20°	1-7/8	1-7/8	3/4	.071	2	HFS20-032-2	-
32	20°	1-7/8	1-7/8	3/4	.071	3	HFS20-032-3	-
32	20°	1-7/8	1-1/2	#1 Taper	.071	1	HFS1-20-032	-
33	20°	1-7/8	1-7/8	3/4	.069	1	HFS20-033	-
34	20°	1-7/8	1-7/8	3/4	.067	1	HFS20-034	-
34	20°	1-7/8	1-1/2	#1 Taper	.067	1	HFS1-20-034	-
36	20°	1-7/8	1-1/2	#1 Taper	.063	1	HFS1-20-036	-
38	20°	1-7/8	1-7/8	3/4	.060	1	HFS20-038	-
40	20°	1-7/8	1-7/8	3/4	.057	1	HFS20-040	HFSL20-040
40	20°	1-7/8	1-1/2	#1 Taper	.057	1	HFS1-20-040	-
42	20°	1-7/8	1-7/8	3/4	.054	1	HFS20-042	-
42	20°	1-7/8	1-1/2	#1 Taper	.054	1	HFS1-20-042	-
44	20°	1-7/8	1-1/2	3/4	.052	1	HFS20-044	-

SERIES CONTINUED ON NEXT PAGE ->



20DP and Finer depth is 2.20/DP+.002
18DP and coarser, depth is 2.157/DP
For HD20 depth is 2.25/DP

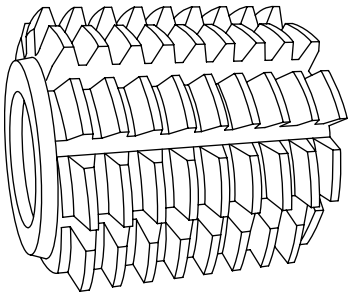




HFS20, HFSL20, HFS1-20 & HD20 Series

DP 20° PA GEAR HOBS

3/4" Bore & #1 Taper Bore
Finishing
Non Topping

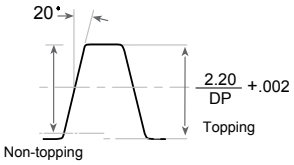


DP	PA	OD	Length	Bore	WD	Leads	Specify Class AA, A, B, C	
							Right Hand	Left Hand
46	20°	1-7/8	1-1/2	3/4	.050	1	HFS20-046	-
48	20°	1-7/8	1-1/2	3/4	.048	1	HFS20-048	HFSL20-048
48	20°	1-7/8	1-7/8	3/4	.048	2	HFS20-048-2	-
48	20°	1-7/8	1-7/8	3/4	.048	3	HFS20-048-3	-
48	20°	1-7/8	1-1/2	#1 Taper	.048	1	HFS1-20-048	-
50	20°	1-7/8	1-1/2	3/4	.046	1	HFS20-050	-
50	20°	1-7/8	1-1/2	#1 Taper	.046	1	HFS1-20-050	-
52	20°	1-7/8	1-1/2	3/4	.044	1	HFS20-052	-
52	20°	1-7/8	1-1/2	#1 Taper	.044	1	HFS1-20-052	-
54	20°	1-7/8	1-1/2	3/4	.043	1	HFS20-054	-
56	20°	1-7/8	1-1/2	3/4	.041	1	HFS20-056	-
57	20°	1-7/8	1-1/2	3/4	.039	1	HFS20-057	-
60	20°	1-7/8	1-1/2	3/4	.039	1	HFS20-060	-
60	20°	1-7/8	1-1/2	#1 Taper	.039	1	HFS1-20-060	-
64	20°	1-5/8	1-1/2	3/4	.036	1	HFS20-064	-
64	20°	1-7/8	1-7/8	3/4	.036	3	HFS20-064-3	-
66	20°	1-7/8	1-1/2	3/4	.035	1	HFS20-066	-
66	20°	1-5/8	1-1/2	#1 Taper	.035	1	HFS1-20-066	-
72	20°	1-7/8	1-1/2	3/4	.033	1	HFS20-072	-
72	20°	1-5/8	1-1/2	3/4	.033	2	HFS20-072-2	-
72	20°	1-5/8	1-1/2	3/4	.033	3	HFS20-072-3	-
72	20°	1-5/8	1-1/2	#1 Taper	.033	1	HFS1-20-072	-
80	20°	1-5/8	1-1/2	3/4	.030	1	HFS20-080	-
80	20°	1-5/8	1-1/2	#1 Taper	.030	1	HFS1-20-080	-
82	20°	1-5/8	1-1/2	3/4	.029	1	HFS20-082	-
84	20°	1-5/8	1-1/2	3/4	.028	1	HFS20-084	-
96	20°	1-5/8	1-1/2	3/4	.025	1	HFS20-096	-
96	20°	1-1/2	1	#1 Taper	.025	1	HFS1-20-096	-
100	20°	1-1/2	1	3/4	.024	1	HFS20-100	-
100	20°	1-1/2	1	#1 Taper	.024	1	HFS1-20-100	-
120	20°	1-1/2	3/4	3/4	.020	1	HFS20-120	-
120	20°	1-1/2	1	#1 Taper	.020	1	HFS1-20-120	-
126	20°	1-1/2	3/4	3/4	.019	1	HFS20-126	-
127	20°	1-1/2	3/4	3/4	.019	1	HFS20-127	-
132	20°	1-1/2	3/4	3/4	.019	1	HFS20-132	-
132	20°	1-1/2	1	#1 Taper	.019	1	HFS1-20-132	-
160	20°	1-1/2	3/4	3/4	.016	1	HFS20-160	-
175	20°	1-1/2	3/4	3/4	.015	1	HFS20-175	-
175	20°	1-1/2	3/4	#1 Taper	.015	1	HFS1-20-175	-
180	20°	1-1/2	3/4	3/4	.014	1	HFS20-180	-

HFH20 & HTH20 Series

DP 20° PA GEAR HOBS

1/2" Bore
Finishing
Non Topping & Topping
Right Hand, Single Thread

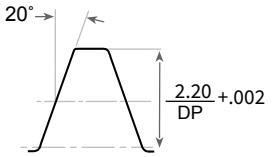


DP	PA	OD	Length	Bore	WD	Specify Class AA, A, B, C	
						Non Topping	Topping
16	20°	1-1/4	1-1/4	1/2	.135	HFH20-016	HTH20-016
18	20°	1-1/4	1-1/4	1/2	.125	HFH20-018	-
20	20°	1-1/4	1-1/4	1/2	.112	HFH20-020	HTH20-020
22	20°	1-1/8	1-1/8	1/2	.102	HFH20-022	HTH20-022
24	20°	1-1/4	1-1/4	1/2	.094	HFH20-024	HTH20-024
26	20°	1-1/4	1-1/4	1/2	.087	HFH20-026	HTH20-026
28	20°	1-1/8	1-1/8	1/2	.081	HFH20-028	HTH20-028
30	20°	1-1/8	1-1/8	1/2	.075	HFH20-030	HTH20-030
32	20°	1-1/8	1-1/8	1/2	.071	HFH20-032	HTH20-032
34	20°	1-1/8	1-1/8	1/2	.067	HFH20-034	HTH20-034
36	20°	1-1/8	1-1/8	1/2	.063	HFH20-036	HTH20-036
38	20°	1-1/8	1-1/8	1/2	.060	-	HTH20-038
40	20°	1-1/8	1-1/8	1/2	.057	HFH20-040	HTH20-040
41	20°	1-1/8	1-1/8	1/2	.056	HFH20-041	-
42	20°	1-1/8	1-1/8	1/2	.054	HFH20-042	HTH20-042
44	20°	1-1/8	1-1/8	1/2	.052	HFH20-044	HTH20-044
46	20°	1-1/8	1-1/8	1/2	.050	HFH20-046	HTH20-046
48	20°	1-1/8	1-1/8	1/2	.048	HFH20-048	HTH20-048
50	20°	1-1/8	1-1/8	1/2	.046	HFH20-050	HTH20-050
54	20°	1-1/8	1-1/8	1/2	.043	HFH20-054	HTH20-054
56	20°	1-1/8	1-1/8	1/2	.041	HFH20-056	HTH20-056
57	20°	1-1/8	1-1/8	1/2	.041	HFH20-057	-
58	20°	1-1/8	1-1/8	1/2	.040	HFH20-058	HTH20-058
64	20°	1-1/8	1-1/8	1/2	.036	HFH20-064	HTH20-064
72	20°	1-1/8	1-1/8	1/2	.033	HFH20-072	HTH20-072
77	20°	1-1/8	1-1/8	1/2	.031	HFH20-077	-
80	20°	1-1/8	1-1/8	1/2	.030	HFH20-080	HTH20-080
84	20°	1-1/8	1-1/8	1/2	.028	HFH20-084	-
88	20°	1-1/8	1-1/8	1/2	.027	HFH20-088	-
92	20°	1-1/8	1-1/8	1/2	.026	HFH20-092	-
96	20°	1-1/8	1-1/8	1/2	.025	HFH20-096	HTH20-096
100	20°	1-1-8	1-1/8	1/2	.024	HFH20-100	HTH20-100
120	20°	1-1/8	1-1/8	1/2	.020	HFH20-120	HTH20-120
127	20°	1-1/8	1-1/8	1/2	.019	HFH20-127	-
160	20°	1-1/8	1-1/8	1/2	.016	HFH20-160	HTH20-160
180	20°	1-1/8	1-7/8	1/2	.014	HFH20-180	-

HM820 & HMT820 Series

DP 20° PA GEAR HOBS

8MM Bore, Finishing
Non Topping & Topping
Right Hand



DP	OD	Length	Bore (mm)	WD	Specify Class AAA, AA, A, B, C	
					Non Topping	Topping
20	1.000	.750	8	.112	HM820-20-10	HMT820-20-10
22	1.000	.750	8	.102	HM820-22-10	-
24	1.000	.750	8	.094	HM820-24-10	HMT820-24-10
24	.750	.750	8	.094	HM820-24-75	HMT820-24-75
26	1.000	.750	8	.087	-	HMT820-26-10
26	.750	.750	8	.087	HM820-26-75	-
28	1.000	.750	8	.081	HM820-28-10	HMT820-28-10
28	0.750	.750	8	.081	HM820-28-75	HMT820-28-75
28	0.690	.750	8	.081	-	HMT820-28-69
30	1.000	.750	8	.075	HM820-30-10	HMT820-30-10
30	.750	.750	8	.075	HM820-30-75	HMT820-30-75
32	1.000	.750	8	.071	HM820-32-10	HMT820-32-10
32	.625	.688	8	.071	HM820-32-62	HMT820-32-62
32	.750	.750	8	.071	HM820-32-75	HMT820-32-75
34	1.000	.625	8	.067	HM820-34-10	HMT820-34-10
34	.620	.470	8	.067	-	HMT820-34-62
34	.750	.750	8	.067	-	HMT820-34-75
34	.930	.625	8	.067	HM820-34-93	HMT820-34-93
36	1.000	.750	8	.063	HM820-36-10	HMT820-36-10
36	.625	.470	8	.063	-	HMT8-20-36-62
36	.750	.750	8	.063	HM820-36-75	HMT820-36-75
36	.938	.500	8	.063	-	HMT820-36-93
38	.750	.750	8	.060	-	HMT820-38-75
40	1.000	.750	8	.057	HM820-40-10	HMT820-40-10
40	.750	.750	8	.057	HM820-40-75	HMT820-40-75
42	1.000	.750	8	.054	HM820-42-10	HMT820-42-10
42	.750	.750	8	.054	HM820-42-75	HMT820-42-75
46	1.000	.688	8	.050	HM820-46-10	HMT820-46-10
48	1.000	.688	8	.048	HM820-48-10	HMT820-48-10
48	.625	.688	8	.048	HM820-48-62	HMT820-48-62
48	.750	.500	8	.048	HM820-48-75	HMT820-48-75
50	1.000	.688	8	.046	HM820-50-10	HMT820-50-10
52	1.000	.688	8	.044	HM820-52-10	HMT820-52-10
52	.625	.670	8	.044	HM820-52-62	HMT820-52-62
54	.930	.590	8	.043	HM820-54-93	HMT820-54-93
56	1.000	.670	8	.041	-	HMT820-56-10
56	.750	.670	8	.041	HM820-56-75	HMT820-56-75
56	.875	.530	8	.041	-	HMT820-56-87
58	.930	.590	8	.040	HM820-58-93	-
60	1.000	.670	8	.039	-	HMT820-60-10
60	.625	.688	8	.039	HM820-60-62	HMT820-60-62

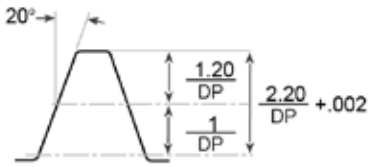
DP	OD	Length	Bore mm	WD	Specify Class AAA, AA, A, B, C	
					Non Topping	Topping
64	1.000	.670	8	.036	HM820-64-10	HMT820-64-10
64	.500	.670	8	.036	HM820-64-50	HMT820-64-50
64	.625	.670	8	.036	HM820-64-62	HMT820-64-62
64	.750	.670	8	.036	HM820-64-75	HMT820-64-75
66	1.000	.670	8	.035	-	HMT820-66-10
70	1.000	.670	8	.033	-	HMT820-70-10
72	1.000	.670	8	.033	HM820-72-10	HMT820-72-10
72	.500	.670	8	.033	HM820-72-50	-
72	.625	.670	8	.033	HM820-72-62	HMT820-72-62
72	.750	.670	8	.033	HM820-72-75	HMT820-72-75
78	1.000	.688	8	.030	HM820-78-10	HMT820-78-10
80	1.000	.670	8	.030	HM820-80-10	HMT820-80-10
80	.500	.670	8	.030	-	HMT820-80-50
80	.625	.670	8	.030	HM820-80-62	HMT820-80-62
80	.750	.500	8	.030	HM820-80-75	-
80	.938	.400	8	.030	HM820-80-93	HMT820-80-93
85	.930	.390	8	.028	HM820-85-93	HMT820-85-93
92	.625	.400	8	.026	HM820-92-62	-
96	1.000	.670	8	.025	HM820-96-10	HMT820-96-10
96	.500	.670	8	.025	HM820-96-50	HMT820-96-50
96	.625	.670	8	.025	HM820-96-62	HMT820-96-62
96	.750	.670	8	.025	HM820-96-75	HMT820-96-75
100	1.000	.600	8	.024	HM820-100-10	-
100	.625	.390	8	.024	-	HMT820-100-62
120	1.000	.670	8	.020	-	HMT820-120-10
120	.500	.670	8	.020	HM820-120-50	HMT820-120-50
120	.625	.670	8	.020	HM820-120-62	HMT820-120-62
120	.750	.500	8	.020	HM820-120-75	HMT820-120-75
120	.930	.390	8	.020	HM820-120-93	HMT820-120-93
126	.930	.390	8	.019	-	HMT820-126-93
127	1.000	.750	8	.019	HM820-127-10	-
127	.750	.670	8	.019	-	HMT820-127-75
132	.625	.625	8	.019	HM820-132-62	-
132	.750	.670	8	.019	-	HMT820-132-75
132	.930	.313	8	.019	HM820-132-93	-
150	.625	.625	8	.017	HM820-150-62	HMT820-150-62
150	.750	.670	8	.017	-	HMT820-150-75
157	.930	.313	8	.016	HM820-157-93	-
175	.625	.280	8	.015	HM820-175-62	HMT820-175-62
180	.625	.390	8	.014	HM820-180-62	HMT820-180-62
200	.930	.310	8	.013	HM820-200-93	HMT820-200-93

HM120 & HMT120 Series

DP 20° PA GEAR HOBS

10MM Bore
Finishing
Non Topping & Topping
Right Hand, Single Thread

DP	PA	OD	Length	Bore (mm)	WD	Specify Class AAA, AA, A, B	
						Non Topping	Topping
20	20°	1.250	1.125	10	.112	HM120-20-12	-
24	20°	1.250	1.000	10	.094	-	HMT120-24-12
28	20°	1.250	.787	10	.081	HM120-28-12	HMT120-28-12
32	20°	1.250	1.125	10	.071	HM120-32-12	HMT120-32-12
34	20°	1.250	1.000	10	.067	HM120-34-12	HMT120-4-12
36	20°	1.250	1.000	10	.063	HM120-36-12	HMT120-36-12
40	20°	1.250	1.000	10	.057	-	HMT120-40-12
46	20°	1.250	1.000	10	.050	-	HMT120-46-12
48	20°	1.250	.750	10	.048	HM120-48-12	HMT120-48-12
50	20°	1.250	1.000	10	.046	HM120-50-12	HMT120-50-12
54	20°	1.250	.790	10	.043	-	HMT120-54-12
56	20°	1.250	.790	10	.041	-	HMT120-56-12
60	20°	1.250	.790	10	.039	-	HMT120-60-12
64	20°	1.250	.750	10	.036	-	HMT120-64-12
72	20°	1.250	.750	10	.033	HM120-72-12	HMT120-72-12
72	20°	.500	.750	10	.033	HM120-72-50	-
80	20°	1.250	.750	10	.030	HM120-80-12	HMT120-80-12
96	20°	1.250	.750	10	.025	HM120-96-12	HMT120-96-12
100	20°	1.250	.590	10	.024	HM120-100-12	HMT120-100-12
120	20°	1.250	.390	10	.020	HM120-120-12	HMT120-120-12
175	20°	1.250	.310	10	.015	-	HMT120-175-12
200	20°	1.250	.310	10	.013	HM120-200-12	HMT120-200-12

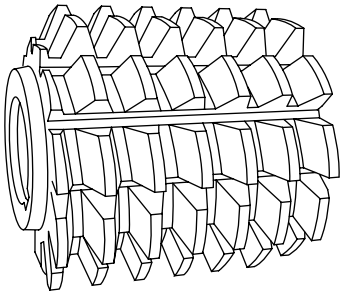


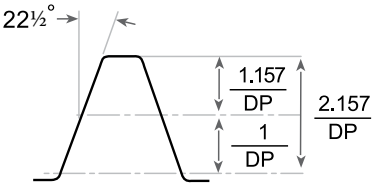
HS22 & HD22 Series

DP 22.5° PA GEAR HOBS

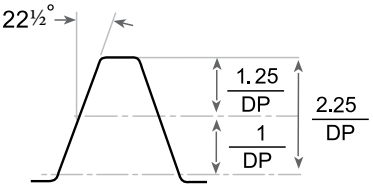
Finishing
Non Topping
Right Hand, Single Thread

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C
1	22.5°	10-3/4	15	2-1/2	2.250	HD22-100
1-1/4	22.5°	8-3/4	12	2	1.726	HS22-125
1-1/2	22.5°	7-1/2	7-1/2	1-1/2	1.438	HS22-150
1-3/4	22.5°	7-1/4	9	2	1.233	HS22-175
2	22.5°	5-1/4	6	1-1/4	1.079	HS22-200
2-1/4	22.5°	5-1/2	7-1/2	1-1/2	.959	HS22-225
2-1/4	22.5°	5-1/2	7-1/2	1-1/2	1.000	HD22-225
2-1/2	22.5°	4-3/4	5	1-1/4	.863	HS22-250
3	22.5°	4-1/2	5	1-1/4	.719	HS22-300
4	22.5°	4	4	1-1/4	.539	HS22-400
5	22.5°	3-1/2	3-1/2	1-1/4	.431	HS22-500
6	22.5°	3-1/2	3-1/2	1-1/4	.360	HS22-600
6	22.5°	3-1/2	3-1/2	1-1/4	.380	HD22-600E
7	22.5°	3-1/4	3-1/4	1-1/4	.308	HS22-700
8	22.5°	3	3	1-1/4	.270	HS22-800
10	22.5°	3	3	1-1/4	.216	HS22-010
10	22.5°	3	3	1-1/4	.225	HD22-010
11	22.5°	2-3/4	2-3/4	1-1/4	.196	HS22-011
12	22.5°	2-3/4	2-3/4	1-1/4	.180	HS22-012
12	22.5°	2-3/4	2-3/4	1-1/4	.188	HD22-012
13	22.5°	2-1/2	2-1/2	1-1/4	.166	HS22-013
14	22.5°	2-1/2	2-1/2	1-1/4	.154	HS22-014
16	22.5°	2-1/2	2-1/2	1-1/4	.135	HS22-016
16	22.5°	2-1/2	2-1/2	1-1/4	.141	HD22-016
18	22.5°	2-1/2	2	1-1/4	.120	HS22-018
20	22.5°	1-7/8	1-7/8	3/4	.108	HS22-020S
22	22.5°	1-7/8	1-7/8	3/4	.102	HS22-022S
24	22.5°	1-1/4	1-1/4	1/2	.090	HS22-024HE





HS22



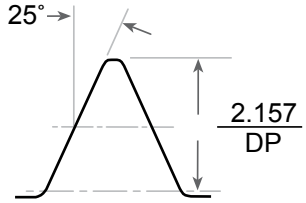
HD22

HS25, CHS25, HD25,CHD25, HLS25 & HLD25 Series

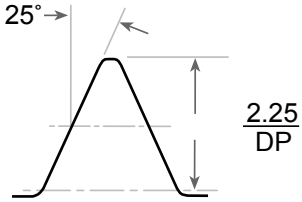
DP 20° PA GEAR HOBS

Finishing
Non Topping
Single Thread

DP	DP	OD	Length	Bore	WD	Specify Class AA, A, B, C	
						Right Hand	Left Hand
3/4	20°	12	15	2-1/2	2.876	HS25 -075	-
1	20°	10-3/4	15	2-1/2	2.250	HD25-100	HLD25-100
1	20°	10-1/4	12-1/2	2	2.250	CHD25-100	-
1-1/4	20°	8-3/4	12	2	1.726	HS25-125	-
1-1/4	20°	9	12	2	1.800	HD25-125	HLD25-125
1-1/4	20°	8-1/4	10-3/4	1-1/2	1.800	CHD25-125	-
1-1/2	20°	8	10	2	1.438	HS25-150	-
1-1/2	20°	8-1/4	10	2	1.500	HD25-150	HLD25-150
1-1/2	20°	7-1/2	7-3/4	1-1/2	1.438	CHS25-150	-
1-1/2	20°	7-3/4	8	1-1/2	1.500	CHD25-150	-
1-3/4	20°	7-1/4	9	2	1.233	HS25-175	-
1-3/4	20°	7-1/4	9	2	1.286	HD25-175	HLD25-175
1-3/4	20°	6-3/4	8	1-1/2	1.286	CHD25-175	-
2	20°	5-3/4	8	1-1/2	1.079	HS25-200	HLS25-200
2	20°	6	8	1-1/2	1.125	HD25-200	HLD25-200
2	20°	5-1/4	6	1-1/4	1.079	CHS25-200	-
2	20°	5-1/2	6	1-1/4	1.125	CHD25-200	-
2-1/4	20°	5-1/2	7-1/2	1-1/2	.959	HS25-225	
2-1/4	20°	6	8	1-1/2	1.000	HD25-225	HLD25-225
2-1/4	20°	5-1/4	6	1-1/4	1.000	CHD25-225	-
2-1/2	20°	5	7	1-1/2	.863	HS25-250	HLS25-250
2-1/2	20°	5-1/4	7	1-1/2	.900	HD25-250	HLD25-250
2-1/2	20°	4-3/4	5	1-1/4	.863	CHS25-250	-
2-1/2	20°	4-3/4	5	1-1/4	.900	CHD25-250	-
2-3/4	20°	5	6	1-1/2	.784	HS25-275	-
2-3/4	20°	5-1/4	6	1-1/2	.818	HD25-275	HLD25-275
2-3/4	20°	4-3/4	5	1-1/4	.818	CHD25-275	-
3	20°	4-1/2	5	1-1/4	.719	HS25-300	HLS25-300
3	20°	4-1/2	5	1-1/4	.750	HD25-300	HLD25-300
3-1/2	20°	4	4	1-1/4	.616	HS25-350	HLS25-350
3-1/2	20°	4-1/4	4-3/4	1-1/4	.643	HD25-350	HLD25-350
4	20°	4	4	1-1/4	.539	HS25-400	HLS25-400
4	20°	4	4	1-1/4	.563	HD25-400	HLD25-400
4-1/2	20°	3-1/2	3-1/2	1-1/4	.479	HS25-450	HLS25-450
4-1/2	20°	3-1/2	3-1/2	1-1/4	.500	HD25-450	-
5	20°	3-1/2	3-1/2	1-1/4	.431	HS25-500	HLS25-500
5	20°	3-1/2	3-1/2	1-1/4	.450	HD25-500	HLD25-500
5-1/2	20°	3-1/2	3-1/2	1-1/4	.409	HD25-550	-
6	20°	3-1/2	3-1/2	1-1/4	.360	HS25-600	-
6	20°	3-1/2	3-1/2	1-1/4	.375	HD25-600	HLD25-600
6-1/2	20°	3-1/4	3-1/4	1-1/4	.346	HD25-650	HLD25-650
7	20°	3-1/4	3-1/4	1-1/4	.308	HS25-700	-
7	20°	3-1/4	3-1/4	1-1/4	.321	HD25-700	HLD25-700
8	20°	3	3	1-1/4	.270	HS25-800	HLS25-800
8	20°	3	3	1-1/4	.281	HD25-800	HLD25-800
9	20°	3	3	1-1/4	.240	HS25-900	-
9	20°	3	3	1-1/4	.250	HD25-900	HLD25-900
10	20°	3	3	1-1/4	.216	HS25-010	HLS25-010
10	20°	3	3	1-1/4	.225	HD25-010	HLD25-010
11	20°	2-3/4	2-3/4	1-1/4	.205	HD25-011	HLD25-011
12	20°	2-3/4	2-3/4	1-1/4	.180	HS25-012	HLS25-012
12	20°	2-3/4	2-3/4	1-1/4	.188	HD25-012	HLD25-012
14	20°	2-1/2	2-1/2	1-1/4	.154	HS25-014	-
14	20°	2-1/2	2-1/2	1-1/4	.161	HD25-014	HLD25-014
16	20°	2-1/2	2-1/2	1-1/4	.135	HS25-016	HLS25-016
16	20°	2-1/2	2-1/2	1-1/4	.141	HD25-016	HLD25-016
17	20°	2-1/2	2	1-1/4	.132	HD25-017	-
18	20°	2-1/2	2	1-1/4	.120	HS25-018	-
18	20°	2-1/2	2	1-1/4	.125	HD25-018	HLD25-018
20	20°	2-1/2	2	1-1/4	.112	HS25-020	-
22	20°	2-1/2	2	1-1/4	.102	HS25-022	-
24	20°	2-1/2	2 1/2	1-1/4	.094	HS25-024	-



For 20DP and finer,
WD = 2.20/DP+.002



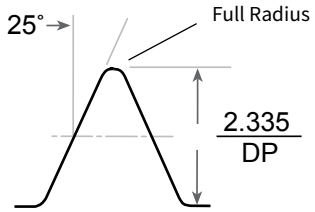
For smaller Hobs see series
HFS25, HFS25, HM825

HR25 & HLR25 Series

DP 25° PA GEAR HOBS

Finishing
Non Topping
Full Fillet
Single Thread

DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
1	25°	10-1/4	12-1/2	2	2.335	HR25-100	-
1-1/4	25°	8-7/8	11	2	1.868	HR25-125	-
1-1/2	25°	8-1/4	10	2	1.557	HR25-150	-
1-3/4	25°	6-3/4	8	1-1/2	1.334	HR25-175	-
2	25°	5-1/2	6	1-1/4	1.168	CHR25-200	-
2	25°	6	7	1-1/2	1.168	HR25-200	-
2-1/4	25°	6	7	1-1/2	1.038	HR25-225	-
2-1/2	25°	5-1/4	7	1-1/2	.934	HR25-250	-
2-3/4	25°	5	6	1-1/2	.849	HR25-275	-
3	25°	4-1/2	5	1-1/4	.778	HR25-300	HLR25-300
3-1/2	25°	4-1/4	4-1/4	1-1/4	.667	HR25-350	-
4	25°	4	4	1-1/4	.584	HR25-400	HLR25-400
4-1/2	25°	3-1/2	3-1/2	1-1/4	.519	HR25-450	-
5	25°	3-1/2	3-1/2	1-1/4	.467	HR25-500	HLR25-500
6	25°	3-1/2	3-1/2	1-1/4	.389	HR25-600	HLR25-600
7	25°	3-1/4	3-1/4	1-1/4	.334	HR25-700	-
8	25°	3	3	1-1/4	.292	HR25-800	HLR25-800
9	25°	3	3	1-1/4	.259	HR25-900	-
10	25°	1-7/8	1-7/8	3/4	.234	HR25-010S	-
10	25°	3	3	1-1/4	.234	HR25-010	HLR25-010
11	25°	2-3/4	2-3/4	1-1/4	.212	HR25-011	-
12	25°	1-7/8	1-7/8	3/4	.195	HR25-012S	-
12	25°	2-3/4	2-3/4	1-1/4	.195	HR25-012	HLR25-012
14	25°	2-1/2	2-1/2	1-1/4	.167	HR25-014	-
16	25°	1-7/8	1-7/8	3/4	.146	HR25-016S	-
16	25°	2-1/2	2-1/2	1-1/4	.146	HR25-016	HLR25-016
20	25°	1-7/8	1-7/8	3/4	.117	HR25-020S	-
24	25°	1-7/8	1-7/8	3/4	.097	HR25-024S	-
32	25°	1-7/8	1 1/2	3/4	.073	HR25-032S	-

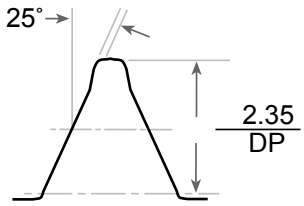


HP25 & HPL25 Series

DP 25° PA GEAR HOBS

Pre-Shave
Non Topping
Single Thread

DP	PA	OD	Length	Bore	WD	Thin Approx "	Protuberance Approx "	Specify Class A, B, C	
								Right Hand	Left Hand
3	25°	4-1/2	5	1-1/4	.783	.004	.003	HP25-300	-
4	25°	4	4	1-1/4	.588	.004	.003	HP25-400	HPL25-400
5	25°	3-1/2	3-1/2	1-1/4	.470	.004	.002	HP25-500	-
6	25°	3-1/2	3-1/2	1-1/4	.392	.004	.002	HP25-600	HPL25-600
7	25°	3-1/4	3-1/4	1-1/4	.336	.003	.002	HP25-700	-
8	25°	3	3	1-1/4	.294	.003	.002	HP25-800	-
10	25°	3	3	1-1/4	.235	.003	.002	HP25-010	-
12	25°	2-3/4	2-3/4	1-1/4	.196	.003	.002	HP25-012	-
14	25°	1-7/8	1-7/8	3/4	.168	.003	.001	HP25-014S	-
16	25°	2-1/2	2-1/2	1-1/4	.147	.003	.001	HP25-016	-
20	25°	1-7/8	1-7/8	3/4	.122	.002	.001	HP25-020S	-
32	25°	1-7/8	1-7/8	3/4	.077	.001	No	HP25-032S	-



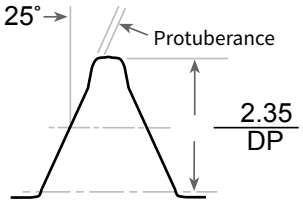
For 20DP and finer,
WD = 2.40/DP+.002

HPG25, HPGN25 & HPGL25 Series

DP 25° PA GEAR HOBS

Pre-Grind
Non Topping
Single Thread

DP	PA	O.D.	Length	Bore	WD	Thin (Approx ")	Protuberance (Approx ")	Specify Class A,B,C	
								Right Hand	Left Hand
1-1/4	25°	8-3/4	11	2	1.880	.020	.012	HPG25-125	-
1-1/2	25°	8	10	2	1.567	.015	.011	HPG25-150	-
1-3/4	25°	7-1/4	8-3/4	2	1.343	.015	.010	HPG25-175	-
2	25°	6	8	1-1/2	1.175	.015	.010	HPG25-200	HPGL25-200
2-1/4	25°	6	7	1 1/2	1.044	.015	.010	HPG25-225	-
2-1/2	25°	5-1/4	7	1-1/2	.940	.015	.009	HPG25-250	HPGL25-250
2-3/4	25°	5	6	1-1/4	.855	.014	.008	HPG25-275	-
3	25°	4-1/2	5	1-1/4	.783	.012	.008	HPG25-300	HPGL25-300
3-1/2	25°	4-1/4	4-1/4	1-1/4	.671	.012	.008	HPG25-350	HPGL25-350
4	25°	4	4	1-1/4	.588	.011	.007	HPG25-400	HPGL25-400
4-1/2	25°	3-1/2	3-1/2	1-1/4	.522	.011	.007	HPG25-450	-
5	25°	3-1/2	3-1/2	1-1/4	.470	.011	.006	HPG25-500	HPGL25-500
6	25°	3-1/2	3-1/2	1-1/4	.392	.011	.006	HPG25-600	HPGL25-600
7	25°	3-1/4	3-1/4	1-1/4	.336	.011	.006	HPG25-700	-
8	25°	3	3	1-1/4	.294	.011	.006	HPG25-800	HPGL25-800
9	25°	3	3	1-1/4	.261	.011	.006	HPG25-900	-
10	25°	1-7/8	1-7/8	3/4	.235	.011	.006	HPG25-010S	-
10	25°	3	3	1-1/4	.235	.011	.006	HPG25-010	HPGL25-010
10	25°	3	3	1-1/4	.235	.011	No	HPGN25-010	-
11	25°	2-3/4	2-3/4	1-1/4	.214	.010	.005	HPG25-011	-
12	25°	1-7/8	1-7/8	3/4	.196	.010	.005	HPG25-012S	-
12	25°	2-3/4	2-3/4	1-1/4	.196	.010	.005	HPG25-012	-
14	25°	1-7/8	1-7/8	3/4	.168	.010	.005	HPG25-014S	-
14	25°	2-1/2	2-1/2	1-1/4	.168	.010	.005	HPG25-014	-
16	25°	1-7/8	1-7/8	3/4	.147	.010	.005	HPG25-016S	-
16	25°	2-1/2	2-1/2	1-1/4	.147	.010	.005	HPG25-016	-
16	25°	2-1/2	2-1/2	1-1/4	.147	.010	No	HPGN25-016	-
18	25°	2-1/2	2-1/2	1-1/4	.131	.008	.005	HPG25-018	-
20	25°	1-7/8	1-7/8	3/4	.122	.006	.004	HPG25-020S	-
20	25°	2-1/2	2	1-1/4	.122	.006	.004	HPG25-020	-
24	25°	1-7/8	1-7/8	3/4	.102	.005	.004	HPG25-024S	-
32	25°	1-7/8	1-7/8	3/4	.077	.005	.003	HPG25-032S	-
40	25°	1-7/8	1-1/2	3/4	.062	.004	.003	HPG25-040S	-



For 20DP and finer,
WD = 2.40/DP+.002

HFS25 & HD25 Series

DP 25° PA GEAR HOBS

3/4 " Bore
Finishing
Non Topping
Right Hand
Single Thread

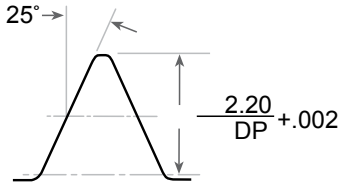
DP	PA	O.D.	Approx. Length	Bore	WD	Specify Class AA, A, B, C
8	25°	2	2	3/4	.281	HD25-800S
10	25°	1-7/8	1-7/8	3/4	.216	HFS25-010
10	25°	1-7/8	1-7/8	3/4	.225	HD25-010S
12	25°	1-7/8	1-7/8	3/4	.180	HFS25-012
12	25°	1-7/8	1-7/8	3/4	.188	HD25-012S
14	25°	1-7/8	1-7/8	3/4	.154	HFS25-014
14	25°	1-7/8	1-7/8	3/4	.161	HD25-014S
16	25°	1-7/8	1-7/8	3/4	.135	HFS25-016
16	25°	1-7/8	1-7/8	3/4	.141	HD25-016S
18	25°	1-7/8	1-7/8	3/4	.120	HFS25-018
18	25°	1-7/8	1-7/5	3/4	.125	HD25-018S
20	25°	1-7/8	1-7/8	3/4	.112	HFS25-020
20	25°	1-7/8	1-7/8	3/4	.113	HD25-020S
22	25°	1-7/8	1-7/8	3/4	.102	HFS25-022
24	25°	1-7/8	1-7/8	3/4	.094	HFS25-024
28	25°	1-7/8	1-7/8	3/4	.081	HFS25-028
32	25°	1-7/8	1-7/8	3/4	.071	HFS25-032
34	25°	1-7/8	1-7/8	3/4	.067	HFS25-034
36	25°	1-7/8	1-1/2	3/4	.063	HFS25-036
40	25°	1-7/8	1-1/2	3/4	.057	HFS25-040
44	25°	1-7/8	1-1/2	3/4	.052	HFS25-044
48	25°	1-7/8	1-1/2	3/4	.048	HFS25-048
64	25°	1-5/8	1-1/2	3/4	.036	HFS25-064

DP	O.D.	Approx. Length	Bore	WD	Specify Class AA, A, B, C
20	1-7/8	1-7/8	3/4	.112	HFT25-020
24	1-7/8	1-7/8	3/4	.094	HFT25-024
120	1-5/8	1-1/2	3/4	.020	HFT25-120

HFT25 Series

DP 25° PA GEAR HOBS

3/4 " Bore
Finishing
1-RH
Topping

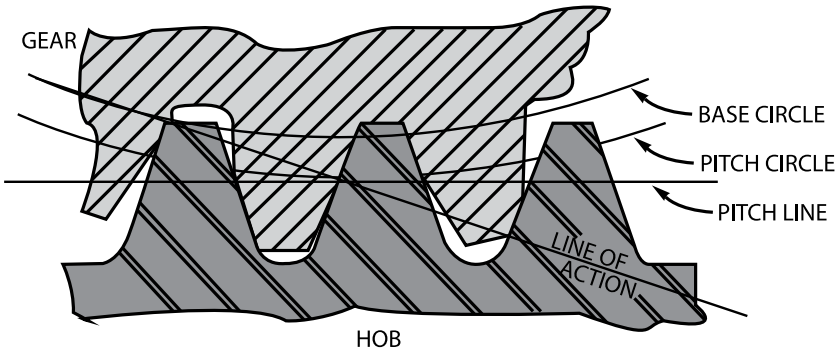


ACCURACY AND BASIC TYPES OF HOBS:

Hobs are generally put into five basic classes depending on accuracy - AA - Ultra Precision, A - Precision Ground, B - Ground, C - Unground (Accurate), D - Commercial Unground.

The requirements of a specific job will determine what class of hob should be used. However, keep in mind, that the results obtained when using any hob are dependent on the accuracy and condition of the machine and tooling with which the hob is used. Proper machine set-up, careful preparation, design of the workpiece holder, proper hob sharpening and inspection all are essential to obtain accurate results on a final part.

THE HOBBING PROCESS



Hobs are made in three different types: namely, roughing, semi-finishing, and finishing. Roughing hobs usually allow more stock for finishing than a corresponding semi-finishing hobs since the part is usually finish hobbed or shaped.

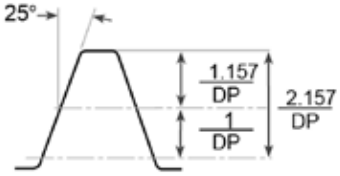
Semi-finishing hobs allow only a small amount of stock for finishing either by shaving or by grinding. Finishing hobs are made to produce the finished tooth form of the part with no subsequent operations needed.

DP	PA	O.D.	Length	Bore	WD	Specify Class AA, A, B, C	
						Non-Topping	Topping
16	25°	1-1/4	1-1/4	1/2	.135	HFH25-016	-
18	25°	1-1/4	1-1/4	1/2	.125	HFH25-018	-
20	25°	1-1/4	1-1/4	1/2	.112	HFH25-020	-
24	25°	1-1/4	1-1/4	1/2	.094	HFH25-024	HTH25-024
32	25°	1-1/8	1-1/8	1/2	.071	HFH25-032	-
40	25°	1-1/8	1-1/8	1/2	.057	HFH25-040	-
44	25°	1-1/8	1-1/8	1/2	.052	HFH25-044	-
48	25°	1-1/8	1-1/8	1/2	.048	HFH25-048	-
64	25°	1-1/8	1-1/8	1/2	.036	HFH25-064	-
96	25°	1-1/8	1-1/8	1/2	.025	HFH25-096	-

HFH25 & HTH25 Series

DP 25° PA GEAR HOBS

1/2" Bore
Finishing
Non Topping & Topping
Right Hand, Single Thread

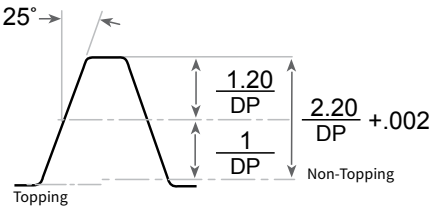


DP	PA	O.D.	Approx. Length	Bore mm	WD	Specify Class AAA, AA, A, B, C	
						Non Topping	Topping
16	25°	1.000	.750	8	.135	HM825-16-10	-
20	25°	1.000	.750	8	.112	HM825-20-10	-
24	25°	.750	.750	8	.094	HM825-24-75	-
24	25°	1.000	.750	8	.094	HM825-24-10	-
30	25°	.750	.750	8	.075	HM825-30-75	-
32	25°	.750	.750	8	.071	HM825-32-75	-
36	25°	.750	.750	8	.063	HM825-36-75	-
40	25°	.750	.750	8	.057	HM825-40-75	-
48	25°	.750	.750	8	.048	HM825-48-75	HMT825-48-75
48	25°	1.000	.688	8	.048	HM825-48-10	-
64	25°	.625	.688	8	.036	HM825-64-62	HMT825-64-62
64	25°	.750	.688	8	.036	HM825-64-75	-
64	25°	.938	.500	8	.036	HM825-64-93	-
64	25°	1.000	1.000	8	.036	HM825-64-10	-
72	25°	.625	.688	8	.033	HM825-72-62	-
80	25°	.750	.688	8	.030	HM825-80-75	HMT825-80-75

HM825 & HMT825 Series

DP 25° PA GEAR HOBS

8mm Bore
Finishing
Non Topping & Topping
Right Hand, Single Thread



For 18 DP and coarser, whole depth is 2.157/DP.

DP	PA	Splines	O.D.	Length	Bore	WD	Specify Class A, B, C
3.556	30°	6	3	3	1-1/4	.088	HA30-355X
3.556	30°	6	3	3	1-1/4	.189	HA30-355Y
4.064	30°	16	3	3	1-1/4	.206	HA30-406X
4.267	30°	16	3	3	1-1/4	..253	HA30-426Y
5.333	30°	16	3-1/2	3-1/2	1-1/4	.133	HA30-533Y
5.333	30°	10	2-3/4	2-3/4	1-1/4	.148	HA30-533Z
5.689	30°	16	2-3/4	2-3/4	1-1/4	.221	HA30-568Z
6.095	30°	24	3-1/2	3-1/2	1-1/4	.210	HA30-609
6.667	30°	10	3-1/4	3-1/4	1-1/4	.118	HA30-666X
8.000	30°	6	2-3/4	2-3/4	1-1/4	.039	HA30-800X
8.533	30°	24	3	3	1-1/4	.154	HA30-853Z
8.889	30°	10	2-1/4	2-1/4	1-1/4	.072	HA30-888
9.482	30°	16	3	3	1-1/4	.132	HA30-948Y
10.667	30°	16	2-3/4	2-3/4	1-1/4	.077	HA30-162Z
10.667	30°	16	2	2	3/4	.077	HA30-1162ZS
14.222	30°	16	3	3	1-1/4	.094	HA30-142Y

HA30 Series

DP 30° PA GEAR HOBS

Old American Standard
Finishing
Semi Topping
1-RH

OLD AMERICAN STANDARD - CONSTANTS (more information available in *Technical* section)

6 Spline			
Diam. Pitch	Deep H	Inter. H	Shallow H
8.0000	0.0375	0.0319	0.0263
6.4000	0.0469	0.0398	0.0328
5.3333	0.0563	0.0475	0.0394
4.5714	0.0656	0.0558	0.0459
4.0000	0.0750	0.0638	0.0525
3.5556	0.0844	0.0717	0.0591
3.2000	0.0938	0.0797	0.0656
2.9091	0.1031	0.0877	0.0722
2.6667	0.1125	0.0956	0.0788
2.4615	0.1219	0.1036	0.0853
2.2857	0.1313	0.1116	0.0919
2.1333	0.1406	0.1195	0.0984
2.0000	0.1500	0.1275	0.1050
1.8824	0.1594	0.1355	0.1116
1.7778	0.1688	0.1434	0.1181
1.6842	0.1781	0.1514	0.1247
1.6000	0.1875	0.1594	0.1313
1.5238	0.1969	0.1673	0.1378
1.4545	0.2063	0.1753	0.1444

10 Spline			
Diam. Pitch	Deep H	Inter. H	Shallow H
13.3333	0.0375	0.0319	0.0263
10.0667	0.0469	0.0398	0.0328
8.2222	0.0563	0.0478	0.0394
7.1905	0.0656	0.0558	0.0459
6.6667	0.0750	0.0638	0.0525
5.4815	0.0844	0.0717	0.0591
5.5333	0.0938	0.0797	0.0656
4.7576	0.1031	0.0877	0.0722
7.1111	0.1125	0.0956	0.0788
6.5641	0.1279	0.1036	0.0853
6.0952	0.1313	0.1116	0.0919
5.6889	0.1406	0.1195	0.0984
5.3333	0.1500	0.1275	0.1050
5.0196	0.1594	0.1355	0.1116
4.7407	0.1688	0.1434	0.1181
4.4912	0.1781	0.1514	0.1247
4.2667	0.1875	0.1594	0.1313
4.0635	0.1969	0.1673	0.1378
3.8788	0.2063	0.1753	0.1444

16 Spline			
Diam. Pitch	Deep H	Inter. H	Shallow H
21.3333	0.0375	0.0319	0.0263
17.0667	0.0469	0.0398	0.0328
14.2222	0.0563	0.0478	0.0394
12.1905	0.0656	0.0558	0.0459
10.6667	0.0750	0.0638	0.0525
9.4815	0.0844	0.0717	0.0591
8.5333	0.0938	0.0797	0.0656
7.7576	0.1031	0.0877	0.0722
7.1111	0.1125	0.0956	0.0788
6.5641	0.1279	0.1036	0.0853
6.0952	0.1313	0.1116	0.0919
5.6889	0.1406	0.1195	0.9840
5.3333	0.1500	0.1275	0.1050
5.0196	0.1594	0.1355	0.1116
4.7407	0.1688	0.1434	0.1181
4.4912	0.1781	0.1514	0.1247
4.2667	0.1875	0.1594	0.1313
4.0635	0.1969	0.1673	0.1378
3.8788	0.2063	0.1753	0.1444

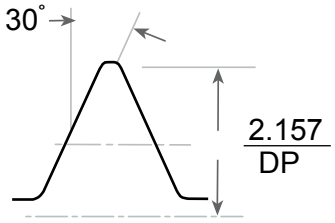
24 Spline			
Diam. Pitch	Deep H	Inter. H	Shallow H
32.0000	0.0281	0.0225	0.0169
25.600	0.0352	0.0281	0.0211
21.3333	0.0422	0.0338	0.0253
18.2857	0.0492	0.0394	0.0295
16.0000	0.0563	0.0450	0.0338
14.2222	0.0633	0.0506	0.0380
12.8000	0.0703	0.0563	0.0422
11.6364	0.0773	0.0619	0.0464
10.6667	0.0844	0.0675	0.0506
9.8462	0.0914	0.0731	0.0548
9.1429	0.0984	0.0788	0.0591
8.5333	0.1055	0.0844	0.0633
8.0000	0.1125	0.0900	0.0675
7.5294	0.1195	0.0956	0.717
7.1111	0.1266	0.1013	0.0759
6.7368	0.1316	0.1069	0.0802
6.4000	0.1406	0.1125	0.0844
6.0952	0.1477	0.1181	0.0886
5.8182	0.1547	0.1238	0.0928

DP	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
2	30°	5 3/4	8	1-1/2	1.079	HS30-200
3	30°	4-1/2	4-1/2	1-1/4	.719	HS30-300
3.5	30°	4-1/4	4-1/4	1-1/4	.616	HS30-350
4	30°	4	4	1-1/4	.539	HS30-400
5	30°	3-1/2	3-1/2	1-1/4	.431	HS30-500
6	30°	3-1/2	3-1/2	1-1/4	.360	HS30-600
7	30°	3-1/4	3-1/4	1-1/4	.308	HS30-700
8	30°	3	3	1-1/4	.270	HS30-800
10	30°	3	3	1-1/4	.216	HS30-010
10	30°	1-7/8	1-7/8	3/4	.216	HS30-010S
11	30°	2-3/4	2-3/4	1-1/4	.196	HS30-011
12	30°	1-7/8	1-7/8	3/4	.180	HS30-012S
12	30°	2-3/4	2-3/4	1-1/4	.180	HS30-012
14	30°	1-7/8	1-7/8	3/4	.154	HS30-014S
14	30°	2-1/2	2-1/2	1-1/4	.154	HS30-014
16	30°	1-7/8	1-7/8	3/4	.135	HS30-016S
16	30°	2-1/2	2-1/2	1-1/4	.135	HS30-016
20	30°	1-7/8	1-7/8	3/4	.112	HS30-020S
24	30°	1-7/8	1-7/8	3/4	.094	HS30-024S
32	30°	1-7/8	1-7/8	3/4	.071	HS30-032S

HS30 Series

DP 30° PA GEAR HOBS

Full Depth
Finishing
Non Topping
Right Hand, Single Thread



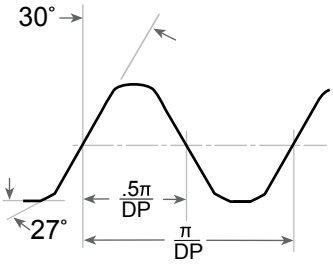
For 20 DP and finer
Whole depth is 2.20/DP+.002.

DP	PA	O.D.	Length	Bore	# of Leads	WD	Specify Class A, B, C
2.5/5	30°	4	4	1-1/4	1	.560	HCF30-250
4/8	30°	3-1/2	3-1/2	1-1/4	1	.350	HCF30-400
5/10	30°	3	3	1-1/4	1	.280	HCF30-500
6/12	30°	3	3	1-1/4	1	.233	HCF30-600
8/16	30°	2-3/4	2-3/4	1-1/4	1	.175	HCF30-800
10/20	30°	1-7/8	1-7/8	3/4	1	.140	HCF30-010S
10/20	30°	2-1/2	2-1/2	1-1/4	1	.140	HCF30-010
12/24	30°	1-7/8	1-7/8	3/4	1	.117	HCF30-012S
12/24	30°	2-1/2	2-1/2	1-1/4	1	.117	HCF30-012
16/32	30°	1-7/8	1-7/8	3/4	1	.094	HCF30-016S
16/32	30°	2-1/2	2	1-1/4	1	.094	HCF30-016
16/32	30°	3 1/7	3-1/7	1-1/4	1	.094	HCF30-016E
20/40	30°	1-7/8	1-7/8	3/4	1	.075	HCF30-020S
24/48	30°	1 1/4	1 1/4	1/2	2	.063	HCF30-024-2H
24/48	30°	1-7/8	1-7/8	3/4	1	.063	HCF30-024S

HCF30 Series

DP 30° PA SPLINE HOBS

Involute Spline
Finishing, Right Hand
Chamfering, Fillet Root

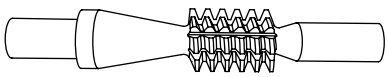


DP	PA	O.D.	WD	Specify Class A, B, C
8/16	30°	.875	.175	HFK30-800
10/20	30°	.875	.140	HFK30-010
12/24	30°	.875	.117	HFK30-012
12/24	30°	1.000	.117	HFK30-012E
16/32	30°	.750	.094	HFK30-016E
16/32	30°	.875	.094	HFK30-016
20/30	30°	.750	.082	HFK30-203
20/30	30°	1.000	.088	HFK30-203
20/40	30°	.750	.075	HFK30-020
20/40	30°	1.000	.075	HFK30-020E
24/48	30°	.750	.063	HFK30-024
24/48	30°	1.000	.063	HFK30-024F
24/48	30°	1.880	.063	HFK30-024E
32/64	30°	.500	.047	HFK30-032E
32/64	30°	.750	.047	HFK30-032
40/80	30°	.750	.038	HFK30-040
48/96	30°	.625	.031	HFK30-048
48/96	30°	.750	.031	HFK30-048E

HFK30 Series

DP 30° PA SPLINE HOBS

Involute Spline, Shank Type
Finishing
Single Lead, Right Hand
Non-Chamfering
Fillet Root

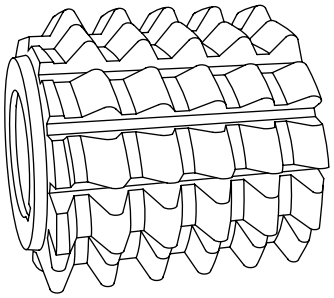


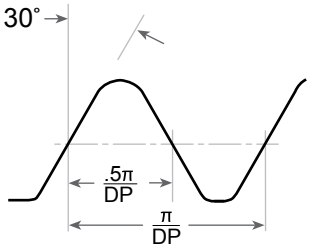
H7F30 Series

DP 30° PA SPLINE HOBS

ANSI Spline
Finishing
Right Hand
Non-Chamfering
Fillet Root

DP	PA	O.D.	Length	Bore	# of Leads	WD	Specify Class A, B, C
2.5/5	30°	4	4	1-1/4	1	.560	H7F30-250
3/6	30°	4	4	1-1/4	1	.467	H7F30-300
4/8	30°	3-1/2	3-1/2	1-1/4	1	.350	H7F30-400
5/10	30°	3	3	1-1/4	1	.280	H7F30-500
6/12	30°	3	3	1-1/4	1	.233	H7F30-600
7/16	30°	1-7/8	1-7/8	3/4	1	.175	H7F30-700S
7/16	30°	2-3/4	2-3/4	1-1/4	1	.175	H7F30-700
8/16	30°	1-7/8	1-7/8	3/4	1	.175	H7F30-800S
8/16	30°	2-3/4	2-3/4	1-1/4	1	.175	H7F30-800
8/16	30°	4	4	1-1/4	1	.175	H7F30-800XL
8/16	30°	2-3/4	2-3/4	1-1/4	2	.175	H7F30-800-2
10/20	30°	1-7/8	1-7/8	3/4	1	.140	H7F30-010S
10/20	30°	2-1/2	2-1/2	1-1/4	1	.140	H7F30-010
10/20	30°	2-1/2	2-1/2	1-1/4	2	.140	H7F30-010-2
12/24	30°	1-1/4	1-1/4	1/2	1	.117	H7F30-012H
12/24	30°	1-7/8	1-7/8	3/4	1	.117	H7F30-012S
12/24	30°	2-1/2	2	1-1/4	1	.117	H7F30-012
12/24	30°	3	3-1/2	1-1/4	1	.117	H7F30-012X
12/24	30°	4	4	1-1/4	2	.117	H7F30-012-2E
16/32	30°	1	3/4	8mm	1	.094	H7F30-016M
16/32	30°	1-1/4	1-1/4	1/2	1	.094	H7F30-016H
16/32	30°	1-1/8	1-1/8	1/2	1	.094	H7F30-016HE
16/32	30°	1-7/8	1-7/8	3/4	1	.094	H7F30-016S
16/32	30°	1-7/8	1-7/8	3/4	2	.094	H7F30-016-2S
16/32	30°	2-1/2	2	1-1/4	1	.094	H7F30-016
16/32	30°	3-1/2	3-2/5	1-1/4	1	.094	H7F30-016E
16/32	30°	2-3/4	2-3/4	1-1/4	3	.094	H7F30-016-3
20/30	30°	3/4	3/4	8mm	1	.082	H7F30-203M
20/30	30°	1-7/8	1-7/8	3/4	1	.082	H7F30-203S
20/30	30°	2-1/2	2	1-1/4	1	.082	H7F30-203
20/40	30°	3/4	3/4	8mm	1	.075	H7F30-020M
20/40	30°	1-1/4	1-1/4	1/2	1	.075	H7F30-020H
20/40	30°	1-7/8	1-7/8	3/4	1	.075	H7F30-020S
20/40	30°	1-7/8	1-7/8	3/4	2	.075	H7F30-020-2S
20/40	30°	2-1/2	2	1-1/4	1	.075	H7F30-020
24/48	30°	3/4	2/3	8mm	1	.063	H7F30-024M
24/48	30°	1-1/4	1-1/4	1/2	1	.063	H7F30-024H
24/48	30°	1 1/8	1-1/8	1/2	1	.063	H7F30-024HE
24/48	30°	1-7/8	1-7/8	3/4	1	.063	H7F30-024S
24/48	30°	1-1/2	1-1/2	3/4	1	.063	H7F30-024SE
24/48	30°	1-7/8	1-7/8	3/4	1	.063	H7F30-024-2S
24/48	30°	2-1/2	2	1-1/4	1	.063	H7F30-024
32/64	30°	3/4	2/3	8mm	1	.047	H7F30-032M
32/64	30°	1-1/8	1-1/8	1/2	1	.047	H7F30-032H
32/64	30°	1-7/8	1-7/8	3/4	1	.047	H7F30-032S
32/64	30°	1-3/8	1-1/2	3/4	1	.047	H7F30-032SE
32/64	30°	1-7/8	1-1/2	3/4	2	.047	H7F30-032-2S
32/64	30°	2-1/2	2	1-1/4	1	.047	H7F30-032
40/80	30°	3/4	2/3	8mm	1	.038	H7F30-040M
40/80	30°	1-1/8	1-1/8	1/2	1	.038	H7F30-040H
40/80	30°	1-7/8	1-7/8	3/4	1	.038	H7F30-040S
40/80	30°	2-1/2	2	1-1/4	1	.038	H7F30-040
48/96	30°	3/4	5/8	8mm	1	.031	H7F30-048M
48/96	30°	1-1/8	1-1/8	1/2	1	.031	H7F30-048H
48/96	30°	1-7/8	1-1/2	3/4	1	.031	H7F30-048S
48/96	30°	2-1/2	2	1-1/4	1	.031	H7F30-048
64/128	30°	3/4	2/3	8mm	1	.023	H7F30-064M
64/128	30°	1-5/8	1-1/2	3/4	1	.023	H7F30-064S





H5K30 & H7K30 Series

DP 30° PA GEAR HOBS

ANSI Spline, Shank Type
Finishing
Non-Chamfering, Flat Root
Single Lead, Right Hand

DP	PA	O.D.	WD	Specify Class A, B, C
8/16	30°	.875	.147	H7K30-800
10/20	30°	.875	.118	H7K30-010
12/24	30°	.875	.098	H7K30-012
16/32	30°	.750	.071	H5K30-016F
16/32	30°	1.000	.071	H5K30-016E
16/32	30°	.875	.073	H7K30-016
20/40	30°	.875	.057	H5K30-020E
20/40	30°	.625	.059	H7K30-020E
20/40	30°	.750	.059	H7K30-020
24/48	30°	.750	.048	H5K30-024
24/48	30°	1.000	.048	H5K30-024E
24/48	30°	.750	.049	H7K30-024
32/64	30°	.750	.037	H7K30-032
40/80	30°	.750	.030	H7K30-040
48/96	30°	.625	.025	H7K30-048

ANSI B92.1-1970

Formulas for basic dimensions 30°, 37.5° and 45° Pressure Angles

		30º Spline		37.5º Spline	45º Spline
	Flat Root Side Fit	Flat Root Major Dia. Fit	Fillet Root Side Fit	Filler Root Side Fit	Fillet Root Side Fit
Terms And Symbols	2.5/5 - 32/64 pitch	3/6 - 13/32 Pitch	2.5/5 - 48/96 Pitch	2.25/5 - 48/96 Pitch	10/20 - 128/256 Pitch
Stub Pitch (Ps)	2P	2P	2P	2P	2P
Pitch Diameter (D)	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$
Base Diameter (Db)	$D \cos j_{\Phi}$	$D \cos j_{\Phi}$	$D \cos j_{\Phi}$	$D \cos j_{\Phi}$	$D \cos j_{\Phi}$
Circular Pitch (P)	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$
Min. Effective Space Width (Sv)	$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{5\pi + 0.1}{P}$	$\frac{5\pi + 0.2}{P}$
Major Diameter Internal (Dri)	$\frac{N + 1.35}{P}$	$\frac{N+1}{P}$	$\frac{N + 1.8}{P}$	$\frac{N + 1.6}{P}$	$\frac{N + 1.4}{P}$
Major Diameter External (Do)	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$
Minor Diameter Internal (Di)	$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 0.8}{P}$	$\frac{N - 0.6}{P}$
Minor Diameter External (Dre)					
2.5/5 - 12/24 Pitch	$\frac{N - 1.35}{P}$	$\frac{N - 1.35}{P}$	$\frac{N - 1.8}{P}$	$\frac{N - 1.3}{P}$	N/A
16/32 Pitch and Finer	$\frac{N - 1.35}{P}$	$\frac{N - 1.35}{P}$	$\frac{N - 2}{P}$	$\frac{N - 1.3}{P}$	N/A
10/20 Pitch and Finer	$\frac{N - 1.35}{P}$	$\frac{N - 1.35}{P}$	N/A	$\frac{N - 1.3}{P}$	$\frac{N - 1}{P}$
Form Diameter Internal (Dfi)	$\frac{N + 1}{P} + 2cf$	$\frac{N + 0.8}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$
Form Diameter External (Dfe)	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$
Form Clearance Radial (cf)	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002

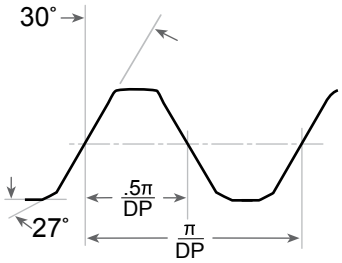
This standard deals with full fillet and flat root, side fit, and major diameter fit, for 30° pressure angle splines; also 37.5° and 45° full fillet side fit pressure angle splines. Formulas for the basic dimensions of these fits are shown above.

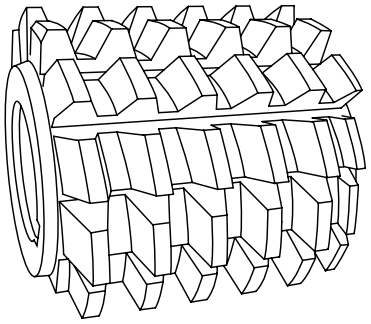
H5C30 & H7C30 Series

DP 30° PA GEAR HOBS

Involute Spline
Finishing
Right Hand
Chamfering
Flat Root

DP	PA	OD	Length	Bore	# of Leads	ASA B5.15-1950		ANSI B92.1 1970/6	
						WD	Specify Class A, B, C	WD	Specify Class A, B, C
2.5/5	30°	4	4	1-1/4	1	.422	-	.470	H5730-250
2.5/5	30°	4-1/4	4-3/4	1-1/4	1	.422	H5C30-250E	.470	-
3/6	30°	4	4	1-1/4	1	.369	H5C30-300	.392	H7C30-300
4/8	30°	3-1/2	3-1/2	1-1/4	1	.277	H5C30-400	.294	H7C30-400
5/10	30°	3	3	1-1/4	1	.222	H5C30-500	.235	H7C30-500
6/12	30°	3	3	1-1/4	1	.185	H5C30-600	.196	H7C30-600
6/12	30°	3-1/4	3-1/4	1-1/4	2	.185	H5C30-600-2	.196	-
8/16	30°	1-7/8	1-7/8	3/4	1	.140	H5C30-800S	.147	H7C30-800S
8/16	30°	2-3/4	2-3/4	1-1/4	1	.140	H5C30-800	.147	H7C30-800
8/16	30°	3	3	1-1/4	1	.140	H5C30-800E	.147	H7C30-800E
8/16	30°	2-3/4	4-3/8	1-1/4	1	.140	H5C30-800W	.147	-
8/16	30°	3	3	1-1/4	2	.140	H5C30-800-2	.147	-
10/20	30°	1-7/8	1-7/8	3/4	1	.112	H5C30-010S	.118	H7C30-010S
10/20	30°	2-1/2	2-1/2	1-1/4	1	.112	H5C30-010	.118	H7C30-010
12/24	30°	1-1/4	1-1/4	1/2	1	.094	H5C30-012H	.098	H7C30-012H
12/24	30°	1-7/8	1-7/8	3/4	1	.094	H5C30-012S	.098	H7C30-012S
12/24	30°	2-1/2	2	1-1/4	1	.094	H5C30-012	.098	H7C30-012
12/24	30°	2-3/4	2-3/4	1-1/4	2	.094	H5C30-012-2	.098	-
16/32	30°	1-1/4	1-1/4	1/2	1	.071	H5C30-016H	.073	H7C30-016H
16/32	30°	1-1/4	1-1/4	1/2	1	.071	H5C30-016HE	.073	-
16/32	30°	1-7/8	1-7/8	3/4	1	.071	H5C30-016S	.073	H7C30-016S
16/32	30°	1-7/8	1-7/8	3/4	2	.071	H5C30-016-2S	.073	-
16/32	30°	2-1/2	2	1-1/4	1	.071	H5C30-016	.073	H7C30-016
16/32	30°	2-1/4	2-3/4	1-1/4	1	.071	H5C30-016E	.073	-
16/32	30°	2-3/4	4	1-1/4	1	.071	H5C30-016X	.073	-
16/32	30°	2-3/4	2-3/4	1-1/4	2	.071	H5C30-016-2	.073	-
20/40	30°	3/4	2/3	8mm	1	.057	H5C30-020M	.059	H7C30-020M
20/40	30°	1-1/4	1-1/4	1/2	1	.057	H5C30-020H	.059	H7C30-020H
20/40	30°	1-7/8	1-7/8	3/4	1	.057	H5C30-020	.059	H7C30-020
20/40	30°	1-7/8	1-7/8	3/4	2	.057	H5C30-020-2S	.059	-
20/40	30°	2-1/2	2	1-1/4	1	.057	H5C30-020	.059	H7C30-020
20/40	30°	3	3	1-1/4	1	.057	H5C30-020E	.059	-
24/48	30°	3/4	5/8	8mm	1	.048	H5C30-024M	.049	H7C30-024M
24/48	30°	1-1/4	1-1/4	1/2	1	.048	H5C30-024H	.049	H7C30-024H
24/48	30°	1-7/8	1-7/8	3/4	1	.048	H5C30-024S	.049	H7C30-024S
24/48	30°	2-1/2	2	1-1/4	1	.048	H5C30-024	.049	H7C30-024
32/64	30°	3/4	2/3	8mm	1	.036	H5C30-032M	.037	H7C30-032M
32/64	30°	1-1/8	1-1/8	1/2	1	.036	H5C30-032H	.037	H7C30-032H
32/64	30°	1-7/8	1-7/8	3/4	1	.036	H5C30-032S	.037	H7C30-032S
32/64	30°	2-1/2	2	1-1/4	1	.036	H5C30-032	.037	H7C30-032
40/80	30°	1-1/8	1-1/8	1/2	1	.0295	H5C30-040H	-	-
48/96	30°	3/4	2/3	8mm	1	.0249	H5C30-048M	-	-



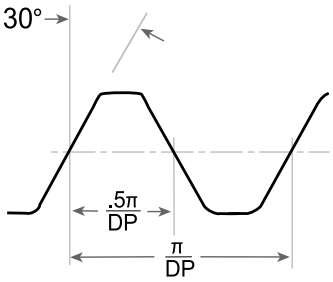


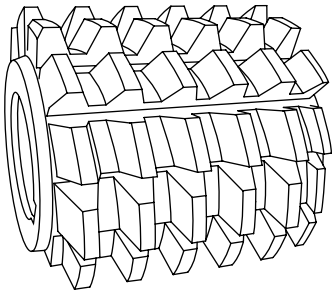
H5N30 & H7N30 Series

DP 30° PA HOBS

ANSI Spline
Finishing
Right Hand
Non-Chamfering
Flat Root

DP	PA	OD	Length	Bore	# Of Leads	ASA B5.15-1950		ANSI B92.1 1970/6	
						WD	Specify Class A, B, C	WD	Specify Class A, B, C
2.5/5	30°	4	4	1-1/4	1	.442	H5N30-250	.470	H7N30-250
3/6	30°	4	4	1-1/4	1	.369	H5N30-300	.392	H7N30-300
4/8	30°	3-1/2	3-1/2	1-1/4	1	.277	H5N30-400	.294	H7N30-400
4/8	30°	4	4	1-1/4	2	.277	-	.294	H7N30-400-2
5/10	30°	3	3	1-1/4	1	.222	H5N30-500	.235	H7N30-500
5/10	30°	3-1/2	3-1/2	1-1/4	2	.222	-	.235	H7N30-500-2
6/12	30°	2	3-1/2	3/4	1	.185	-	.196	H7N30-600SL
6/12	30°	3	3	1-1/4	1	.185	H5N30-600	.196	H7N30-600
6/12	30°	3-1/4	3-1/4	1-1/4	2	.185	-	.196	H7N30-600-2
8/16	30°	1-7/8	1-7/8	3/4	1	.140	H5N30-800S	.147	H7N30-800S
8/16	30°	2-3/4	2-3/4	1-1/4	1	.140	H5N30-800	.147	H7N30-800
8/16	30°	3	3	1-1/4	2	.140	-	.147	H7N30-800-2
10/20	30°	1-7/8	1-7/8	3/4	1	.112	H5N30-010S	.118	H7N30-010S
10/20	30°	2	2	3/4	2	.112	-	.118	H7N30-010S-2
10/20	30°	2-1/2	2-1/2	1-1/4	1	.112	H5N30-010	.118	H7N30-010
10/20	30°	2-3/4	2-3/4	1-1/4	2	.112	-	.118	H7N30-010-2
10/20	30°	114mm	114mm	40mm	1	.112	-	.118	H7N30-010F
12/24	30°	1-1/4	1-1/4	1/2	1	.094	H5N30-012H	.098	H7N30-012H
12/24	30°	1-1/4	2-1/2	1/2	1	.094	-	.098	H7N30-012HL
12/24	30°	1-7/8	1-7/8	3/4	1	.094	H5N30-012S	.098	H7N30-012S
12/24	30°	2	2	3/4	2	.094	-	.098	H7N30-012S-2
12/24	30°	2-1/2	2	1-1/4	1	.094	H5N30-012	.098	H7N30-012
12/24	30°	3	3	1-1/4	1	.094	-	.098	H7N30-012B
12/24	30°	2-3/4	2-3/4	1-1/4	2	.094	-	.098	H7N30-012-2
12/24	30°	48mm	50mm	22mm	1	.094	-	.098	H7N30-012T
16/32	30°	1-1/4	1-1/4	1/2	1	.071	H5N30-016H	.073	H7N30-016H
16/32	30°	1	1-7/8	1/2	2	.071	-	.073	H7N30-016-2H
16/32	30°	1-7/8	1-7/8	3/4	1	.071	H5N30-016S	.073	H7N30-016S
16/32	30°	1-7/8	1-7/8	3/4	2	.071	-	.073	H7N30-016S-2
16/32	30°	1-7/8	1-7/8	3/4	3	.071	-	.073	H7N30-016S-3
16/32	30°	2-1/2	2	1-1/4	1	.071	H5N30-016	.073	H7N30-016
16/32	30°	2-3/4	2-3/4	1-1/4	2	.071	-	.073	H7N30-016-2
16/32	30°	2-3/4	2-3/4	1-1/4	3	.071	-	.073	H7N30-016-3
16/32	30°	48mm	50mm	22mm	1	.071	-	.073	H7N30-016T
20/40	30°	3/4	3/4	8mm	1	.057	H5N30-020M	.078	H7N30-020M
20/40	30°	1-1/4	1-1/4	1/2	1	.057	H5N30-020H	.059	H7N30-020H
20/40	30°	1-1/4	1-1/4	1/2	2	.057	-	.059	H7N30-020H-2
20/40	30°	1-7/8	1-7/8	3/4	1	.057	H5N30-020S	.059	H7N30-020S
20/40	30°	1-7/8	1-7/8	3/4	2	.057	-	.059	H7N30-020S-2
20/40	30°	1-7/8	1-7/8	3/4	2	.057	-	.059	H7N30-020S-2
20/40	30°	2-1/2	2	1-1/4	1	.057	H5N30-020	.059	H7N30-020
20/40	30°	60mm	80mm	27mm	1	.057	-	.059	H7N30-020T
24/48	30°	3/4	5/8	8mm	1	.048	H5N30-024M	.049	H7N30-024M
24/48	30°	1-1/4	1-1/4	1/2	1	.048	H5N30-024H	.049	H7N30-024H
24/48	30°	1-7/8	1-7/8	3/4	1	.048	H5N30-024S	.049	H7N30-024S
24/48	30°	1-7/8	1-7/8	3/4	2	.048	-	.049	H7N30-024S-2
24/48	30°	2-1/2	2	1-1/4	1	.048	H5N30-024	.049	H7N30-024
24/48	30°	3	4	1-1/4	1	.048	-	.049	H7N30-024L
32/64	30°	3/4	2/3	8mm	1	.036	H5N30-032M	.037	H7N30-032M
32/64	30°	1-1/8	1-1/8	1/2	1	.036	H5N30-032H	.037	H7N30-032H
32/64	30°	1-7/8	1-1/2	3/4	1	.036	H5N30-032S	.037	H7N30-032S
32/64	30°	1-7/8	1-7/8	3/4	2	.036	-	.037	H7N30-032S-2
32/64	30°	2-1/2	2	1-1/4	1	.036	H5N30-032	.037	H7N30-032
40/80	30°	3/4	5/8	8mm	1	.030	H5N30-040M	.030	H7N30-040M
40/80	30°	1-1/8	1-1/8	1/2	1	.030	H5N30-040H	.030	H7N30-040H
40/80	30°	1-7/8	1-7/8	3/4	1	.030	H5N30-040S	.030	H7N30-040S
40/80	30°	2-1/2	2	1-1/4	1	.030	H5N30-040	.030	H7N30-040
48/96	30°	3/4	5/8	8mm	1	.025	H5N30-048M	.025	H7N30-048M
48/96	30°	1-1/8	1-1/8	1/2	1	.025	H5N30-048H	.025	H7N30-048H
48/96	30°	1-7/8	1-1/2	3/4	1	.025	H5N30-048S	.025	H7N30-048S
48/96	30°	2-1/2	2	1-1/4	1	.025	H5N30-048	.025	H7N30-048



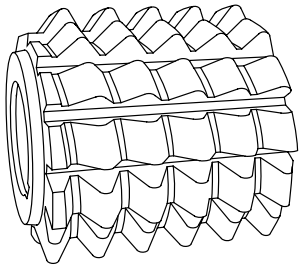


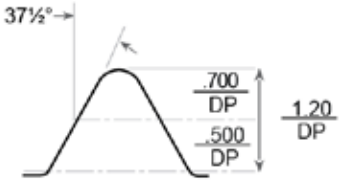
DP	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
2.5/5	37.5°	4	4	1-1/4	.511	HI37-250
3/6	37.5°	3-1/4	3-1/4	1-1/4	.427	HI37-300
4/8	37.5°	3-1/2	3-1/2	1-1/4	.231	HI37-400
5/10	37.5°	3	3	1-1/4	.258	HI37-500
6/12	37.5°	3	3	1-1/4	.216	HI37-600
8/16	37.5°	2-3/4	2-3/4	1-1/4	.163	HI37-800
10/20	37.5°	1-7/8	1-7/8	3/4	.120	HI37-010S
10/20	37.5°	2-1/2	2	1-1/4	.120	HI37-010
12/24	37.5°	1-7/8	1-7/8	3/4	.110	HI37-012S
16/32	37.5°	1-7/8	1-7/8	3/4	.075	HI37-016S
16/32	37.5°	2-1/2	2	1-1/4	.075	HI37-016
20/40	37.5°	1-1/4	1-1/4	1/2	.060	HI37-020H
20/40	37.5°	1-7/8	1-7/8	3/4	.060	HI37-020S
20/40	37.5°	2-1/2	2	1-1/4	.068	HI37-020
24/48	37.5°	3/4	5/8	8mm	.058	HI37-024M
24/48	37.5°	1-1/4	1-1/4	1/2	.058	HI37-024H
24/48	37.5°	1-7/8	1-7/8	3/4	.058	HI37-024S
24/48	37.5°	2-1/2	2	1-1/4	.058	HI37-024
32/64	37.5°	1-1/8	1-1/8	1/2	.045	HI37-032H
32/64	37.5°	1-7/8	1-1/2	3/4	.045	HI37-032S
32/64	37.5°	2-1/2	2	1-1/4	.045	HI37-032
40/80	37.5°	3/4	5/8	8mm	.037	HI37-040M
40/80	37.5°	1-1/8	1-1/8	1/2	.037	HI37-040H
40/80	37.5°	1-7/8	1-1/2	3/4	.037	HI37-040S
40/80	37.5°	2-1/2	2	1-1/4	.037	HI37-040
48/96	37.5°	3/4	5/8	8mm	.026	HI37-048M
48/96	37.5°	2-1/2	2	1-1/4	.026	HI37-048

HI37 Series

DP 37.5° PA HOBS

ANSI Spline
Finishing
Single Lead, Right Hand
Fillet Root
Non-Chamfering



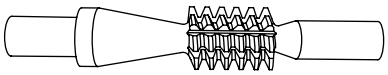


DP	PA	O.D.	Length	WD	Specify Class A, B, C
16/32	37.5°	.875	6	.0750	HFK37-016
20/40	37.5°	.875	6	.0600	HFK37-020
24/48	37.5°	.750	6	.0577	HFK37-024
32/64	37.5°	.750	6	.0445	HFK37-032
40/80	37.5°	.750	6	.0366	HFK37-040
48/96	37.5°	.625	6	.0264	HFK37-048

HFK37 Series

DP 37.5° PA HOBS

ANSI Spline
Finishing, Right Hand
Non Chamfering
Fillet Root
5/8" Straight Shanks

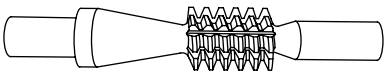


DP	PA	O.D.	Length	WD	Specify Class A, B, C
8/16	45°	.875	6.000	.131	HFK45-800
10/20	45°	.875	6.000	.105	HFK45-010
16/32	45°	.875	6.000	.066	HFK45-016
20/40	45°	.875	6.000	.053	HFK45-020
24/48	45°	.750	6.000	.044	HFK45-024
32/64	45°	.750	6.000	.033	HFK45-032
40/80	45°	.750	6.000	.026	HFK45-040
48/96	45°	.625	6.000	.022	HFK45-048
64/128	45°	.563	6.000	.016	HFK45-064

HFK45 Series

DP 45° PA GEAR HOBS

ANSI Spline
Finishing
Single Lead Right Hand
Non Chamfering
Fillet Root Right Hand
5/8 " Straight Shanks

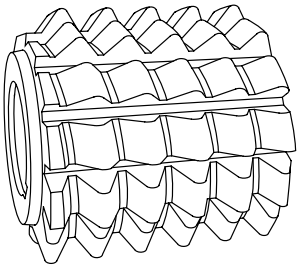


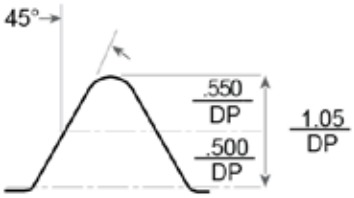
HI45 Series

DP 45° PA HOBS

ANSI Spline
Finishing , Right Hand
Non Chamfering
Fillet Root

DP	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
8/16	45°	2-3/4	2-3/4	1-1/4	.131	HI45-800
10/20	45°	1-1/8	1-1/8	1/2	.105	HI45-010HE
10/20	45°	1-3/4	1-3/4	3/4	.105	HI45-010S
10/20	45°	2-1/2	2-1/2	1-1/4	.105	HI45-010
12/24	45°	1-7/8	1-7/8	3/4	.088	HI45-012S
12/24	45°	2-1/2	2	1-1/4	.088	HI45-012
16/32	45°	1-1/4	1-1/4	1/2	.066	HI45-016H
16/32	45°	1-7/8	1-7/8	3/4	.066	HI45-016S
16/32	45°	2-1/2	2	1-1/4	.066	HI45-016
20/40	45°	1-1/4	1-1/4	1/2	.053	HI45-020H
20/40	45°	3/4	3/4	8mm	.053	HI45-020M
20/40	45°	1-7/8	1-7/8	3/4	.053	HI45-020S
20/40	45°	2-1/2	2	1-1/4	.053	HI45-020
24/48	45°	3/4	5/8	8mm	.044	HI45-024M
24/48	45°	1-1/4	1-1/4	1/2	.044	HI45-024H
24/48	45°	1-7/8	1-7/8	3/4	.044	HI45-024S
24/48	45°	1-3/8	1-1/2	3/4	.044	HI45-024SE
24/48	45°	2-1/2	2	1-1/4	.044	HI45-024
32/64	45°	3/4	5/8	8mm	.033	HI45-032M
32/64	45°	1-1/8	1-1/8	1/2	.033	HI45-032H
32/64	45°	1-7/8	1-7/8	3/4	.033	HI45-032S
32/64	45°	2-1/2	2	1-1/4	.033	HI45-032
40/80	45°	3/4	5/8	8mm	.026	HI45-040M
40/80	45°	1-1/8	1-1/8	1/2	.026	HI45-040H
40/80	45°	1-7/8	1-7/8	3/4	.026	HI45-040S
40/80	45°	1-3/8	1-1/2	3/4	.026	HI45-040SE
40/80	45°	2-1/2	2	1-1/4	.026	HI45-040
48/96	45°	3/4	5/8	8mm	.022	HI45-048M
48/96	45°	1-1/8	1-1/8	1/2	.022	HI45-048H
48/96	45°	1-7/8	1-7/8	3/4	.022	HI45-048S
64/128	45°	3/4	5/8	8mm	.016	HI45-064M
64/128	45°	1-1/8	1-1/8	1/2	.016	HI45-064H
64/128	45°	1-7/8	1-1/2	3/4	.016	HI45-064S
80/160	45°	3/4	1/2	8mm	.013	HI45-080M
80/160	45°	1-1/8	1-1/8	1/2	.013	HI45-080H
80/160	45°	1-7/8	1-1/2	3/4	.013	HI45-080S



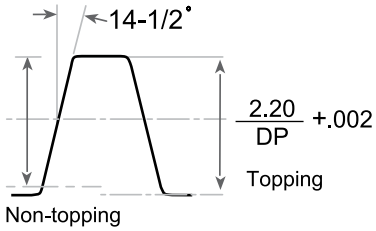


HFM14 & HM14 Series

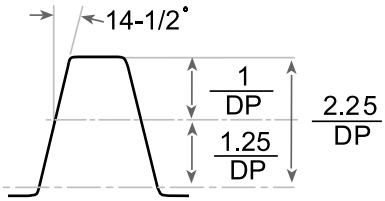
MODULE 14.5° PA GEAR HOBS

Finishing
Non Topping
1-RH

Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
.500	14.5°	1 1/8	1 1/8	1/2	.045	HFM14-050H
.600	14.5°	1 1/8	1 1/8	1/2	.054	HFM14-060H
.750	14.5°	1 1/8	1 1/8	1/2	.067	HFM14-075H
.800	14.5°	1 1/8	1 1/8	1/2	.071	HFM14-080H
.900	14.5°	1 7/8	1 7/8	3/4	.080	HFM14-090S
1	14.5°	1-7/8	1-7/8	3/4	.089	HM14-100S
1	14.5°	2-1/2	2	1-1/4	.089	HM14-100
1.250	14.5°	1-7/8	1-7/8	3/4	.111	HM14-125S
1.250	14.5°	2-1/2	2	1-1/4	.111	HM14-125
1.500	14.5°	1-7/8	1-7/8	3/4	.133	HM14-150S
1.500	14.5°	2-1/2	2-1/2	1-1/4	.133	HM14-150
1.750	14.5°	1-7/8	1-7/8	3/4	.155	HM14-175S
1.750	14.5°	2-1/2	2-1/2	1-1/4	.155	HM14-175
2	14.5°	1-7/8	1-7/8	3/4	.177	HM14-200S
2	14.5°	2-3/4	2-3/4	1-1/4	.177	HM14-200
2.250	14.5°	1-7/8	1-7/8	3/4	.199	HM14-225S
2.250	14.5°	2-3/4	2-3/4	1-1/4	.199	HM14-225
2.50	14.5°	1-7/8	1-7/8	3/4	.221	HM14-250S
2.500	14.5°	2-3/4	2-3/4	1-1/4	.221	HM14-250
2.500	14.5°	2-3/4	2-3/4	1-1/4	.212	HM14-250E
2.750	14.5°	3	3	1-1/4	.244	HM14-275
3	14.5°	3	3	1-1/4	.266	HM14-300
3.250	14.5°	3	3	1-1/4	.288	HM14-325
3.500	14.5°	3 1/3	3	1-1/4	.310	HM14-350
3.750	14.5°	3	3	1-1/4	.332	HM14-375
4	14.5°	3-1/2	3-1/2	1-1/4	.354	HM14-400
4.250	14.5°	3-1/2	3-1/2	1-1/4	.376	HM14-425
4.500	14.5°	3-1/2	3-1/2	1-1/4	.399	HM14-450
4.750	14.5°	3-1/2	3-1/2	1-1/4	.421	HM14-475
5	14.5°	3-1/2	3-1/2	1-1/4	.443	HM14-500
5.250	14.5°	3-1/2	3-1/2	1-1/4	.465	HM14-525
5.500	14.5°	3-1/2	3-1/2	1-1/4	.487	HM14-550
5.750	14.5°	3-1/2	3-1/2	1-1/4	.509	HM14-575
6	14.5°	4	4	1-1/4	.531	HM14-600
7	14.5°	4-1/4	4-1/4	1-1/4	.620	HM14-700
7.500	14.5°	5	5	1 1/2	.664	HM14-750
8	14.5°	4-1/2	5	1-1/4	.709	HM14-800
9	14.5°	5	6	1-1/4	.797	HM14-900
10	14.5°	5	6	1-1/2	.886	HM14-010
11	14.5°	5-3/4	6-1/2	1-1/2	.974	HM14-011
12	14.5°	5-3/4	7	1-1/2	1.063	HM14-012



HFM14 Rack Profile



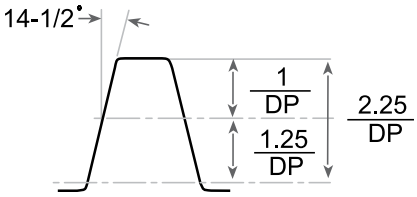
HM14 Rack Profile

HM15 Series

MODULE 15° PA GEAR HOBS

Finishing
Non Topping
1-RH

Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
1	15°	1-7/8	1-7/8	3/4	.089	HM15-100S	-
1	15°	2-1/2	2	1-1/4	.089	HM15-100	-
1.250	15°	2-1/2	2	1-1/4	.111	HM15-125	-
1.500	15°	2-1/2	2-1/2	1-1/4	.133	HM15-150	-
1.750	15°	2-1/2	2-1/2	1-1/4	.155	HM15-175	-
2	15°	2-3/4	2-3/4	1-1/4	.177	HM15-200	HML15-200
2 .250	15°	2-3/4	2-3/4	1-1/4	.199	HM15-225	HML15-225
2.500	15°	2-3/4	2-3/4	1-1/4	.221	HM15-250	-
2.750	15°	3	3	1-1/4	.244	HM15-275	-
3	15°	3	3	1-1/4	.266	HM15-300	-
3.250	15°	3	3	1-1/4	.288	HM15-325	-
3.500	15°	3	3	1-1/4	.310	HM15-350	-
3.750	15°	3	3	1-1/4	.332	HM15-375	-
4	15°	3-1/2	3-1/2	1-1/4	.354	HM15-400	-

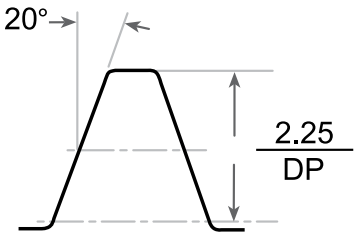


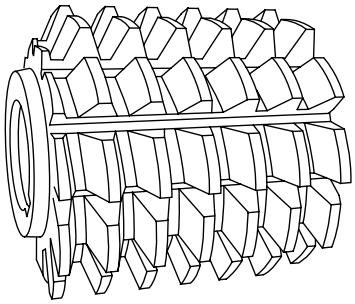
HM20, HML20, CHM20 & CHML20 Series

MODULE 20° PA GEAR HOBS

Finishing
Non Topping

Module	PA	O.D.	Length	Bore	# of Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
1	20°	1	3/4	8mm	1	.089	HM20-100M	-
1	20°	1-1/4	1-1/4	1/2	1	.089	HM20-100H	-
1	20°	1-7/8	1-7/8	3/4	1	.089	HM20-100S	HML20-100S
1	20°	2-1/2	2	1-1/4	1	.089	HM20-100	HML20-100
1	20°	32mm	75mm	13mm	1	.089	HM20-100R	HML20-100
1	20°	1-7/8	1-7/8	3/4	2	.089	HM20-100S-2	-
1	20°	1-7/8	1-7/8	3/4	3	.089	HM20-100S-3	-
1-1/8	20°	1-7/8	1-7/8	3/4	1	.100	HM20-112S	-
1-1/8	20°	2-1/2	2	1-1/4	1	.100	HM20-112	-
1-1/4	20°	1	3/4	8mm	1	.111	HM20-125M	-
1-1/4	20°	1-1/4	1-1/4	1/2	1	.111	HM20-125H	HML20-125H
1-1/4	20°	1-7/8	1-7/8	3/4	1	.111	HM20-125S	HML20-125S
1-1/4	20°	2-1/2	2	1-1/4	1	.111	HM20-125	HML20-125
1-3/8	20°	1-7/8	1-7/8	3/4	1	.122	HM20-137S	-
1-3/8	20°	2-1/2	2	1-1/4	1	.122	HM20-137	-
1-1/2	20°	1-1/4	1-1/4	1/2	1	.133	HM20-150H	-
1-1/2	20°	1-7/8	1-7/8	3/4	1	.133	HM20-150S	HML20-150S
1-1/2	20°	32mm	75mm	13mm	1	.133	HM20-150R	-
1-1/2	20°	2-1/2	2-1/2	1-1/4	1	.133	HM20-150	HML20-150
1-1/2	20°	36mm	71mm	16mm	1	.133	HM20-150TE	-
1-3/4	20°	1-7/8	1-7/8	3/4	1	.155	HM20-175S	HML20-175S
1-3/4	20°	2-1/2	2-1/2	1-1/4	1	.155	HM20-175	HML20-175
2	20°	1-7/8	1-7/8	3/4	1	.177	HM20-200S	HML20-200S
2	20°	2-3/4	2-3/4	1-1/4	1	.177	HM20-200	HML20-200
2	20°	40mm	71mm	16mm	1	.177	HM20-200X	-
2	20°	50mm	70mm	22mm	1	.177	HM20-200T	-
2	20°	70mm	120mm	27mm	1	.177	HM20-200N	-
2-1/4	20°	1-7/8	1-7/8	3/4	1	.199	HM20-225S	HML20-225S
2-1/4	20°	2-3/4	2-3/4	1-1/4	1	.199	HM20-225	HML20-225
2-1/2	20°	1-7/8	1-7/8	3/4	1	.221	HM20-250S	HML20-250S
2-1/2	20°	2-3/4	2-3/4	1-1/4	1	.221	HM20-250	HML20-250
2-3/4	20°	2	2	3/4	1	.244	HM20-275S	-
2-3/4	20°	3	3	1-1/4	1	.244	HM20-275	HML20-275
3	20°	2	2	3/4	1	.266	HM20-300S	HML20-300S
3	20°	3	3	1-1/4	1	.266	HM20-300	HML20-300
3	20°	65mm	100mm	27mm	1	.266	HM20-300T	-
3	20°	112mm	130mm	40mm	1	.266	HM20-300F	-
3-1/4	20°	3	3	1-1/4	1	.288	HM20-325	-
3-1/2	20°	3	3	1-1/4	1	.310	HM20-350	HML20-350
3-3/4	20°	3	3	1-1/4	1	.332	HM20-375	-
4	20°	3-1/2	3-1/2	1-1/4	1	.354	HM20-400	HML20-400
4	20°	75mm	120mm	27mm	1	.354	HM20-400T	-
4	20°	90mm	120mm	27mm	1	.354	HM20-400TE	-
4	20°	120mm	140mm	40mm	1	.354	HM20-400F	-
4-1/4	20°	3-1/2	3-1/2	1-1/4	1	.376	HM20-425	–
4-1/2	20°	3-1/2	3-1/2	1-1/4	1	.399	HM20-450	HML20-450
4-1/2	20°	76mm	121mm	27mm	1	.399	HM20-450T	-
4-3/4	20°	3-1/2	3-1/2	1-1/4	1	.421	HM20-475	–
5	20°	3-1/2	3-1/2	1-1/4	1	.443	HM20-500	HML20-500
5	20°	5	6	1 1/2	3	.443	HM20-500-3	-
5	20°	90mm	120mm	27mm	1	.443	HM20-500T	-





SERIES CONTINUED ON NEXT PAGE ->

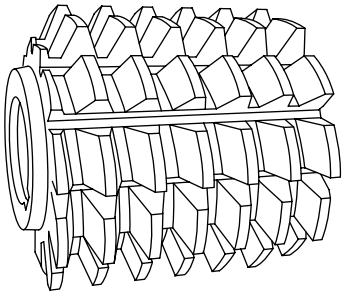
HM20, HML20, CHM20 & CHML20 Series

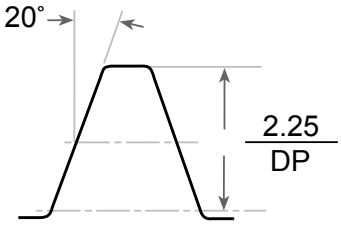
MODULE 20° PA GEAR HOBS

Finishing

Non Topping

Module	PA	O.D.	Length	Bore	# of Leads	WD	Specify Class AA, A, B, C	
							Right Hand	Left Hand
5-1/4	20°	3-1/2	3-1/2	1-1/4	1	.465	HM20-525	–
5-1/2	20°	3-1/2	3-1/2	1-1/4	1	.487	HM20-550	–
5-3/4	20°	3-1/2	3-1/2	1-1/4	1	.509	HM20-575	–
6	20°	4	4	1-1/4	1	.531	HM20-600	HML20-600
6	20°	90mm	110mm	27mm	1	.531	HM20-600W	-
6	20°	100mm	120mm	32mm	1	.531	HM20-600T	-
6	20°	120mm	140mm	40mm	1	.531	HM20-600F	-
6-1/4	20°	4	4	1-1/4	1	.554	HM20-625	–
6-1/2	20°	4	4	1-1/4	1	.576	HM20-650	–
7	20°	4-1/4	4-3/4	1-1/4	1	.620	HM20-700	HML20-700
7-1/2	20°	4-1/2	5	1-1/4	1	.664	HM20-750	–
8	20°	4-1/2	5	1-1/4	1	.709	HM20-800	HML20-800
8	20°	119mm	140mm	40mm	1	.709	HM20-800F	-
8-1/2	20°	4-1/2	5	1-1/4	1	.753	HM20-850	–
9	20°	5	6	1-1/2	1	.797	HM20-900	HML20-900
9	20°	4-3/4	5	1 1/4	1	.797	CHM20-900	CHML20-900
10	20°	5	7	1-1/2	1	.886	HM20-010	HML20-010
10	20°	4-3/4	5-1/2	1-1/4	1	.886	CHM20-010	CHML20-010
10	20°	127mm	150mm	40mm	1	.886	HM20-010F	-
11	20°	5-1/2	7-1/2	1-1/2	1	.974	HM20-011	HML20-011
11	20°	5 1/4	6	1-1/4	1	.974	CHM20-011	-
12	20°	5-3/4	8	1-1/2	1	1.063	HM20-012	HML20-012
12	20°	5-1/2	6	1-1/4	1	1.063	CHM20-012	CHML20-012
12	20°	146mm	203mm	50mm	1	1.063	HM20-012F	-
13	20°	6	8	1-1/2	1	1.152	HM20-013	HML20-013
13	20°	5-1/2	6	1-1/4	1	1.152	CHM20-013	-
14	20°	7-1/4	9	2	1	1.240	HM20-014	HML20-014
14	20°	6-1/2	8	1-1/2	1	1.240	CHM20-014	CHML20-014
15	20°	7-1/4	9	2	1	1.329	HM20-015	HML20-015
15	20°	6-1/2	8	1-1/2	1	1.329	CHM20-015	CHML20-015
16	20°	8	10	2	1	1.417	HM20-016	HML20-016
16	20°	7-1/2	8	1-1/2	1	1.417	CHM20-016	CHML20-016
17	20°	8	10	2	1	1.506	HM20-017	-
18	20°	8	10	2	1	1.594	HM20-018	HML20-018
18	20°	7-1/2	8	1-1/2	1	1.594	CHM20-018	CHML20-018
19	20°	8-1/2	11	2	1	1.683	HM20-019	–
20	20°	8-3/4	12	2	1	1.772	HM20-020	HML20-020
20	20°	8-1/4	10-1/2	1-1/2	1	1.772	CHM20-020	CHML20-020
21	20°	8-3/4	12	2	1	1.860	HM20-021	–
22	20°	9-1/2	13	2	1	1.949	HM20-022	–
22	20°	8-3/4	11	1 1/2	1	1.949	CHM20-022	–
24	20°	10-3/4	18	2-1/2	1	2.126	HM20-024	–
24	20°	10-1/4	12-1/2	2	1	2.126	CHM20-024	–
25	20°	10-3/4	15	2-1/2	1	2.215	HM20-025	–
25	20°	10-1/4	12-1/2	2	1	2.215	CHM20-025	–
26	20°	12-1/2	12-1/2	2	1	2.303	CHM20-026	
28	20°	11-3/4	15	2-1/2	1	2.480	HM20-028	–
30	20°	12-1/2	15-1/2	2-1/2	1	2.657	HM20-030	–
30	20°	11-1/2	13-1/2	2-1/2	1	2.657	CHM20-030	–
32	20°	12-1/2	16	2-1/2	1	2.835	HM20-032	–
32	20°	12	14	2 1/2	1	2.835	CHM20-032	–



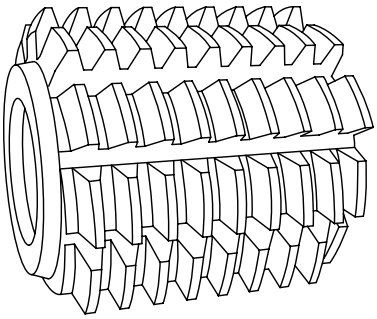


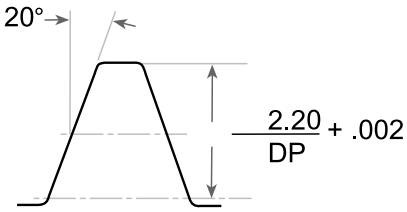
HFM20 & HFML20 Series

MODULE 20° PA GEAR HOBS

Finishing
Non Topping
Single Lead

Module	PA	O.D.	Length	Bore	WD	Specify Class AA, A, B, C	
						Right Hand	Left Hand
0.2	20°	3/4	5/8	8mm	.019	HFM20-020M	-
0.25	20°	5/8	2/3	8mm	.024	HFM20-025M	-
0.3	20°	3/4	5/7	8mm	.028	HFM20-030M	-
0.3	20°	1-5/8	1-1/2	1/2	.028	HFM20-030H	-
0.3	20°	1-5/8	1-1/2	3/4	.028	HFM20-030S	-
0.35	20°	3/4	11/16	8mm	.032	HFM20-035M	-
0.35	20°	1-1/8	1-1/8	1/2	.032	HFM20-035H	-
0.4	20°	3/4	2/3	8mm	.037	HFM20-040M	-
0.4	20°	1-1/8	1-1/8	1/2	.037	HFM20-040H	-
0.4	20°	1-5/8	1-1/2	3/4	.037	HFM20-040S	-
0.45	20°	3/4	2/3	8mm	.041	HFM20-045M	-
0.45	20°	1-7/8	1-1/2	3/4	.041	HFM20-045S	-
0.5	20°	3/4	5/8	8mm	.045	HFM20-050M	-
0.5	20°	1-1/8	1-1/8	1/2	.045	HFM20-050H	-
0.5	20°	1-7/8	1-1/2	3/4	.045	HFM20-050S	-
0.5	20°	2-1/2	2	1-1/4	.041	HFM20-050	-
0.55	20°	3/4	3/4	8mm	.050	HFM20-055	-
0.55	20°	1-7/8	1-7/8	0.75	.050	HFM20-055S	-
0.6	20°	3/4	3/4	8mm	.054	HFM20-060M	-
0.6	20°	1-1/8	1-1/8	1/2	.054	HFM20-060H	-
0.6	20°	1-7/8	1-1/2	3/4	.054	HFM20-060S	-
0.6	20°	2-1/2	2	1-1/4	.054	HFM20-060	-
0.65	20°	3/4	2/3	8mm	.058	HFM20-065M	-
0.65	20°	1-1/8	1-1/8	1/2	.058	HFM20-065H	-
0.65	20°	1-7/8	1-1/2	3/4	.058	HFM20-065S	-
0.7	20°	3/4	3/4	8mm	.063	HFM20-070M	-
0.7	20°	1-1/8	1-1/8	1/2	.063	HFM20-070H	-
0.7	20°	1-7/8	1-1/2	3/4	.063	HFM20-070S	-
0.7	20°	2-1/2	2	1-1/4	.063	HFM20-070	-
0.75	20°	1	5/8	8mm	.067	HFM20-075M	-
0.75	20°	1-1/8	1-1/2	1/2	.067	HFM20-075H	-
0.75	20°	1-7/8	1-7/8	3/4	.067	HFM20-075S	-
0.75	20°	2-1/2	2	1-1/4	.067	HFM20-075	HFML20-075
0.8	20°	1	3/4	8mm	.071	HFM20-080M	-
0.8	20°	1-1/8	1-1/8	1/2	.071	HFM20-080H	-
0.8	20°	1-7/8	1-7/8	3/4	.071	HFM20-080S	HFML20-080S
0.8	20°	2-1/2	2	1.24	.071	HFM20-080	-
0.85	20°	1	3/4	8mm	.076	HFM20-085M	-
0.85	20°	1-1/8	1-1/8	1/2	.076	HFM20-085H	-
0.85	20°	1-7/8	1-7/8	3/4	.076	HFM20-085S	-
0.85	20°	2-1/2	2	1-1/4	.076	HFM20-085	-
0.9	20°	1	3/4	8mm	.080	HFM20-090M	-
0.9	20°	1-1/4	1-1/4	1/2	.080	HFM20-090H	-
0.9	20°	1-7/8	1-7/8	3/4	.080	HFM20-090S	HFML20-090S
0.9	20°	2-1/2	2	1-1/4	.080	HFM20-090	HFML20-090
0.95	20°	1	3/4	8mm	.084	HFM20-095M	-
0.95	20°	1-7/8	1-1/2	3/4	.084	HFM20-095S	-



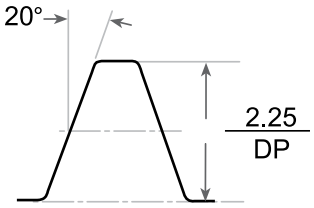


HMT20 & HFMT20 Series

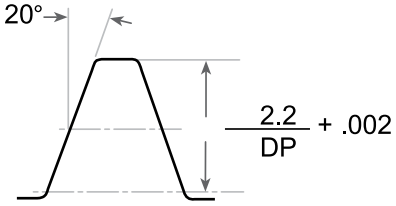
MODULE DP 20° PA GEAR HOBS

Finishing
Topping
Single Lead

Module	PA	O.D.	Length	Bore	WD	Specify Class AA, A, B, C
0.3	20°	1	1/2	8mm	.028	HFMT20-030M
0.35	20°	3/4	1/2	8mm	.032	HFMT20-035M
0.4	20°	1	2/3	8MM	.037	HFMT20-040M
0.4	20°	1-5/8	1-1/2	3/4	.037	HFMT20-040S
0.5	20°	3/4	2/3	8MM	.045	HFMT20-050M
0.5	20°	1-7/8	1-1/2	3/4	.045	HFMT20-050S
0.55	20°	2/3	1/2	8MM	.050	HFMT20-055M
0.6	20°	3/4	3/4	8MM	.054	HFMT20-060M
0.6	20°	1-1/8	1-1/8	1/2	.054	HFMT20-060H
0.6	20°	1-7/8	1-1/2	3/4	.054	HFMT20-060S
0.65	20°	3/4	3/4	8MM	.058	HFMT20-065M
0.7	20°	1-1/8	1-1/5	1/2	.063	HFMT20-070H
0.75	20°	1	3/4	8MM	.067	HFMT20-075M
0.75	20°	1-1/8	1-1/8	1/2	.067	HFMT20-075H
0.75	20°	1-7/8	1-7/8	3/4	.067	HFMT20-075S
0.8	20°	1	3/4	8MM	.071	HFMT20-080M
0.8	20°	1-1/8	1-1/5	1/2	.071	HFMT20-080H
0.8	20°	1-7/8	1-7/8	3/4	.071	HFMT20-080S
0.85	20°	3/4	3/4	8MM	.076	HFMT20-085M
0.9	20°	1-7/8	1-1/2	3/4	.080	HFMT20-090S
0.9	20°	2-1/2	2	1 1/4	.080	HFMT20-090
1	20°	1	3/4	8mm	.089	HMT20-100M
1	20°	1-1/4	1-1/4	1/2	.089	HMT20-100H
1	20°	1-7/8	1-7/8	3/4	.089	HMT20-100S
1.25	20°	1-1/4	1-1/4	1/2	.111	HMT20-125H
1.25	20°	1-7/8	1-7/8	3/4	.111	HMT20-125S
1.5	20°	1-7/8	1-7/8	3/4	.133	HMT20-150S
1.5	20°	2-1/2	2-1/2	1-1/4	.133	HMT20-150
1.75	20°	1-7/8	1-7/8	3/4	.155	HMT20-175S
1.75	20°	2-1/2	2-1/2	1-1/4	.155	HMT20-175
2	20°	2	2	3/4	.177	HMT20-200S
2	20°	2-3/4	2-3/4	1-1/4	.177	HMT20-200
2.25	20°	2-3/4	2-3/4	1-1/4	.199	HMT20-225
2.5	20°	1-7/8	1-7/8	3/4	.221	HMT20-250S
2.5	20°	2-3/4	2-3/4	1-1/4	.221	HMT20-250
2.75	20°	2	2	3/4	.244	HMT20-275S
2.75	20°	3	3	1-1/4	.244	HMT20-275
3	20°	3	3	1-1/4	.266	HMT20-300
3.5	20°	3	3	1-1/4	.310	HMT20-350
6	20°	4	4	1-1/4	.531	HMT20-600



HMT20 Rack Profile

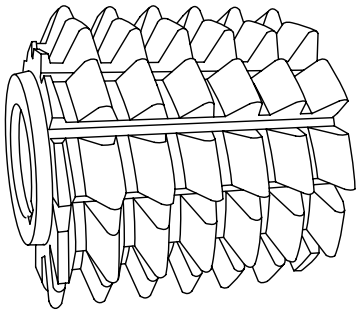


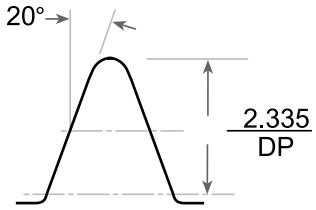
HFMT20 Rack Profile
1 MOD & Finer

HMR20 Series

MODULE 20° PA GEAR HOBS

Full Fillet
Finishing
Non Topping
Single Lead, Right Hand



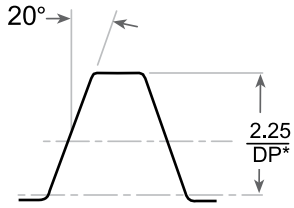


Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
1	20°	1-7/8	1-7/8	3/4	.092	HMR20-100S
1	20°	2 1/2	2	1-1/4	.092	HMR20-100
1-1/4	20°	1-7/8	1-7/8	3/4	.115	HMR20-125S
1-1/4	20°	2-1/2	2	1-1/4	.115	HMR20-125
1-3/8	20°	2-1/2	2	1-1/4	.126	HMR20-137
1-1/2	20°	1-7/8	1-7/8	3/4	.138	HMR20-150S
1-1/2	20°	2-1/2	2	1-1/4	.138	HMR20-150
1-3/4	20°	1-7/8	1-7/8	3/4	.161	HMR20-175S
1-3/4	20°	2-1/2	2-1/2	1-1/4	.161	HMR20-175
2	20°	1-7/8	1-7/8	3/4	.184	HMR20-200S
2	20°	2-3/4	2-3/4	1-1/4	.184	HMR20-200
2-1/4	20°	1-7/8	1-7/8	3/4	.207	HMR20-225S
2-1/4	20°	2-3/4	2-3/4	1-1/4	.207	HMR20-225
2-1/2	20°	1-7/8	1-7/8	3/4	.230	HMR20-250S
2-1/2	20°	2-3/4	2-3/4	1-1/4	.230	HMR20-250
2-3/4	20°	3	3	1-1/4	.253	HMR20-275
3	20°	2	2	3/4	.276	HMR20-300S
3	20°	3	3	1-1/4	.276	HMR20-300
3-1/4	20°	3-1/4	3-1/4	1-1/4	.299	HMR20-325
3-1/2	20°	3	3	1-1/4	.322	HMR20-350
3-3/4	20°	3	3	1-1/4	.345	HMR20-375
4	20°	3-1/2	3-1/2	1-1/4	.368	HMR20-400
4-1/4	20°	3-1/2	3-1/2	1-1/4	.391	HMR20-425
4-1/2	20°	3-1/2	3-1/2	1-1/4	.414	HMR20-450
4-3/4	20°	3-1/2	3-1/2	1-1/4	.437	HMR20-475
5	20°	3-1/2	3-1/2	1-1/4	.460	HMR20-500
6	20°	4	4	1-1/4	.552	HMR20-600
6-1/2	20°	4	4	1-1/4	.598	HMR20-600
7	20°	4-1/4	4-3/4	1-1/4	.644	HMR20-700
8	20°	4-1/2	5	1-1/4	.735	HMR20-800
9	20°	5	6	1-1/4	.827	HMR20-900
10	20°	5	6	1-1/2	.919	HMR20-010
11	20°	5-1/2	6-1/2	1-1/2	1.011	HMR20-011
12	20°	5-3/4	7	1-1/2	1.103	HMR20-012
14	20°	6-1/2	8	1-1/2	1.287	HMR20-014
15	20°	6-1/2	8	1-1/2	1.379	HMR20-015
16	20°	8	9	2	1.471	HMR20-016
18	20°	8-1/4	9	2	1.655	HMR20-018
20	20°	8-3/4	11	2	1.839	HMR20-020
25	20°	11	15	2-1/2	2.298	HMR20-025

HMF20 Series

MODULE 20° PA GEAR HOBS

Combination Pitch Stub
Finishing, Non Topping
Single Lead, Right Hand



(* Denominator)

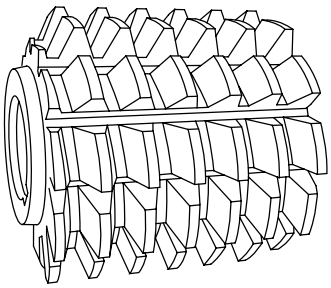
Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
1.25/1	20°	2-1/2	2-1/2	1-1/.4	.089	HMF20-125
1.5/1.25	20°	2-1/2	2-1/2	1-1/4	.111	HMF20-150
2/1.75	20°	2-3/4	2-3/4	1-1/4	.155	HMF20-200
2.5/2	20°	2-3/4	2-3/4	1-1/4	.177	HMF20-250
3/2.25	20°	3	3	1-1/4	.199	HMF20-300
3.5/2.5	20°	3	3	1-1/4	.222	HMF20-350
4/3	20°	3-1/2	3-1/2	1-1/4	.266	HMF20-400
5/3.75	20°	3-1/2	3-1/2	1-1/4	.332	HMF20-500

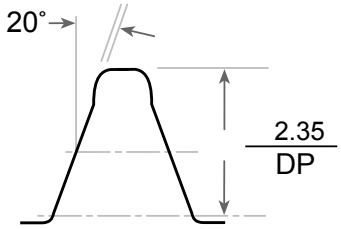
HMPG20 Series

MODULE 20° PA GEAR HOBS

Pre-Grind
Non Topping
Single Lead

Module	PA	O.D.	Length	Bore	WD	Thin (Approx “)	Protuberance (Approx “)	Specify Class A, B, C	
								Right Hand	Left Hand
.750	20°	1-7/8	1-1/2	3/4	.069	.004	.003	HMPG20-075S	-
.800	20°	1-7/8	1-7/8	3/4	.074	.006	.003	HMPG20-080S	-
1	20°	1-7/8	1-7/8	3/4	.093	.010	.004	HMPG20-100S	-
1	20°	2-1/2	2	1-1/4	.093	.010	.004	HMPG20-100	-
1.250	20°	1-7/8	1-7/8	3/4	.116	.010	.004	HMPG20-125S	-
1.250	20°	2-1/2	2-1/2	1-1/4	.116	.010	.004	HMPG20-125	-
1.500	20°	2-1/2	2-1/2	1-1/4	.139	.010	.007	HMPG20-125	-
1.500	20°	1-7/8	1-7/8	3/4	.139	.010	.007	HMPG20-150S	-
1.500	20°	2-1/2	2-1/2	1-1/4	.139	.010	.007	HMPG20-150	HMPGL20-150
1.750	20°	1-7/8	1-7/8	3/4	.162	.010	.007	HMPG20-175S	-
1.750	20°	2-1/2	2-1/2	1-1/4	.162	.010	.007	HMPG20-175	-
2	20°	2-3/4	2-3/4	1-1/4	.185	.010	.007	HMPG20-200	HMPGL20-200
2.250	20°	2-3/4	2-3/4	1-1/4	.208	.010	.007	HMPG20-225	-
2.500	20°	2-3/4	2-3/4	1-1/4	.231	.010	.007	HMPG20-250	-
2.750	20°	3	3	1-1/4	.254	.010	.007	HMPG20-275	HMPGL20-275
3	20°	3	3	1-1/4	.278	.010	.006	HMPG20-300	HMPGL20-300
3.250	20°	3	3	1-1/4	.301	.011	.006	HMPG20-325	-
3.500	20°	3	3	1-1/4	.324	.012	.006	HMPG20-350	-
3.750	20°	3	3	1-1/4	.347	.012	.006	HMPG20-375	-
4	20°	3-1/2	3-1/2	1-1/4	.370	.012	.006	HMPG20-400	HMPGL20-400
4.250	20°	3-1/2	3-1/2	1-1/4	.393	.012	.007	HMPG20-425	-
4.500	20°	3-1/2	3-1/2	1-1/4	.416	.012	.007	HMPG20-450	HMPGL20-450
4.750	20°	3-1/2	3-1/2	1-1/4	.439	.012	.007	HMPG20-475	-
5	20°	3-1/2	3-1/2	1-1/4	.463	.012	.008	HMPG20-500	-
5.500	20°	4	4	1-1/4	.509	.012	.008	HMPG20-550	-
6	20°	4	4	1-1/4	.555	.012	.008	HMPG20-600	HMPGL20-600
6.500	20°	4-1/4	4-3/4	1-1/4	.601	.013	.008	HMPG20-650	-
7	20°	4-1/4	4-3/4	1-1/4	.648	.013	.008	HMPG20-700	-
7.500	20°	4-1/2	4-1/2	1-1/4	.694	.013	.008	HMPG20-750	-
8	20°	4-1/2	5	1-1/4	.740	.013	.010	HMPG20-800	HMPGL20-800
9	20°	5	6	1-1/2	.833	.013	.010	HMPG20-900	-
10	20°	5	6	1-1/2	.925	.013	.010	HMPG20-010	HMPGL20-010
11	20°	5-1/2	6-1/2	1-1/2	1.018	.016	.010	HMPG20-011	-
12	20°	5-3/4	7	1-1/2	1.110	.016	.010	HMPG20-012	HMPGL20-012
13	20°	6	7-1/2	1-1-2	1.203	.016	.010	HMPG20-013	-
14	20°	6-1/2	8	1-1/2	1.295	.016	.012	HMPG20-014	-
15	20°	6-3/4	8	1-1/2	1.388	.016	.012	HMPG20-015	-
16	20°	7-1/2	8-1/2	1-1/2	1.480	.018	.012	HMPG20-016	-
18	20°	8-1/4	9	2	1.665	.020	.012	HMPG20-018	-
20	20°	8-3/4	10	2	1.850	.025	.015	HMPG20-020	-
22	20°	9-3/4	13	2	2.035	.026	.015	HMPG20-022	-
25	20°	11	15	2-1/2	2.313	.027	.015	HMPG20-025	-

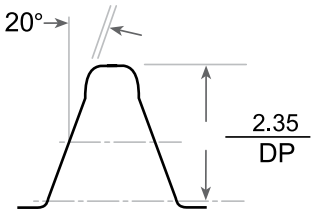




HMP20 Series

MODULE 20° PA GEAR HOBS

Pre-Shave
Non Topping
Single Lead, Right Hand

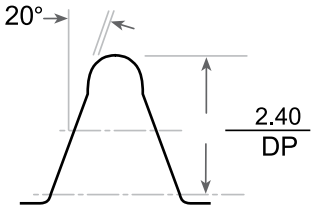


Module	PA	O.D.	Length	Bore	WD	Thin (Approx “)	Protuberance (Approx “)	Specify Class A, B, C
0.750	20°	1-7/8	1-1/2	3/4	.069	.001	.001	HMP20-075S
0.800	20°	1-7/8	1-7/8	3/4	.074	.001	.001	HMP20-080S
1	20°	1-7/8	1-7/8	3/4	.093	.002	.001	HMP20-100S
1	20°	2-1/2	2	1-1/4	.093	.002	.001	HMP20-100
1.250	20°	1-7/8	1-7/8	3/4	.116	.002	.002	HMP20-125S
1.500	20°	1-7/8	1-7/8	3/4	.139	.002	.002	HMP20-150S
1.500	20°	2-1/2	2-1/2	1-1/4	.139	.002	.002	HMP20-150
1.750	20°	1-7/8	1-7/8	3/4	.162	.003	.002	HMP20-175S
1.750	20°	2-1/2	2-1/2	1-1/4	.162	.003	.002	HMP20-175
2	20°	2-3/4	2-3/4	1-1/4	.185	.003	.002	HMP20-200
2.500	20°	2-3/4	2-3/4	1-1/4	.231	.003	.002	HMP20-250
2.750	20°	3	3	1-1/4	.254	.003	.002	HMP20-275
3	20°	3	3	1-1/4	.278	.004	.002	HMP20-300
3.500	20°	3	3	1-1/4	.324	.004	.002	HMP20-350
4	20°	3-1/2	3-1/2	1-1/4	.370	.004	.002	HMP20-400
4.500	20°	3-1/2	3-1/2	1-1/4	.416	.004	.003	HMP20-450
5	20°	3-1/2	3-1/2	1-1/4	.463	.004	.003	HMP20-500
6	20°	4	4	1-1/4	.555	.004	.003	HMP20-600
7	20°	4-1/4	4-3/4	1-1/4	.648	.005	.004	HMP20-700

HMPGR20 & HMPGRC20 Series

MODULE 20° PA GEAR HOBS

Pre-Grind
Fillet Root
Topping & Semi Topping
Single Lead, Right Hand



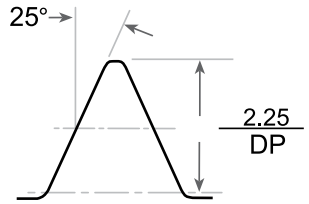
Module	PA	O.D.	Length	Bore	WD	Thin (Approx “)	Protuberance (Approx “)	Specify Class A, B, C	
								Non-Chamfering	Chamfering
1.750	20°	2 1/2	2-3/4	1-1/4	.165	.010	.007	HMPGR20-175	HMPGRC20-175
2	20°	2-3/4	2-3/4	1-1/4	.189	.010	.007	HMPGR20-200	HMPGRC20-200
2.250	20°	2-3/4	2-3/4	1-1/4	.213	.010	.007	HMPGR20-225	-
2.500	20°	2-3/4	2-3/4	1-1/4	.236	.010	.007	HMPGR20-250	-
2.750	20°	3	3	1-1/4	.260	.010	.007	HMPGR20-275	HMPGRC20-275
3	20°	3	3	1-1/4	.283	.010	.006	HMPGR20-300	HMPGRC20-300
3.500	20°	3	3	1-1/4	.331	.010	.006	HMPGR20-350	HMPGRC20-350
3.750	20°	3	3	1-1/4	.354	.010	.006	HMPGR20-375	-
4	20°	3-1/2	3-1/2	1-1/4	.378	.010	.006	HMPGR20-400	HMPGRC20-400
4.500	20°	3-1/2	3-1/2	1-1/4	.425	.010	.006	HMPGR20-450	HMPGRC20-450
5	20°	3-1/2	3-1/2	1-1/4	.472	.010	.006	HMPGR20-500	HMPGRC20-500
5.500	20°	4	4	1-1/4	.520	.012	.008	HMPGR20-550	-
5.750	20°	3-1/2	3-1/2	1-1/4	.543	.012	.008	HMPGR20-575	-
6	20°	4	4	1-1/4	.567	.012	.008	HMPGR20-600	HMPGRC20-600
6.500	20°	4	4	1-1/4	.614	.012	.008	HMPGR20-650	-
7	20°	4-1/2	5	1-1/4	.661	.012	.008	HMPGR20-700	-
8	20°	4-1/2	5	1-1/4	.756	.013	.010	HMPGR20-800	HMPGRC20-800
9	20°	5	6	1-1/4	.850	.016	.010	HMPGR20-900	HMPGRC20-900
10	20°	5	6	1-1/4	.945	.016	.010	HMPGR20-010	HMPGRC20-010
11	20°	5-1/2	5	1-1/4	1.039	.016	.010	HMPGR20-011	-
12	20°	5-3/4	7	1-1/4	1.134	.016	.012	HMPGR20-012	HMPGRC20-012
14	20°	6-1/2	8	1-1/2	1.323	.018	.012	HMPGR20-014	HMPGRC20-014
16	20°	8	9	2	1.512	.018	.012	HMPGR20-016	HMPGRC20-016
18	20°	8-1/4	9	2	1.701	.020	.012	HMPGR20-018	HMPGRC20-018
20	20°	8-3/4	10	2	1.890	.024	.015	HMPGR20-020	HMPGRC20-020
24	20°	11	15	2-1/2	2.268	.026	.015	HMPGR20-024	-

HM25, CHM25, & HFM25 Series

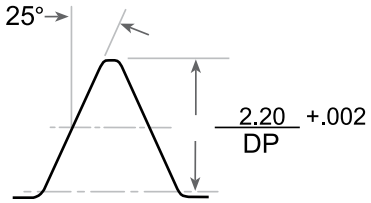
MODULE 25° PA GEAR HOBS

Finishing
Non Topping
Single Lead
Right Hand

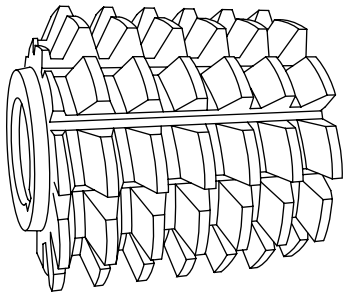
Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
.600	25°	1-7/8	1-7/8	3/4	.054	HFM25-060S
.750	25°	1-7/8	1-1/2	3/4	.067	HFM25-075S
.800	25°	1	3/4	8mm	.071	HFM25-080M
.800	25°	1-1/8	1-1/8	1/2	.071	HFM25-080H
1	25°	1	3/4	8mm	.089	HFM25-100M
1	25°	1-1/4	1-1/4	1/2	.089	HM25-100H
1	25°	1-7/8	1-7/8	3/4	.089	HM25-100S
1	25°	2-1/2	2	1-1/4	.089	HM25-100
1.250	25°	1-7/8	1-7/8	3/4	.111	HM25-125S
1.250	25°	2-1/2	2-1/2	1.25	.111	HM25-125
1.500	25°	1-7/8	1-7/8	3/4	.133	HM25-150S
1.500	25°	2-1/2	2-1/2	1-1/4	.133	HM25-150
1.750	25°	1-7/8	1-7/8	3/4	.155	HM25-175S
1.750	25°	2-1/2	2-1/2	1-1/4	.155	HM25-175
2	25°	1-7/8	1-7/8	3/4	.177	HM25-200S
2	25°	2-3/4	2-3/4	1-1/4	.177	HM25-200
2.250	25°	1-7/8	1-7/8	3/4	.199	HM25-225S
2.250	25°	2-3/4	2-3/4	1-1/4	.199	HM25-225
2.500	25°	1-7/8	1-7/8	3/4	.221	HM25-250S
2.500	25°	2-3/4	2-3/4	1-1/4	.221	HM25-250
2.750	25°	3	3	1-1/4	.244	HM25-275
3	25°	3	3	1-1/4	.266	HM25-300
3.250	25°	3	3	1-1/4	.288	HM25-325
3.500	25°	3	3	1-1/4	.310	HM25-350
3.750	25°	3	3	1-1/4	.332	HM25-375
4	25°	3-1/2	3-1/2	1-1/4	.354	HM25-400
4.500	25°	3-1/2	3-1/2	1-1/4	.399	HM25-450
5	25°	3-1/2	3-1/2	1-1/4	.443	HM25-500
6	25°	4	4	1-1/4	.531	HM25-600
7	25°	4-1/4	4-3/4	1-1/4	.620	HM25-700
8	25°	4-1/2	5	1-1/4	.709	HM25-800
9	25°	5	5	1-1/4	.797	HM25-900
10	25°	5-1/2	6	1-1/2	.886	HM25-010
12	25°	5-3/4	8	1-1/2	1.063	HM25-012
14	25°	7-1/4	9	2	1.240	HM25-014
15	25°	7-1/4	9	2	1.329	HM25-015
16	25°	8	10	2	1.417	HM25-016
18	25°	8	10	2	1.594	HM25-018
20	25°	8-3/4	12	2	1.772	HM25-020
20	25°	8-1/4	10-3/4	1-1/2	1.772	CHM25-020
22	25°	9-1/2	13	2	1.949	HM25-022
24	25°	10-3/4	15	2-1/2	2.126	HM25-024
25	25°	10-3/4	15	2-1/2	2.215	HM25-025



HM25 Rack Profile



HFM25 Rack Profile



HMP25 Series

MODULE 25° PA GEAR HOBS

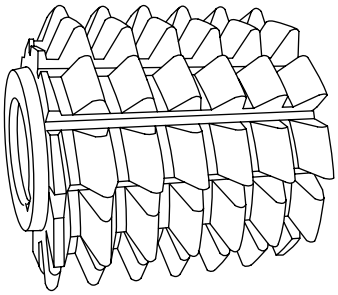
Pre-Shave, Non Topping
Single Lead, Right Hand

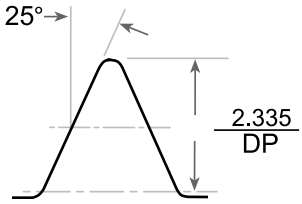
Module	PA	O.D.	Length	Bore	WD	Thin (Approx “)	Protuberance (Approx “)	Specify Class A, B, C Pre-Shave
2	25°	2-3/4	2-3/4	1-1/4	.184	.003	.002	HMP25-200
3	25°	3	3	1-1/4	.276	.003	.002	HMP25-300
3.500	25°	3	3	1-1/4	.322	.003	.002	HMP25-350
4	25°	3-1/2	3-1/2	1-1/4	.368	.003	.003	HMP25-400

HMR25 Series

MODULE 25° PA GEAR HOBS

Fillet Root
Fishing Non-Topping
Single Lead
Right Hand



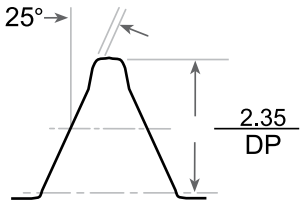


Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
1	25°	1-7/8	1-7/8	3/4	.092	HMR25-100S
1.250	25°	1-7/8	1-7/8	3/4	.115	HMR25-125S
1.500	25°	1-7/8	1-7/8	3/4	.138	HMR25-150S
1.750	25°	1-7/8	1-7/8	3/4	.161	HMR25-175S
2	25°	1-7/8	1-7/8	3/4	.184	HMR25-200S
2.250	25°	1-7/8	1-7/8	3/4	.207	HMR25-225S
2.500	25°	1-7/8	1-7/8	3/4	.230	HMR25-250S
2.750	25°	3	3	1-1/4	.253	HMR25-275
3	25°	3	3	1-1/4	.276	HMR25-300
3.750	25°	3-1/2	3-1/2	1-1/4	.345	HMR25-350
4	25°	3-1/2	3-1/2	1-1/4	.368	HMR25-400
4.250	25°	3-1/2	3-1/2	1-1/4	.391	HMR25-425
4.500	25°	3-1/2	3-1/2	1-1/4	.414	HMR25-450
4.750	25°	3-1/2	3-1/2	1-1/4	.437	HMR25-475
5	25°	3-1/2	3-1/2	1-1/4	.460	HMR25-500
6	25°	4	4	1-1/4	.552	HMR25-600
8	25°	4-1/2	5	1-1/4	.735	HMR25-800
9	25°	5	6	1-1/4	.827	HMR25-900
10	25°	5	6	1-1/2	.919	HMR25-010
12	25°	5-3/4	7	1-1/2	1.103	HMR25-012
14	25°	6-1/2	8	1-1/2	1.287	HMR25-014

HMPG25 Series

MODULE 25° PA GEAR HOBS

Pre-Grind
Non Topping
Single Lead



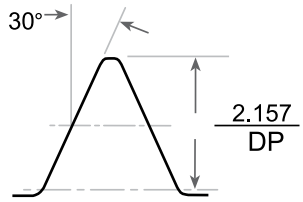
Module	PA	O.D.	Length	Bore	WD	Thin (Approx “)	Protuberance (Approx “)	Specify Class A, B, C	
								Right Hand	Left Hand
1.500	25°	1-7/8	1-7/8	3/4	.139	.008	.005	HMPG25-150S	-
2	25°	2-3/4	2-3/4	1-1/4	.185	.009	.006	HMPG25-200	-
2.250	25°	2-3/4	2-3/4	1-1/4	.208	.009	.006	HMPG25-225	-
2.5	25°	2-3/4	2-3/4	1-1/4	.231	.009	.006	HMPG25-250	-
2.750	25°	3	3	1-1/4	.254	.009	.006	HMPG25-275	-
3	25°	3	3	1-1/4	.278	.009	.006	HMPG25-300	-
3.500	25°	3	3	1-1/4	.324	.009	.006	HMPG25-350	-
4	25°	3-1/2	3-1/2	1-1/4	.370	.009	.006	HMPG25-400	HMPGL25-400
4.250	25°	3-1/2	3-1/2	1-1/4	.393	.011	.007	HMPG25-425	-
4.500	25°	3-1/2	3-1/2	1-1/4	.416	.012	.007	HMPG25-450	-
5	25°	3-1/2	3-1/2	1-1/4	.463	.012	.007	HMPG25-500	HMPGL25-500
6	25°	4	4	1-1/4	.555	.012	.007	HMPG25-600	HMPGL25-600
7	25°	4-1/4	4-3/4	1-1/4	.648	.013	.008	HMPG25-700	-
8	25°	4-1/2	5	1-1/4	.740	.014	.008	HMPG25-800	HMPGL25-800
9	25°	5	6	1-1/4	.833	.014	.009	HMPG25-900	-
10	25°	5	5	1-1/2	.925	.015	.009	HMPG25-010	-
12	25°	5-3/4	7	1-1/2	1.110	.016	.010	HMPG25-012	-
14	25°	6-1/2	8	1-1/2	1.295	.016	.010	HMPG25-014	-
16	25°	7-1/2	8-1/2	1-1/2	1.480	.017	.010	HMPG25-016	-
18	25°	8 1/4	9	2	1.665	.020	.012	HMPG25-016	-
20	25°	8 3/4	10	2	1.850	.025	.015	HMPG25-016	-

Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
.500	30°	1-1/2	1-1/2	3/4	.044	HMS30-050SE
.750	30°	1-7/8	1-1/2	3/4	.064	HMS30-075S
.750	30°	1-7/8	1-7/8	3/4	.066	HMS30-075SE
1	30°	1-7/8	1-7/8	3/4	.085	HMS30-100S
1.500	30°	1-7/8	1-7/8	3/4	.133	HMS30-150SE
1.500	30°	2-1/2	2-1/2	1-1/4	.127	HMS30-150
1.750	30°	1-7/8	1-7/8	3/4	.155	HMS30-175SE
2	30°	2-3/4	2-3/4	1-1/4	.170	HMS30-200
2.250	30°	2-3/4	2-3/4	1-1/4	.191	HMS30-225
2.500	30°	2-3/4	2-3/4	1-1/4	.212	HMS30-250
3	30°	3	3	1-1/4	.255	HMS30-300
4	30°	3-1/4	3-1/4	1-1/4	.340	HMS30-400
5	30°	3-1/2	3-1/2	1-1/4	.425	HMS30-500
6	30°	3-1/2	3-1/2	1-1/4	.510	HMS30-600
8	30°	4	4	1-1/4	.679	HMS30-800

HMS30 Series

MODULE 30° PA GEAR HOBS

Finishing
Non Topping
Single Lead
Right Hand



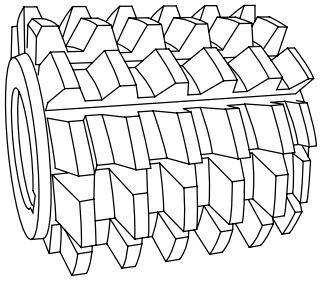
*Some Finer Pitch 2.25/DP

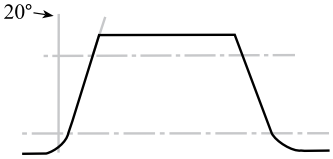
Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
.500	30°	1-7/8	1-1/2	3/4	.024	HMJ-050S
.750	30°	1-7/8	1-1/2	3/4	.035	HMJ-075S
1	30°	1-7/8	1-1/2	3/4	.047	HMJ-100S
1	30°	2-1/2	2	1-1/4	.047	HMJ-100
1.250	30°	1-7/8	1-1/2	3/4	.059	HMJ-125S
1.250	30°	2-1/2	2	1-1/4	.059	HMJ-125
1.500	30°	1-7/8	1-7/8	3/4	.071	HMJ-150S
1.500	30°	2-1/2	2	1-1/4	.071	HMJ-150
1.667	30°	1-7/8	1-7/8	3/4	.079	HMJ-167S
1.667	30°	2-1/2	2	1-1/4	.079	HMJ-167
1.750	30°	1-7/8	1-7/8	3/4	.083	HMJ-175S
2	30°	1-7/8	1-7/8	3/4	.094	HMJ-200S
2	30°	2-3/4	2-1/2	1-1/4	.094	HMJ-200
2.500	30°	2-3/4	2-1/2	1-1/4	.118	HMJ-250
3	30°	3	3	1-1/4	.142	HMJ-300
3.750	30°	3	3	1-1/4	.177	HMJ-375
4.500	30°	3-1/4	3-1/4	1-1/4	.212	HMJ-450
5	30°	3-1/4	3-1/4	1-1/4	.236	HMJ-500
6	30°	3-1/2	3-1/2	1-1/4	.283	HMJ-600
7.500	30°	3-1/2	3-1/2	1-1/4	.354	HMJ-750
10	30°	4	4	1-1/4	.472	HMJ-010

HMJ20 Series

MODULE 20° PA GEAR HOBS

JIS Standard / NFE Standard
Spline
Finishing ,Non Topping
Single Lead, Right Hand





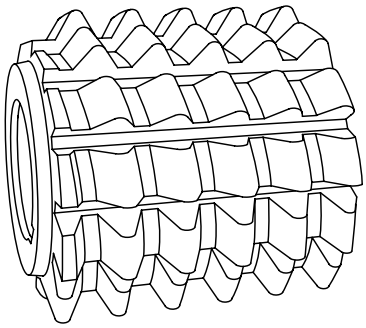
Flat Root
(.04724 x MOD)

Module	PA	O.D.	Length	Bore	# of Leads	WD	Specify Class A, B, C
.300	30°	2-1/2	2	1-1/4	1	.017	HMF30-030
.500	30°	1-1/8	1-1/8	1/2	1	.028	HMF30-050H
.750	30°	3/4	3/4	8mm	1	.041	HMF30-075M
.750	30°	1-1/8	1-1/8	1/2	1	.041	HMF30-075H
.750	30°	1-7/8	1-1/2	3/4	1	.041	HMF30-075S
.750	30°	2-1/2	2	1-1/4	1	.041	HMF30-075
.750	30°	2-1/2	2	1-1/4	2	.041	HMF30-075-2
.800	30°	1-1/8	1-1/8	1/2	1	.044	HMF30-080H
.900	30°	1-7/8	1-1/2	3/4	1	.050	HMF30-090S
1	30°	3/4	3/4	8mm	1	.055	HMF30-100M
1	30°	1-1/4	1-1/4	1/2	1	.055	HMF30-100H
1	30°	1-7/8	1-7/8	3/4	1	.055	HMF30-100S
1	30°	2-1/2	2	1-1/4	1	.055	HMF30-100
1.250	30°	1-7/8	1-7/8	3/4	1	.069	HMF30-125S
1.250	30°	2-1/2	2	1-1/4	1	.069	HMF30-125
1.500	30°	1-7/8	1-7/8	3/4	1	.083	HMF30-150S
1.500	30°	2-1/2	2-1/2	1-1/4	1	.083	HMF30-150
1.750	30°	1-7/8	1-7/8	3/4	1	.096	HMF30-175S
1.750	30°	2-1/2	2-1/2	1-1/4	1	.096	HMF30-175
2	30°	1-7/8	1-7/8	3/4	1	.110	HMF30-200S
2	30°	2-3/4	2-3/4	1-1/4	1	.110	HMF30-200
2.250	30°	2-3/4	2-3/4	1-1/4	1	.124	HMF30-225
2.500	30°	1-7/8	1-7/8	3/4	1	.138	HMF30-250S
2.500	30°	2-3/4	2-3/4	1-1/4	1	.138	HMF30-250
2.750	30°	2-3/4	2-3/4	1-1/4	1	.152	HMF30-275
3	30°	3	3	1-1/4	1	.165	HMF30-300
4	30°	3-1/4	3-1/4	1-1/4	1	.220	HMF30-400
4	30°	3-1/4	3-1/4	1-1/4	1	.220	HMF30-400-2
5	30°	3-1/2	3-1/2	1-1/4	1	.276	HMF30-500
6	30°	3-1/2	3-1/2	1-1/4	1	.331	HMF30-600
8	30°	3-3/4	3-3/4	1-1/4	1	.441	HMF30-800
10	30°	4	4	1-1/4	1	.551	HMF30-010

HMF30 Series

MODULE 30° PA GEAR HOBS

Involute Spline
Finishing
Right Hand
Non Chamfering
Fillet Root



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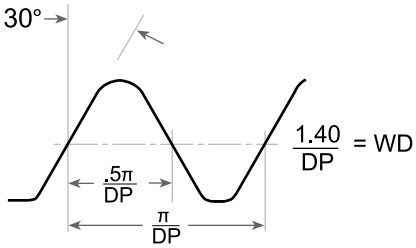
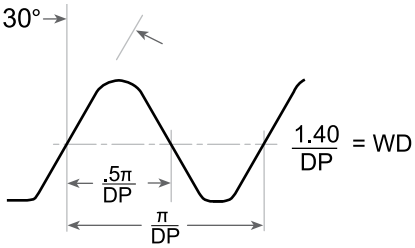


Module	PA	O.D.	Length	WD	Specify Class A, B, C
.500	30°	.625	6	.028	HMFK30-050
.750	30°	.750	6	.041	HMFK30-075
1	30°	.750	6	.055	HMFK30-100
1.500	30°	.875	6	.083	HMFK30-150
1.750	30°	.875	6	.096	HMFK30-175
2	30°	.875	6	.110	HMFK30-200

HMFK30 Series

MODULE 30° PA GEAR HOBS

Involute Spline, Finishing
Single Lead, Right Hand
Non-Chamfering
Fillet Root Shank Type

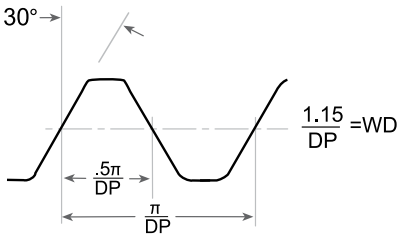


HM30 Series

MODULE 30° PA GEAR HOBS

Involute Spline
Finishing
Non-Chamfering
Fillet Root
DIN 5480, Flat Root

Module	PA	O.D.	Length	Bore	Leads	WD	Specify Class A, B, C	
							Right Hand	Left Hand
.500	30°	5/8	11/16	8mm	1	.0216	HM30-050M	-
.500	30°	1-1/8	1-1/8	1/2	1	.0216	HM30-050H	-
.500	30°	1-7/8	1-1/2	3/4	1	.0216	HM30-050S	-
.500	30°	2-1/2	2	1-1/4	1	.0216	HM30-050	-
.600	30°	3/4	3/4	8mm	1	.0259	HM30-060M	-
.600	30°	1-1/8	1-1/8	1/2	1	.0259	HM30-060H	-
.600	30°	1-7/8	1-1/2	3/4	1	.0259	HM30-060S	-
.650	30°	1-1/8	1-1/8	1/2	1	.0281	HM30-065H	-
.700	30°	1-1/8	1-1/8	1/2	1	.0303	HM30-070H	-
.700	30°	1-7/8	1-1/2	3/4	1	.0303	HM30-070S	-
.750	30°	3/4	3/4	8mm	1	.0324	HM30-075M	-
.750	30°	1-1/8	1-1/8	1/2	1	.0324	HM30-075H	-
.750	30°	1-7/8	1-1/2	3/4	1	.0324	HM30-075S	-
.750	30°	2-1/2	2	1-1/4	1	.0324	HM30-075	-
.800	30°	1-1/8	1-1/8	1/2	1	.0346	HM30-080H	-
.800	30°	1-7/8	1-1/2	3/4	1	.0346	HM30-080S	-
1	30°	3/4	3/4	8mm	1	.0433	HM30-100M	-
1	30°	1-1/4	1-1/4	1/2	1	.0433	HM30-100H	-
1	30°	1-7/8	1-7/8	3/4	1	.0433	HM30-100S	-
1	30°	2-1/2	2	1-1/4	1	.0433	HM30-100	-
1.250	30°	1-7/8	1-7/8	3/4	1	.0541	HM30-125S	HML30-125S
1.250	30°	2-1/2	2	1-1/4	1	.0541	HM30-125	-
1.250	30°	48mm	70mm	22mm	1	.0541	HM30-125T	-
1.500	30°	1-7/8	1-7/8	3/4	1	.0649	HM30-150S	-
1.500	30°	2-1/2	2-1/2	1-1/4	1	.0649	HM30-150	-
1.750	30°	1-7/8	1-7/8	3/4	1	.0757	HM30-175S	-
1.750	30°	2-1/2	2-1/2	1-1/4	1	.0757	HM30-175	-
2	30°	1-7/8	1-7/8	3/4	1	.0866	HM30-200S	-
2	30°	2-3/4	2-3/4	1-1/4	1	.0866	HM30-200	-
2	30°	70mm	70mm	32mm	1	.0866	HM30-200T	-
2.250	30°	1-7/8	1-7/8	3/4	1	.0974	HM30-225S	-
2.250	30°	2-3/4	2-3/4	1-1/4	1	.0974	HM30-225	-
2.500	30°	1-7/8	1-7/8	3/4	1	.1082	HM30-250S	-
2.500	30°	2-3/4	2-3/4	1-1/4	1	.1082	HM30-250	-
3	30°	2	2	3/4	1	.1299	HM30-300S	-
3	30°	3	3	1-1/4	1	.1299	HM30-300	-
3	30°	3	3	1-1/4	2	.1299	HM30-300-2	-
3	30°	76mm	76mm	32mm	1	.1299	HM30-300T	-
3.500	30°	3	3	1-1/4	1	.1515	HM30-350	-
3.750	30°	3	3	1-1/4	1	.1624	HM30-375	-
4	30°	3-1/4	3-1/4	1-1/4	1	.1732	HM30-400	-
4.500	30°	3-1/4	3-1/4	1-1/4	1	.1948	HM30-450	-
5	30°	3-1/2	3-1/2	1-1/4	1	.2165	HM30-500	-
6	30°	3-1/2	3-1/2	1-1/4	1	.2598	HM30-600	-
7	30°	3-3/4	3-3/4	1-1/4	1	.3031	HM30-700	-
8	30°	3-3/4	3-3/4	1-1/4	1	.3464	HM30-800	-
10	30°	4	4	1-1/4	1	.4330	HM30-010	HML30-010
12	30°	5-3/4	9	1 1/2	1	.5196	HM30-012	-



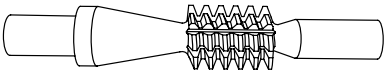
For left hand hob, inquire on HML30 Series.

Module	PA	O.D.	Length	WD	Specify Class A, B, C
.500	30°	0.625	-	.0216	HMK30-050
.750	30°	0.750	6	.0324	HMK30-075
.800	30°	0.750	6	.0346	HMK30-075
1	30°	0.750	6	.0433	HMK30-100
1.250	30°	0.750	6	.0541	HMK30-125
1.500	30°	0.875	6	.0649	HMK30-150
1.750	30°	0.875	6	.0757	HMK30-175
2	30°	0.875	6	.0866	HMK30-200
2.500	30°	0.875	-	.1082	HMK30-250

HMK30 Series

MODULE 30° PA GEAR HOBS

Involute Spline, Finishing
Non-Chamfering, DIN 5480,
Flat Root Shank Type
Single Lead, Right Hand



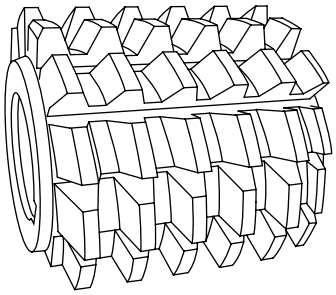
1.15/DP = WD

Module	PA	O.D.	Length	Bore	W.D.	Specify Class A, B, C	
						Right Hand	Left Hand
.200	30°	5/8	2/3	8mm	.010	HMA30-020M	-
.400	30°	1-1/8	1-1/8	1/2	.020	HMA30-040H	-
.500	30°	3/4	3/4	8mm	.025	HMA30-050M	-
.500	30°	1-1/8	1-1/8	1/2	.025	HMA30-050H	-
.500	30°	1-7/8	1-1/2	3/4	.025	HMA30-050S	-
.600	30°	1-7/8	1-1/2	3/4	.030	HMA30-060S	-
.750	30°	1-1/8	1-1/8	1/2	.037	HMA30-075H	-
.750	30°	1-7/8	1-1/2	3/4	.037	HMA30-075S	-
.800	30°	1-7/8	1-1/2	3/4	.039	HMA30-080S	-
1	30°	3/4	3/4	8mm	.049	HMA30-100M	-
1	30°	1-1/4	1-1/4	1/2	.049	HMA30-100H	-
1	30°	1-7/8	1-7/8	3/4	.049	HMA30-100S	-
1	30°	2-1/2	2	1-1/4	.049	HMA30-100	-
1.250	30°	1-7/8	1-7/8	3/4	.062	HMA30-125S	HMAL30-125S
1.250	30°	2-1/2	2	1-1/4	.062	HMA30-125	-
1.500	30°	1-7/8	1-7/8	3/4	.074	HMA30-150S	-
1.500	30°	2-1/2	2-1/2	1-1/4	.074	HMA30-150	-
1.750	30°	1-7/8	1-7/8	3/4	.086	HMA30-175S	-
1.750	30°	2-1/2	2-1/2	1-1/4	.086	HMA30-175	-
2	30°	1-7/8	1-7/8	3/4	.098	HMA30-200S	-
2	30°	2-3/4	2-3/4	1-1/4	.098	HMA30-200	HMAL30-200
2.250	30°	1-7/8	1-7/8	3/4	.111	HMA30-225S	-
2.250	30°	2-3/4	2-3/4	1-1/4	.111	HMA30-225	-
2.500	30°	1-7/8	1-7/8	3/4	.123	HMA30-250S	-
2.500	30°	2-3/4	2-3/4	1-1/4	.123	HMA30-250	-
2.750	30°	2-3/4	2-3/4	1-1/4	.135	HMA30-275	-
3	30°	2	2	3/4	.148	HMA30-300S	-
3	30°	3	3	1-1/4	.148	HMA30-300	HMAL30-300
4	30°	3-1/4	3-1/4	1-1/4	.197	HMA30-400	-
5	30°	3-1/2	3-1/2	1-1/4	.246	HMA30-500	-
6	30°	3-1/2	3-1/2	1-1/4	.295	HMA30-600	-
7	30°	3-3/4	3-3/4	1-1/4	.344	HMA30-700	-
8	30°	3-3/4	3-3/4	1-1/4	.394	HMA30-800	-
10	30°	4	4	1-1/4	.492	HMA30-010	-

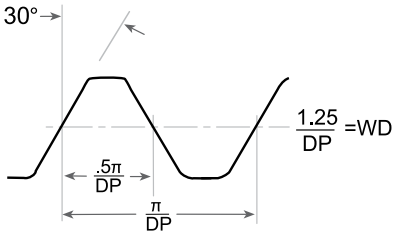
HMA30 Series

MODULE 30° PA GEAR HOBS

Involute Spline
Finishing
Non-Chamfering
ANSI Flat Root



ANSI B92.2M-1980 STD.



HMKA30 Series

MODULE 30° PA GEAR HOBS

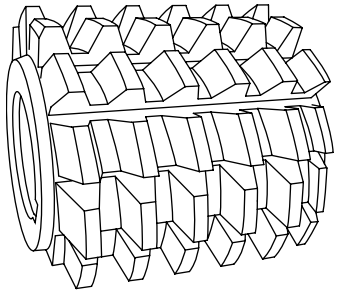
Involute Spline
Finishing, Non-Chamfering
ANSI Flat Root, Shank Type
Single Lead, Right Hand

Module	PA	O.D.	Length	WD	Specify Class A, B, C
.750	30°	.750	6	.037	HMKA30-075
1	30°	.750	6	.049	HMKA30-100
1.250	30°	.750	6	.062	HMKA30-125
1.500	30°	.875	6	.074	HMKA30-150
1.750	30°	.875	6	.086	HMKA30-175

H2M30 Series

MODULE 30° PA GEAR HOBS

Involute Spline
Finishing, Non Topping
Single Start, Right Hand
DIN 5482 Flat Root

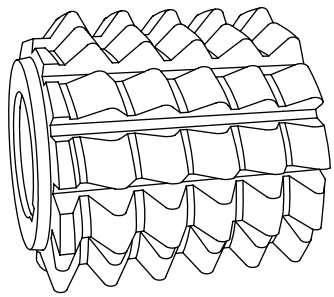


Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
1.600	30°	1-1/2	1-1/2	1/2	.065	H2M30-160H
1.600	30°	1-7/8	1-7/8	3/4	.065	H2M30-160S
1.600	30°	2-1/2	2-1/2	1-1/4	.065	H2M30-160
1.750	30°	1-7/8	1-7/8	3/4	.079	H2M30-175S
1.750	30°	2-1/2	2-1/2	1-1/4	.079	H2M30-175
1.900	30°	1-7/8	1-7/8	3/4	.079	H2M30-190S
1.900	30°	2-3/4	2-3/4	1-1/4	.079	H2M30-190
1.900	30°	62mm	80mm	27mm	.079	H2M30-190T
2	30°	1-7/8	1-7/8	3/4	.108	H2M30-200S
2	30°	2-3/4	2-3/4	1-1/4	.108	H2M30-200
2	30°	62mm	80mm	27mm	.108	H2M30-200T
2.100	30°	1-7/8	1-7/8	3/4	.114	H2M30-210S
2.100	30°	2-3/4	2-3/4	1-1/4	.114	H2M30-210
2.100	30°	62mm	80mm	27mm	.114	H2M30-210T
2.250	30°	1-7/8	1-7/8	3/4	.114	H2M30-225S
2.250	30°	2-3/4	2-3/4	1-1/4	.114	H2M30-225

HM37 Series

MODULE 37.5° PA GEAR HOBS

Involute Spline
Finishing, Non Topping
Right Hand, ANSI Fillet Root



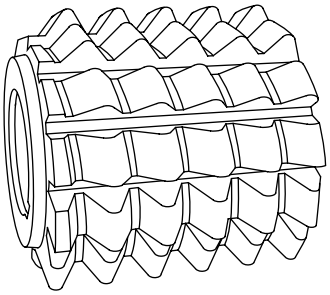
Module	PA	O.D.	Length	Bore	Leads	WD	Specify Class A, B, C
.500	37.5°	1-1/8	1-1/8	1/2	1	.023	HM37-050H
.500	37.5°	1-7/8	1-1/2	3/4	1	.023	HM37-050S
.750	37.5°	1-1/8	1-1/8	1/2	1	.034	HM37-075H
.750	37.5°	1-1/8	1-1/8	1/2	2	.034	HM37-075H-2
.750	37.5°	1-7/8	1-7/8	3/4	1	.034	HM37-075S
.750	37.5°	2-1/2	2	1-1/4	1	.034	HM37-075
1	37.5°	1-7/8	1-7/8	3/4	1	.045	HM37-100S
1	37.5°	2-1/2	2	1-1/4	1	.045	HM37-100
1.250	37.5°	1-1/4	1-1/4	1/2	1	.057	HM37-125H
1.250	37.5°	1-7/8	1-7/8	3/4	1	.057	HM37-125S
1.250	37.5°	2-1/2	2	1-1/4	1	.057	HM37-125
1.500	37.5°	1-7/8	1-7/8	3/4	1	.068	HM37-150S
1.500	37.5°	2-1/2	2-1/2	1-1/4	1	.068	HM37-150
1.750	37.5°	1-7/8	1-7/8	3/4	1	.079	HM37-175S
1.750	37.5°	2-1/2	2-1/2	1-1/4	1	.079	HM37-175
2	37.5°	1-7/8	1-7/8	3/4	1	.091	HM37-200S
2	37.5°	2-3/4	2-3/4	1-1/4	1	.091	HM37-200
2.500	37.5°	1-7/8	1-7/8	3/4	1	.113	HM37-250S
3	37.5°	3	3	1-1/4	1	.136	HM37-300
4	37.5°	3-1/4	3-1/4	1-1/4	1	.181	HM37-400
5	37.5°	3-1/2	3-1/2	1-1/4	1	.226	HM37-500
6	37.5°	3-1/2	3-1/2	1-1/4	1	.272	HM37-600
8	37.5°	3-3/4	3-3/4	1-1/4	1	.362	HM37-800

Module	PA	O.D.	Length	Bore	WD	Specify Class A, B, C
.250	45°	1-1/8	1-1/8	1/2	.010	HM45-025H
.500	45°	1-1/8	1-1/8	1/2	.020	HM45-050H
.500	45°	1-7/8	1-1/2	3/4	.020	HM45-050S
.750	45°	3/4	3/4	8mm	.030	HM45-075M
.750	45°	1-1/8	1-1/8	1/2	.030	HM45-075H
.750	45°	1-7/8	1-1/2	3/4	.030	HM45-075S
.750	45°	2-1/2	2	1-1/4	.030	HM45-075
1	45°	1	3/4	8mm	.039	HM45-100M
1	45°	1-1/4	1-1/4	1/2	.039	HM45-100H
1	45°	1-7/8	1-7/8	3/4	.039	HM45-100S
1	45°	2-1/2	2	1-1/4	.039	HM45-100
1.250	45°	1-1/4	1-1/4	1/2	.049	HM45-125H
1.250	45°	1-7/8	1-7/8	3/4	.049	HM45-125S
1.250	45°	2-1/2	2	1-1/4	.049	HM45-125
1.500	45°	1-7/8	1-7/8	3/4	.059	HM45-150S
1.500	45°	2-1/2	2-1/2	1-1/4	.059	HM45-150
1.750	45°	1-7/8	1-7/8	3/4	.069	HM45-175S
1.750	45°	2-1/2	2-3/4	1-1/4	.069	HM45-175
2	45°	1-7/8	1-7/8	3/4	.079	HM45-200S
2	45°	2-3/4	2-3/4	1-1/4	.079	HM45-200
2.500	45°	2-3/4	2-3/4	1-1/4	.098	HM45-250

HM45 Series

MODULE 45° PA GEAR HOBS

Involute Spline, Finishing
Non Topping, Right Hand
ANSI Fillet Root



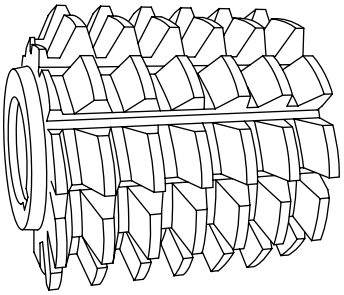
ANSI B92.2M-1980

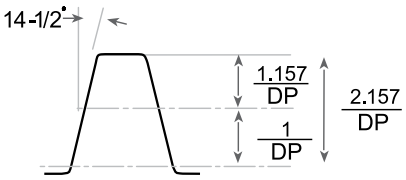
CP (Fraction)	Circular Pitch	PA	OD	Length	Bore	WD	Specify Class A, B, C
1/16	.063	14.5°	1-7/8	1-1/2	3/4	.046	HC14-006S
1/10	.100	14.5°	1-1/2	1-1/2	3/4	.072	HC14-010SE
1/8	.125	14.5°	1-7/8	1-7/8	3/4	.090	HC14-012S
1/8	.125	14.5°	2-1/2	2-1/2	1-1/4	.090	HC14-012
1/6	.167	14.5°	1-7/8	1-7/8	3/4	.114	HC14-016S
3/16	.188	14.5°	1-7/8	1-7/8	3/4	.129	HC14-018S
1/5	.200	14.5°	1-7/8	1-7/8	3/4	.137	HC14-020S
1/4	.250	14.5°	1-7/8	1-7/8	3/4	.172	HC14-025S
1/4	.250	14.5°	2-3/4	2-3/4	1-1/4	.172	HC14-025
5/16	.313	14.5°	2	2	3/4	.215	HC14-031S
1/3	.333	14.5°	2	2	3/4	.229	HC14-033S
1/3	.333	14.5°	2-3/4	2-3/4	1-1/4	.229	HC14-033
3/8	.375	14.5°	2	2	3/4	.257	HC14-037S
3/8	.375	14.5°	2-3/4	2-3/4	1-1/4	.257	HC14-037
7/16	.438	14.5°	3	3	1-1/4	.300	HC14-043
1/2	.500	14.5°	3-1/4	3-1/4	1-1/4	.343	HC14-050
9/16	.563	14.5°	2-1/2	2-1/2	3/4	.386	HC14-056S
9/16	.563	14.5°	3-1/4	3-1/4	1-1/4	.386	HC14-056
5/8	.625	14.5°	3-1/2	3-1/2	1-1/4	.429	HC14-062
2/3	.667	14.5°	3-3/4	3-3/4	1-1/4	.458	HC14-066
11/16	.688	14.5°	3-1/2	3-1/2	1-1/4	.472	HC14-068
3/4	.750	14.5°	4	4	1-1/4	.515	HC14-075
7/8	.875	14.5°	4	4	1-1/4	.601	HC14-087
1	1	14.5°	4-1/2	4-1/2	1-1/4	.687	HC14-100
1-1/8	1.125	14.5°	4-1/2	5	1-1/4	.772	HC14-112
1-1/4	1.250	14.5°	5-1/4	6	1-1/2	.858	HC14-125
1-3/8	1.375	14.5°	5-1/4	6	1-1/2	.944	HC14-137
1-1/2	1.500	14.5°	6	7	1-1/2	1.030	HC14-150
1-5/8	1.625	14.5°	5-3/4	6	1-1/2	1.116	HC14-162
1-3/4	1.750	14.5°	6-1/2	7	1-1/2	1.202	HC14-175
1-7/8	1.875	14.5°	7	8	1-1/2	1.287	HC14-187
2	2	14.5°	7	9	1-1/2	1.373	HC14-200
2-1/4	2.250	14.5°	8-1/4	9	2	1.545	HC14-225
2-1/2	2.500	14.5°	9-1/2	11	2	1.716	HC14-250
2-3/4	2.750	14.5°	10	12-1/2	2	1.888	HC14-275
3	3	14.5°	10-1/2	14	2	2.060	HC14-300
3-1/2	3.500	14.5°	11-1/4	15	2-1/2	2.403	HC14-350
4	4	14.5°	12	16	2-1/2	2.746	HC14-400

HC14 Series

CIRCULAR PITCH
14.5° PA GEAR HOBS

Finishing, Non Topping
Single Lead. Right Hand





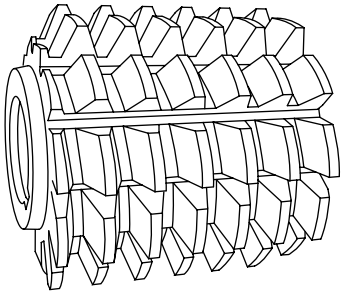
For 1/8 CP & finer, WD = 2.20/DP+.002

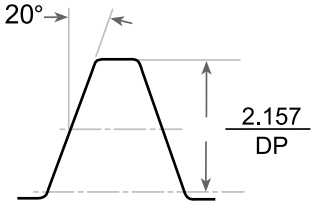
HC20 Series

CIRCULAR PITCH
20° PA GEAR HOBS

Finishing, Non Topping
Single Lead, Right Hand

CP (Fraction)	Circular Pitch	PA	OD	Length	Bore	WD	Specify Class A, B, C
1/20	.050	20°	3/4	1/2	8mm	.037	HC20-005M
1/20	.050	20°	1-1/8	1-1/8	1/2	.037	HC20-005H
1/16	.063	20°	3/4	1/2	8mm	.046	HC20-006M
1/16	.063	20°	1-7/8	1-1/2	3/4	.046	HC20-006S
1/10	.100	20°	15/16	1/2	8mm	.072	HC20-010M
1/10	.100	20°	1-1/8	1-1/8	1/2	.072	HC20-010H
1/10	.100	20°	1-7/8	1-7/8	3/4	.072	HC20-010S
1/8	.125	20°	1-7/8	1-7/8	3/4	.090	HC20-012S
1/8	.125	20°	1-1/2	1-1/2	3/4	.090	HC20-012SE
1/8	.125	20°	2-1/2	2	1-1/4	.090	HC20-012
1/6	.167	20°	1-7/8	1-7/8	3/4	.114	HC20-016S
1/6	.167	20°	2-1/2	2-1/2	1-1/4	.114	HC20-016
3/16	.188	20°	1-7/8	1-7/8	3/4	.129	HC20-018S
1/5	.200	20°	1-7/8	1-7/8	3/4	.137	HC20-020S
1/4	.250	20°	1-7/5	1-7/8	3/4	.172	HC20-025S
1/4	.250	20°	2-3/4	2-3/4	1-1/4	.172	HC20-025
5/16	.313	20°	2	2	3/4	.215	HC20-031S
5/16	.313	20°	3	3	1-1/4	.215	HC20-031
1/3	.333	20°	2	2	3/4	.229	HC20-033S
1/3	.333	20°	2-3/4	2-3/4	1-1/4	.229	HC20-033
3/8	.375	20°	2	2	3/4	.257	HC20-037S
3/8	.375	20°	2-3/4	2-3/4	1-1/4	.257	HC20-037
7/16	.438	20°	3	3	1-1/4	.300	HC20-043
1/2	.500	20°	2	2	3/4	.343	HC20-050S
1/2	.500	20°	3-1/4	3-1/4	1-1/4	.343	HC20-050
9/16	.563	20°	2-1/2	2-1/2	3/4	.386	HC20-056S
9/16	.563	20°	3-1/4	3-1/4	1-1/4	.386	HC20-056
5/8	.625	20°	3-1/2	3-1/2	1-1/4	.429	HC20-062
2/3	.667	20°	3-3/4	3-3/4	1-1/4	.458	HC20-066
11/16	.688	20°	3-1/2	3-1/2	1-1/4	.472	HC20-068
3/4	.750	20°	4	4	1-1/4	.515	HC20-075
7/8	.875	20°	4-1/4	4-1/4	1-1/4	.601	HC20-087
1	1	20°	4-1/2	4-1/2	1-1/4	.687	HC20-100
1-1/8	1.125	20°	4-1/2	5	1-1/4	.772	HC20-112
1-1/4	1.250	20°	5-1/4	6	1-1/2	.858	HC20-125
1-3/8	1.375	20°	5-1/4	6	1-1/2	.944	HC20-137
1-1/2	1.500	20°	6	7	1-1/2	1.030	HC20-150
1-5/8	1.625	20°	5-3/4	6	1-1/2	1.116	HC20-162
1-3/4	1.750	20°	6-1/2	7	1-1/2	1.202	HC20-175
2	2	20°	7	9	1-1/2	1.373	HC20-200
2-1/4	2.250	20°	8-1/4	9	2	1.545	HC20-225
2-1/2	2.500	20°	9-1/2	11	2	1.716	HC20-250
2-3/4	2.750	20°	10	12-1/2	2	1.888	HC20-275
3	3	20°	10-1/2	14	2	2.060	HC20-300
3-1/2	3.500	20°	11-1/4	15	2-1/2	2.403	HC20-350
4	4	20°	12	16	2-1/2	2.746	HC20-400





HC25 Series

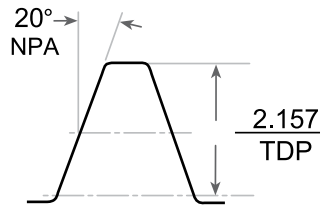
CIRCULAR PITCH
25° PA GEAR HOBS
Finishing, Non Topping
Single Lead. Right Hand

CP (Fraction)	Circular Pitch	OD	Length	Bore	WD	Specify Class A, B, C
1/8	.125	1-7/8	1-7/8	3/4	.090	HC25-012S
1/4	.250	1-7/5	1-7/8	3/4	.172	HC25-025S
1/4	.250	2-3/4	2-3/4	1-1/4	.172	HC25-025

HTD7 Series

TRANSVERSE PITCH 20° PA
for 7.5° Helix Angle
Finishing, Non Topping
Single Thread

Transverse DP	Normal DP	Normal PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1	1.009	20°	10-1/4	13-1/2	2	2.157	HTD7-100	-
1-1/4	1.261	20°	8-1/4	9	1-1/2	1.726	HTD7-125	-
1-1/2	1.513	20°	7	8	1-1/2	1.438	HTD7-150	-
1-3/4	1.765	20°	6-1/4	7	1-1/2	1.233	HTD7-175	-
2	2.017	20°	5-3/4	6-1/2	1-1/2	1.079	HTD7-200	HTDL-200
2-1/2	2.522	20°	5	6-1/2	1-1/2	.863	HTD7-250	HTDL7-250
3	3.026	20°	4-1/2	5	1-1/4	.719	HTD7-300	HTDL7-300
3-1/2	3.530	20°	4	4	1-1/4	.616	HTD7-350	-
4	4.035	20°	4	4	1-1/4	.539	HTD7-400	HTDL7-400
5	5.043	20°	3-1/2	3-1/2	1-1/4	.431	HTD7-500	-
6	6.052	20°	3-1/4	3-1/4	1-1/4	.360	HTD7-600	HTDL7-600
7	7.060	20°	3	3	1-1/4	.308	HTD7-700	HTDL7-700
8	8.069	20°	3	3	1-1/4	.270	HTD7-800	-
10	10.086	20°	2-3/4	2-3/4	1-1/4	.216	HTD7-010	-
12	12.104	20°	2-1/2	2-1/2	1-1/4	.180	HTD7-012	-
16	16.138	20°	1-7/8	1-7/8	3/4	.135	HTD7-016S	-
16	16.138	20°	2-1/2	2-1/2	1-1/4	.135	HTD7-016	-
20	20.173	20°	1-7/8	1-7/8	3/4	.112	HTD7-020S	-
20	20.173	20°	2-1/2	2-1/2	1-1/4	.112	HTD7-020	
24	24.207	20°	2-1/2	2-1/2	1-1/4	.094	HTD7-024	-

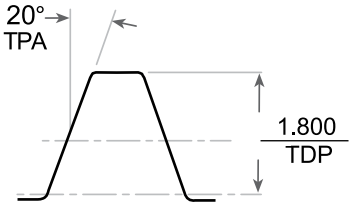


20 DP & finer, WD=2.20/TDP +.002
20° NPA=20.1587° TPA=(20° 9'31")

HTS7 Series

TRANSVERSE PITCH 20° PA
for 7.5° Helix Angle
Stub, Finishing
Non Topping, Single Thread

Transverse DP	Normal DP	Transverse PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1 1/4	1.261	20°	8-1/4	9	1-1/2	1.440	HTS7-125	HTSL7-125
1 1/2	1.513	20°	7	8	1-1/2	1.200	HTS7-150	HTSL7-150
1 3/4	1.765	20°	6-1/4	7-1/4	1-1/4	1.029	HTS7-175	HTSL7-175
2	2.017	20°	5	6	1-1/4	.900	HTS7-200	-
2 1/2	2.522	20°	4-1/2	5-1/2	1-1/4	.720	HTS7-250	-
3	3.026	20°	4-1/4	4-1/4	1-1/4	.600	HTS7-300	-
4	4.035	20°	4	4	1-1/4	.450	HTS7-400	-



20° TPA=19.8423° NPA=(19° 50'32")

HTS10 Series

TRANSVERSE PITCH 20° PA
for 10° Helix Angle
Stub, Finishing, Non Topping
Single Thread, Right Hand

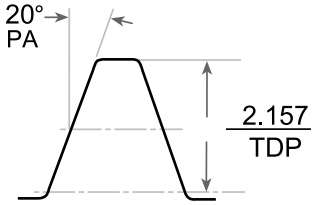
Transverse DP	Normal DP	Transverse PA	OD	Length	Bore	WD	Specify Class A,B,C
1 1/2	1.523	20°Transverse	7	8	1-1/2	1.200	HTS10-150
1 3/4	1.777	20°Transverse	6-1/4	7-1/4	1-1/2	1.029	HTS10-175
2	2.031	20°Transverse	5	6	1-1/4	0.900	HTS10-200
2 1/2	2.539	20°Transverse	4-1/2	5-1/2	1-1/4	0.720	HTS10-250

Transverse DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C Right Hand
2	2.031	20° Normal	5-3/4	6-1/2	1-1/2	1.079	HTD10-200
2-1/2	2.539	20°Transverse	5	6	1-1/2	.863	HTD10-250
3	3.046	20°Transverse	4-1/2	5	1-1/4	.719	HTD10-300
3-1/2	3.554	20°Transverse	4	4	1-1/4	.616	HTD10-350
4	4.062	20°Transverse	4	4	1-1/4	.539	HTD10-400
5	5.077	20°Transverse	3-1/2	3-1/2	1-1/4	.431	HTD10-500
5	5.077	20°Normal	3-1/2	3-1/2	1-1/4	.431	HTD10-500E
6	6.093	20°Transverse	3-1/4	3-1/4	1-1/4	.360	HTD10-600
7	7.108	20°Transverse	3	3	1-1/4	.308	HTD10-700
7	7.108	20°Normal	3	3	1-1/4	.308	HTD10-700E
8	8.123	20°Transverse	3	3	1-1/4	.270	HTD10-800
9	9.139	20°Transverse	2-3/4	2-3/4	1-1/4	.240	HTD10-900
10	10.154	20°Transverse	2-3/4	2-3/4	1-1/4	.216	HTD10-010
12	12.185	20°Transverse	2-1/2	2-1/2	1-1/4	.180	HTD10-012
14	14.216	20°Transverse	2-1/2	2-1/2	1-1/4	.154	HTD10-014
16	16.247	20°Transverse	2-1/2	2-1/2	1-1/4	.135	HTD10-016

HTD10 Series

TRANSVERSE PITCH 20° PA for 10° Helix Angle

Finishing, Non Topping
Single Thread, Right Hand



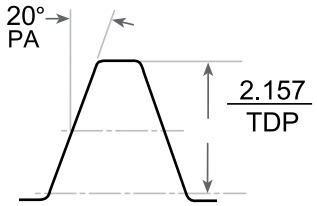
20° TPA=19.7197° NPA=(19° 43'11")

Transverse DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C Right Hand	Specify Class A, B, C Left Hand
1-1/2	1.553	20°Normal	7	8	1-1/2	1.438	HTD15-150	-
2	2.071	20°Normal	5-3/4	6-1/2	1-1/2	1.079	HTD15-200	-
2	2.071	20°Transverse	5-3/4	6-1/2	1-1/2	1.079	HTD15-200E	-
2-1/2	2.588	20°Normal	5	6-1/2	1-1/2	.863	HTD15-250	-
3	3.106	20°Normal	4-1/2	5	1-1/4	.719	HTD15-300	HTDL15-300
3	3.106	20°Transverse	4-1/2	5	1-1/4	.719	HTD15-300E	HTDL15-300E
3-1/2	3.623	20°Normal	4	4	1-1/4	.616	HTD15-350	HTDL15-350
4	4.141	20°Normal	4	4	1-1/4	.539	HTD15-400	HTDL15-400
5	5.176	20°Normal	3-1/2	3-1/2	1-1/4	.431	HTD15-500	HTDL15-500
5	5.176	20°Transverse	3-1/2	3-1/2	1-1/4	.431	HTD15-500E	-
6	6.212	20°Normal	3-1/4	3-1/4	1-1/4	.360	HTD15-600	HTDL15-600
7	7.247	20°Normal	3	3	1-1/4	.308	HTD15-700	HTDL15-700
8	8.282	20°Normal	3	3	1-1/4	.270	HTD15-800	HTDL15-800
8	8.282	20°Transverse	3	3	1-1/4	.270	HTD15-800E	HTDL15-800E
9	9.317	20°Normal	2-3/4	2-3/4	1-1/4	.240	HTD15-900	HTDL15-900
10	10.353	20°Normal	2-3/4	2-3/4	1-1/4	.216	HTD15-010	HTDL15-010
11	11.388	20°Normal	2-1/2	2-1/2	1-1/4	.196	HTD15-011	-
12	12.423	20°Normal	2-1/2	2-1/2	1-1/4	.180	HTD15-012	HTDL15-012
14	14.494	20°Normal	2-1/2	2-1/2	1-1/4	.154	HTD15-014	HTDL15-014
16	16.564	20°Normal	1-7/8	1-7/8	3/4	.135	HTD15-016S	-
16	16.564	20°Normal	2-1/2	2-1/2	1-1/4	.135	HTD15-016	-
18	18.635	20°Normal	1-7/8	1-7/8	3/4	.120	HTD15-018S	-
20	20.706	20°Normal	1-7/8	1-7/8	3/4	.112	HTD15-020S	-
24	24.847	20°Normal	1-7/8	1-7/8	3/4	.094	HTD15-024S	HTDL15-024S

HTD15 Series

TRANSVERSE PITCH 20° PA for 15° Helix Angle

Finishing, Non Topping
Single Thread



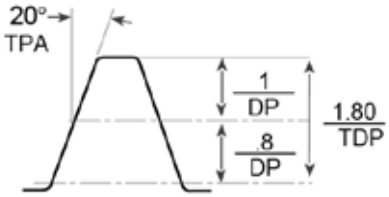
20 DP & Finer WD=2.2/TDP+.002

Trans. DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1-1/2	1.553	20°Transverse	7	8	1-1/2	1.200	HTS15-150	-
1-3/4	1.812	20°Transverse	6-1/4	7-1/4	1-1/2	1.029	HTS15-175	-
2	2.071	20°Transverse	5	6	1-1/4	.900	HTS15-200	HTSL15-200
2-1/2	2.588	20°Transverse	4-1/2	5-1/2	1-1/4	.720	HTS15-250	-
3	3.106	20°Transverse	4-1/4	4-1/4	1-1/4	.600	HTS15-300	-
4	4.141	20°Transverse	4	4	1-1/4	.450	HTS15-400	-
5	5.176	20°Transverse	3-1/2	3-1/2	1-1/4	.360	HTS15-500	-
6	6.212	20°Transverse	2-3/4	2-3/4	1-1/4	.300	HTS15-600	HTSL15-600
6	6.212	20°Normal	3-1/4	3-1/4	1-1/4	.300	HTS15-600E	-
7	7.247	20°Transverse	3	3	1-1/4	.257	HTS15-700	-
8	8.282	20°Transverse	3	3	1-1/4	.225	HTS15-800	-

HTS15 Series

TRANSVERSE PITCH 20° PA for 15° Helix Angle

Stub, Finishing
Non Topping, Single Thread

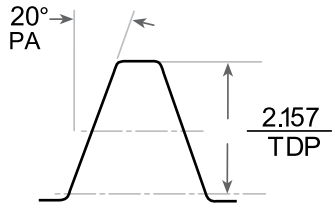


Trans. DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C
							Right Hand
2	2.128	20°Transverse	5-3/4	6-1/2	1-1/2	1.079	HTD20-200
3	3.193	20°Transverse	4-1/2	5	1-1/4	.719	HTD20-300
3-1/2	3.725	20°Transverse	4	4	1-1/4	.616	HTD20-350
4	4.257	20°Transverse	4	4	1-1/4	.539	HTD20-400
5	5.321	20°Transverse	3-1/2	3-1/2	1-1/4	.431	HTD20-500
6	6.385	20°Transverse	3-1/4	3-1/4	1-1/4	.360	HTD20-600
6	6.385	20°Normal	3-1/4	3-1/4	1-1/4	.360	HTD20-600E
7	7.449	20°Transverse	3	3	1-1/4	.308	HTD20-700
8	8.513	20°Transverse	3	3	1-1/4	.270	HTD20-800
8	8.513	20°Normal	3	3	1-1/4	.270	HTD20-800E
9	9.578	20°Transverse	2-3/4	2-3/4	1-1/4	.240	HTD20-900
10	10.642	20°Transverse	1-7/8	1-7/8	3/4	.216	HTD20-010S
10	10.642	20°Transverse	2-3/4	2-3/4	1-1/4	.216	HTD20-010
10	10.642	20°Normal	2-3/4	2-3/4	1-1/4	.216	HTD20-010E
12	12.770	20°Transverse	2-1/2	2-1/2	1-1/4	.180	HTD20-012
16	17.027	20°Transverse	1-7/8	1-7/8	3/4	.135	HTD20-016S
16	17.027	20°Transverse	2-1/2	2-1/2	1-1/4	.135	HTD20-016
20	21.284	20°Transverse	1-7/8	1-7/8	3/4	.112	HTD20-020S

HTD20 Series

TRANSVERSE PITCH 20° PA for 20° Helix Angle

Finishing, Non Topping
Single Thread



20 DP & finer, WD = 2.2/TDP + .002
20˚ TPA = 18.8817˚ NPA = (18˚ 52'54")

For left hand hob, inquire on HTDL20

HTS20 Series

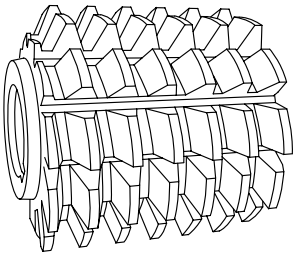
TRANSVERSE PITCH 20° PA
for 20° Helix Angle
Stub, Finishing
Non Topping, Single Thread

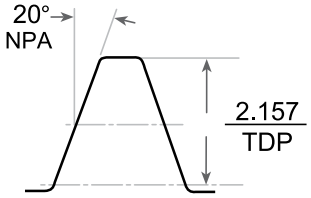
Trans. DP	Normal DP	Transverse PA	OD	Length	Bore	WD	Specify Class A, B, C
							Right Hand
1-1/2	1.596	20°	7	8	1-1/2	1.200	HTS20-150
1-3/4	1.862	20°	6-1/4	7-1/4	1-1/2	1.029	HTS20-175
2	2.128	20°	5	6	1-1/4	.900	HTS20-200
2-1/2	2.660	20°	4-1/2	5-1/2	1-1/4	.720	HTS20-250
3	3.193	20°	4-1/4	4-1/4	1-1/4	.600	HTS20-300

HTD23 Series

TRANSVERSE PITCH 20° PA
for 23° Helix Angle
Finishing
Non Topping
Single Thread

Trans. DP	Normal DP	Normal PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1	1.086	20°	10-1/4	13-1/2	2	2.157	HTD23-100	-
1-1/4	1.358	20°	8-1/4	9	1-1/2	1.726	HTD23-125	HTDL23-125
1-1/2	1.630	20°	7	8	1-1/2	1.438	HTD23-150	-
2	2.173	20°	5-3/4	6-1/2	1-1/2	1.079	HTD23-200	HTDL23-200
2-1/2	2.716	20°	5	6-1/2	1-1/2	.863	HTD23-250	HTDL23-250
3	3.259	20°	4-1/2	5	1-1/4	.719	HTD23-300	HTDL23-300
3-1/2	3.802	20°	4	4	1-1/4	.616	HTD23-350	-
4	4.345	20°	4	4	1-1/4	.539	HTD23-400	-
5	5.432	20°	3-1/2	3-1/2	1-1/4	.431	HTD23-500	HTDL23-500
6	6.518	20°	3-1/4	3-1/4	1-1/4	.360	HTD23-600	HTDL23-600
7	7.605	20°	3	3	1-1/4	.308	HTD23-700	-
8	8.691	20°	3	3	1-1/4	.270	HTD23-800	HTDL23-800
9	9.777	20°	2-3/4	2-3/4	1-1/4	.240	HTD23-900	-
10	10.864	20°	2-3/4	2-3/4	1-1/4	.216	HTD23-010	HTDL23-010
11	11.950	20°	2-1/2	2-1/2	1-1/4	.196	HTD23-011	HTDL23-011
12	13.036	20°	2-1/2	2-1/2	1-1/4	.180	HTD23-012	HTDL23-012
14	15.209	20°	2-1/2	2-1/2	1-1/4	.154	HTD23-014	HTDL23-014
16	17.382	20°	1-7/8	1-7/8	3/4	.135	HTD23-016S	HTDL23-016S
20	21.727	20°	1-7/8	1-7/8	3/4	.112	HTD23-020S	-
24	26.073	20°	1-7/8	1-7/8	3/4	.094	HTD23-024S	-



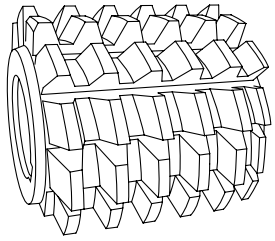


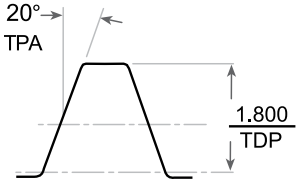
20 DP & Finer, WD=2.20/TDP+.002
20° NPA=21.5939° TPA=(21 34'26")

HTS23 & HTSL23 Series

TRANSVERSE PITCH 20° PA
for 23° Helix Angle
Stub, Finishing
Non Topping
Single Thread

Trans. DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1	1.086	20°Transverse	10	12-1/2	2	1.800	HTS23-100	-
1-1/4	1.358	20°Transverse	7-1/2	9-1/2	1-1/2	1.440	HTS23-125	-
1-1/2	1.630	20°Transverse	7	8	1-1/2	1.200	HTS23-150	HTSL23-150
1-3/4	1.901	20°Transverse	6-1/4	7-1/4	1-1/2	1.029	HTS23-175	-
2	2.173	20°Transverse	5	6	1-1/4	.900	HTS23-200	HTSL23-200
2-1/2	2.716	20°Transverse	4-1/2	5-1/2	1-1/4	.720	HTS23-250	-
3	3.259	20°Transverse	4-1/4	4-1/4	1-1/4	.600	HTS23-300	HTSL23-300
4	4.345	20°Transverse	4	4	1-1/4	.450	HTS23-400	HTSL23-400
5	5.432	20°Transverse	3-1/4	3-1/4	1-1/4	.360	HTS23-500	HTSL23-500
5	5.432	20°Normal	3-1/4	3-1/4	1-1/4	.360	HTS23-500E	-
6	6.518	20°Transverse	3-1/4	3-1/4	1-1/4	.300	HTS23-600	HTSL23-600
8	8.691	20°Transverse	3	3	1-1/4	.225	HTS23-800	HTSL23-800
9	9.777	20°Transverse	3	3	1-1/4	.200	HTS23-900	-
10	10.864	20°Transverse	3	3	1-1/4	.180	HTS23-010	-
10	10.864	20°Normal	3	3	1-1/4	.180	HTS23-010E	-
12	13.036	20°Transverse	2-1/2	2-1/2	1-1/4	.150	HTS23-012	-





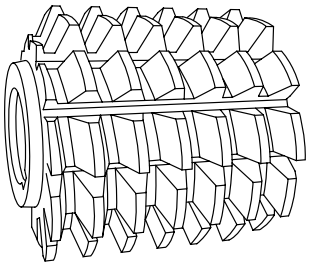
20° TPA=18.5227° NPA=(18° 31'22")

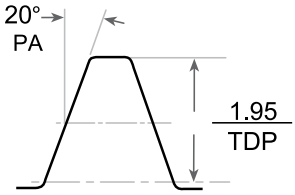
Trans. DP	Normal DP	PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1-1/4	1.443	20°Transverse	8-1/4	9	1-1/2	1.560	HTD30-125	-
1-1/2	1.732	20°Transverse	7	8	1-1/2	1.300	HTD30-150	-
1-3/4	2.021	20°Transverse	6-1/4	7	1-1/2	1.114	HTD30-175	-
2	2.309	20°Transverse	5-3/4	6-1/2	1-1/2	.975	HTD30-200	HTDL30-200
2-1/2	2.887	20°Transverse	5	6-1/2	1-1/2	.780	HTD30-250	HTDL30-250
2-1/2	2.887	20°Normal	5	6-1/2	1-1/2	.780	-	HTDL30-250E
2-3/4	3.175	20°Transverse	4-1/2	5	1-1/4	.709	HTD30-275	-
3	3.464	20°Transverse	4-1/2	5	1-1/4	.650	HTD30-300	HTDL30-300
3-1/2	4.041	20°Transverse	4	4	1-1/4	.557	HTD30-350	HTDL30-350
4	4.619	20°Transverse	4	4	1-1/4	.488	HTD30-400	HTDL30-400
4	4.619	20°Normal	4	4	1-1/4	.488	-	HTDL30-400E
4-1/2	5.196	20°Transverse	3-1/2	3-1/2	1-1/4	.433	HTD30-450	-
5	5.774	20°Transverse	3-1/2	3-1/2	1-1/4	.390	HTD30-500	HTDL30-500
6	6.928	20°Transverse	3-1/4	3-1/4	1-1/4	.325	HTD30-600	HTDL30-600
6-1/2	7.506	20°Transverse	3	3	1-1/4	.300	HTD30-650	-
7	8.083	20°Transverse	3	3	1-1/4	.279	HTD30-700	HTDL30-700
7	8.083	20°Normal	3	3	1-1/4	.279	HTD30-700E	-
8	9.238	20°Transverse	3	3	1-1/4	.244	HTD30-800	HTDL30-800
9	10.392	20°Transverse	2-3/4	2-3/4	1-1/4	.217	HTD30-900	HTDL30-900
10	11.547	20°Transverse	1-7/8	1-7/8	3/4	.195	HTD30-010S	-
10	11.547	20°Transverse	2-3/4	2-3/4	1-1/4	.195	HTD30-010	HTDL30-010
11	12.702	20°Transverse	2-1/2	2-1/2	1-1/4	.177	HTD30-011	-
12	13.856	20°Transverse	2-1/2	2-1/2	1-1/4	.163	HTD30-012	HTDL30-012
12	13.856	20°Normal	2-1/2	2-1/2	1-1/4	.163	HTD30-012E	HTDL30-012E
16	18.475	20°Transverse	1-7/8	1-7/8	3/4	.122	HTD30-016S	HTDL30-016S
16	18.475	20°Transverse	2-1/2	2-1/2	1-1/4	.122	HTD30-016	-
18	20.785	20°Transverse	1-7/8	1-7/8	3/4	.108	HTD30-018S	-
20	23.094	20°Transverse	1-7/8	1-7/8	3/4	.112	HTD30-020S	-
24	27.713	20°Transverse	1-7/8	1-7/8	3/4	.094	HTD30-024S	-

HTD30 Series

TRANSVERSE PITCH 20° PA for 30° Helix Angle

Finishing, Non Topping
Single Thread





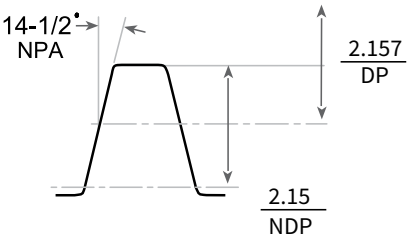
20 DP & finer, WD = 2.20/TDP + .002
20˚ TPA = 17.4952˚ NPA = (17˚ 29'43")

Trans. DP	Normal DP	Normal PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
4	5.657	14.5°	4	4	1-1/4	.381	HTD45-14-400	-
5	7.071	14.5°	3-1/2	3-1/2	1-1/4	.305	HTD45-14-500	-
6	8.485	14.5°	3	3	1-1/4	.254	HTD45-14-600	HTDL45-14-600
7	9.899	14.5°	3	3	1-1/4	.218	HTD45-14-700	-
8	11.314	14.5°	1-7/8	1-7/8	3/4	.191	HTD45-14-800S	HTDL45-14-800S
8	11.314	14.5°	2-3/4	2-3/4	1-1/4	.191	HTD45-14-800	HTDL45-14-800
9	12.728	14.5°	2-3/4	2-3/4	1-1/4	.169	HTD45-14-900	-
10	14.142	14.5°	1-7/8	1-7/8	3/4	.153	HTD45-14-010S	-
10	14.142	14.5°	2-1/2	2-1/2	1-1/4	.153	HTD45-14-010	HTDL45-14-010
12	16.971	14.5°	1-7/8	1-7/8	3/4	.127	HTD45-14-012S	HTDL45-14-012S
12	16.971	14.5°	2-1/2	2-1/2	1-1/4	.127	HTD45-14-012	HTDL45-14-012
14	19.799	14.5°	2-1/2	2-1/2	1-1/4	.109	HTD45-14-014	HTDL45-14-014
16	22.627	14.5°	1-7/8	1-7/8	3/4	.099	HTD45-14-016S	HTDL45-14-016S
16	22.627	14.5°	2-1/2	2-1/2	1-1/4	.099	HTD45-14-016	HTDL45-14-016
20	28.284	14.5°	1-7/8	1-7/8	3/4	.080	HTD45-14-020S	HTDL45-14-020S
24	33.941	14.5°	1-7/8	1-7/8	3/4	.067	HTD45-14-024S	HTDL45-14-024S

HTD45-14 Series

TRANSVERSE PITCH 14.5° NPA for 45° Helix Angle

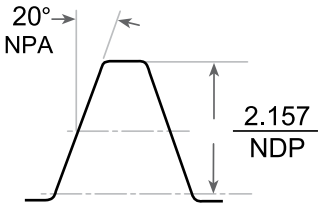
Finishing
Non Topping, Single Thread



HTD45-20 Series

TRANSVERSE PITCH 20° NPA
for 45° Helix Angle
Finishing
Non Topping, Single Thread

Trans. DP	Normal DP	Normal PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
3	4.243	20°	4-1/2	5	1-1/4	.508	HTD45-20-300	-
4	5.657	20°	4	4	1-1/4	.381	HTD45-20-400	-
5	7.071	20°	3-1/2	3-1/2	1-1/4	.305	HTD45-20-500	HTDL45-20-500
6	8.485	20°	3	3	1-1/4	.254	HTD45-20-600	HTDL45-20-600
8	11.314	20°	2-3/4	2-3/4	1-1/4	.191	HTD45-20-800	HTDL45-20-800
8	11.314	20°	1-7/8	1-7/8	3/4	.191	-	HTDL45-20-800S
10	14.142	20°	1-7/8	1-7/8	3/4	.153	HTD45-20-010S	-
10	14.142	20°	2-1/2	2-1/2	1-1/4	.153	HTD45-20-010	HTDL45-20-10
12	16.971	20°	1-7/8	1-7/8	3/4	.127	HTD45-20-012S	-
12	16.971	20°	2-1/2	2-1/2	1-1/4	.127	HTD45-20-012	HTDL45-20-12
16	22.627	20°	1-7/8	1-7/8	3/4	.099	HTD45-20-016S	HTDL45-20-16S
16	22.627	20°	2-1/2	2-1/2	1-1/4	.099	HTD45-20-016	HTDL45-20-16
20	28.284	20°	1-7/8	1-7/8	3/4	.080	HTD45-20-020S	HTDL45-20-20S
24	33.941	20°	1-7/8	1-7/8	3/4	.067	HTD45-20-024S	-



20 DP & Finer WD=2.2/NDP + .002

HTDM Series

20°PA Transverse DP
for 15 & 20°Helix Angle
Finishing , Non-Topping
Single Thread Right Hand

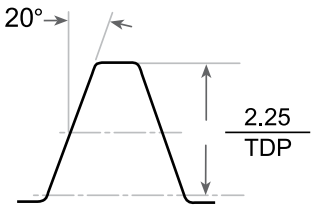
Trans. Module	Normal Module	For Helix Angle °	PA	OD	Length	Bore	WD	Specify Class A, B, C	
								Right Hand	Left Hand
1-1/4	1.083	30	20°Transverse	1-7/8	1-7/8	3/4	.096	HTDM30-125S	-
1-1/4	.884	45	20°Normal	1-7/8	1-7/8	3/4	.075	HTDM45-125S	-
1-1/2	1.299	30	20°Transverse	1-7/8	1-7/8	3/4	.115	HTDM30-150S	-
1-1/2	1.061	45	20°Normal	1-7/8	1-7/8	3/4	.094	HTDM45-150S	-
1-1/2	1.061	45	20°Normal	2-1/2	2-1/2	1-1/4	.094	HTDM45-150	-
1-3/4	1.644	20	20°Transverse	2-1/2	2-1/2	1-1/4	.155	HTDM20-175	-
1-3/4	1.237	45	20°Normal	1-7/8	1-7/8	3/4	.109	HTDM45-175S	-
2	1.879	20	20°Transverse	2-3/4	2-3/4	1-1/4	.177	HTDM20-200	-
2	1.732	30	20°Transverse	2-3/4	2-3/4	1-1/4	.154	HTDM30-200	-
2	1.414	45	20°Normal	2-3/4	2-3/4	1-1/4	.120	HTDM45-200	-
2	1.414	45	20°Normal	1-7/8	1-7/8	3/4	.120	HTDM45-200S	-
2-1/2	2.415	15	20°Transverse	2-3/4	2-3/4	1-1/4	.205	HTDM15-250	-
2-1/2	2.165	30	20°Transverse	2-3/4	2-3/4	1-1/4	.192	HTDM30-250	-
2-1/2	1.768	45	20°Normal	2-3/4	2-3/4	1-1/4	.150	HTDM45-250	-
3	2.819	20	20°Transverse	3	3	1-1/4	.266	HTDM20-300	-
3	2.598	30	20°Transverse	2-3/4	2-3/4	1-1/4	.230	HTDM30-300	-
3	2.121	45	20°Normal	2-3/4	2-3/4	1-1/4	.180	HTDM45-300	-
3-3/4	3.524	20	20°Transverse	3	3	1-1/4	.332	HTDM20-375	-
4	3.464	30	20°Transverse	3-1/4	3-1/4	1-1/4	.307	HTDM30-400	-
4	2.828	45	20°Normal	3-1/4	3-1/4	1-1/4	.240	HTDM45-400	-
5	4.330	30	20°Transverse	3-1/4	3-1/4	1-1/4	.384	HTDM30-500	-
5	3.536	45	20°Normal	3-1/2	3-1/2	1-1/4	.300	HTDM45-500	-
5-1/2	3.889	45	20°Normal	3-1/2	3-1/2	1-1/4	.422	-	HTDML45-550

Trans. Module	Normal Module	For Helix Angle	PA	OD	Length	Bore	WD	Specify Class A, B, C
1-3/4	1.644	20	20°Transverse	2-1/2	2-1/2	1-1/4	.155	HTDM20-175
2	1.879	20	20°Transverse	2-3/4	2-3/4	1-1/4	.154	HTDM20-200
2-1/2	2.415	15	20°Transverse	2-3/4	2-3/4	1-1/4	.205	HTDM15-250
3	2.819	20	20°Transverse	3	3	1-1/4	.266	HTDM20-300
3-3/4	3.524	20	20°Transverse	3	3	1-1/4	.332	HTDM20-375

HTDM15 & HTDM20 Series

20°PA Transverse DP for 15 & 20°Helix Angle

Finishing , Non-Topping
Single Thread, Right Hand

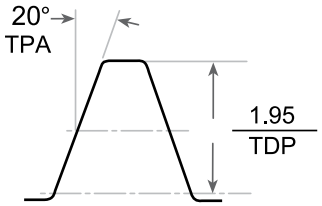


Trans. Module	Normal Module	PA	OD	Length	Bore	WD	Specify Class A, B, C	
							Right Hand	Left Hand
1-1/4	1.083	20°Transverse	1-7/8	1-7/8	3/4	.096	HTDM30-125S	-
1-1/2	1.299	20°Transverse	1-7/8	1-7/8	3/4	.115	HTDM30-150S	-
2	1.732	20°Transverse	2-3/4	2-3/4	1-1/4	.154	HTDM30-200	HTDML30-200
2-1/2	2.165	20°Transverse	2-3/4	2-3/4	1-1/4	.192	HTDM30-250	-
3	2.598	20°Transverse	2-3/4	2-3/4	1-1/4	.230	HTDM30-300	-
3-1/2	3.031	20°Transverse	3	3	1-1/4	.269	HTDM30-350	-
4	3.464	20°Transverse	3-1/4	3-1/4	1-1/4	.307	HTDM30-400	-
5	4.330	20°Transverse	3-1/2	3-1/2	1-1/4	.384	HTDM30-500	-
5-1/2	4.763	20°Transverse	3-1/2	3-1/2	1-1/4	.422	HTDM30-500	HTDML30-500

HTDM30 Series

20°PA Transverse DP for 30°Helix Angle

Finishing, Non-Topping
Single Thread

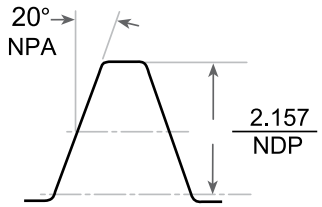


Trans. Module	Normal Module	PA	OD	Length	Bore	WD	Specify Class A, B, C
1-1/4	.884	20°Normal	1-7/8	1-7/8	3/4	.078	HTDM45-125S
1-1/2	1.061	20°Normal	1-7/8	1-7/8	3/4	.094	HTDM45-150S
1-1/2	1.061	20°Normal	2 1/2	2-1/2	1-1/4	.094	HTDM45-150
1-3/4	1.237	20°Normal	1-7/8	1-7/8	3/4	.110	HTDM45-175S
2	1.414	20°Normal	2-3/4	2-3/4	1-1/4	.120	HTDM45-200
2-1/2	1.768	20°Normal	2-3/4	2-3/4	1-1/4	.150	HTDM45-250
3	2.121	20°Normal	2-3/4	2-3/4	1-1/4	.180	HTDM45-300
4	2.828	20°Normal	3-1/4	3-1/4	1-1/4	.240	HTDM45-400
5	3.536	20°Normal	3-1/2	3-1/2	1-1/4	.300	HTDM45-500

HTDM45 Series

20°PA Transverse DP for 45°Helix Angle

Finishing, Non-Topping
Single Thread, Right Hand



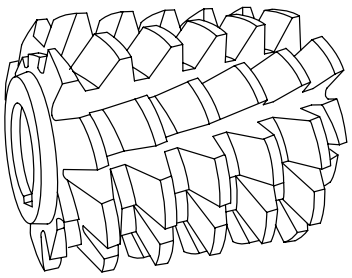
HTC18 Series

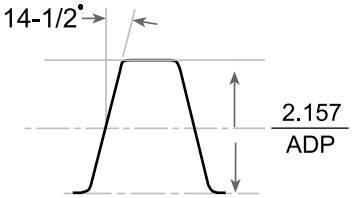
14.5 °Normal Pressure Angle
Transverse CP
for 18°Helix Angle
Finishing, Non-Topping
Single Thread

Trans. CP	Normal Pressure Angle	OD	Length	Bore	WD	Specify Class A, B, C	
						Right Hand	Left Hand
1/8	14.5	3	3	1-1/4	.090	HTC18-012	-
1/4	14.5	2-3/4	2-3/4	1-1/4	.179	HTC18-025	HTCL18-025

HWS14 & HWSL14 Series

Topping Worm Gear
Shell Type
14.5°PA Axial DP



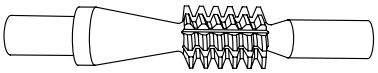


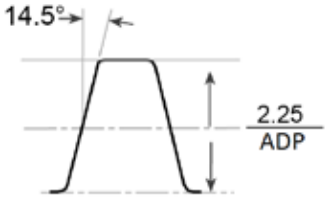
Axial Diam. Pitch	PA	Worm P.D.	OD	Length	# of Threads	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
3	14.5°	4.000	4.970	4	1	1-1/4	HWS14-03-1	HWSL14-03-1
3	14.5°	4.000	4.970	4	2	1-1/4	HWS14-03-2	HWSL14-03-2
4	14.5°	3.000	3.731	4-1/2	1	1-1/4	HWS14-04-1	HWSL14-04-1
4	14.5°	3.000	3.731	4-1/2	2	1-1/4	HWS14-04-2	HWSL14-04-2
4	14.5°	3.000	3.731	4-1/2	3	1-1/4	HWS14-04-3	-
4	14.5°	3.000	3.731	4-1/2	4	1-1/4	HWS14-04-4	-
5	14.5°	2.300	2.880	3	1	1-1/4	HWS14-05-1	HWSL14-05-1
5	14.5°	2.300	2.880	3	2	1-1/4	HWS14-05-2	HWSL14-05-2
5	14.5°	2.300	2.880	3	3	1-1/4	HWS14-05-3	HWSL14-05-3
5	14.5°	2.300	2.880	3	4	1-1/4	HWS14-05-4	-
6	14.5°	2.000	2.490	3	1	3/4	HWS14-06-1	HWSL14-06-1
6	14.5°	2.000	2.490	3	2	3/4	HWS14-06-2	HWSL14-06-2
6	14.5°	2.000	2.490	3	3	3/4	HWS14-06-3	HWSL14-06-3
6	14.5°	2.000	2.490	3	4	3/4	HWS14-06-4	HWSL14-06-4
8	14.5°	1.500	1.878	2-1/2	1	3/4	HWS14-08-1	HWSL14-08-1
8	14.5°	1.500	1.878	2-1/2	2	3/4	HWS14-08-2	HWSL14-08-2
8	14.5°	1.500	1.878	2-1/2	3	3/4	HWS14-08-3	HWSL14-08-3
8	14.5°	1.500	1.878	2-1/2	4	3/4	HWS14-08-4	HWSL14-08-4
10	14.5°	1.250	1.555	2	1	1/2	HWS14-10-1	HWSL14-10-1
10	14.5°	1.250	1.555	2	2	1/2	HWS14-10-2	HWSL14-10-2
10	14.5°	1.250	1.555	2	3	1/2	HWS14-10-3	HWSL14-10-3
10	14.5°	1.250	1.555	2	3	5/8	HWS14-10-3E	-
10	14.5°	1.250	1.555	2	4	1/2	HWS14-10-4	-
12	14.5°	1.000	1.285	1-3/4	1	1/2	HWS14-12-1	HWSL14-12-1
12	14.5°	1.000	1.285	1-3/4	2	1/2	HWS14-12-2	-
12	14.5°	1.000	1.285	1-3/4	3	1/2	HWS14-12-3	-
12	14.5°	1.000	1.285	1-3/4	4	1/2	HWS14-12-4	-
16	14.5°	1.125	1.355	1-3/4	1	1/2	HWS14-16-1	HWSL14-16-1

Axial DP	PA	Worm P.D.	OD	# of Threads	Specify Class A, B, C	
					Right Hand	Left Hand
8	14.5°	1.500	1.890	1	HWK14-08-1	HWKL14-08-1
8	14.5°	1.500	1.890	2	HWK14-08-2	HWKL14-08-2
8	14.5°	1.500	1.890	3	HWK14-08-3	-
8	14.5°	1.500	1.890	4	HWK14-08-4	-
10	14.5°	1.250	1.570	1	HWK14-10-1	HWKL14-10-1
10	14.5°	1.250	1.570	2	HWK14-10-2	HWKL14-10-2
10	14.5°	1.250	1.570	3	HWK14-10-3	HWKL14-10-3
10	14.5°	1.250	1.570	4	HWK14-10-4	HWKL14-10-4
12	14.5°	1.000	1.285	1	HWK14-12-1	HWKL14-12-1
12	14.5°	1.000	1.285	2	HWK14-12-2	HWKL14-12-2
12	14.5°	1.000	1.285	3	HWK14-12-3	HWKL14-12-3
12	14.5°	1.000	1.285	4	HWK14-12-4	HWKL14-12-4
16	14.5°	.625	0.855	1	HWK14-16-1	HWKL14-16-1
16	14.5°	1.125	1.355	4	HWK14-16-1E	HWKL14-16-1E
16	14.5°	.625	0.855	2	HWK14-16-2	HWKL14-16-2
16	14.5°	1.125	1.355	2	HWK14-16-2E	HWKL14-16-2E
16	14.5°	.625	0.855	3	HWK14-16-3	-
16	14.5°	.625	0.855	4	HWK14-16-4	-
20	14.5°	.563	0.766	1	HWK14-20-1	-
24	14.5°	.500	0.681	1	HWK14-24-1	HWKL14-24-1
24	14.5°	.500	0.681	2	HWK14-24-2	-
32	14.5°	.438	0.590	1	HWK14-32-1	HWKL14-32-1
48	14.5°	.333	0.457	1	HWK14-48-1	HWKL14-48-1
64	14.5°	.313	0.422	1	HWK14-64-1	-
64	14.5°	.313	0.422	4	HWK14-64-4	-

HWK14 & HWKL14 Series

Topping Worm Gear Shank Type 14.5°PA Axial DP

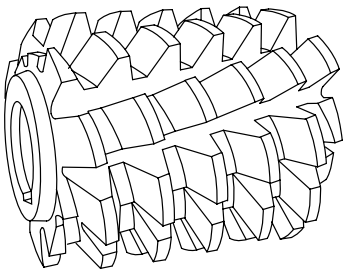


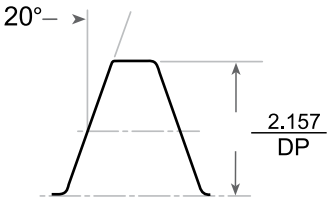


Axial DP	PA	Worm P.D.	# of Threads	OD	Length	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
3	20°	4.000	1	4.970	4	1-1/4	HWS20-03-1	-
3	20°	4.000	2	4.970	4	1-1/4	HWS20-03-2	HWSL20-03-2
3	20°	4.000	3	4.970	4	1-1/4	HWS20-03-3	-
4	20°	3.000	1	3.373	4-1/2	1-1/4	HWS20-04-1	HWSL20-04-1
4	20°	3.000	2	3.373	4-1/2	1-1/4	HWS20-04-2	HWSL20-04-2
4	20°	3.000	3	3.373	4-1/2	1-1/4	HWS20-04-3	-
4	20°	3.000	4	3.373	4-1/2	1-1/4	HWS20-04-4	-
5	20°	2.300	1	2.880	3	1-1/4	HWS20-05-1	HWSL20-05-1
5	20°	2.300	2	2.880	3	1-1/4	HWS20-05-2	HWSL20-05-2
5	20°	2.300	3	2.880	3	1-1/4	HWS20-05-3	HWSL20-05-3
5	20°	2.300	4	2.880	3	1-1/4	HWS20-05-4	-
6	20°	2.000	1	2.490	3	3/4	HWS20-06-1	HWSL20-06-1
6	20°	2.000	2	2.490	3	3/4	HWS20-06-2	HWSL20-06-2
6	20°	2.000	3	2.490	3	3/4	HWS20-06-3	-
6	20°	2.000	4	2.490	3	3/4	HWS20-06-4	HWSL20-06-4
8	20°	1.500	1	1.878	2-1/2	3/4	HWS20-08-1	HWSL20-08-1
8	20°	1.750	1	2.120	2-1/2	3/4	HWS20-08-1E	-
8	20°	1.500	2	1.878	2-1/2	3/4	HWS20-08-2	HWSL20-08-2
8	20°	1.500	3	1.878	2-1/2	3/4	HWS20-08-3	HWSL20-08-3
8	20°	1.500	4	1.878	2-1/2	3/4	HWS20-08-4	HWSL20-08-4
10	20°	1.250	1	1.555	2	1/2	HWS20-10-1	HWSL20-10-1
10	20°	1.250	1	1.555	2	5/8	HWS20-10-1E	-
10	20°	1.250	2	1.555	2	1/2	HWS20-10-2	-
10	20°	1.250	3	1.555	2	1/2	HWS20-10-3	-
10	20°	1.250	3	1.555	2	5/8	HWS20-10-3E	-
10	20°	1.250	4	1.555	2	1/2	HWS20-10-4	-
12	20°	1.000	1	1.285	1-3/4	1/2	HWS20-12-1	HWSL20-12-1
12	20°	1.000	2	1.285	1-3/4	1/2	HWS20-12-2	HWSL20-12-2
12	20°	1.000	3	1.285	1-3/4	1/2	HWS20-12-3	-
12	20°	1.000	4	1.285	1-3/4	1/2	HWS20-12-4	-

HWS20 & HWSL20 Series

Topping Worm Gear Shell Type 20° PA Axial DP



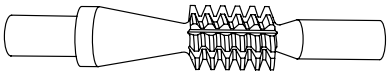


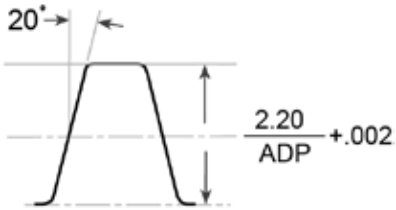
HWK20 & HWKL20 Series

Topping Worm Gear Shank Type

20° PA Axial DP

Axial DP	PA	Worm P.D.	# of Threads	OD	Specify Class A, B, C	
					Right Hand	Left Hand
8	20°	1.500	1	1.890	HWK20-08-1	-
8	20°	1.500	2	1.890	HWK20-08-2	-
8	20°	1.500	4	1.890	HWK20-08-4	-
10	20°	1.250	1	1.570	HWK20-10-1	-
10	20°	1.250	2	1.570	HWK20-10-2	HWKL20-10-2
10	20°	1.250	3	1.570	HWK20-10-3	-
10	20°	1.250	4	1.570	HWK20-10-4	HWKL20-10-4
12	20°	1.000	1	1.285	HWK20-12-1	HWKL20-12-1
12	20°	1.000	2	1.285	HWK20-12-2	HWKL20-12-2
12	20°	1.000	3	1.285	HWK20-12-3	-
12	20°	1.000	4	1.285	HWK20-12-4	-
14	20°	.750	1	.970	HWK20-14-1E	-
16	20°	.625	1	.855	HWK20-16-1	HWKL20-16-1
16	20°	.625	2	.855	HWK20-16-2	-
16	20°	.625	3	.855	HWK20-16-3	-
16	20°	.625	4	.855	HWK20-16-4	HWKL20-16-4
20	20°	.563	1	.766	HWK20-20-1	-
20	20°	.563	2	.766	HWK20-20-2	-
20	20°	.563	3	.766	HWK20-20-3	-
20	20°	.563	4	.766	HWK20-20-4	-
24	20°	.500	1	.681	HWK20-24-1	-
24	20°	.500	2	.681	HWK20-24-2	HWKL20-24-2
24	20°	.500	3	.681	HWK20-24-3	-
24	20°	.500	4	.681	HWK20-24-4	-
32	20°	.438	1	.590	HWK20-32-1	-
32	20°	.438	2	.590	HWK20-32-2	HWKL20-32-2
32	20°	.438	4	.590	HWK20-32-4	HWKL20-32-4
48	20°	.333	1	.457	HWK20-48-1	-
48	20°	.333	2	.457	HWK20-48-2	HWKL20-48-2
64	20°	.313	2	.422	HWK20-64-2	-



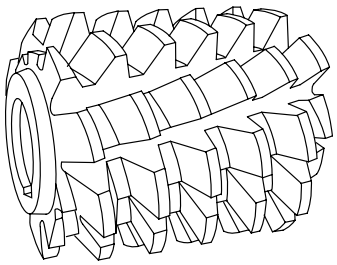


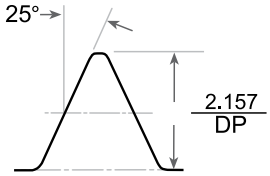
HWS25 & HWSL25 Series

Topping Worm Gear Shell Type

25° PA Axial DP

Axial DP	PA	Worm P.D.	# of Threads	OD	Length	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
3	25°	4.000	2	4.970	4	1-1/4	HWS25-03-2	-
4	25°	3.000	1	3.373	4-1/2	1-1/4	HWS25-04-1	-
4	25°	3.000	2	3.373	4-1/2	1-1/4	HWS25-04-2	-
4	25°	3.000	3	3.373	4-1/2	1-1/4	HWS25-04-3	-
5	25°	2.300	1	2.880	3	1-1/4	HWS25-05-1	-
5	25°	2.300	2	2.880	3	1-1/4	HWS25-05-2	-
6	25°	2.000	1	2.490	3	3/4	HWS25-06-1	HWSL25-06-1
6	25°	2.000	2	2.490	3	3/4	HWS25-06-2	-
6	25°	2.000	3	2.490	3	3/4	HWS25-06-3	-
6	25°	2.000	4	2.490	3	3/4	HWS25-06-4	-
8	25°	1.500	1	1.878	2-1/2	3/4	HWS25-08-1	-
8	25°	1.500	2	1.878	2-1/2	3/4	HWS25-08-2	-
8	25°	1.500	3	1.878	2-1/2	3/4	HWS25-08-3	-
8	25°	1.500	4	1.878	2-1/2	3/4	HWS25-08-4	-
10	25°	1.250	1	1.555	2	1/2	HWS25-10-1	-
10	25°	1.250	2	1.555	2	1/2	HWS25-10-2	-
12	25°	1.000	1	1.285	1-3/4	1/2	HWS25-12-1	-

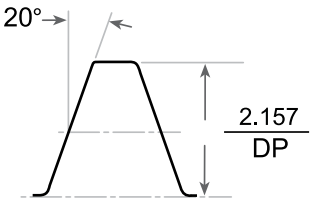




Axial Circ. Pitch	PA	Worm P.D.	# of Threads	OD	Length	Bore	Specify Class A,B,C
1/4	20°	1.000	1	1.27	1-3/4	1/2	HWC20-025-1
1/4	20°	1.000	2	1.27	1-3/4	1/2	HWC20-025-2
3/8	20°	1.500	1	1.88	2-1/2	3/4	HWC20-037-1
3/8	20°	1.500	2	1.88	2-1/2	3/4	HWC20-037-2
3/8	20°	1.500	3	1.88	2-1/2	3/4	HWC20-037-3
1/2	20°	1.750	1	2.24	3	3/4	HWC20-050-1
1/2	20°	1.750	2	2.24	3	3/4	HWC20-050-2
5/8	20°	2.250	1	2.83	3	3/4	HWC20-062-1
5/8	20°	2.250	2	2.83	3	3/4	HWC20-062-2

HWC20 Series

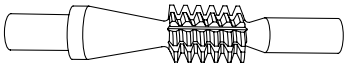
Topping Worm Gear
Shell Type
20° PA Axial CP

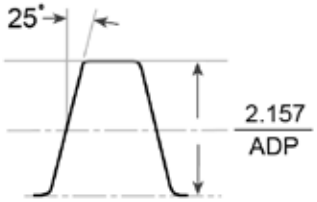


Axial Diam. Pitch	PA	Worm P.D.	# of Threads	OD	Specify Class A, B, C	
					Right Hand	Left Hand
10	25°	1.250	4	1.570	HWK25-10-4	-
12	25°	1.000	2	1.285	HWK25-12-2	-
16	25°	.625	1	.855	HWK25-16-1	HWKL25-16-1
16	25°	.625	2	.855	HWK25-16-2	-
20	25°	.563	1	.766	HWK25-20-1	-
20	25°	.563	2	.766	HWK25-20-2	-
20	25°	.563	4	.766	HWK25-20-4	-
24	25°	.500	1	.681	HWK25-24-1	-
24	25°	.500	2	.681	HWK25-24-2	-
24	25°	.500	4	.681	HWK25-24-4	HWKL25-24-4
32	25°	.438	1	.590	HWK25-32-1	-
32	25°	.438	2	.590	HWK25-32-2	-
32	25°	.438	4	.590	HWK25-32-4	HWKL25-32-4
48	25°	.333	2	.457	HWK25-48-2	-
48	25°	.333	4	.457	HWK25-48-4	HWKL25-48-4

HWK25 & HWKL25 Series

Topping Worm Gear
Shank Type
25° PA Axial DP

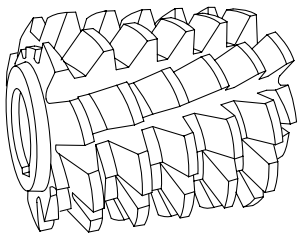




Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Length	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
1.75	14.5°	24	2	1.204	1-1/4	1/2	HWSM14-175-2	-
2.00	14.5°	31	1	1.500	1-1/2	1/2	HWSM14-200-1	HWSML14-200-1
2.25	14.5°	34	1	1.660	1-3/4	1/2	HWSM14-225-1	-
2.50	14.5°	37	1	1.850	2	3/4	HWSM14-250-1	-
2.50	14.5°	37	2	1.850	2	3/4	HWSM14-250-2	-
2.75	14.5°	40.8	1	1.980	2-1/4	3/4	HWSM14-275-1	-
3.00	14.5°	44	1	2.140	2-1/4	3/4	HWSM14-300-1	-
3.00	14.5°	44	2	2.140	2-1/4	3/4	HWSM14-300-2	-
3.50	14.5°	52	1	2.500	2-3/4	3/4	HWSM14-350-1	-
4.00	14.5°	62	1	2.930	3	1-1/4	HWSM14-400-1	-
4.00	14.5°	62	2	2.930	3	1-1/4	HWSM14-400-2	-
5.00	14.5°	72	1	3.450	3-3/4	1-1/4	HWSM14-500-1	-
6.00	14.5°	86	1	4.100	4-1/2	1-1/4	HWSM14-600-1	-

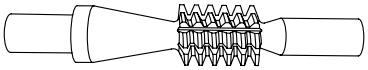
HWSM14 & HWSML14 Series

Topping Worm Gear
Shell Type
14.5° PA
Axial Module



HWKM14 Series

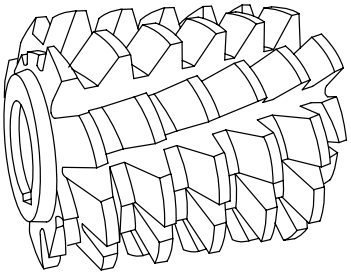
Topping Worm Gear
Shank Type
14.5° PA
Right Hand
Axial Module

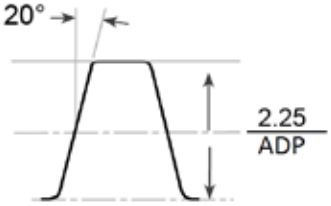


Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Specify Class A, B, C
.50	14.5°	9	1	.420	HWKM14-050-1
.60	14.5°	14	1	.635	HWKM14-060-1E
.75	14.5°	11	1	.600	HWKM14-075-1
.80	14.5°	11.4	1	.610	HWKM14-080-1
1.00	14.5°	12	1	.640	HWKM14-100-1
1.25	14.5°	14	1	.755	HWKM14-125-1
1.50	14.5°	16	1	.827	HWKM14-150-1
1.50	14.5°	16	2	.827	HWKM14-150-2
1.75	14.5°	24	1	1.150	HWKM14-175-1

HWSM20 & HWSML20 Series

Topping Worm Gear
Shell Type
20° PA
Axial Module
Right & Left Hand





Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Length	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
1.60	20°	28	1	1.345	1-1/4	1/2	HWSM20-160-1	-
2.00	20°	28	1	1.375	1-1/2	1/2	HWSM20-202-1	HWSML20-202-1
2.00	20°	28	2	1.375	1-1/2	1/2	HWSM20-202-2	HWSML20-202-2
2.00	20°	28	4	1.375	1-1/2	1/2	HWSM20-202-4	-
2.00	20°	31	1	1.500	1-3/4	1/2	HWSM20-203-1	HWSML20-203-1
2.00	20°	31	2	1.500	1-3/4	1/2	HWSM20-203-2	HWSML20-203-2
2.00	20°	31	4	1.500	1-3/4	1/2	HWSM20-203-4	HWSML20-203-4
2.00	20°	35.5	1	1.700	1-3/4	1/2	HWSM20-204-1	-
2.25	20°	34	1	1.650	1-3/4	1/2	HWSM20-225-1	-
2.25	20°	34	2	1.650	1-3/4	1/2	HWSM20-225-2	-
2.25	20°	34	4	1.650	1-3/4	1/2	HWSM20-225-4	-
2.50	20°	26.5	1	1.390	2	1/2	HWSM20-251-1	-
2.50	20°	26.5	2	1.390	2	1/2	HWSM20-251-2	-
2.50	20°	26.5	4	1.390	2	1/2	HWSM20-251-4	-
2.50	20°	33.5	1	1.650	2	5/8	HWSM20-252-1	-
2.50	20°	33.5	2	1.650	2	5/8	HWSM20-252-2	-
2.50	20°	33.5	4	1.650	2	5/8	HWSM20-252-4	-
2.50	20°	37	1	1.800	2	3/4	HWSM20-253-1	-
2.50	20°	37	2	1.800	2	3/4	HWSM20-253-2	HWSML20-253-2
2.50	20°	37	3	1.800	2	3/4	HWSM20-253-3	-
2.50	20°	37	4	1.800	2	3/4	HWSM20-253-4	-
2.50	20°	42.5	1	2.000	2	3/4	HWSM20-254-1	-
2.75	20°	40.8	1	1.970	2	3/4	HWSM20-275-1	-
3.00	20°	44	1	2.130	2-1/4	3/4	HWSM20-300-1	HWSML20-300-1
3.00	20°	44	2	2.130	2-1/4	3/4	HWSM20-300-2	-
3.00	20°	44	3	2.130	2-1/4	3/4	HWSM20-300-3	-
3.00	20°	44	4	2.130	2-1/4	3/4	HWSM20-300-4	-
3.15	20°	33.5	1	1.750	2-1/4	3/4	HWSM20-316-1	-
3.15	20°	42.5	1	2.080	2-3/8	3/4	HWSM20-317-1	-
3.15	20°	42.5	2	2.080	2-3/8	3/4	HWSM20-317-2	-
3.15	20°	53	1	2.500	2-1/2	1-1/4	HWSM20-318-1	-
3.50	20°	52	1	2.500	2-1/2	1	HWSM20-350-1	-
3.50	20°	52	2	2.500	2-1/2	1	HWSM20-350-2	-
3.50	20°	52	3	2.500	2-1/2	1	HWSM20-350-3	-
3.50	20°	52	4	2.500	2-1/2	1	HWSM20-350-4	-
4.00	20°	50	1	2.475	3	3/4	HWSM20-402-1	HWSML20-402-1
4.00	20°	50	2	2.475	3	3/4	HWSM20-402-2	-
4.00	20°	50	4	2.475	3	3/4	HWSM20-402-4	-

SERIES CONTINUED
ON NEXT PAGE ->

HWSM20 & HWSML20 Series

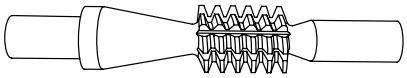
Topping Worm Gear
Shell Type
20° PA
Axial Module
Right & Left Hand

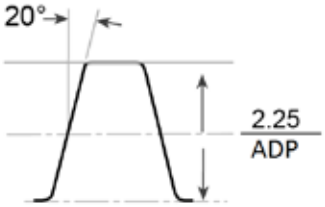
Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Length	Bore	Specify Class A, B, C	
							Right Hand	Left Hand
4.00	20°	62	1	2.975	3	1-1/4	HWSM20-403-1	-
4.00	20°	62	2	2.975	3	1-1/4	HWSM20-403-2	-
4.00	20°	62	4	2.975	3	1-1/4	HWSM20-403-4	-
4.00	20°	67	1	3.160	3	1-1/4	HWSM20-404-1	-
5.00	20°	63	1	3.100	3-3/4	1-1/4	HWSM20-502-1	HWSML20-502-1
5.00	20°	63	2	3.100	3-3/4	1-1/4	HWSM20-502-2	HWSML20-502-2
5.00	20°	63	4	3.105	3-1/2	1-1/4	HWSM20-502-4	-
5.00	20°	72	1	3.410	3-3/4	1-1/4	HWSM20-503-1	-
5.00	20°	72	2	3.410	3-3/4	1-1/4	HWSM20-503-2	-
6.00	20°	86	1	4.125	4-1/4	1-1/4	HWSM20-600-1	-
6.00	20°	86	2	4.125	4-3/8	1-1/4	HWSM20-600-2	-
6.00	20°	86	4	4.125	4-3/8	1-1/4	HWSM20-600-4	-
6.30	20°	63	1	3.34	4-1/2	1-1/4	HWSM20-630-1	-
6.30	20°	63	2	3.340	4-1/2	1-1/4	HWSM20-630-2	-
6.30	20°	63	4	3.340	4-1/2	1-1/4	HWSM20-630-4	-
6.30	20°	80	1	3.925	4-1/2	1-1/4	HWSM20-631-1	-
8.00	20°	100	1	4.900	5-3/4	1-1/2	HWSM20-800-1	-
8.00	20°	100	2	4.900	5-3/4	1-1/2	HWSM20-800-2	-

HWKM20 Series

Topping Worm Gear
Shank Type
20° PA Axial MOD
Axial

Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Specify Class A, B, C	
					Right Hand	Left Hand
.50	20°	9	1	.450	HWKM20-050-1	-
.50	20°	9	2	.450	HWKM20-050-2	-
.70	20°	10.4	2	.560	HWKM20-070-2	-
.75	20°	11	1	.600	HWKM20-075-1	-
.75	20°	11	2	.600	HWKM20-075-2	-
.80	20°	11.4	1	.610	HWKM20-080-1	-
.80	20°	11.4	2	.610	HWKM20-080-2	-
.80	20°	11.4	4	.610	HWKM20-080-4	-
1.00	20°	12	1	.640	HWKM20-100-1	-
1.00	20°	12	3	.640	HWKM20-100-3	-
1.00	20°	12	4	.640	HWKM20-100-4	-
1.00	20°	17	1	.850	HKWM20-101-1	-
1.00	20°	17	2	.850	HKWM20-101-2	-
1.00	20°	17	1	.860	-	HWKML20-101-1
1.25	20°	14	1	.750	HWKM20-125-1	-
1.25	20°	14	2	.750	HWKM20-125-2	-
1.25	20°	14	4	.750	HWKM20-125-4	-
1.25	20°	22.4	1	1.100	HWKM20-126-1	-
1.50	20°	16	1	.865	HWKM20-150-1	-
1.50	20°	16	2	.865	HWKM20-150-2	-
1.50	20°	16	3	.865	HWKM20-150-3	-
1.50	20°	16	4	.865	HWKM20-150-4	-
1.60	20°	28	1	1.333	HWKM20-160-1	-
1.75	20°	24	1	1.190	HWKM20-175-1	-
1.75	20°	24	2	1.190	HWKM20-175-2	-
2.00	20°	22.4	1	1.175	HWKM20-200-1	-
2.00	20°	22.4	2	1.175	HWKM20-200-2	-
2.00	20°	22.4	4	1.175	HWKM20-200-4	-
2.50	20°	37	1	1.800	HWKM20-250-1	-
2.50	20°	37	2	1.800	HWKM20-250-2	-
3.00	20°	44	1	2.130	HWKM20-300-1	





Axial Mod.	PA	Worm P.D. (mm)	# of Threads	OD	Specify Class A, B, C
.50	25°	9	4	.423	HWKM25-050-4
.80	25°	11.4	2	.610	HWKM25-080-2
.80	25°	11.4	4	.610	HWKM25-080-4
1.00	25°	12	2	.645	HWKM25-100-2
1.00	25°	12	4	.645	HWKM25-100-4

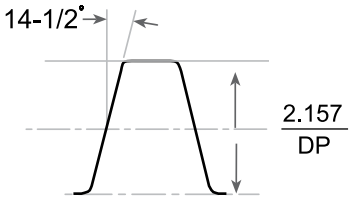
HWKM25 Series

Topping Worm Gear
Shank Type
25° PA Axial MOD
Right Hand
Axial Module

Axial Circ. Pitch	PA	Worm P.D.	# of Threads	OD	Length	Bore	Specify Class A,B,C
1/4	14.5°	1.000	1	1.27	1-3/4	1/2	HWC14-025-1
1/4	14.5°	1.000	2	1.27	1-3/4	1/2	HWC14-025-2
3/8	14.5°	1.500	1	1.88	2-1/2	3/4	HWC14-037-1
3/8	14.5°	1.500	2	1.88	2-1/2	3/4	HWC14-037-2
1/2	14.5°	1.750	1	2.24	3	3/4	HWC14-050-1
1/2	14.5°	1.750	2	2.24	3	3/4	HWC14-050-2
5/8	14.5°	2.250	1	2.83	3	3/4	HWC14-062-1
5/8	14.5°	2.250	2	2.83	3	3/4	HWC14-062-2
3/4	14.5°	2.750	1	3.45	4	1-1/4	HWC14-075-1
3/4	14.5°	2.750	2	3.45	4	1-1/4	HWC14-075-2

HWC14 Series

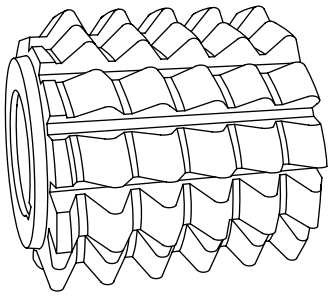
Topping Worm Gear
Shell Type
14.5° PA Axial CP
Circular Pitch

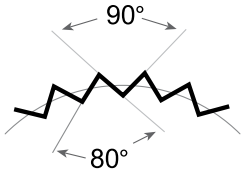


Nom. Dia.	Dec. Equiv.	OD	Length	Bore	Leads	WD	Specify Class A,B,C
1/8	.125	3/4	5/8	8mm	1	.004	HS36-012M
3/16	.188	3/4	3/4	8mm	1	.006	HS36-018M
3/16	.188	1-1/8	1-1/8	1/2	1	.006	HS36-018H
1/4	.250	3/4	2/3	8mm	1	.008	HS36-025M
1/4	.250	1-1/8	1-1/8	1/2	1	.008	HS36-025H
1/4	.250	1-1/8	1-1/8	1/2	2	.008	HS36-025H-2
1/4	.250	1-7/8	1	3/4	1	.008	HS36-025S
5/16	.313	3/4	5/8	8mm	1	.011	HS36-031M
5/16	.313	1-1/8	1-1/8	1/2	1	.011	HS36-031H
5/16	.313	1-5/8	1	3/4	1	.011	HS36-031S
3/8	.375	3/4	3/4	8mm	1	.013	HS36-037M
3/8	.375	1-1/8	1-1/8	1/2	1	.013	HS36-037H
3/8	.375	1-1/8	1-1/8	1/2	2	.013	HS36-037H-2
3/8	.375	1-5/8	1	3/4	1	.013	HS36-037S
1/2	.500	3/4	2/3	8mm	1	.017	HS36-050M
1/2	.500	1-1/4	1-1/4	1/2	1	.017	HS36-050H
1/2	.500	1-7/8	1-1/2	3/4	1	.017	HS36-050S
1/2	.500	1-7/8	1-1/2	3/4	2	.017	HS36-050S-2
9/16	.563	1-7/8	1-1/2	3/4	1	.018	HS36-056S
5/8	.625	3/4	2/3	8mm	1	.021	HS36-062M
5/8	.625	1-1/8	1-1/8	1/2	1	.021	HS36-062H
5/8	.625	1-7/8	1-1/2	3/4	1	.021	HS36-062S
5/8	.625	1-7/8	1-1/2	3/4	2	.021	HS36-062S-2
3/4	.750	1-7/8	1-1/2	3/4	1	.027	HS36-075S
3/4	.750	1-7/8	1-1/2	3/4	2	.027	HS36-075S-2
3/4	.750	2-1/2	2	1-1/4	1	.027	HS36-075
7/8	.875	1-1/4	1-1/4	1/2	1	.031	HS36-087H
7/8	.875	1-7/8	1-1/2	3/4	1	.031	HS36-087S
7/8	.875	2-1/2	2	1-1/4	1	.031	HS36-087
1	1.000	1-7/8	1-1/2	3/4	1	.034	HS36-100S
1	1.000	2-1/2	2	1-1/4	1	.034	HS36-100
1-1/8	1.125	1-7/8	1-1/2	3/4	1	.038	HS36-112S
1-1/8	1.125	2-1/2	2	1-1/4	1	.038	HS36-112
1-1/4	1.250	2-1/2	2	1-1/4	1	.042	HS36-125

HS36 Series

36 Tooth
Straight Sided Serrations
Non Topping
Right Hand





Nom. Dia.	Dec. Equiv.	OD	Length	Bore	Leads	WD	Specify Class A, B, C
1/2	.500	1-7/8	1-1/2	3/4	1	.014	HS48-050S
3/4	.750	1-1/4	1-1/4	1/2	1	.018	HS48-075H
3/4	.750	1-7/8	1-1/2	3/4	1	.018	HS48-075S
3/4	.750	1-7/8	1-1/2	3/4	2	.018	HS48-075S-2
3/4	.750	2-1/2	2	1-1/4	1	.018	HS48-075
7/8	.875	1-1/8	1-1/8	1/2	1	.021	HS48-087H
7/8	.875	1-7/8	1-1/2	3/4	1	.021	HS48-087S
7/8	.875	2-1/2	2	1-1/4	1	.021	HS48-087
1	1.000	1-1/4	1-1/4	1/2	1	.027	HS48-100H
1	1.000	1-7/8	1-1/2	3/4	1	.027	HS48-100S
1	1.000	2-1/2	2	1-1/4	1	.027	HS48-100
1-1/8	1.125	1-1/4	1-1/4	1/2	1	.029	HS48-112H
1-1/8	1.125	1-7/8	1-1/2	3/4	1	.029	HS48-112S
1-1/8	1.125	1-7/8	1-1/2	3/4	2	.029	HS48-112S-2
1-1/8	1.125	2-1/2	2	1-1/4	1	.029	HS48-112
1-1/4	1.250	1-1/4	1-1/4	1/2	1	.033	HS48-125H
1-1/4	1.250	1-7/8	1-1/2	3/4	1	.033	HS48-125S
1-1/4	1.250	2-1/2	2	1-1/4	1	.033	HS48-125
1-3/8	1.375	1-1/4	1-1/4	1/2	1	.035	HS48-137H
1-3/8	1.375	2-1/2	2	1-1/4	1	.035	HS48-137
1-1/2	1.500	1-7/8	1-1/2	3/4	1	.038	HS48-150S
1-1/2	1.500	1-7/8	1-1/2	3/4	2	.038	HS48-150S-2
1-1/2	1.500	2-1/2	2	1-1/4	1	.038	HS48-150
1-3/4	1.750	1-7/8	1-1/2	3/4	1	.044	HS48-175S
1-3/4	1.750	2-1/2	2	1-1/4	1	.044	HS48-175
2	2.000	2-1/2	2	1-1/4	1	.050	HS48-200
2-1/4	2.250	2-1/2	2	1-1/4	1	.056	HS48-225
2-1/2	2.500	2-1/2	2	1-1/4	1	.062	HS48-250

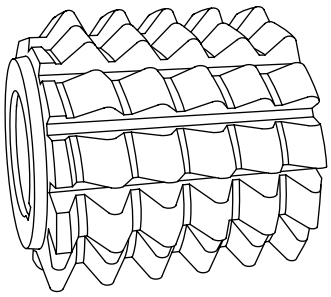
HS48 Series

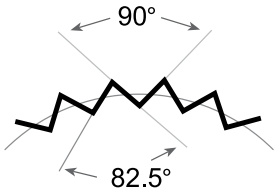
48 Tooth

Straight Sided Serrations

Non Topping

Right Hand





Nominal Dia.	No. Serrations	O.D.	Length	Bore	WD	Specify Class A, B, C
7/16	16	1-7/8	1-1/2	3/4	.033	HBS16-043S
1/2	16	1-7/8	1-1/2	3/4	.038	HBS16-050S
5/8	20	1-7/8	1-1/2	3/4	.040	HBS20-062S
3/4	20	1-7/8	1-1/2	3/4	.047	HBS20-075S
1	24	1-7/8	1-1/2	3/4	.054	HBS24-100S
1-1/8	24	1-7/8	1-1/2	3/4	.059	HBS24-112S
1-1/4	24	1-7/8	1-1/2	3/4	.067	HBS24-125S
1-1/2	24	1-7/8	1-1/2	3/4	.080	HBS24-150S
1-5/8	36	1-7/8	1-1/2	3/4	.057	HBS36-162S
1-3/4	36	1-7/8	1-1/2	3/4	.063	HBS36-175S
2	36	1-7/8	1-1/2	3/4	.071	HBS36-200S

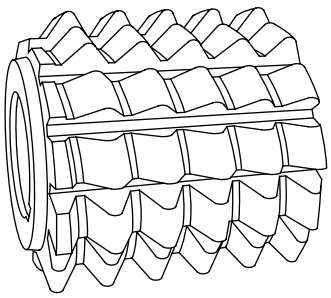
HBS Series

British Straight Sided Serrations

Non Topping

Single Lead

Right Hand



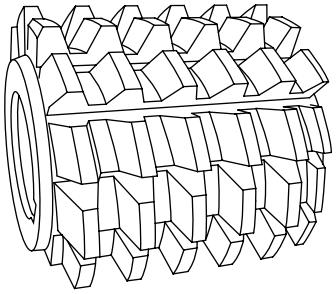
BS 2059 - 1953

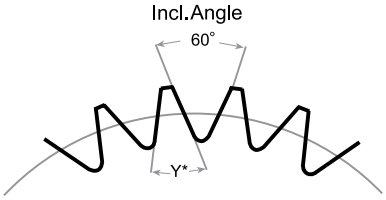
HM81 Series

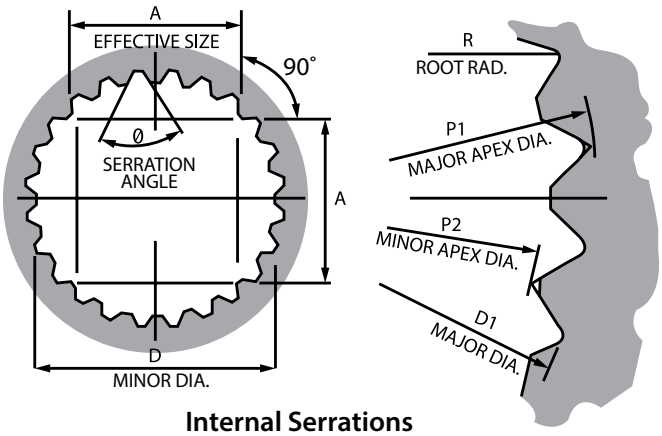
55° & 60° Angle Serrations Per DIN 5481

Single Lead
Right Hand

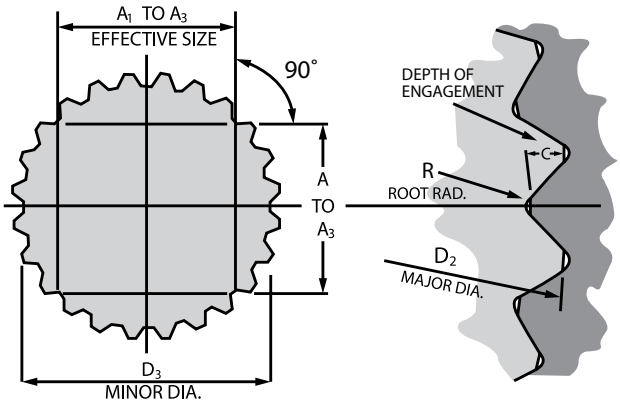
Nom. Dia. in mm	No. Teeth in Part	Included Angle	OD	Length	Bore	Approx. Whole Depth	Specify Class A,B,C
8 x 7	28	60°	1-1/8	1-1/8	1/2	.018	HM81-8-28H
10 x 8	28	60°	1-1/8	1-1/8	1/2	.031	HM81-10-28H
12 x 10	30	60°	1-1/8	1-1/8	1/2	.030	HM81-12-30H
14 x 12	31	60°	1-1/8	1-1/8	1/2	.036	HM81-14-31H
17 x 15	32	60°	1-1/8	1-1/8	1/2	.039	HM81-17-32H
20 x 17	33	60°	1-7/8	1-1/2	3/4	.046	HM81-20-33S
24 x 21	34	60°	1-7/8	1-1/2	3/4	.052	HM81-24-34S
30 x 26	35	60°	1-7/8	1-1/2	3/4	.065	HM81-30-35S
34 x 30	36	60°	1-7/8	1-1/2	3/4	.065	HM81-34-36S
40 x 36	37	60°	1-7/8	1-7/8	3/4	.072	HM81-40-37S
44 x 40	38	60°	2-1/2	2	1-1/4	.078	HM81-44-38
50 x 45	39	60°	1-7/8	1-7/8	3/4	.093	HM81-50-39S
50 x 45	39	60°	2-1/2	2	1-1/4	.093	HM81-50-39
55 x 50	40	60°	1-7/8	1-7/8	3/4	.095	HM81-55-40S
55 x 50	40	60°	2-1/2	2	1-1/4	.095	HM81-55-40
60 x 55	42	60°	1-7/8	1-7/8	3/4	.097	HM81-60-42S
60 x 55	42	60°	2-1/2	2	1-1/4	.097	HM81-60-42
65 x 60	41	55°	2-1/2	2	1-1/4	.099	HM81-65-125
70 x 65	45	55°	2-1/2	2	1-1/4	.099	HM81-65-125
75 x 70	48	55°	2-1/2	2	1-1/4	.099	HM81-65-125
80 x 75	51	55°	2-1/2	2	1-1/4	.099	HM81-65-125
85 x 80	55	55°	2-1/2	2	1-1/4	.099	HM81-65-125
90 x 85	58	55°	2-1/2	2	1-1/4	.099	HM81-65-125
95 x 90	61	55°	2-1/2	2	1-1/4	.099	HM81-65-125
100 x 95	65	55°	2-1/2	2	1-1/4	.099	HM81-65-125
105 x 100	68	55°	2-1/2	2	1-1/4	.099	HM81-65-125
110 x 105	71	55°	2-1/2	2	1-1/4	.099	HM81-65-125
115 x 110	75	55°	2-1/2	2	1-1/4	.099	HM81-65-125
120 x 115	78	55°	2-1/2	2	1-1/4	.099	HM81-65-125
125 x 120	81	55°	2-1/2	2	1-1/4	.099	HM81-65-125







Internal Serrations



External Serrations

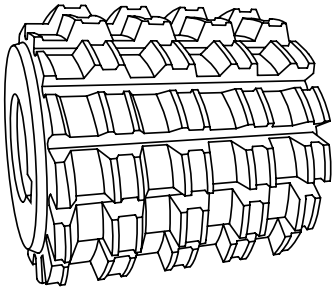
H6 & H6C Series

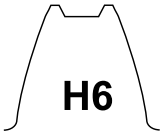
6 Straight Sided Spline

Single Lead
Right Hand

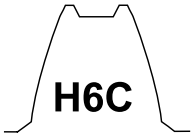
Will Produce				Hob Size			Specify Class A,B,C	
Shaft Dia.	Fit	Root Dia.	Key	OD	Length	Bore	Non-Chamfering	Chamfering
.375	B	.319	.092	1	1-1/4	1/2	H6-037BH	–
.375	C	.300	.091	1-7/8	1-1/2	3/4	H6-037CS	–
.500	A	.450	.125	2-1/4	2	1-1/4	–	H6C-050A
.500	B	.423	.121	1-7/8	1-7/8	3/4	H6-050BS	–
.500	C	.397	.121	1-7/8	1-7/8	3/4	H6-050CS	–
.500	C	.397	.121	2-1/4	2	1-1/4	H6-050C	H6C-050C
.625	A	.563	.156	2-1/4	2	1-1/4	–	H6C-062A
.625	B	.529	.152	1-7/8	1-7/8	3/4	H6-062BS	H6C-062BS
.625	B	.529	.152	2-1/4	2	1-1/4	H6-062B	H6C-062B
.625	C	.497	.152	1-7/8	1-7/8	3/4	H6-062CS	–
.625	C	.497	.152	2-1/4	2	1-1/4	H6-062C	–
.688	A	.614	.168	3	3	1-1/4	–	H6C-068A
.750	A	.675	.188	1-7/8	1-7/8	3/4	H6-075AS	H6C-075AS
.750	B	.635	.185	1-7/8	1-7/8	3/4	H6-075BS	H6C-075BS
.750	B	.635	.185	2-1/2	2-1/2	1-1/4	H6-075B	–
.750	C	.597	.185	1-7/8	1-7/8	3/4	H6-075CS	H6C-075CS
.750	C	.597	.185	2-1/2	2-1/2	1-1/4	H6-075C	–
.875	A	.788	.219	1-7/8	1-7/8	3/4	–	H6C-087AS
.875	A	.788	.219	2-1/2	2-1/2	1-1/4	–	H6C-087A
.875	B	.741	.215	1-7/8	1-7/8	3/4	H6-087BS	H6C-087BS
.875	B	.741	.215	2-1/2	2-1/2	1-1/4	H6-087B	–
.875	C	.696	.215	1-7/8	1-7/8	3/4	H6-087CS	H6C-087CS
.875	C	.696	.215	2-1/2	2-1/2	1-1/4	H6-087C	H6C-087C
1.000	A	.900	.250	1-7/8	1-7/8	3/4	–	H6C-100AS
1.000	A	.900	.250	2-1/2	2-1/2	1-1/4	–	H6C-100A
1.000	B	.847	.246	1-7/8	1-7/8	3/4	H6-100BS	H6C-100BS
1.000	B	.847	.246	2-1/2	2-1/2	1-1/4	H6-100B	H6C-100B
1.000	C	.796	.246	1-7/8	1-7/8	3/4	H6-100CS	H6C-100CS
1.000	C	.796	.246	2-1/2	2-1/2	1-1/4	H6-100C	H6C-100C
1.125	A	1.013	.281	1-7/8	1-7/8	3/4	–	H6C-112AS
1.125	A	1.013	.281	2-1/2	2-1/2	1-1/4	–	H6C-112A
1.125	B	.953	.277	1-7/8	1-7/8	3/4	H6-112BS	H6C-112BS
1.125	B	.953	.277	2-1/2	2-1/2	1-1/4	H6-112B	H6C-112B
1.125	C	.894	.277	1-7/8	1-7/8	3/4	H6-112CS	H6C-112CS
1.125	C	.894	.277	2-1/2	2-1/2	1-1/4	H6-112C	H6C-112C
1.250	A	1.126	.313	1-7/8	1-7/8	3/4	–	H6C-125AS
1.250	A	1.126	.313	2-1/2	2-1/2	1-1/4	–	H6C-125A
1.250	B	1.060	.309	1-7/8	1-7/8	3/4	H6-125BS	H6C-125BS
1.250	B	1.060	.309	2-1/2	2-1/2	1-1/4	H6-125B	H6C-125B
1.250	C	.996	.309	1-7/8	1-7/8	3/4	H6-125CS	–
1.250	C	.996	.309	2-1/2	2-1/2	1-1/4	H6-125C	H6C-125C
1.375	A	1.239	.345	2-3/4	2-3/4	1-1/4	–	H6C-137A
1.375	B	1.165	.340	2	2	3/4	H6-137BS	–
1.375	B	1.165	.340	2-3/4	2-3/4	1-1/4	H6-137B	H6C-137B
1.375	C	1.096	.340	2	2	3/4	H6-137CS	H6C-137CS
1.375	C	1.096	.340	2-3/4	2-3/4	1-1/4	H6-137C	H6C-137C

SERIES CONTINUED ON NEXT PAGE ->





Non-Chamfering
With Lugs



Chamfering
With Lugs

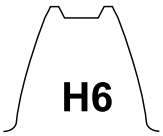
H6 & H6C Series

6 Straight Sided Spline

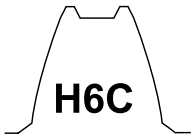
Single Lead

Right Hand

Will Produce				Hob Size			Specify Class A,B,C	
Shaft Dia.	Fit	Root Dia.	Key	OD	Length	Bore	Non-Chamfering	Chamfering
1.500	A	1.350	.375	2-3/4	2-3/4	1-1/4	–	H6C-150A
1.500	B	1.271	.371	2	2	3/4	H6-150BS	–
1.500	B	1.271	.371	2-3/4	2-3/4	1-1/4	H6-150B	H6C-150B
1.500	C	1.196	.371	2	2	3/4	H6-150CS	H6C-150CS
1.500	C	1.196	.371	2-3/4	2-3/4	1-1/4	H6-150C	H6C-150C
1.625	A	1.465	.441	2-3/4	2-3/4	1-1/4	-	H6C-162A
1.625	B	1.378	.402	2-3/4	2-3/4	1-1/4	H6-162B	H6C-162B
1.625	C	1.296	.402	2-3/4	2-3/4	1-1/4	H6-162C	-
1.750	A	1.577	.438	3	3	1-1/4	-	H6C-175A
1.750	B	1.485	.434	3	3	1-1/4	H6-175B	H6C-175B
1.750	C	1.396	.434	3	3	1-1/4	H6-175C	H6C-175C
1.875	A	1.688	.469	3	3	1-1/4	-	H6C-187A
1.875	B	1.594	.465	3	3	1-1/4	H6-187B	-
1.875	C	1.500	.465	3	3	1-1/4	H6-187C	-
2.000	A	1.802	.500	3-1/4	3-1/4	1-1/4	-	H6C-200AC
2.000	B	1.696	.495	3-1/4	3-1/4	1-1/4	H6-200B	H6C-200B
2.000	C	1.595	.495	3-1/4	3-1/4	1-1/4	H6-200C	-
2.250	A	2.027	.563	3-1/4	3-1/4	1-1/4	-	H6C-225A
2.250	B	1.908	.558	3-1/4	3-1/4	1-1/4	H6-225B	H6C-225B
2.250	C	1.797	.558	3-1/4	3-1/4	1-1/4	H6-225C	-
2.500	A	2.252	.625	3-1/2	3-1/2	1-1/4	-	H6C-250A
2.500	B	2.120	.620	3-1/2	3-1/2	1-1/4	H6-250B	H6C-250B
2.500	C	1.996	.620	3-1/2	3-1/2	1-1/4	H6-250C	-
2.750	A	2.447	.688	3-1/2	3-1/2	1-1/4	-	H6C-275A
2.750	B	2.333	.683	3-1/2	3-1/2	1-1/4	H6-275B	-
2.750	C	2.194	.683	3-1/2	3-1/2	1-1/4	H6-275C	-
3.000	A	2.702	.750	3-1/2	3-1/2	1-1/4	-	H6C-300A
3.000	B	2.545	.745	3-1/2	3-1/2	1-1/4	H6-300B	H6C-300B
3.000	C	2.394	.745	3-1/2	3-1/2	1-1/4	H6-300C	-
3.250	B	2.757	.808	3-1/2	3-1/2	1-1/4	H6-325B	H6C-325B
3.250	C	2.594	.808	3-1/2	3-1/2	1-1/4	H6-325C	-
3.500	B	2.970	.870	3-3/4	3-3/4	1-1/4	H6-350B	-
3.500	C	2.793	.870	3-3/4	3-3/4	1-1/4	H6-350C	-
3.750	B	3.183	.933	3-3/4	3-3/4	1-1/4	H6-375B	-
4.000	B	3.395	.995	4	4	1-1/4	H6-400B	-
4.000	C	3.192	.995	4	4	1-1/4	H6-400C	H6C-400C



Non-Chamfering With Lugs



Chamfering With Lugs

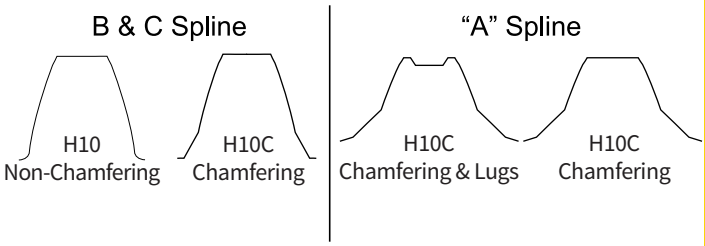
H10 & H10C Series

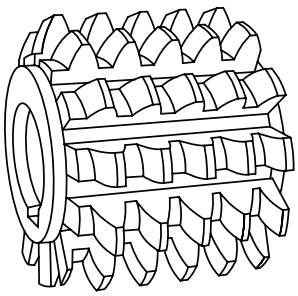
10 Straight Sided Spline

Single Lead
Right Hand

Will Produce					Hob Size			Specify Class A, B, C	
Shaft Dia.	Fit	Root Dia.	Straight Line Dia.	Key	OD	Length	Bore	Non-Chamfering	Chamfering
.500	B	.403	.430	.075	1-7/8	1-7/8	3/4	H10-050BS	–
.500	C	.368	.405	.075	1-7/8	1-7/8	3/4	H10-050CS	–
.625	B	.502	.537	.095	1-7/8	1-7/8	3/4	H10-062BS	–
.625	C	.459	.506	.095	1-7/8	1-7/8	3/4	H10-062CS	–
.750	A	.683	.683	.117	1-7/8	1-7/8	3/4	–	H10C-075AS
.750	A	.683	.683	.117	2-1/2	2-1/2	1-1/4	–	–
.750	B	.601	.644	.114	1-7/8	1-7/8	3/4	H10-075BS	H10C-075BS
.750	B	.601	.644	.114	2-1/2	2-1/2	1-1/4	H10-075B	–
.750	C	.550	.607	.114	1-7/8	1-7/8	3/4	H10-075CS	–
.750	C	.550	.607	.114	2-1/2	2-1/2	1-1/4	H10-075C	H10C-075C
.750	spec	.629	.652	.114	1-7/8	1-7/8	3/4	H10-075XS	–
.875	A	.797	.797	.137	1-7/8	1-7/8	3/4	–	H10C-087AS
.875	B	.706	.753	.134	1-7/8	1-7/8	3/4	H10-087BS	H10C-087BS
.875	B	.706	.753	.134	2-1/2	2 1/2	1-1/4	H10-087B	–
.875	C	.642	.709	.134	1-7/8	1-7/8	3/4	H10-087CS	–
.875	C	.642	.709	.134	2-1/2	2-1/2	1-1/4	H10-087C	H10C-087C
.875	spec	.735	.775	.134	2-1/2	2-1/2	1-1/4	H10-087X	–
1.000	A	.911	.910	.156	1-7/8	1-7/8	3/4	–	H10C-100AS
1.000	B	.806	.859	.153	1-7/8	1-7/8	3/4	H10-100BS	–
1.000	B	.806	.859	.153	2-1/2	2-1/2	1-1/4	H10-100B	–
1.000	C	.734	.810	.153	1-7/8	1-7/8	3/4	H10-100CS	–
1.000	C	.734	.810	.153	2-1/2	2-1/2	1-1/4	H10-100C	–
1.125	A	1.024	1.023	.176	2-1/2	2-1/2	1-1/4	–	H10C-112A
1.125	B	.904	.967	.173	1-7/8	1-7/8	3/4	H10-112BS	H10C-112BS
1.125	B	.904	.967	.173	2-1/2	2-1/2	1-1/4	H10-112B	H10C-112B
1.125	C	.824	.911	.173	1-7/8	1-7/8	3/4	H10-112CS	H10C-112CS
1.125	C	.824	.911	.173	2-1/2	2-1/2	1-1/4	–	H10C-112C
1.125	spec	.937	.990	.173	1-7/8	1-7/8	3/4	H10-112XS	–
1.250	A	1.138	1.137	.195	1-7/8	1-7/8	3/4	–	–
1.250	A	1.138	1.137	.195	2-1/2	2-1/2	1-1/4	–	H10C-125A
1.250	B	1.003	1.073	.192	1-7/8	1-7/8	3/4	H10-125BS	–
1.250	B	1.003	1.073	.192	2-1/2	2-1/2	1-1/4	H10-125B	H10C-125B
1.250	C	.916	1.012	.192	1-7/8	1-7/8	3/4	H10-125CS	–
1.250	C	.916	1.012	.192	2-1/2	2-1/2	1-1/4	H10-125C	H10C-125C
1.250	spec	1.056	1.088	.192	2-1/2	2-1/2	1-1/4	H10-125X	–
1.375	A	1.252	1.251	.215	2-3/4	2-1/2	1-1/4	–	H10C-137A
1.375	B	1.107	1.183	.212	2-3/4	2-1/2	1-1/4	H10-137B	H10C-137B
1.375	B	1.107	1.183	.212	2	2	3/4	H10-137BS	–
1.375	C	1.008	1.113	.212	2-3/4	2-1/2	1-1/4	H10-137C	H10C-137C
1.375	spec	1.053	1.146	.212	2-3/4	2-3/4	1-1/4	H10-137X	–
1.375	spec	1.165	1.198	.212	2-3/4	2-3/4	1-1/4	H10-137Y	–
1.500	A	1.366	1.365	.235	2-3/4	2-1/2	1-1/4	–	H10C-150A
1.500	B	1.200	1.288	.231	2-3/4	2-1/2	1-1/4	H10-150B	H10C-150B
1.500	B	1.200	1.288	.231	2	2	3/4	H10-150BS	–
1.500	C	1.100	1.215	.231	2	2	3/4	H10-150CS	–
1.500	C	1.100	1.215	.231	2-3/4	2-1/2	1-1/4	H10-150C	HC10-150C
1.500	spec	1.192	1.279	.231	2-3/4	2-3/4	1-1/4	H10-150X	–
1.500	spec	1.260	1.289	.231	2-3/4	2-3/4	1-1/4	H10-150Y	–
1.625	A	1.480	1.479	.255	2-1/2	2-1/2	1-1/4	–	H10C-162A
1.625	B	1.305	1.369	.251	2-1/2	2-1/2	1-1/4	H10-162B	H10C-162B
1.625	C	1.190	1.316	.251	2-1/2	2-1/2	1-1/4	H10-162C	H10C-162C
1.625	spec	1.342	1.397	.251	3	3	1-1/4	–	H10C-162X
1.625	spec	1.386	1.430	.251	2-1/2	2-1/2	1-1/4	H10-162Y	–

Will Produce					Hob Size			Specify Class A, B, C	
Shaft Dia.	Fit	Root Dia.	Straight Line Dia.	Key	OD	Length	Bore	Non-Chamfering	Chamfering
1.750	A	1.594	1.593	.274	3	3	1-1/4	–	H10C-175A
1.750	B	1.408	1.504	.270	3	3	1-1/4	H10-175B	H10C-175B
1.750	C	1.281	1.417	.270	3	3	1-1/4	H10-175C	H10C-175C
1.750	spec	1.385	1.488	.270	3	3	1-1/4	H10-175X	–
1.750	spec	1.457	1.538	.270	3	3	1-1/4	H10-175Y	H10C-175Y
1.750	spec	1.478	1.551	.270	3	3	1-1/4	H10-175Z	–
1.875	C	1.372	1.518	.289	3	3	1-1/4	H10-187C	–
2.000	A	1.821	1.820	.313	3	3	1-1/4	–	H10C-200A
2.000	B	1.608	1.717	.307	3	3	1-1/4	H10-200B	H10C-200B
2.000	C	1.461	1.618	.307	3	3	1-1/4	H10-200C	H10C-200C
2.000	spec	1.592	1.706	.307	3	3	1-1/4	H10-200X	–
2.000	spec	1.694	1.776	.307	3	3	1-1/4	H10-200Y	–
2.250	A	2.049	2.048	.352	3	3	1-1/4	–	H10C-225A
2.250	B	1.812	1.934	.346	3	3	1-1/4	H10-225B	H10C-225B
2.250	C	1.646	1.882	.346	3	3	1-1/4	H10-225C	H10C-225C
2.500	A	2.277	2.275	.391	3-1/4	3-1/4	1 1/4	–	H10C-250A
2.500	B	2.007	2.148	.385	3-1/4	3-1/4	1 1/4	H10-250B	H10C-250B
2.500	C	1.830	2.023	.385	3-1/2	3-1/2	1 1/4	H10-250C	H10C-250C
2.500	spec	2.130	2.228	.385	3-1/4	3-1/4	1 1/4	H10-250Y	–
2.750	A	2.503	2.501	.430	3-1/4	3-1/4	1 1/4	–	H10C-275A
2.750	B	2.210	2.320	.424	3-1/4	3-1/4	1-1/4	H10-275B	H10C-275B
2.750	C	2.013	2.227	.424	3-1/4	3-1/4	1-1/4	H10-275C	–
3.000	A	2.732	2.730	.469	3-1/4	3-1/4	1-1/4	–	H10C-300A
3.000	B	2.412	2.578	.463	3-1/4	3-1/4	1-1/4	H10-300B	H10C-300B
3.000	C	2.195	2.428	.463	3-1/2	3-1/2	1-1/4	H10-300C	H10C-300C
3.000	spec	2.510	2.644	.463	3-1/4	3-1/4	1-1/4	H10-300X	–
3.500	A	3.190	3.188	.546	3-1/2	3-1/2	1-1/4	–	H10C-350A
3.500	B	2.814	3.010	.541	3-1/2	3-1/2	1-1/4	H10-350B	–
3.500	C	2.562	2.835	.541	3-1/2	3-1/2	1-1/4	H10-350C	–
3.500	spec	2.974	3.125	.541	3-1/2	3-1/2	1-1/4	H10-350X	H10C-350X
4.000	A	3.640	3.638	.624	3-3/4	3-3/4	1-1/4	–	H10C-400A
4.000	B	3.216	3.440	.619	3-3/4	3-3/4	1-1/4	H10-400B	–
4.000	C	2.927	3.240	.619	3-3/4	3-3/4	1-1/4	H10-400C	H10C-400C





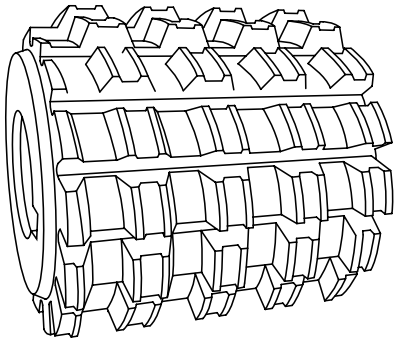
HX4, HX6, HX8, HX10 & HX16 Series

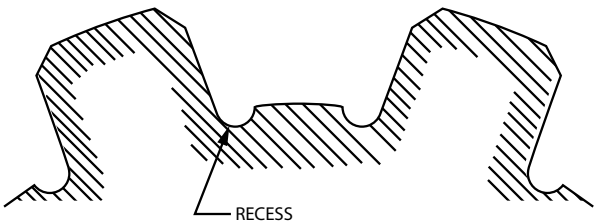
Metric Straight Sided Spline DIN 5462/5463 - UNI 220/221 Standard

Single Lead, Right Hand, With Lugs, Chamfering.

Will Produce				Hob Size			Specify Class A,B,C
Shaft Dia. (mm)	Root Dia. (mm)	Key (mm)	# Of Splines	OD	Length	Bore	
14	11	4	4	1-7/8	1-7/8	3/4	HX4-14-11S
16	13	5	4	64mm	64mm	27mm	HX4-16-13T
20	16	6	4	1-7/8	1-7/8	3/4	HX4-20-16S
22	18	7	4	2-1/2	2-1/2	1-1/4	-
25	21	8	4	2-1/2	2-1/2	1-1/4	HX4-25-21
38	32	10	4	2 3/4	2 1/2	1 1/4	HX4-38-32
14	11	3	6	1-7/8	1-7/8	3/4	HX6-14-11S
14	11	3	6	2 1/4	2	1 1/4	HX6-14-11
16	13	3.5	6	1-7/8	1-1/2	3/4	HX6-16-13S
20	16	4	6	1-7/8	1-1/2	3/4	HX6-20-16S
20	16	4	6	2-1/2	2-1/2	1-1/4	HX6-20-16
22	18	5	6	2-1/2	2-1/2	1-1/4	HX6-22-18
25	21	5	6	2-1/2	2-1/2	1-1/4	HX6-25-21
26	23	6	6	2-3/4	2-1/2	1-1/4	HX6-26-23
28	23	6	6	2-3/4	2-1/2	1-1/4	HX6-28-23
30	26	6	6	2-3/4	2-1/2	1-1/4	HX6-30-26
32	26	6	6	2-3/4	2-1/2	1-1/4	HX6-32-26
32	28	7	6	2-3/4	2-1/2	1-1/4	HX6-32-28
34	28	7	6	2-3/4	2-1/2	1-1/4	HX6-34-28
38	32	8	6	2-3/4	2-1/2	1-1/4	HX6-38-32
42	36	8	6	2-3/4	2-1/2	1-1/4	HX6-42-36
48	42	10	6	2-3/4	2-1/2	1-1/4	HX6-48-42
52	46	12	6	2-3/4	2-1/2	1-1/4	HX6-52-46
60	52	14	6	3	3	1-1/4	HX6-60-52
65	58	14	6	3	3	1-1/4	HX6-65-58
70	62	16	6	3	3	1-1/4	HX6-70-62
78	68	16	6	3 1/4	3 1/4	1-1/4	HX6-78-68
82	72	16	6	3 1/4	3 1/4	1-1/4	HX6-82-72
90	78	16	6	3 1/4	3 1/4	1-1/4	HX6-90-78
95	82	16	6	4	4	1-1/4	HX6-95-82
100	88	16	6	4	4	1-1/4	HX6-100-88
105	92	20	6	4	4	1-1/4	HX6-105-92
110	98	20	6	4	4	1-1/4	HX6-110-98
120	105	20	6	5	5	1 1/2	HX6-120-105
36	32	6	8	2-3/4	2-3/4	1-1/4	HX8-36-32
38	32	6	8	2-3/4	2-3/4	1-1/4	HX8-38-32

Will Produce				Hob Size			Specify Class A,B,C
Shaft Dia. (mm)	Root Dia. (mm)	Key (mm)	# Of Splines	OD	Length	Bore	
40	36	7	8	2-3/4	2-3/4	1-1/4	HX8-40-36
42	36	7	8	2-3/4	2-3/4	1-1/4	HX8-42-36
46	42	8	8	3	3	1-1/4	HX8-46-42
48	42	8	8	3	3	1-1/4	HX8-48-42
50	46	9	8	3	3	1-1/4	HX8-50-46
54	46	9	8	3-1/4	3	1-1/4	HX8-54-46
58	52	10	8	3-1/4	3	1-1/4	HX8-58-52
60	52	10	8	3-1/4	3	1-1/4	HX8-60-52
62	56	10	8	3-1/4	3	1-1/4	HX8-62-56
65	56	10	8	3-1/2	3-1/2	1-1/4	HX8-65-56
68	62	12	8	3-1/2	3-1/2	1-1/4	HX8-68-62
72	62	12	8	3-1/2	3-1/2	1-1/4	HX8-72-62
20	16	2.5	10	2 1/2	2 1/2	1 1/4	HX10-20-16
23	18	3	10	2 1/2	2 1/2	1 1/4	HX10-23-18
26	21	3	10	2 3/4	2 3/4	1 1/4	HX10-26-21
29	23	4	10	2 3/4	2 3/4	1 1/4	HX10-29-23
32	26.7	4	10	2 3/4	2 3/4	1 1/4	HX10-32-26
35	25.2	4	10	3	3	1 1/4	HX10-35-28
40	32	5	10	3	3	1 1/4	HX10-40-32
45	36	5	10	3 1/4	3 1/4	1 1/4	HX10-45-36
52	42	6	10	3 1/4	3 1/4	1 1/4	HX10-52-42
56	46	7	10	3 1/4	3 1/4	1 1/4	HX10-56-46
78	72	12	10	3-1/4	3-1/4	1-1/4	HX10-78-72
82	72	12	10	3-1/4	3-1/4	1-1/4	HX10-82-72
88	82	12	10	3-1/2	3-1/4	1-1/4	HX10-88-82
92	82	12	10	3-1/2	3-1/4	1-1/4	HX10-92-82
98	92	14	10	3-1/2	3-1/2	1-1/4	HX10-98-92
102	92	14	10	3-1/2	3-1/2	1-1/4	HX10-102-92
108	102	16	10	3-3/4	3-1/2	1-1/4	HX10-108-102
112	102	16	10	3-3/4	3-1/2	1-1/4	HX10-112-102
120	112	16	10	4	3-1/2	1-1/4	HX10-120-112
125	112	18	10	4	3-1/2	1-1/4	HX10-125-112
60	52	5	16	3	3	1 1/4	HX16-60-52
65	56	5	16	3	3	1 1/4	HX16-65-56
72	62	6	16	3-1/4	3-1/4	1-1/4	HX16-72-62
82	72	7	16	3-1/4	3-1/4	1-1/4	HX16-82-72



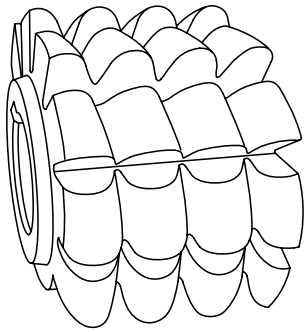


The above drawing shows a spline shaft hobbed with a recess in the root diameter at the sides of the key. In this design it is possible to avoid fillet interference between the shaft and the splined hole.

HRC, HRC2 & HRC3 Series

Roller Chain

Finishing
Non Topping
Right Hand



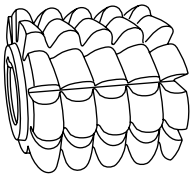
Chain #	Circ. Pitch	Roller Dia.	OD	Length	Bore	# Leads	Specify Class A,B,C
spec.	.123	.060	1-1/8	1-1/8	1/2	1	HRC-012H
spec.	.148	.090	1	3/4	8mm	1	HRC-014M
spec.	.148	.090	1-1/8	1-1/8	1/2	1	HRC-014H
spec.	.148	.090	1-7/8	1-1/2	3/4	1	HRC-014S
25	1/4	.130	1-7/8	1-7/8	3/4	1	HRC-025S
25	1/4	.130	2-1/2	2-1/2	1-1/4	1	HRC-025
25	1/4	.130	2-3/4	3-1/2	1-1/4	2	HRC2-025
25	1/4	.130	2-3/4	3-1/2	1-1/4	3	HRC3-025
35	3/8	.200	1-7/8	1-7/8	3/4	1	HRC-035S
35	3/8	.200	3	2-1/2	1-1/4	1	HRC-035
35	3/8	.200	4	4	1-1/4	1	HRC-035L
35	3/8	.200	5	4	1-1/2	1	HRC-035X
35	3/8	.200	3-3/8	5	1-1/4	1	HRC-035W
35	3/8	.200	80mm	65mm	40mm	1	HRC-035F
35	3/8	.200	3-1/4	4	1-1/4	3	HRC3-035
40	1/2	.313	2	2	3/4	1	HRC-040S
40	1/2	.313	3-1/8	2-1/2	1-1/4	1	HRC-040
40	1/2	.313	4	4	1-1/4	1	HRC-040L
40	1/2	.313	5	4	1-1/2	1	HRC-040X
40	1/2	.313	3-1/2	5	1-1/4	1	HRC-040W
40	1/2	.313	3-3/8	4	1-1/4	2	HRC2-040
40	1/2	.313	3-3/8	4	1-1/4	3	HRC3-040
spec.	1/2	.306	3-1/8	2-1/2	1-1/4	1	HRC-041
50	5/8	.400	3-1/2	2-1/2	1-1/4	1	HRC-050
50	5/8	.400	4	4-1/2	1-1/4	1	HRC-050L
50	5/8	.400	5	4-1/2	1-1/2	1	HRC-050X
50	5/8	.400	4	5	1-1/4	1	HRC-050W
50	5/8	.400	70mm	120mm	27mm	1	HRC-050T
50	5/8	.400	3-3/4	4-1/2	1-1/4	2	HRC2-050
50	5/8	.400	3-3/4	4-1/2	1-1/4	3	HRC3-050
60	3/4	.469	3-1/2	2-7/8	1-1/4	1	HRC-060
60	3/4	.469	4	4	1-1/4	1	HRC-060L
60	3/4	.469	5	5	1-1/2	1	HRC-060X
60	3/4	.469	80mm	120mm	27mm	1	HRC-060T
60	3/4	.469	4	4-3/4	1-1/4	2	HRC2-060
80	1	.625	4-1/4	3-1/2	1-1/4	1	HRC-080
80	1	.625	4-1/2	5	1-1/2	1	HRC-080L
80	1	.625	106mm	110m	40mm	1	HRC-080F
80	1	.625	4-1/2	5-1/2	1-1/4	2	HRC2-080
100	1-1/4	.750	4-3/4	4-1/2	1-1/4	1	HRC-100
100	1-1/4	.750	5-1/2	5	1-1/2	1	HRC-100L
100	1-1/4	.750	120mm	120mm	32mm	1	HRC-100T
120	1-1/2	.875	5	4-3/4	1-1/4	1	HRC-120
120	1-1/2	.875	5-1/4	5-1/4	1-1/2	1	HRC-120L
120	1-1/2	.875	127mm	121mm	40mm	1	HRC-120F
140	1-3/4	1.000	5-1/2	5-1/2	1-1/2	1	HRC-140
140	1-3/4	1.000	6-1/4	6	2	1	HRC-140L
160	2	1.125	6	6	1-1/2	1	HRC-160
160	2	1.125	6-7/8	6-3/4	2	1	HRC-160L
180	2-1/4	1.406	6-3/4	6-3/4	1-1/2	1	HRC-180
180	2-1/4	1.406	8	8	2	1	HRC-180L
200	2-1/2	1.563	7-1/4	7-1/4	1-1/2	1	HRC-200
200	2-1/2	1.563	8-1/2	8-1/2	2	1	HRC-200L
240	3	1.875	9-1/2	11	2	1	HRC-240

HTC, HTC2 & HTC3 Series

American Standard Roller Chain

Topping, Single Lead

Right Hand



Chain #	Circ. Pitch	Roller Dia.	OD	Length	Bore	# Leads	Specify Class A,B,C					
							14-18 Teeth	19-23 Teeth	24-29Teeth	30-36Teeth	37-48 Teeth	49 & Over Teeth
spec.	.123	.060	1-1/8	1-1/8	1/2	1	-	-	HTC-012-24H	-	-	-
spec.	.148	.090	1-7/8	1-1/2	3/4	1	HTC-014-14S	HTC-014-19S	HTC-014-24S	HTC-014-30S	HTC-014-37S	HTC-014-49S
							7-8 Teeth	9-11 Teeth	12-17 Teeth	18-34 Teeth	35 & Over Teeth	
25	1/4	.130	1-7/8	1-7/8	3/4	1	-	-	HTC-025-12S	-	-	-
25	1/4	.130	2-1/2	2-1/2	1-1/4	1	-	HTC-025-9	HTC-025-12	HTC-025-18	HTC-025-35	-
35	3/8	.200	3	2-1/2	1-1/4	1	HTC-035-7	HTC-035-9	HTC-035-12	HTC-035-18	HTC-035-35	-
35	3/8	.200	3-1/4	4	1-1/4	2	-	-	-	HTC2-035-18	HTC2-035-35	-
35	3/8	.200	4	4	1-1/4	1	-	-	-	HTC-035L-18	-	-
35	3/8	.200	5	4	1-1/2	1	-	-	-	HTC-035X-18	-	-
40	1/2	.313	3-1/8	2-1/2	1-1/4	1	HTC-040-7	HTC-040-9	HTC-040-12	HTC-040-18	HTC-040-35	-
40	1/2	.313	3-3/8	4	1-1/4	2	-	-	-	HTC2-040-18	HTC2-040-35	-
40	1/2	.313	4	4	1-1/4	3	-	-	-	-	HTC3-040-35	-
40	1/2	.313	4	4	1-1/4	1	-	-	-	HTC-040L-18	HTC-040L-35	-
40	1/2	.313	5	4	1-1/2	1	-	-	-	HTC-040X-18	-	-
50	5/8	.400	3-1/2	2-1/2	1-1/4	1	HTC-050-7	HTC-050-9	HTC-050-12	HTC-050-18	HTC-050-35	-
50	5/8	.400	3-1/2	2-1/2	1-1/4	2	-	-	HTC2-050-12	HTC2-050-18	-	-
50	5/8	.400	4	4	1-1/4	1	-	-	-	HTC-050L-18	HTC-050L-35	-
50	5/8	.400	5	4-1/2	1-1/2	1	-	-	-	HTC-050X-18	HTC-050X-35	-
60	3/4	.469	3-1/2	2-7/8	1-1/4	1	HTC-060-7	HTC-060-9	HTC-060-12	HTC-060-18	HTC-060-35	-
60	3/4	.469	4	4-3/4	1-1/4	2			HTC2-060-12	HTC2-060-18	HTC2-060-35	-
60	3/4	.469	4	4-1/2	1-1/4	1	-	-	-	HTC-060L-18	HTC-060L-35	-
60	3/4	.469	5	5	1-1/2	1	-	-	-	HTC-060X-18	-	-
80	1	.625	4-1/4	3-1/2	1-1/4	1	HTC-080-7	HTC-080-9	HTC-080-12	HTC-080-18	HTC-080-35	-
80	1	.625	4-1/2	5	1-1/4	1	-	-	-	HTC-080L-18	HTC-080L-35	-
80	1	.625	5-1/2	5	1-1/2	1	-	-	-	HTC-080X-18	HTC-080X-35	-
80	1	.625	4-1/2	5-1/2	1-1/4	2	-	-	HTC2-080-12	HTC2-080-18	HTC2-080-35	-
100	1-1/4	.750	4-3/4	4-1/2	1-1/4	1	HTC-100-9	HTC-100-9	HTC-100-12	HTC-100-18	HTC-100-35	-
100	1-1/4	.750	5-1/2	5	1-1/2	1	-	-	-	HTC-100L-18	-	-
120	1-1/2	.875	5-1/4	5-1/4	1-1/2	1	-	-	HTC-120-12	-	-	-
140	1-3/4	1.000	5-1/2	6	1-1/2	1	-	-	HTC-140-12	-	HTC-140-35	-

* Parts in inventory may have different tooth counts available than listed above, please call for more specific part information.

HTC0 Series

Roller Chain 0° PA Rack Form Cycloidal

Finishing, Topping

Right Hand

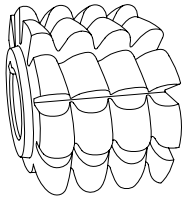
Chain #	Circ. Pitch	Roller Dia.	OD	Length	Bore	# Leads	Specify Class A, B, C	
							12-17 Teeth	18-34 Teeth
40	1/2	.313	3-1/8	2-1/2	1-1/4	1	-	HTC0-040-18
60	3/4	.469	85mm	100mm	27mm	1		HTC0-060-18T
100	1-1/4	.750	4-3/4	4-1/2	1-1/4	1	HTC0-100-12	-

Chain #	Circ. Pitch	Roller Dia.	OD	Length	Bore	# Leads	Specify Class A,B,C
36	3/8	.250	1-7/8	1-7/8	3/4	1	HEC-036S
36	3/8	.250	3	2-1/2	1-1/4	1	HEC-036
42	1/2	.335	3-1/8	2-1/2	1-1/4	1	HEC-042
42	1/2	.335	3-1/2	2-1/2	1-1/4	3	HEC-042-3
51	5/8	.400	3-1/2	2-1/2	1-1/4	1	HEC-051
61	3/4	.475	3-1/2	2-7/8	1-1/4	1	HEC-061
61	3/4	.475	90mm	120mm	27mm	1	HEC-061T
spec	1	.625	4-1/4	3-1/2	1-1/4	1	HEC-100
spec	1-1/2	1.000	5	4-3/4	1-1/4	1	HEC-150
spec	1-1/2	1.000	190mm	170mm	40mm	1	HEC-150F

HEC Series

Roller Chain
European Standard

Finishing
Topping
Right Hand



Pitch (mm)	Roller Dia. (mm)	OD	Length	Bore	Specify Class A,B,C
6	4	1-7/8	1-7/8	3/4	HRCM-6S
6	4	2-1/2	2-1/2	1-1/4	HRCM-6
6	4	64mm	64mm	32 mm	HRCM-6T
8	5	1-7/8	1-7/8	3/4	HRCM-8S
8	5	2-1/2	2-1/2	1-1/4	HRCM-8

HRCM Series

Metric Roller Chain

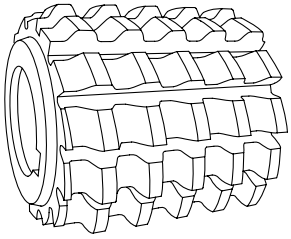
Finishing
Non Topping
Right Hand

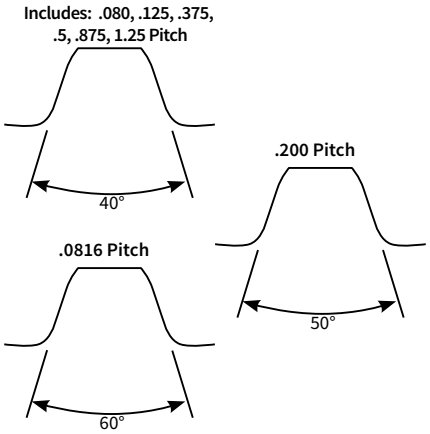
Belt	Pitch	Tooth Range	OD	Length	Bore	Approx. WD	# Leads	Specify Class A,B,C
XXL	40 DP	10-23	1	3/4	8mm	.021	1	HTB-040-10M
XXL	40 DP	10-23	1-7/8	1-1/2	3/4	.021	1	HTB-040-10S
XXL	40 DP	24 ∞	1	3/4	8mm	.021	1	HTB-040-24M
XXL	40 DP	24 ∞	1-7/8	1-1/2	3/4	.021	1	HTB-040-24S
MXL	1/12.5	10-23	1	3/4	8mm	.026	1	HTB-080-10M
MXL	1/12.5	24 ∞	1	3/4	8mm	.026	1	HTB-080-24M
MXL	1/12.5	10-23	1-1/8	1-1/8	1/2	.026	1	HTB-080-10H
MXL	1/12.5	24 ∞	1-1/8	1-1/8	1/2	.026	1	HTB-080-24H
MXL	1/12.5	10-23	1-7/8	1-1/2	3/4	.026	1	HTB-080-10S
MXL	1/12.5	24 ∞	1-7/8	1-1/2	3/4	.026	1	HTB-080-24S
MXL	1/12.5	24 ∞	2-1/2	2	1-1/4	.026	1	HTB-080-24
–	1/8	10 ∞	1-7/8	1-7/8	3/4	.035	1	HTB-012-10S
XL	1/5	12 ∞	1-1/4	1-1/4	1/2	.056	1	HTB-200-12H
XL	1/5	10 ∞	1-7/8	1-7/8	3/4	.056	1	HTB-200-10S
XL	1/5	10 ∞	2-1/4	2	1-1/4	.056	1	HTB-200-10
XL	1/5	10 ∞	2-1/4	2	1-1/4	.056	2	HTB-200-10-2
L	3/8	10 ∞	1-7/8	1-7/8	3/4	.085	1	HTB-375-10S
L	3/8	10 ∞	1-7/8	1-7/8	3/4	.085	2	HTB-375-10-2S
L	3/8	10 ∞	2-1/2	2-1/2	1-1/4	.085	1	HTB-375-10
H	1/2	12-19	2	2	3/4	.103	1	HTB-500-12S
H	1/2	20 ∞	2	2	3/4	.103	1	HTB-500-20S
H	1/2	12-19	2-3/4	2-3/4	1-1/4	.103	1	HTB-500-12
H	1/2	20 ∞	2-3/4	2-3/4	1-1/4	.103	1	HTB-500-20
XH	7/8	18 ∞	3-1/2	3-1/2	1-1/4	.272	1	HTB-087-18
XH	7/8	18 ∞	112mm	100mm	40mm	.272	1	HTB-087-18F
XXH	1-1/4	18 ∞	4-1/2	5	1-1/2	.405	1	HTB-125-18

HTB Series

Timing Belt
ANSI+British
Standard

Finishing
Topping
Right Hand





Belt	Pitch	Tooth Range	OD	Length	Bore	Approx. WD	Specify Class A,B,C
MXL	3/16	10 ∞	1-7/8	1-7/8	3/4	.060	HTBY-018-10S
XL	1/5	10-23	1-7/8	1-7/8	3/4	.064	HTBY-020-10S
XL	1/5	24 ∞	1-7/8	1-7/8	3/4	.065	HTBY-020-24S
–	15/64	10 ∞	1-7/8	1-7/8	3/4	.073	HTBY-023-10S
L	3/8	10-23	1-7/8	1-7/8	3/4	.103	HTBY-037-10S
L	3/8	24 ∞	1-7/8	1-7/8	3/4	.103	HTBY-037-24S
L	3/8	10-23	2-1/2	2-1/2	1-1/4	.103	HTBY-037-10
L	3/8	24 ∞	2-1/2	2-1/2	1-1/4	.103	HTBY-037-24
H	1/2	10-23	2-3/4	2-3/4	1-1/4	.118	HTBY-050-10
H	1/2	24 ∞	2-3/4	2-3/4	1-1/4	.118	HTBY-050-24
XH	7/8	20 ∞	3-1/2	3-1/2	1-1/4	.281	HTBY-087-20
XXH	1-1/4	18 ∞	4-1/2	5	1-1/4	.406	HTBY-125

HTBY Series

Timing Belt

Goodyear Pd®

Finishing, Topping

Single Lead, Right Hand

Pitch (mm)	Tooth Range	OD	Length	Bore	Specify Class A,B,C
2	10 ∞	1-1/4	1-1/4	1/2	HTMY-020H
2	10 ∞	1-1/4	1-1/4	3/4	HTMY-020SE
2.5	10 ∞	1-7/8	1-7/8	3/4	HTMY-025S
3	10 ∞	1-7/8	1-7/8	3/4	HTMY-030S
3	10 ∞	2-1/2	2-1/2	1-1/4	HTMY-030
4.5	12 ∞	2-1/2	2-1/2	1-1/4	HTMY-045
5	12 ∞	1-7/8	1-7/8	3/4	HTMY-050S
5	12 ∞	2-1/2	2-1/2	1-1/4	HTMY-050
6	16 ∞	1-7/8	1-7/8	3/4	HTMY-060S
6	16 ∞	2-3/4	2-3/4	1-1/4	HTMY-060
8	20 ∞	2-3/4	2-3/4	1-1/4	HTMY-080
14	28 ∞	3	3	1-1/4	HTMY-1400

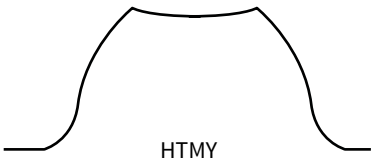
HTMY Series

Timing Belt

Goodyear Super Torque Pd®

Finishing, Topping

Single Lead, Right Hand



HTMY
Hob Tooth Profile

Circ. Pitch	OD	Length	Bore	Specify Class A,B,C
0.100	1-7/8	1 1/2	3/4	HTBG-010S

HTBG Series

Timing Belt

Berg Micro

Single Thread, Right Hand

Pitch	Tooth Range	OD	Length	Bore	Specify Class A,B,C
3/8	20 ∞	2-3/4	2-3/4	1-1/4	HTHN-375

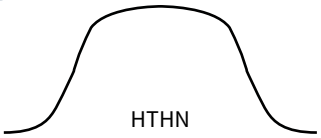
HTHN Series

Timing Belt

Honda

Topping, Single Lead

Right Hand



HTHN
Hob Tooth Profile

Pitch (mm)	Tooth Range	OD	Length	Bore	# of Leads	Specify Class A,B,C
2	10-12	1-7/8	1-1/2	3/4	1	HTGT-02-10S
2	13-18	1-7/8	1-1/2	3/4	1	HTGT-02-13S
2	19-35	1-7/8	1-1/2	3/4	1	HTGT-02-19S
2	36-60	1-7/8	1-1/2	3/4	1	HTGT-02-36S
2	36-60	1-7/8	1-1/2	3/4	2	HTGT-02-36S-2
2	61-200	1-1/4	1-1/4	1/2	1	HTGT-02-61H
2	61-200	1-7/8	1-1/2	3/4	1	HTGT-02-61S
3	15-27	1-1/8	1-1/8	1/2	1	HTGT-03-15H
3	15-27	1-7/8	1-7/8	3/4	1	HTGT-03-15S
3	15-27	50mm	50mm	22mm	1	HTGT-03-15T
3	9-14	1-7/8	1-7/8	3/4	1	HTGT-03-9S
3	15-27	2-1/2	2	1-1/4	1	HTGT-03-15
3	28-56	1-1/4	1-1/4	1/2	1	HTGT-03-28H
3	28-56	1-7/8	1-7/8	3/4	1	HTGT-03-28S
3	28-56	2-1/2	2	1-1/4	1	HTGT-03-28
3	28-56	50mm	50mm	22mm	1	HTGT-03-28T
3	57-140	1-1/4	1-1/4	1/2	1	HTGT-03-57H
3	57-140	1-7/8	1-7/8	3/4	1	HTGT-03-57S
3	57-140	2-1/2	2-1/2	1-1/4	1	HTGT-03-57
3	57-140	50mm	50mm	22mm	1	HTGT-03-57T
3	141-200	2-1/2	2-1/2	1-1/4	1	HTGT-03-141
5	12-15	1-7/8	1-7/8	3/4	1	HTGT-05-12S
5	12-15	2-1/2	2-1/2	1-1/4	1	HTGT-05-12
5	16-32	1-7/8	1-7/8	3/4	1	HTGT-05-16S
5	16-32	2-1/2	2	1-1/4	1	HTGT-05-16
5	16-32	1-7/8	1-7/8	3/4	2	HTGT-05-16-2S
5	33-60	1-7/8	1-7/8	3/4	1	HTGT-05-33S
5	33-60	2-1/2	2-1/2	1-1/4	1	HTGT-05-33
5	61-140	1-7/8	1-7/8	3/4	1	HTGT-05-61S
5	61-140	2-1/2	2-1/2	1-1/4	1	HTGT-05-61
5	141-200	2-1/2	2	1-1/4	1	HTGT-05-141
8	22-29	2-3/4	2-3/4	1-1/4	1	HTGT-08-22
8	30-50	2-3/4	2-3/4	1-1/4	1	HTGT-08-30
8	51-119	2-3/4	2-3/4	1-1/4	1	HTGT-08-51
8	120-220	2-3/4	2-3/4	1-1/4	1	HTGT-08-120
14	25-29	2-3/4	2-3/4	1-1/4	1	HTGT-14-25
14	30-35	3	3	1-1/4	1	HTGT-14-30
14	36-45	3	3	1-1/4	1	HTGT-14-36
14	46-60	3	3	1-1/4	1	HTGT-14-46
14	61-90	3	3	1-1/4	1	HTGT-14-61
14	91-149	3	3	1-1/4	1	HTGT-14-91
14	150-250	3	3	1-1/4	1	HTGT-14-150

HTGT Series

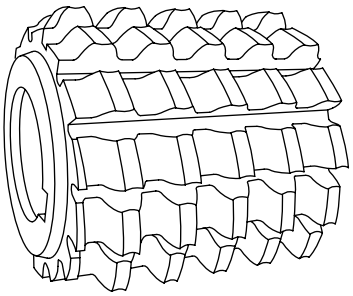
Timing Belt

Gates Power Grip GT (PGGT)

Finishing

Topping

Right Hand



HTGT
Hob Tooth Profile

Circ. Pitch	Tooth Range	OD	Length	Bore	Specify Class A,B,C
15/64	14 ∞	1-7/8	1-7/8	3/4	HGI-023-14S
3/8	25-39	2-3/4	2-3/4	1-1/4	HGI-037-25
1/2	17-24	2-3/4	2-3/4	1-1/4	HGI-050-17
1/2	40 ∞	2-3/4	2-3/4	1-1/4	HGI-050-40

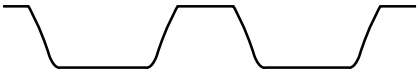
HGI Series

Timing Belt

Gilmer

Topping, Single Thread

Right Hand



HGI
Hob Tooth Profile

HTMU Series

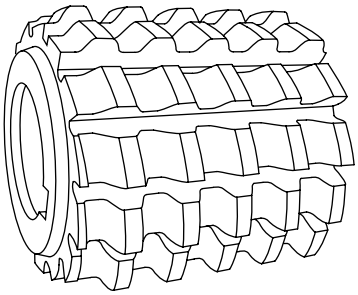
Timing Belt

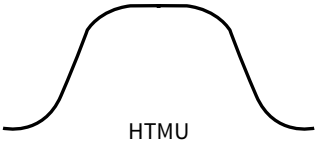
Gates High Torque Drive (HTD)

Finishing, Topping

Right Hand

Pitch (mm)	Tooth Range	OD	Length	Bore	# Of Leads	Specify Class A,B,C
3	9-13	3/4	1/2	8mm	1	HTMU-03-9M
3	9-13	1-7/8	1-7/8	3/4	1	HTMU-03-9S
3	14-25	1-1/4	1	1/2	1	HTMU-03-14H
3	14-25	1-7/8	1-7/8	3/4	1	HTMU-03-14S
3	14-25	2-1/2	2-1/2	1-1/4	1	HTMU-03-14
3	14-25	50mm	60mm	22mm	1	HTMU-03-14T
3	26-80	1-1/4	1	1/2	1	HTMU-03-26H
3	26-80	1-7/8	1-7/8	3/4	1	HTMU-03-26S
3	26-80	2-1/2	2	1-1/4	1	HTMU-03-26
3	26-80	50mm	60mm	22mm	1	HTMU-03-26T
3	81-200	1-7/8	1-7/8	3/4	1	HTMU-03-81S
3	81-200	2-1/2	2	1-1/4	1	HTMU-03-81
3	81-200	50mm	60mm	22mm	1	HTMU-03-81T
5	12-16	1-1/4	1	1/2	1	HTMU-05-12H
5	12-16	1-7/8	1-7/8	3/4	1	HTMU-05-12S
5	12-16	2-3/4	2-3/4	1-1/4	1	HTMU-05-12
5	12-16	50mm	60mm	22mm	1	HTMU-05-12T
5	17-31	1-1/4	1	1/2	1	HTMU-05-17H
5	17-31	1-7/8	1-7/8	3/4	1	HTMU-05-17S
5	17-31	2-3/4	2-3/4	1-1/4	1	HTMU-05-17
5	17-31	50mm	60mm	22mm	1	HTMU-05-17T
5	32-79	1-7/8	1-7/8	3/4	1	HTMU-05-32S
5	32-79	2-3/4	2-3/4	1-1/4	1	HTMU-05-32
5	32-79	2-3/4	2-3/4	1-1/4	2	HTMU-05-32-2
5	32-79	50mm	60mm	22mm	1	HTMU-05-32T
5	80-200	1-7/8	1-7/8	3/4	1	HTMU-05-80S
5	80-200	2-3/4	2-3/4	1-1/4	1	HTMU-05-80
5	80-200	50mm	60mm	22mm	1	HTMU-05-80T
8	19-27	1-7/8	1-7/8	3/4	1	HTMU-08-19S
8	19-27	2-3/4	2-3/4	1-1/4	1	HTMU-08-19
8	28-89	1-7/8	1-7/8	3/4	1	HTMU-08-28S
8	28-89	2-3/4	2-3/4	1-1/4	1	HTMU-08-28
8	90-200	1-7/8	1-7/8	3/4	1	HTMU-08-90S
8	90-200	2-3/4	2-3/4	1-1/4	1	HTMU-08-90
14	28-36	3	3	1-1/4	1	HTMU-14-28
14	37-89	3	3	1-1/4	1	HTMU-14-37
14	90 ∞	3	3	1-1/4	1	HTMU-14-90
14	90 ∞	3	3	1-1/4	2	HTMU-14-90-2
20	32-45	3-1/2	3-1/2	1-1/4	1	HTMU-20-32
20	46-100	3-1/2	3-1/2	1-1/4	1	HTMU-20-46
20	101-200	3-1/2	3-1/2	1-1/4	1	HTMU-20-101





HTMU
Hob Tooth Profile

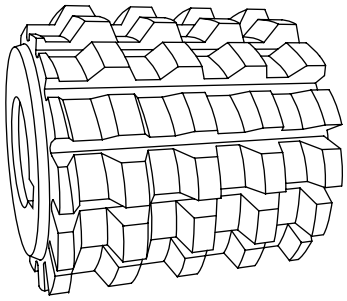
HTX & HTXN Series

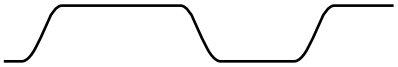
Timing Belt

Synchroflex - T Style

Topping, Single Lead

Right Hand





DIN 7721

Pitch (mm)	Tooth Range	OD	Length	Bore	Backlash	Specify Class A,B,C
2	12-20	1-7/8	1-7/8	3/4	-	-
2	21 ∞	1-7/8	1-7/8	3/4	-	-
2.5	12-20	1-7/8	1-7/8	3/4	-	HTX-025-12S
2.5	21 ∞	1-7/8	1-7/8	3/4	-	HTX-025-21S
5	12-20	1-7/8	1-7/8	3/4	-	HTX-05-12S
5	12-20	2-1/2	2-1/2	1-1/4	-	HTX-05-12
5	21 ∞	1-7/8	1-7/8	3/4	-	HTX-05-21S
5	21 ∞	2-1/2	2-1/2	1-1/4	-	HTX-05-21
5	21 ∞	50mm	60mm	22mm	-	HTX-05-21T
5	12-20	1-7/8	1-7/8	3/4	zero	HTXN-05-12S
5	12-20	2-1/2	2-1/2	1-1/4	zero	HTXN-05-12
5	21 ∞	1-7/8	1-7/8	3/4	zero	HTXN-05-21S
5	21 ∞	2-1/2	2-1/2	1-1/4	zero	HTXN-05-21
10	14-20	1-7/8	1-7/8	3/4	-	HTX-10-14S
10	14-20	2-3/4	2-3/4	1-1/4	-	HTX-10-14
10	21∞	1-7/8	1-7/8	3/4	-	HTX-10-21S
10	21 ∞	2-3/4	2-3/4	1-1/4	-	HTX-10-21
10	21 ∞	70mm	70mm	27mm	-	HTX-10-21T
10	14-20	2-3/4	2-3/4	1-1/4	zero	HTXN-10-14
10	21 ∞	2-3/4	2-3/4	1-1/4	zero	HTXN-10-21
20	15-20	3-1/2	3-1/2	1-1/4	-	HTX-20-15
20	21-34	3-1/2	3-1/2	1-1/4	-	HTX-20-21
20	35-80	3-1/2	3-1/2	1-1/4	-	HTX-20-35
20	21 ∞	3-1/2	3-1/2	1-1/4	zero	HTXN-20-21

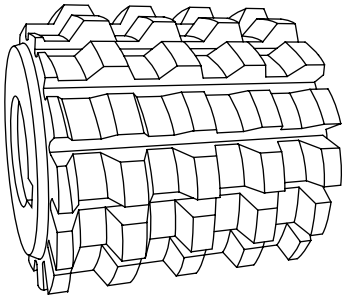
HTXA & HTXAN Series

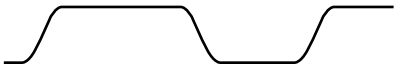
Timing Belt

Synchroflex - AT Style

Topping, Single Lead

Right Hand





DIN 7721

Pitch (mm)	Tooth Range	OD	Length	Bore	Backlash	Specify Class A,B,C
2	12-20	1-7/8	1-7/8	3/4	-	-
2	21 ∞	1-7/8	1-7/8	3/4	-	-
2.5	12-20	1-7/8	1-7/8	3/4	-	-
2.5	21 ∞	1-7/8	1-7/8	3/4	-	-
5	12-20	1-7/8	1-7/8	3/4	-	HTXA-05-12S
5	12-20	2-1/2	2-1/2	1-1/4	-	HTXA-05-12
5	21 ∞	1-7/8	1-7/8	3/4	-	HTXA-05-21S
5	21 ∞	2-1/2	2-1/2	1-1/4	-	HTXA-05-21
5	12-20	1-7/8	1-7/8	3/4	zero	HTXAN-05-12S
5	12-20	2-1/2	2-1/2	1-1/4	zero	HTXAN-05-12
5	21 ∞	1-7/8	1-7/8	3/4	zero	HTXAN-05-21S
5	21 ∞	2-1/2	2-1/2	1-1/4	zero	HTXAN-05-21
5	21 ∞	50mm	60mm	22mm	-	HTXA-05-21T
10	14-20	1-7/8	1-7/8	3/4	-	HTXA-10-14S
10	14-20	2-3/4	2-3/4	1-1/4	-	HTXA-10-14
10	21 ∞	1-7/8	1-7/8	3/4	-	HTXA-10-21S
10	21 ∞	2-3/4	2-3/4	1-1/4	-	HTXA-10-21
10	21 ∞	65mm	70mm	27mm	-	HTXA-10-21T
10	14-20	1-7/8	1-7/8	3/4	zero	HTXA-10-14S
10	14-20	2-3/4	2-3/4	1-1/4	zero	HTXA-10-14
10	21 ∞	2-3/4	2-3/4	1-1/4	zero	HTXA-10-21
10	21 ∞	60mm	80mm	27mm	zero	HTXA-10-21T
20	15-20	3-1/2	3-1/2	1-1/4	-	HTXA-20-15
20	21 ∞	3-1/2	3-1/2	1-1/4	-	HTXA-20-21
20	14-20	3-1/2	3-1/2	1-1/4	zero	HTXAN-20-14
20	21 ∞	3-1/2	3-1/2	1-1/4	zero	HTXAN-20-21

HTXAP Series

Synchroflex Timing Belt

ATP Style

Topping, Single Lead,Right Hand

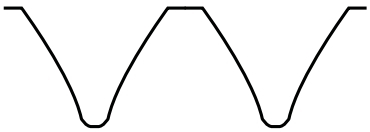
Pitch (mm)	Tooth Range	OD	Length	Bore	Backlash	Specify Class A,B,C
10	21 ∞	70mm	70mm	27mm	zero	HTXPA-10TA

Chain #	Circ. Pitch	OD	Length	Bore	Tooth Range	Specify Class A,B,C
SC-1	3/16	2	2	3/4	17-23	HSC-018-17S
SC-1	3/16	1-7/8	1-7/8	3/4	22-30	HSC-018-22S
SC-1	3/16	2	2	3/4	33-43	HSC-018-33S
SC-1	3/16	2	2	3/4	44-58	HSC-018-44S
SC-1	3/16	1-7/8	1-7/8	3/4	46-100	HSC-018-46SE
SC-1	3/16	2	2	3/4	59-79	HSC-018-59S
SC-3	3/8	3	3	1-1/4	12-16	HSC-037-12
SC-3	3/8	3	3	1-1/4	17-23	HSC-037-17
SC-3	3/8	3	3	1-1/4	24-32	HSC-037-24
SC-3	3/8	3	3	1-1/4	33-43	HSC-037-33
SC-3	3/8	3	3	1-1/4	44-58	HSC-037-44
SC-3	3/8	3	3	1-1/4	59-79	HSC-037-59
SC-3	3/8	3	3	1-1/4	80-110	HSC-037-80
SC-3	3/8	3	3	1-1/4	111 ∞	HSC-037-111
SC-4	1/2	3	3	1-1/4	12-16	HSC-050-12
SC-4	1/2	3	3	1-1/4	17-23	HSC-050-17
SC-4	1/2	3	3	1-1/4	24-32	HSC-050-24
SC-4	1/2	3	3	1-1/4	33-43	HSC-050-33
SC-4	1/2	3	3	1-1/4	44-58	HSC-050-44
SC-4	1/2	3	3	1-1/4	59-79	HSC-050-59
SC-4	1/2	3	3	1-1/4	80-110	HSC-050-80
SC-4	1/2	3	3	1-1/4	111-150	HSC-050-111
SC-5	5/8	3-1/2	3-1/2	1-1/4	12-16	HSC-062-12
SC-5	5/8	3-1/2	3-1/2	1-1/4	17-23	HSC-062-17
SC-5	5/8	3-1/2	3-1/2	1-1/4	24-32	HSC-062-24
SC-5	5/8	3-1/2	3-1/2	1-1/4	33-43	HSC-062-33
SC-5	5/8	3-1/2	3-1/2	1-1/4	44-58	HSC-062-44
SC-5	5/8	3-1/2	3-1/2	1-1/4	80-110	HSC-062-80
SC-5	5/8	3-1/2	3-1/2	1-1/4	111-150	HSC-062-111
SC-6	3/4	3-1/2	3-1/2	1-1/4	12-16	HSC-075-12
SC-6	3/4	3-1/2	3-1/2	1-1/4	17-23	HSC-075-17
SC-6	3/4	3-1/2	3-1/2	1-1/4	24-32	HSC-075-24
SC-6	3/4	3-1/2	3-1/2	1-1/4	33-43	HSC-075-33
SC-6	3/4	3-1/2	3-1/2	1-1/4	44-58	HSC-075-44
SC-6	3/4	3-1/2	3-1/2	1-1/4	59-79	HSC-075-59
SC-6	3/4	3-1/2	3-1/2	1-1/4	80-110	HSC-075-80
SC-6	3/4	3-1/2	3-1/2	1-1/4	111-150	HSC-075-111
SC-8	1	4-1/2	4-1/2	1-1/4	17-23	HSC-100-17
SC-8	1	4-1/2	4-1/2	1-1/4	24-32	HSC-100-24
SC-8	1	4-1/2	4-1/2	1-1/4	33-43	HSC-100-33
SC-8	1	4-1/2	4-1/2	1-1/4	44-58	HSC-100-44
SC-8	1	4-1/2	4-1/2	1-1/4	59-79	HSC-100-59
SC-8	1	4-1/2	4-1/2	1-1/4	80-110	HSC-100-80
SC-8	1	4-1/2	4-1/2	1-1/4	111 ∞	HSC-100-111
SC-10	1-1/4	5	5-1/2	1-1/2	17-23	HSC-125-17
SC-10	1-1/4	5	5-1/2	1-1/2	24-32	HSC-125-24
SC-10	1-1/4	5	5-1/2	1-1/2	33-43	HSC-125-33
SC-10	1-1/4	5	5-1/2	1-1/2	44-58	HSC-125-44
SC-10	1-1/4	5	5-1/2	1-1/2	59-79	HSC-125-59
SC-10	1-1/4	5	5-1/2	1-1/2	80-110	HSC-125-80
SC-12	1-1/2	5-1/4	5-1/2	1-1/2	24-32	HSC-150-24
SC-12	1-1/2	5-1/4	5-1/2	1-1/2	33-43	HSC-150-33

HSC Series

Silent Chain

Topping
Single Lead
Right Hand

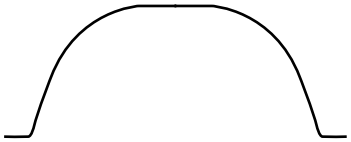


HSC
Hob Tooth Profile

HCN Series

Conveyor Chain

Topping
Single Thread
Right Hand

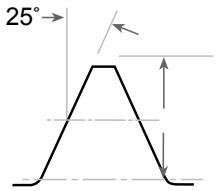


Circ. Pitch	Tooth Range	OD	Length	Bore	Specify Class A,B,C
3/4	15-25	3-3/4	3-3/4	1-1/4	HCN-075

HDD Series

Ladder Chain

Single Lead
Right Hand

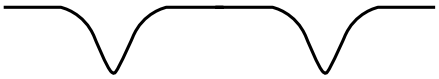


Pitch	PA	OD	Length	Bore	Specify Class B, C
.1869	25	1-7/8	1-7/8	3/4	HDD-185S
.2857	25	1-7/8	1-7/8	3/4	HDD-286S

HBK Series

Block Chain

Single Lead
Right Hand
Non-Topping

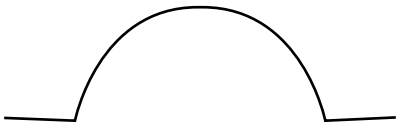


Pitch	Block Diam.	Roller Diam.	OD	Length	Bore	Specify Class B,C
1	.325	.3125	3	3	1-1/4	HBK-100

HSS Series

Sawmill Splines

Topping
Single Lead
Right Hand



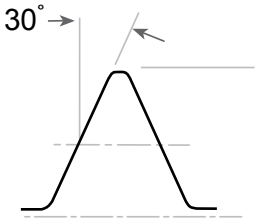
Lobes	OD	Length	Bore	Specify Class A, B, C
25	4	4	1-1/4	HSS-500

HVO Series

Hy-Vo Silent Chain

Topping
Single Lead
Right Hand

Circ. Pitch	Style #	Tooth Range	OD	Length	Bore	WD	Specify Class A, B, C
.3750	147	22-25	3	3-1/2	1-1/4	.210	HVO-037-22
.3750	147	26 & Up	3	3-1/2	1-1/4	.210	HVO-037-26
.3750	139	25 & Up	3-1/2	3-1/2	1-1/4	.213	HVO-037-26X
.5000	139	18-25	3-1/2	3-1/2	1-1/4	.284	HVO-050-18
.5033	147	20 & Up	3	3-1/2	1-1/4	.280	HVO-050-20
.5000	139	25 & Up	3-1/2	3-/1	1-1/4	.284	HVO-050-25X
.7500	115	17 & Up	4	4	1-1/4	.471	HVO-075-17
1.000	115	18 & Up	4-1/4	4-1/4	1-1/4	.628	HVO-100-18
1.000	139	26 & Up	5	4	1-1/4	.568	HVO-100-26X
1.500	115	10 & Up	5-1/2	6-1/2	1-1/4	.941	HVO-150-10



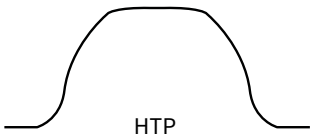
Hob Tooth Profile

HTP Series

Poly Chain GT®(PCGT)

Topping
Single Lead
Right Hand

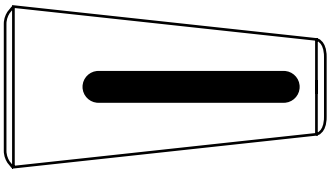
Pitch (mm)	Tooth Range	OD	Length	Bore	Specify Class A, B, C
8	20-27	3	3	1-1/4	HTP-08-22
8	28-37	3	3	1-1/4	HTP-08-28
8	38-58	3	3	1-1/4	HTP-08-38
8	59-89	3	3	1-1/4	HTP-08-59
8	90-224	3	3	1-1/4	HTP-08-90
14	25-29	3	3	1-1/4	HTP-014-25
14	30-35	3	3	1-1/4	HTP-014-30
14	36-45	3	3	1-1/4	HTP-014-36
14	46-60	3	3	1-1/4	HTP-014-46
14	61-90	3	3	1-1/4	HTP-014-61
14	91-149	3	3	1-1/4	HTP-014-91
14	150-250	3	3	1-1/4	HTP-014-150



HTP
Hob Tooth Profile

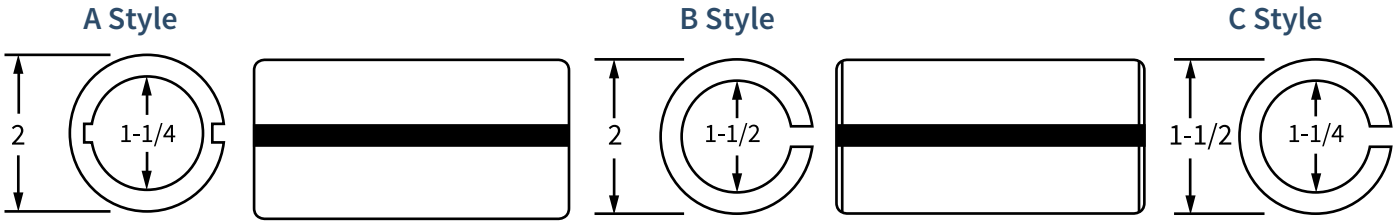
Hob ID	Sleeve ID	Approximate OD	Overall Length	Series
#5 BC Taper	1-1/4”	1.947	4-1/8	AHS-105

AHS Series
Hob Reduction Sleeves



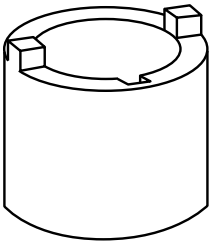
Style	Hob ID "	Sleeve ID "	External (internal) key	Overall Length	Series
A	2	1-1/4”	.512 x .280	4	AS-2-125
B	2	1-1/2	.512 thru	4.4	AS-2-150
C	1-1/2	1-1/4	.266 thru	4.4	AS-150-125

AS Series
Straight Hob Sleeve



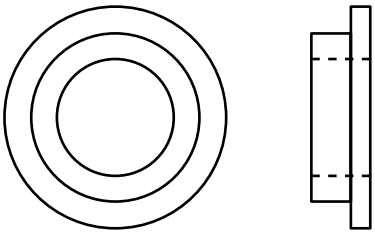
Hob ID "	Sleeve ID "	Approximate OD	Overall Length	Drive Slot Width	Series
1/2	1/2	.750	.625	.127	AEK-500
5/8	5/8	.875	.750	.129	AEK-625
3/4	3/4	1.250	.750	.125	AEK-750
1-1/4	1-1/4	1.875	1	.250	AEK-125

AEK Series
End Key Drive Bushing



External Diameter	Internal Diameter	Series
1-3/4	1-1/4	ASR-175

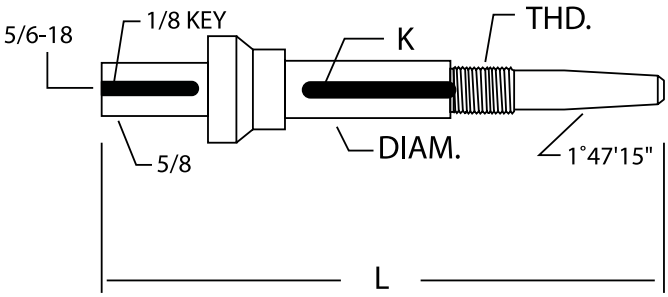
ASR Series
Bore Reduction Ring



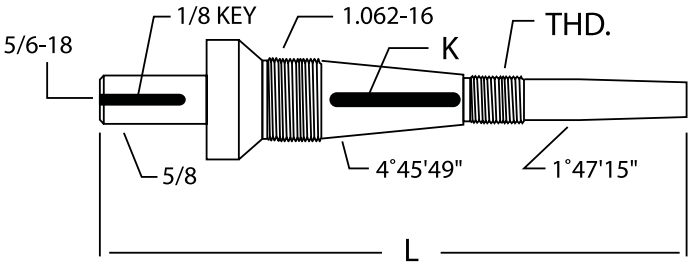
AH Series
Hob Arbors

Style	Hob Mounting (Diam.)	Bushings	Key (K)	Thread (THD)	Overall Length	Series
A	1/2 "	1	.126	1/2-20	7-1/4	AH-500
A	5/8 "	1	.138	5/8-18	7-3/4	AH-625
A	3/4 "	1	.138	5/8-18	7-3/4	AH-750
A	1 "	1	.157	7/8-16	7-3/4	AH-100
B	#1 Taper	-	.157	5/8-16	7-3/4	AH-T100

A Style



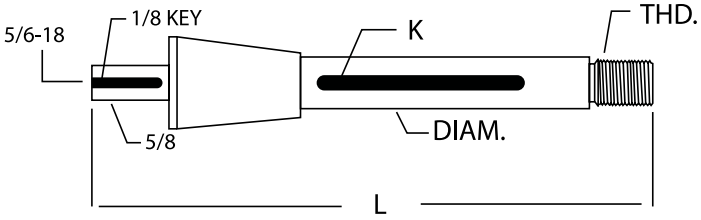
B Style



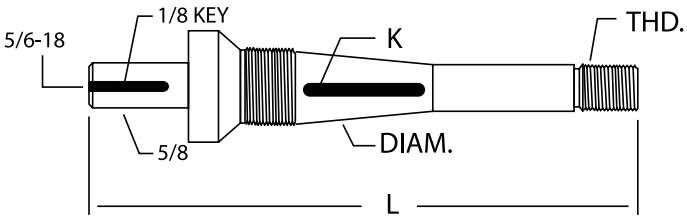
AR & ARM Series
Hob Arbors

Style	Hob Mounting (Diam.)	Bushings	Key (K)	Thread (THD)	Overall Length	Series
A	8mm	3	.126	5/16-24	6-1/8	ARM-314
A	1/2 "	1	.126	3/8-24	8-3/4	AR-500
A	5/8 "	3	.138	5/8-18	8-3/4	AR-625
A	3/4 "	3	.138	5/8-18	8-3/4	AR-750
B	#1 Taper	-	.157	7/8-18	8-3/4	AR-T100

A Style



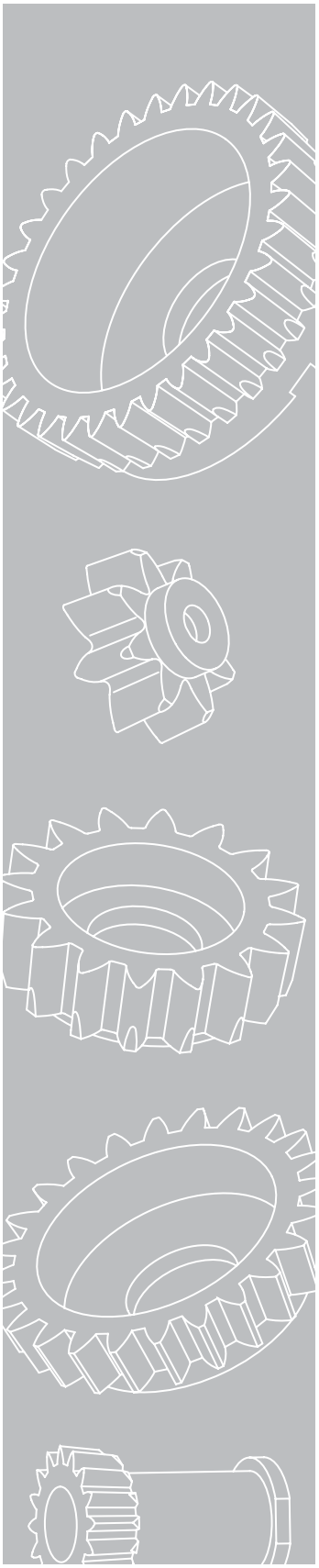
B Style



ARB Series
Hob Arbor Bushings

Hob ID	Overall Length	Series
3/4	1.5	ARB-750
8mm	2	ARMB-314

Disc Shaper Sort Index



Normal Diametral Pitch
- 14.5° 95
- 20° 97
- 22.5° 105
- 25° 106
- 30° 109
- 37.5° 116
- 45° 116

Normal Module Pitch
- 14.5° 117
- 20° 118
- 25° 121
- 30° 123
- 37.5° 127
- 45° 127

Normal Circular Pitch 128

Transverse Pitch 129

Serrations
- 36 130
- 48 130
- British 130
- DIN 131

Parallel Splines 132

Roller Chain & Silent Chain 133

Timing Belts 134

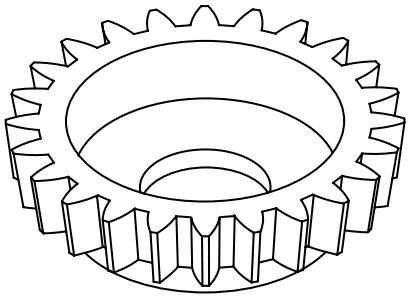
Shaper Adapters 138

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
2	14 1/2°	4.5	1-1/4	9	1.125	S14-200-4
2	14 1/2°	6	1-3/4	12	1.125	S14-200-6
2-1/2	14 1/2°	4	1-1/4	10	.900	S14-250-4
2-1/2	14 1/2°	5.2	1-3/4	13	.900	S14-250-5
3	14 1/2°	4	1-1/4	12	.750	S14-300-4
3	14 1/2°	5	1-3/4	16	.750	S14-300-5E
3	14 1/2°	6	1-3/4	18	.750	S14-300-6
3	14 1/2°	6.7	1-3/4	20	.750	S14-300-7
3	14 1/2°	8	4	24	.750	S84-14-300
3-1/2	14 1/2°	4	1-1/4	14	.643	S14-350-4
4	14 1/2°	2.3	3/4	9	.563	S14-400-S
4	14 1/2°	3	1-1/4	12	.563	S14-400-3
4	14 1/2°	4	1-1/4	16	.563	S14-400-4
4	14 1/2°	5	1-3/4	20	.563	S14-400-5
4	14 1/2°	6	1-3/4	24	.563	S14-400-6
4-1/2	14 1/2°	4	1-1/4	18	.500	S14-450-4
5	14 1/2°	2	3/4	10	.450	S14-500-S
5	14 1/2°	3	1-1/4	15	.450	S14-500-3
5	14 1/2°	4	1-1/4	20	.450	S14-500-4
5	14 1/2°	5	1-3/4	25	.450	S14-500-5
6	14 1/2°	2	1/2	12	.375	S14-600-H
6	14 1/2°	3	1-1/4	18	.375	S14-600-3
6	14 1/2°	4	1-1/4	24	.375	S14-600-4
6	14 1/2°	4	1-3/4	24	.375	S14-600-4L
6	14 1/2°	5	1-3/4	30	.375	S14-600-5
6	14 1/2°	6	1-3/4	36	.375	S14-600-6
6	14 1/2°	8	4	48	.375	S84-14-600
7	14 1/2°	3	1-1/4	21	.321	S14-700-3
7	14 1/2°	4	1-1/4	28	.321	S14-700-4
7	14 1/2°	5	1-3/4	35	.321	S14-700-5
8	14 1/2°	1.8	1/2	14	.281	S14-800-H
8	14 1/2°	2.0	3/4	18	.281	S14-800-S
8	14 1/2°	2	1-1/4	24	.281	S14-800-3
8	14 1/2°	4	1-1/4	32	.281	S14-800-4
8	14 1/2°	4	1-3/4	32	.281	S14-800-4L
8	14 1/2°	5	1-3/4	40	.281	S14-800-5
8	14 1/2°	6	1-3/4	48	.281	S14-800-6
9	14 1/2°	3	1-1/4	27	.250	S14-900-3
9	14 1/2°	4	1-1/4	36	.250	S14-900-4
9	14 1/2°	4	1-3/4	36	.250	S14-900-4L
9	14 1/2°	5	1-3/4	45	.250	S14-900-5
10	14 1/2°	1.5	1/2	15	.225	S14-010-H

S14 Series

DP 14.5° PA Disc Shaper

Finishing
Non-Topping
Disc Type



2.25/DP=WD
20DP and finer - depth is 2.20/DP + .002

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
10	14 1/2°	2.0	3/4	20	.225	S14-010-S
10	14 1/2°	3	1-1/4	30	.225	S14-010-3
10	14 1/2°	4	1-1/4	40	.225	S14-010-4
10	14 1/2°	4	1-3/4	40	.225	S14-010-4L
10	14 1/2°	5	1-3/4	50	.225	S14-010-5
10	14 1/2°	6	1-3/4	60	.225	S14-010-6
11	14 1/2°	3	1-1/4	33	.205	S14-011-3
11	14 1/2°	4	1-1/4	44	.205	S14-011-4
11	14 1/2°	4	1-3/4	44	.205	S14-011-4L
11	14 1/2°	5	1-3/4	55	.205	S14-011-5
12	14 1/2°	1.5	1/2	18	.188	S14-012-H
12	14 1/2°	2.0	3/4	24	.188	S14-012-S
12	14 1/2°	3	1-1/4	36	.188	S14-012-3
12	14 1/2°	4	1-1/4	48	.188	S14-012-4
12	14 1/2°	4	1-3/4	48	.188	S14-012-4L
12	14 1/2°	5	1-3/4	60	.188	S14-012-5
12	14 1/2°	6	1-3/4	72	.188	S14-012-6
14	14 1/2°	3	1-1/4	42	.161	S14-014-3
14	14 1/2°	4	1-1/4	56	.161	S14-014-4
14	14 1/2°	4	1-3/4	56	.161	S14-014-4L
14	14 1/2°	5	1-3/4	70	.161	S14-014-5
15	14 1/2°	3	1-1/4	45	.150	S14-015-3
16	14 1/2°	1.5	1/2	24	.141	S14-016-H
16	14 1/2°	3	1-1/4	48	.141	S14-016-3

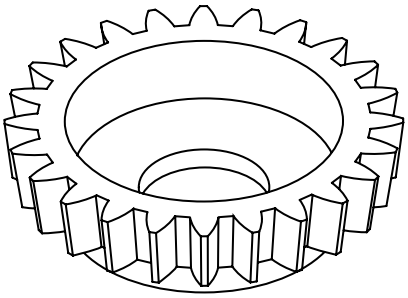
SERIES CONTINUED ON NEXT PAGE ->

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
16	14 1/2°	4	1-1/4	64	.141	S14-016-4
16	14 1/2°	4	1-3/4	64	.141	S14-016-4L
16	14 1/2°	5	1-3/4	80	.141	S14-016-5
17	14 1/2°	4	1-1/4	68	.132	S14-017-4
18	14 1/2°	3	1-1/4	54	.125	S14-018-3
18	14 1/2°	4	1-1/4	72	.125	S14-018-4
18	14 1/2°	4	1-3/4	72	.125	S14-018-4L
18	14 1/2°	5	1-3/4	90	.125	S14-018-5
19	14 1/2°	3	1-1/4	57	.118	S14-019-3
19	14 1/2°	4	1-1/4	76	.118	S14-019-4
20	14 1/2°	1.5	1/2	30	.112	S14-020-H
20	14 1/2°	3	1-1/4	60	.112	S14-020-3
20	14 1/2°	4	1-1/4	80	.112	S14-020-4
20	14 1/2°	4	1-3/4	80	.112	S14-020-4L
20	14 1/2°	5	1-3/4	100	.112	S14-020-5
22	14 1/2°	3	1-1/4	66	.102	S14-022-3
24	14 1/2°	1.5	1/2	36	.094	S14-024-H
24	14 1/2°	3	1-1/4	72	.094	S14-024-3
24	14 1/2°	4	1-1/4	96	.094	S14-024-4
24	14 1/2°	4	1-3/4	96	.094	S14-024-4L
24	14 1/2°	5	1-3/4	120	.094	S14-024-5
26	14 1/2°	3	1-1/4	78	.087	S14-026-3
28	14 1/2°	3	1-1/4	84	.081	S14-028-3
29	14 1/2°	3	1-1/4	87	.078	S14-029-3
30	14 1/2°	3	1-1/4	90	.075	S14-030-3
32	14 1/2°	1.5	1/2	48	.071	S14-032-H
32	14 1/2°	3	1-1/4	96	.071	S14-032-3
32	14 1/2°	4	1-1/4	128	.071	S14-032-4
32	14 1/2°	5	1-3/4	160	.071	S14-032-5
36	14 1/2°	3	1-1/4	108	.063	S14-036-3
36	14 1/2°	1.5	1/2	54	.063	S14-036-H
40	14 1/2°	3	1-1/4	120	.057	S14-040-3
48	14 1/2°	1.5	1/2	72	.048	S14-048-H
48	14 1/2°	3	1-1/4	144	.048	S14-048-3
64	14 1/2°	1.5	1/2	96	.036	S14-064-H
64	14 1/2°	3	1-1/4	192	.036	S14-064-3
64	14 1/2°	4	1-1/4	256	.036	S14-064-4
72	14 1/2°	1.5	1/2	108	.033	S14-072-H
72	14 1/2°	2.5	1-1/4	180	.033	S14-072-2
80	14 1/2°	1.5	1/2	120	.030	S14-080-H
96	14 1/2°	1.5	1/2	144	.025	S14-096-H
100	14 1/2°	1.50	1/2	150	.024	S14-100-H
120	14 1/2°	1.5	1/2	180	.020	S14-120-H

S14 Series

DP 14.5° PA Disc Shaper

Finishing
Non-Topping
Disc Type

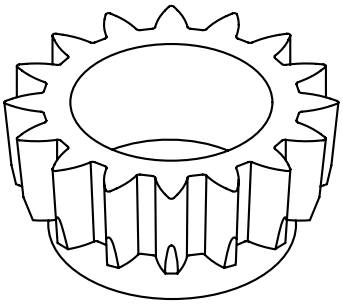


2.25/DP=WD
20DP and finer - depth is 2.20/DP + .002

SDC14 Series

DP 14.5° PA

Finishing
Non-Topping
Deep Counter Bore
Disc Type



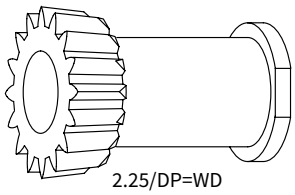
2.25/DP=WD
20DP and finer- depth is 2.20/DP + .002

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
3	14 1/2°	4	1-1/4	12	.750	SDC14-300-4
3	14 1/2°	5	1-3/4	15	.750	SDC14-300-5
4	14 1/2°	4	1-1/4	16	.563	SDC14-400-4
5	14 1/2°	4	1-1/4	20	.450	SDC14-500-4
6	14 1/2°	4	1-1/4	24	.375	SDC14-600-4
8	14 1/2°	2	3/4	18	.281	SDC14-800-S
8	14 1/2°	3	1-1/4	24	.281	SDC14-800-3
8	14 1/2°	4	1-1/4	32	.281	SDC14-800-4
9	14 1/2°	3	1-1/4	27	.250	SDC14-900-3
9	14 1/2°	4	1-1/4	36	.250	SDC14-900-4
10	14 1/2°	4	1-1/4	40	.225	SDC14-010-4
12	14 1/2°	3	1-1/4	36	.188	SDC14-012-3
12	14 1/2°	4	1-1/4	48	.188	SDC14-012-4
16	14 1/2°	4	1-1/4	64	.141	SDC14-016-4
20	14 1/2°	3	1-1/4	60	.112	SDC14-020-3
24	14 1/2°	3	1-1/4	72	.094	SDC14-024-3
32	14 1/2°	3	1-1/4	96	.071	SDC14-032-3
48	14 1/2°	3	1-1/4	144	.048	SDC14-048-3

SHB14 Series

DP 14.5° PA

Finishing, Non-Topping
Hub Type



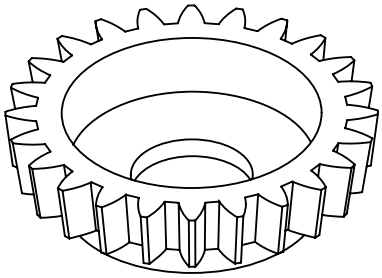
2.25/DP=WD

DP	PA	Pitch Dia.	Teeth	Approx. Height	WD	Series
6	14 1/2°	2	12	3	.375	SHB14-06-2
8	14 1/2°	2	16	3	.281	SHB14-08-2
10	14 1/2°	2	20	3	.225	SHB14-10-2
12	14 1/2°	2	24	3	.188	SHB14-12-2

STP14 Series

DP 14.5° PA

Finishing
Topping
Disc Type



2.25/DP=WD
20DP and finer - depth is
2.20/DP + .002

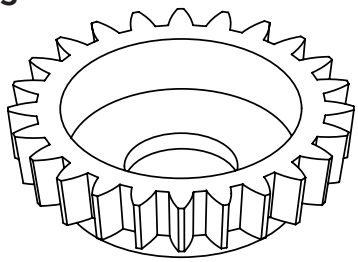
Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
5	14 1/2°	4	1-1/4	20	.450	STP14-500-4
6	14 1/2°	4	1-1/4	24	.375	STP14-600-4
6	14 1/2°	5	1-1/4	30	.375	STP14-600-5
8	14 1/2°	4	1-1/4	32	.281	STP14-800-4
9	14 1/2°	4	1-1/4	36	.250	STP14-900-4
10	14 1/2°	4	1-1/4	40	.225	STP14-010-4
12	14 1/2°	4	1-1/4	48	.188	STP14-012-4
16	14 1/2°	4	1-1/4	64	.141	STP14-016-4
20	14 1/2°	4	1-1/4	80	.112	STP14-020-4
24	14 1/2°	3	1-1/4	72	.094	STP14-024-3
24	14 1/2°	4	1-1/4	96	.094	STP14-024-4
32	14 1/2°	1.5	1/2	48	.071	STP14-032-H
32	14 1/2°	3	1-1/4	96	.071	STP14-032-3
32	14 1/2°	4	1-1/4	128	.071	STP14-032-4
48	14 1/2°	1.5	1/2	72	.048	STP14-048-H
48	14 1/2°	3	1-1/4	144	.048	STP14-048-3
64	14 1/2°	1.5	1/2	96	.036	STP14-064-H
64	14 1/2°	3	1-1/4	192	.036	STP14-064-3
72	14 1/2°	1.5	1/2	108	.033	STP14-072-H
80	14 1/2°	1.5	1/2	120	.028	STP14-080-H
96	14 1/2°	1.5	1/2	144	.023	STP14-096-H
120	14 1/2°	1.5	1/2	180	.020	STP14-120-H

DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
1-1/4	20°	8.0	4	11	1.800	Normal	S84-125
1-1/2	20°	6.7	1-3/4	10	1.500	Normal	S20-150-7
1-1/2	20°	8.0	4	13	1.500	Normal	S84-150
1-3/4	20°	6.9	1-3/4	12	1.286	Normal	S20-175-7
1-3/4	20°	8.0	4	14	1.286	Normal	S84-175
2	20°	4.5	1-1/4	9	1.125	Normal	S20-200-4
2	20°	6	1-3/4	12	1.125	Normal	S20-200-6
2	20°	7.5	1-3/4	15	1.125	Normal	S20-200-7
2	20°	8.0	4	16	1.125	Normal	S84-200
2-1/4	20°	4	1-1/4	9	1.000	Normal	S20-225-4
2-1/4	20°	5	1-3/4	11	1.000	Normal	S20-225-5
2-1/4	20°	8	4	18	1.000	Normal	S84-225
2-1/2	20°	4	1-1/4	10	.900	Normal	S20-250-4
2-1/2	20°	5	1-3/4	13	.900	Normal	S20-250-5
2-1/2	20°	6	1-3/4	15	.900	Normal	S20-250-6
2-1/2	20°	6.8	1-3/4	17	.900	Normal	S20-250-7E
2-1/2	20°	8.0	4	20	.900	Normal	S84-250
2-3/4	20°	4	1-1/4	11	.818	Normal	S20-275-4
2-3/4	20°	8	4	22	.818	Normal	S84-275
3	20°	2.7	1/2	8	.750	Normal	S20-300-H
3	20°	2.7	3/4	8	.750	Normal	S20-300-S
3	20°	3.3	1-1/4	10	.750	Normal	S20-300-3
3	20°	4	1-1/4	12	.750	Normal	S20-300-4
3	20°	4	1-3/4	12	.750	Normal	S20-300-4L
3	20°	5	1-3/4	15	.750	Normal	S20-300-5
3	20°	6	1-3/4	18	.750	Normal	S20-300-6
3	20°	6.6	1-3/4	20	.750	Normal	S20-300-7
3	20°	8.0	4	24	.750	Normal	S84-300
3-1/4	20°	4	1-1/4	13	.692	Normal	S20-325-4
3-1/2	20°	3	1-1/4	11	.643	Normal	S20-350-3
3-1/2	20°	4	1-1/4	14	.643	Normal	S20-350-4
3-1/2	20°	5.1	1-3/4	18	.643	Normal	S20-350-5
3-1/2	20°	6	1-3/4	21	.643	Normal	S20-350-6
3-1/2	20°	8	4	18	.643	Normal	S84-350
4	20°	2.3	3/4	9	.563	Normal	S20-400-S
4	20°	3	1-1/4	12	.563	Normal	S20-400-3
4	20°	4	1-1/4	16	.563	Normal	S20-400-4
4	20°	4	1-3/4	16	.563	Normal	S20-400-4L
4	20°	5	1-3/4	20	.563	Normal	S20-400-5
4	20°	5	1-1/4	20	.563	Normal	S20-400-5E
4	20°	6	1-3/4	24	.563	Normal	S20-400-6
4	20°	8	4	32	.563	Normal	S84-400
4-1/2	20°	4	1-1/4	18	.500	Normal	S20-450-4
4-1/2	20°	5	1-3/4	23	.500	Normal	S20-450-5

S20 & S84 Series

DP 20° PA

Finishing
Non-Topping
Disc Type



2.25/DP=WD
20DP and finer - depth is 2.20/DP + .002

DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
5	20°	2	3/4	10	.450	Normal	S20-500-S
5	20°	2.4	3/4	12	.450	Normal	S20-500-SA
5	20°	3	1-1/4	15	.450	Normal	S20-500-3
5	20°	4	1-1/4	20	.450	Normal	S20-500-4
5	20°	5	1-3/4	25	.450	Normal	S20-500-5
5	20°	6	1-3/4	30	.450	Normal	S20-500-6
5	20°	8	4	40	.450	Normal	S84-500
5-1/2	20°	3	1-1/4	17	.409	Normal	S20-550-3
5-1/2	20°	4	1-1/4	22	.409	Normal	S20-550-4
6	20°	1.7	1/2	10	.375	Normal	S20-600-H
6	20°	2	3/4	12	.375	Normal	S20-600-S
6	20°	3	1-1/4	18	.375	Normal	S20-600-3
6	20°	4	1-1/4	24	.375	Normal	S20-600-4
6	20°	4	1-3/4	24	.375	Normal	S20-600-4L
6	20°	5	1-3/4	30	.375	Normal	S20-600-5
6	20°	6	1-3/4	36	.375	Normal	S20-600-6
6	20°	8	4	48	.375	Normal	S84-600
6-1/2	20°	4	1-1/4	26	.346	Normal	S20-650-4
7	20°	2	3/4	14	.321	Normal	S20-700-S
7	20°	3	1-1/4	21	.321	Normal	S20-700-3
7	20°	4	1-1/4	28	.321	Normal	S20-700-4
7	20°	4	1-3/4	28	.321	Normal	S20-700-4L
7	20°	5	1-3/4	35	.321	Normal	S20-700-5
7	20°	6	1-3/4	42	.321	Normal	S20-700-6
7-1/2	20°	4	1-1/4	30	.300	Normal	S20-750-4
8	20°	1.8	1/2	14	.281	Normal	S20-800-H
8	20°	1.9	3/4	15	.281	Normal	S20-800-S
8	20°	3	1-1/4	24	.281	Normal	S20-800-3
8	20°	3	1-1/4	24	.281	Precision	S20-800-3P
8	20°	4	1-1/4	32	.281	Normal	S20-800-4
8	20°	4	1-3/4	32	.281	Normal	S20-800-4L
8	20°	5	1-3/4	40	.281	Normal	S20-800-5
8	20°	6	1-3/4	48	.281	Normal	S20-800-6
8	20°	8	4	64	.281	Normal	S84-800

SERIES CONTINUED ON NEXT PAGE ->

S20 & S84 Series

DP 20° PA

Finishing
Non-Topping , Disc Type

DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
9	20°	3	1-1/4	27	.250	Normal	S20-900-3
9	20°	4	1-1/4	36	.250	Normal	S20-900-4
9	20°	4	1-3/4	36	.250	Normal	S20-900-4L
9	20°	5	1-3/4	45	.250	Normal	S20-900-5
9	20°	6	1-3/4	54	.250	Normal	S20-900-6
10	20°	1.6	1/2	16	.225	Normal	S20-010-H
10	20°	1.8	3/4	18	.225	Normal	S20-010-S
10	20°	3	1-1/4	30	.225	Normal	S20-010-3
10	20°	3	1-1/4	30	.225	Precision	S20-010-3P
10	20°	4	1-1/4	40	.225	Normal	S20-010-4
10	20°	4	1-1/4	40	.225	Precision	S20-010-4P
10	20°	4	1-3/4	40	.225	Normal	S20-010-4L
10	20°	5	1-3/4	50	.225	Normal	S20-010-5
10	20°	6	1-3/4	60	.225	Normal	S20-010-6
11	20°	1.5	1/2	16	.205	Normal	S20-011-H
11	20°	3	1-1/4	33	.205	Normal	S20-011-3
11	20°	4	1-1/4	44	.205	Normal	S20-011-4
11	20°	5	1-3/4	55	.205	Normal	S20-011-5
12	20°	1.5	1/2	18	.188	Normal	S20-012-H
12	20°	1.6	3/4	21	.188	Normal	S20-012-S
12	20°	2.0	3/4	24	.188	Normal	S20-012-SE
12	20°	3	1-1/4	36	.188	Normal	S20-012-3
12	20°	3	1-1/4	36	.188	Precision	S20-012-3P
12	20°	4	1-1/4	48	.188	Normal	S20-012-4
12	20°	4	1-1/4	48	.188	Precision	S20-012-4P
12	20°	4	1-3/4	48	.188	Normal	S20-012-4L
12	20°	5	1-3/4	60	.188	Normal	S20-012-5
12	20°	6	1-3/4	72	.188	Normal	S20-012-6
13	20°	3	1-1/4	39	.173	Normal	S20-013-3
13	20°	4	1-1/4	52	.173	Normal	S20-013-4
14	20°	1.7	1/2	24	.161	Normal	S20-014-H
14	20°	3	1-1/4	42	.161	Normal	S20-014-3
14	20°	3	1-1/4	42	.161	Precision	S20-014-3P
14	20°	4	1-1/4	56	.161	Normal	S20-014-4
14	20°	4	1-3/4	56	.161	Normal	S20-014-4L
14	20°	5	1-3/4	70	.161	Normal	S20-014-5
14	20°	6	1-3/4	84	.161	Normal	S20-014-6
15	20°	3	1-1/4	45	.150	Normal	S20-015-3
15	20°	4	1-1/4	60	.150	Normal	S20-015-4
16	20°	1.5	1/2	24	.141	Normal	S20-016-H
16	20°	1.5	1/2	24	.141	Precision	S20-016-HP
16	20°	1.75	1/2	28	.141	Normal	S20-016-HE

DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
16	20°	2	3/4	32	.141	Normal	S20-016-S
16	20°	3	1-1/4	48	.141	Normal	S20-016-3
16	20°	3	1-1/4	48	.141	Precision	S20-016-3P
16	20°	4	1-1/4	64	.141	Normal	S20-016-4
16	20°	5	1-3/4	80	.141	Normal	S20-016-5
16	20°	6	1-3/4	96	.141	Normal	S20-016-6
17	20°	3	1-1/4	51	.132	Normal	S20-017-3
17	20°	4	1-1/4	68	.132	Normal	S20-017-4
18	20°	1.5	1/2	26	.125	Normal	S20-018-H
18	20°	2	3/4	36	.125	Normal	S20-018-S
18	20°	3	1-1/4	54	.125	Normal	S20-018-3
18	20°	3	1-1/4	54	.125	Precision	S20-018-3P
18	20°	4	1-1/4	72	.125	Normal	S20-018-4
19	20°	3	1-1/4	57	.118	Normal	S20-019-3
19	20°	4	1-1/4	76	.118	Normal	S20-019-4
20	20°	1.5	1/2	30	.112	Normal	S20-020-H
20	20°	1.5	1/2	30	.112	Precision	S20-020-HP
20	20°	2	3/4	40	.112	Normal	S20-020-S
20	20°	3	1-1/4	60	.112	Normal	S20-020-3
20	20°	3	1-1/4	60	.112	Precision	S20-020-3P
20	20°	4	1-1/4	80	.112	Normal	S20-020-4
20	20°	4	1-3/4	80	.112	Normal	S20-020-4L
20	20°	5	1-3/4	100	.112	Normal	S20-020-5
20	20°	6	1-3/4	120	.112	Normal	S20-020-6
21	20°	3	1-1/4	63	.107	Normal	S20-021-3
21	20°	4	1-1/4	84	.107	Normal	S20-021-4
22	20°	1.5	1/2	33	.102	Normal	S20-022-H
22	20°	3	1-1/4	66	.102	Normal	S20-022-3
22	20°	4	1-1/4	88	.102	Normal	S20-022-4
24	20°	1.3	1/2	32	.094	Normal	S20-024-H
24	20°	1.5	1/2	36	.094	Normal	S20-024-HA
24	20°	3	1-1/4	72	.094	Normal	S20-024-3
24	20°	3	1-1/4	72	.094	Precision	S20-024-3P
24	20°	4	1-1/4	96	.094	Normal	S20-024-4
24	20°	5	1-3/4	120	.094	Normal	S20-024-5
24	20°	6	1-3/4	144	.094	Normal	S20-024-6
25	20°	3	1-1/4	75	.090	Normal	S20-025-3
26	20°	1.5	1/2	39	.087	Normal	S20-026-H
26	20°	3	1-1/4	78	.087	Normal	S20-026-3
26	20°	4	1-1/4	104	.087	Normal	S20-026-4
27	20°	3	1-1/4	80	.084	Normal	S20-027-3
28	20°	1.5	1/2	42	.081	Normal	S20-028-H

SERIES CONTINUED ON NEXT PAGE ->

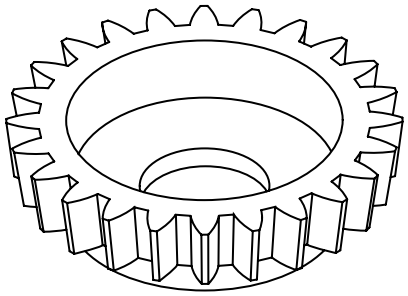
S20 Series

DP 20° PA

Finishing

Non-Topping

Disc Type



2.25/DP=WD

20DP and finer - depth is 2.20/DP + .002

DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
28	20°	3	1-1/4	84	.081	Normal	S20-028-3
28	20°	3	1-1/4	84	.081	Precision	S20-028-3P
28	20°	4	1-1/4	112	.081	Normal	S20-028-4
29	20°	3	1-1/4	87	.078	Normal	S20-029-3
30	20°	1.5	1/2	45	.075	Normal	S20-030-H
30	20°	3	1-1/4	90	.075	Normal	S20-030-3
30	20°	4	1-1/4	120	.075	Normal	S20-030-4
32	20°	1.25	1/2	40	.071	Normal	S20-032-H
32	20°	1.5	1/2	48	.071	Normal	S20-032-HA
32	20°	1.5	1/2	48	.071	Precision	S20-032-HAP
32	20°	3	1-1/4	96	.071	Normal	S20-032-3
32	20°	3	1-1/4	96	.071	Precision	S20-032-3P
32	20°	4	1-1/4	128	.071	Normal	S20-032-4
32	20°	5	1-3/4	160	.071	Normal	S20-032-5
36	20°	1.5	1/2	54	.063	Normal	S20-036-H
36	20°	1.5	1/2	54	.063	Precision	S20-036-HP
36	20°	3	1-1/4	108	.063	Normal	S20-036-3
36	20°	4	1-1/4	144	.063	Normal	S20-036-4
38	20°	3	1-1/4	112	.060	Normal	S20-038-3
40	20°	1.5	1/2	60	.057	Normal	S20-040-H
40	20°	3	1-1/4	120	.057	Normal	S20-040-3
40	20°	3	1-1/4	120	.057	Precision	S20-040-3P
42	20°	1.5	1/2	63	.054	Normal	S20-042-H
42	20°	3	1-1/4	126	.054	Normal	S20-042-3
48	20°	1.5	1/2	72	.048	Normal	S20-048-H
48	20°	1.5	1/2	72	.048	Precision	S20-048-HP
48	20°	3	1-1/4	144	.048	Normal	S20-048-3
48	20°	3	1-1/4	144	.048	Precision	S20-048-3P
48	20°	4	1-1/4	192	.048	Normal	S20-048-4
50	20°	1.5	1/2	75	.046	Normal	S20-050-H
56	20°	1.5	1/2	84	.041	Normal	S20-056-H
56	20°	3	1-1/4	168	.041	Normal	S20-056-3
64	20°	1.5	1/2	96	.036	Normal	S20-064-H
64	20°	1.5	1/2	96	.036	Precision	S20-064-HP
64	20°	3	1-1/4	192	.036	Normal	S20-064-3
64	20°	3	1-1/4	192	.036	Precision	S20-064-3P
64	20°	4	1-1/4	256	.036	Normal	S20-064-4
64	20°	4	1-1/4	256	.036	Precision	S20-064-4P
72	20°	1.5	1/2	108	.033	Normal	S20-072-H
72	20°	1.5	1/2	108	.033	Precision	S20-072-HP
72	20°	2.5	1-1/4	180	.033	Normal	S20-072-2
72	20°	3	1-1/4	216	.033	Normal	S20-072-3

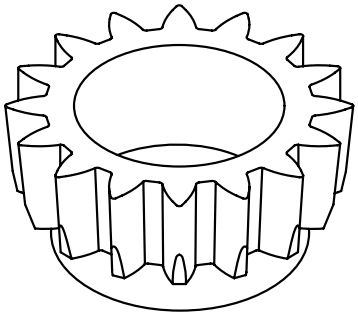
DP	PA	PD	Bore	No. Teeth	WD	Tolerance	Series
72	20°	3	1-1/4	216	.033	Precision	S20-072-3P
72	20°	4	1-1/4	288	.033	Normal	S20-072-4
80	20°	1.5	1/2	120	.030	Normal	S20-080-H
80	20°	1.5	1/2	120	.030	Precision	S20-080-HP
80	20°	2.6	1-1/4	208	.030	Normal	S20-080-2
80	20°	3	1-1/4	240	.030	Normal	S20-080-3
96	20°	1	1/2	96	.025	Normal	S20-096-HA
96	20°	1.5	1/2	144	.025	Normal	S20-096-H
96	20°	1.5	1/2	144	.025	Precision	S20-096-HP
96	20°	2.5	1-1/4	240	.025	Normal	S20-096-2
96	20°	3	1-1/4	288	.025	Normal	S20-096-3
96	20°	4	1-1/4	384	.025	Normal	S20-096-4
100	20°	1.5	1/2	150	.024	Normal	S20-0100-H
120	20°	1.5	1/2	180	.020	Normal	S20-0120-H
120	20°	1.5	1/2	180	.020	Precision	S20-0120-HP
120	20°	3	1-1/4	360	.020	Normal	S20-0120-3
180	20°	1.5	1/2	270	.014	Precision	S20-0180-HP
200	20°	1.5	1/2	300	.013	Precision	S20-200-HP

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
3	20°	4	1-1/4	12	.750	SDC20-300-4
3	20°	5	1-3/4	15	.750	SDC20-300-5
3-1/2	20°	4	1-1/4	14	.643	SDC20-350-4
3-1/2	20°	5.1	1-3/4	18	.643	SDC20-350-5
4	20°	3	1-1/4	12	.563	SDC20-400-3
4	20°	4	1-1/4	16	.563	SDC20-400-4
4	20°	5	1-3/4	20	.563	SDC20-400-5
4	20°	6	1-3/4	24	.563	SDC20-400-6
5	20°	2.4	3/4	12	.450	SDC20-500-S
5	20°	3	1-1/4	15	.450	SDC20-500-3
5	20°	4	1-1/4	20	.450	SDC20-500-4
5	20°	5	1-3/4	25	.450	SDC20-500-5
5	20°	6	1-3/4	30	.450	SDC20-500-6
6	20°	2	3/4	12	.375	SDC20-600-S
6	20°	3	1-1/4	18	.375	SDC20-600-3
6	20°	4	1-1/4	24	.375	SDC20-600-4
6	20°	5	1-3/4	30	.375	SDC20-600-5
7	20°	2	3/4	14	.321	SDC20-700-S
7	20°	3	1-1/4	21	.321	SDC20-700-3
7	20°	4	1-1/4	28	.321	SDC20-700-4
7	20°	5	1-3/4	35	.321	SDC20-700-5
8	20°	3	1-1/4	24	.281	SDC20-800-3
8	20°	4	1-1/4	32	.281	SDC20-800-4
8	20°	5	1-3/4	40	.281	SDC20-800-5
8	20°	6	1-3/4	48	.281	SDC20-800-6
9	20°	3	1-1/4	27	.250	SDC20-900-3
9	20°	4	1-1/4	36	.250	SDC20-900-4
10	20°	2	3/4	20	.225	SDC20-010-S
10	20°	3	1-1/4	30	.225	SDC20-010-3
10	20°	4	1-1/4	40	.225	SDC20-010-4
10	20°	5	1-3/4	50	.225	SDC20-010-5
11	20°	3	1-1/4	33	.205	SDC20-011-3
12	20°	1.8	3/4	21	.188	SDC20-012-S
12	20°	3	1-1/4	36	.188	SDC20-012-3
12	20°	4	1-1/4	48	.188	SDC20-012-4
12	20°	5	1-3/4	60	.188	SDC20-012-5
12	20°	6	1-3/4	72	.188	SDC20-012-6
14	20°	1.7	1/2	24	.161	SDC20-014-H
14	20°	3	1-1/4	42	.161	SDC20-014-3
16	20°	2	3/4	32	.141	SDC20-016-S
16	20°	3	1-1/4	48	.141	SDC20-016-3
16	20°	4	1-1/4	64	.141	SDC20-016-4
16	20°	5	1-3/4	80	.141	SDC20-016-5
20	20°	2	1/2	30	.113	SDC20-020-H
20	20°	1.5	3/4	30	.113	SDC20-020-S

SDC20 Series

DP 20° PA

Finishing
Non-Topping
Deep Counter Bore
Disc Type



2.25/DP=WD
20DP and finer - depth is 2.20/DP + .002

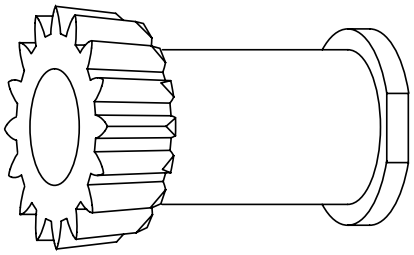
Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
20	20°	3	1-1/4	60	.113	SDC20-020-3
20	20°	4	1-1/4	80	.113	SDC20-020-4
24	20°	2	3/4	48	.094	SDC20-024-S
24	20°	3	1-1/4	72	.094	SDC20-024-3
24	20°	4	1-1/4	96	.094	SDC20-024-4
30	20°	2	1/2	45	.075	SDC20-030-H
30	20°	3	1-1/4	90	.075	SDC20-030-3
32	20°	2	1/2	64	.071	SDC20-032-H
32	20°	3	1-1/4	96	.071	SDC20-032-3
32	20°	4	1-1/4	128	.071	SDC20-032-4
36	20°	2	1/2	54	.063	SDC20-036-H
48	20°	1.5	1/2	72	.048	SDC20-048-H
48	20°	3	1-1/4	144	.048	SDC20-048-3
48	20°	4	1-1/4	192	.048	SDC20-048-4
56	20°	1.5	1/2	84	.041	SDC20-056-H
64	20°	2.5	1-1/4	160	.036	SDC20-064-3
72	20°	2.5	1-1/4	180	.033	SDC20-072-3

DP	PA	Pitch Dia.	Teeth	Approx. Height	WD	Series
6	20°	2	12	3	.375	SHB20-06-2
7	20°	2	14	3	.321	SHB20-07-2
8	20°	2	16	3	.281	SHB20-08-2
9	20°	2	18	3	.250	SHB20-09-2
10	20°	2	20	3	.225	SHB20-10-2
11	20°	2	22	3	.205	SHB20-11-2
12	20°	2	24	3	.188	SHB20-12-2
14	20°	2	28	3	.161	SHB20-14-2
16	20°	2	32	3	.141	SHB20-16-2
18	20°	2	36	3	.125	SHB20-18-2
20	20°	2	40	3	.112	SHB20-20-2
24	20°	2	48	3	.094	SHB20-24-2

SHB20 Series

DP 20° PA

Finishing
Non-Topping
Hub Type



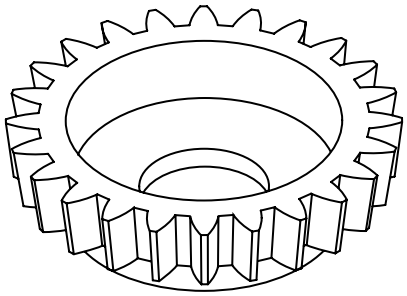
2.25/DP=WD
20DP and finer - depth is 2.20/DP + .002

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
2	20°	6	1-3/4	12	1.168	SR20-200-6
2-1/2	20°	5	1-3/4	13	.934	SR20-250-5
3	20°	4	1-1/4	12	.778	SR20-300-4
3	20°	5	1-3/4	15	.778	SR20-300-5
3	20°	6	1-3/4	18	.778	SR20-300-6
3-1/2	20°	4	1-1/4	14	.667	SR20-350-4
4	20°	3	1-1/4	12	.584	SR20-400-3
4	20°	4	1-1/4	16	.584	SR20-400-4
4-1/2	20°	4	1-1/4	18	.519	SR20-450-4
5	20°	3	1-1/4	15	.467	SR20-500-3
5	20°	4	1-1/4	20	.467	SR20-500-4
6	20°	3	1-1/4	18	.389	SR20-600-3
6	20°	4	1-1/4	24	.389	SR20-600-4
6	20°	5	1-3/4	30	.389	SR20-600-5
7	20°	5	1-3/4	35	.334	SR20-700-5
8	20°	3	1-1/4	24	.292	SR20-800-3
8	20°	4	1-1/4	32	.292	SR20-800-4
8	20°	5	1-3/4	40	.292	SR20-800-5
9	20°	3	1-1/4	27	.259	SR20-900-3
10	20°	3	1-1/4	30	.234	SR20-010-3
10	20°	4	1-1/4	40	.234	SR20-010-4
10	20°	5	1-3/4	50	.234	SR20-010-5
12	20°	3	1-1/4	36	.195	SR20-012-3
12	20°	4	1-1/4	48	.195	SR20-012-4
12	20°	5	1-3/4	60	.195	SR20-012-5
14	20°	3	1-1/4	42	.167	SR20-014-3
16	20°	3	1-1/4	48	.146	SR20-016-3
16	20°	4	1-1/4	64	.146	SR20-016-4
18	20°	3	1-1/4	54	.130	SR20-018-3
20	20°	3	1-1/4	60	.117	SR20-020-3
20	20°	4	1-1/4	80	.117	SR20-020-4
24	20°	3	1-1/4	72	.097	SR20-024-3
32	20°	3	1-1/4	96	.073	SR20-032-3

SR20 Series

Full Fillet 20° PA

Finishing
Non-Topping
Disc Type



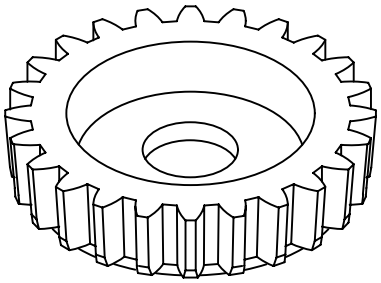
2.335/DP=WD

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
2.5	20°	5	1-3/4	13	.800	STBR20-250-5
3	20°	4	1-1/4	12	.667	STBR20-300-4
4	20°	4	1-1/4	16	.500	STBR20-400-4
5	20°	4	1-1/4	20	.400	STBR20-500-4
6	20°	4	1-1/4	24	.333	STBR20-600-4
8	20°	3	1-1/4	24	.250	STBR20-800-3
8	20°	4	1-1/4	32	.250	STBR20-800-4
9	20°	4	1-1/4	36	.222	STBR20-900-4
10	20°	3	1-1/4	30	.200	STBR20-010-3
10	20°	4	1-1/4	40	.200	STBR20-010-4
12	20°	3	1-1/4	36	.167	STBR20-012-3
12	20°	4	1-1/4	48	.167	STBR20-012-4
16	20°	3	1-1/4	48	.125	STBR20-016-3

STBR20 Series

AGMA Stub 20° PA

Full Fillet, Finishing
Non-Topping, Disc Type



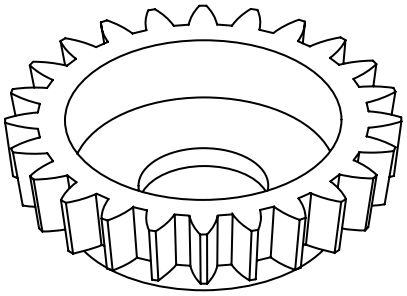
2.00/DP=WD
Addendum of the shaper tooth is 1.2/DP, the dedendum is 0.8/DP

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
5	20°	4	1-1/4	20	.450	STP20-500-4
6	20°	3	1-1/4	18	.375	STP20-600-3
6	20°	4	1-1/4	24	.375	STP20-600-4
6	20°	5	1 3/4	30	.375	STP20-600-5
7	20°	4	1-1/4	28	.321	STP20-700-4
8	20°	3	1-1/4	24	.281	STP20-800-3
8	20°	4	1-1/4	32	.281	STP20-800-4
9	20°	4	1-1/4	36	.250	STP20-900-4
10	20°	3	1-1/4	30	.225	STP20-010-3
10	20°	4	1-1/4	40	.225	STP20-010-4
10	20°	5	1-3/4	50	.225	STP20-010-5
12	20°	4	1-1/4	48	.188	STP20-012-4
14	20°	4	1-1/4	56	.161	STP20-014-4
16	20°	3	1-1/4	48	.141	STP20-016-3
16	20°	4	1-1/4	64	.141	STP20-016-4
20	20°	3	1-1/4	60	.112	STP20-020-3
20	20°	4	1-1/4	80	.112	STP20-020-4
20	20°	5	1-3/4	100	.112	STP20-020-5
24	20°	1.5	1/2	36	.094	STP20-024-H
24	20°	3	1-1/4	72	.094	STP20-024-3
26	20°	3	1-1/4	78	.087	STP20-026-3
30	20°	1.5	1/2	45	.075	STP20-030-H
30	20°	3	1-1/4	90	.075	STP20-030-3
32	20°	1.5	1/2	48	.071	STP20-032-H
32	20°	3	1-1/4	96	.071	STP20-032-3
36	20°	1.5	1/2	54	.063	STP20-036-H
40	20°	1.5	1/2	60	.057	STP20-040-H
48	20°	1.5	1/2	72	.048	STP20-048-H
48	20°	3	1-1/4	144	.048	STP20-048-3
64	20°	1.5	1/2	96	.036	STP20-064-H
64	20°	3	1-1/4	192	.036	STP20-064-3
72	20°	2.9	1-1/4	208	.033	STP20-072-3
80	20°	1.5	1/2	120	.030	STP20-080-H
96	20°	1.5	1/2	144	.025	STP20-096-H
96	20°	2.5	1-1/4	240	.025	STP20-096-2

STP20 Series

DP 20° PA

Finishing
Topping
Disc Type

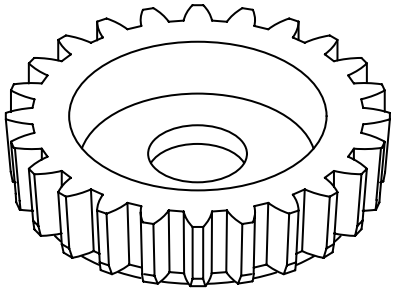


Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
1-1/4	20°	8.0	4	12	1.440	SG84-125
1-1/2	20°	8.0	4	13	1.200	SG84-150
1-3/4	20°	8.0	4	14	1.028	SG84-175
2	20°	4.5	1-1/4	9	.900	STB20-200-4
2	20°	5	1-3/4	10	.900	STB20-200-5
2	20°	6	1-3/4	12	.900	STB20-200-6
2	20°	8	4	16	.900	SG84-200
2-1/2	20°	4	1-1/4	10	.720	STB20-250-4
2-1/2	20°	5	1-3/4	13	.720	STB20-250-5
2-1/2	20°	6	1-3/4	15	.720	STB20-250-6
2-1/2	20°	8	4	20	.720	SG84-250
3	20°	4	1-1/4	12	.600	STB20-300-4
3	20°	5	1-3/4	15	.600	STB20-300-5
3	20°	6	1-3/4	18	.600	STB20-300-6
3	20°	8	4	24	.600	SG84-300
3-1/2	20°	4	1-1/4	14	.514	STB20-350-4
3-1/2	20°	5.1	1-3/4	18	.514	STB20-350-5
3-1/2	20°	6	1-3/4	21	.514	STB20-350-6
3-1/2	20°	8	4	28	.514	SG84-350
4	20°	3	1-1/4	12	.450	STB20-400-3
4	20°	4	1-1/4	16	.450	STB20-400-4
4	20°	5	1-3/4	20	.450	STB20-400-5
4	20°	8	4	32	.450	SG84-400
5	20°	4	1-1/4	20	.360	STB20-500-4
5	20°	5	1-3/4	25	.360	STB20-500-5
5	20°	8	4	40	.360	SG84-500
6	20°	3	1-1/4	18	.300	STB20-600-3
6	20°	4	1-1/4	24	.300	STB20-600-4
6	20°	5	1-3/4	30	.300	STB20-600-5
7	20°	3	1-1/4	21	.257	STB20-700-3
7	20°	4	1-1/4	28	.257	STB20-700-4
7	20°	5	1-3/4	35	.257	STB20-700-5
8	20°	3	1-1/4	24	.225	STB20-800-3
8	20°	4	1-1/4	32	.225	STB20-800-4
8	20°	5	1-3/4	40	.225	STB20-800-5
8	20°	6	1-3/4	48	.225	STB20-800-6
9	20°	4	1-1/4	36	.200	STB20-900-4
10	20°	4	1-1/4	40	.180	STB20-010-4
12	20°	2	3/4	21	.150	STB20-012-S
12	20°	3	1-1/4	36	.150	STB20-012-3
14	20°	3	1-1/4	42	.129	STB20-014-3
16	20°	3	1-1/4	48	.113	STB20-016-3

STB20 & SG84 Series

AGMA STUB DP 20° PA

Finishing
Non-Topping
Disc Type



1.80/DP=WD

Finer pitch AGMA stubs can be furnished by "topping" stock cutters.

The AGMA stub tooth has a 20° pressure angle with an addendum & dedendum shorter than the conventional full depth tooth.

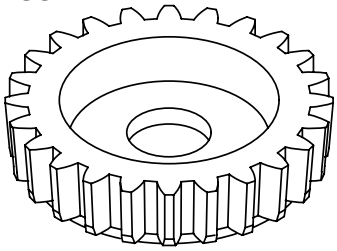
The addendum is .8/DP & the dedendum is 1/DP. Thus the tooth is shorter & stronger.

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
3/4	20°	2.3	3/4	7	.563	Disc	STF20-300-S
3/4	20°	4	1-1/4	12	.563	Disc	STF20-300-4
3/4	20°	5	1-3/4	15	.563	Disc	STF20-300-5
3/4	20°	6	1-3/4	18	.563	Disc	STF20-300-6
3/4	20°	6.7	1-3/4	20	.563	Disc	STF20-300-6E
4/5	20°	2	3/4	8	.450	Disc	STF20-400-S
4/5	20°	3	3/4	10	.450	Disc	STF20-400-SE
4/5	20°	3	1-1/4	12	.450	Disc	STF20-400-3
4/5	20°	3	1-1/4	12	.450	Deep C Bore	SDF20-400-3
4/5	20°	4	1-1/4	16	.450	Disc	STF20-400-4
4/5	20°	4	1-1/4	16	.450	Deep C Bore	SDF20-400-4
4/5	20°	4	1-3/4	16	.450	Disc	STF20-400-4L
4/5	20°	5	1-1/4	18	.450	Deep C Bore	SDF20-400-4E
4/5	20°	5	1-3/4	20	.450	Disc	STF20-400-5
4/5	20°	5	1-3/4	20	.450	Deep C Bore	SDF20-400-5
4/5	20°	6	1-3/4	24	.450	Disc	STF20-400-6
4/5	20°	6	1-3/4	24	.450	Deep C Bore	SDF20-400-6
5/7	20°	2	3/4	10	.321	Disc	STF20-500-S
5/7	20°	3	1-1/4	15	.321	Disc	STF20-500-3
5/7	20°	4	1-1/4	20	.321	Disc	STF20-500-4
5/7	20°	4	1-1/4	20	.321	Deep C Bore	SDF20-500-4
5/7	20°	4	1-3/4	20	.321	Disc	STF20-500-4L
5/7	20°	5	1-3/4	25	.321	Disc	STF20-500-5
5/7	20°	6	1-3/4	30	.321	Disc	STF20-500-6
6/8	20°	1.7	1/2	10	.281	Disc	STF20-600-H
6/8	20°	2	3/4	12	.281	Disc	STF20-600-S
6/8	20°	3	1-1/4	18	.281	Disc	STF20-600-3
6/8	20°	3	1-1/4	18	.281	Deep C Bore	SDF20-600-3
6/8	20°	4	1-1/4	24	.281	Disc	STF20-600-4
6/8	20°	4	1-1/4	24	.281	Deep C Bore	SDF20-600-4
6/8	20°	4	1-3/4	24	.281	Disc	STF20-600-4L
6/8	20°	5	1-3/4	30	.281	Disc	STF20-600-5
6/8	20°	5	1-3/4	30	.281	Deep C Bore	SDF20-600-5
6/8	20°	6	1-3/4	36	.281	Disc	STF20-600-6
6/8	20°	6	1-3/4	36	.281	Deep C Bore	SDF20-600-6
7/9	20°	2	1/2	14	.250	Disc	STF20-700-H
7/9	20°	3	1-1/4	21	.250	Disc	STF20-700-3
7/9	20°	3	1-1/4	21	.250	Deep C Bore	SDF20-700-3
7/9	20°	4	1-1/4	28	.250	Disc	STF20-700-4
7/9	20°	4	1-1/4	28	.250	Deep C Bore	SDF20-700-4
7/9	20°	5	1-3/4	35	.250	Disc	STF20-700-5
8/10	20°	1.8	1/2	14	.225	Disc	STF20-800-H
8/10	20°	1.8	3/4	14	.225	Disc	STF20-800-S
8/10	20°	3	1-1/4	24	.225	Disc	STF20-800-3
8/10	20°	3	1-1/4	24	.225	Deep C Bore	SDF20-800-3
8/10	20°	4	1-1/4	32	.225	Disc	STF20-800-4
8/10	20°	4	1-1/4	32	.225	Deep C Bore	SDF20-800-4
8/10	20°	5	1-3/4	40	.225	Disc	STF20-800-5
8/10	20°	5	1-3/4	40	.225	Deep C Bore	SDF20-800-5

STF20 & SDF20 Series

Combination Pitch
Stub 20° PA

Finishing
Non-Topping
Disc Type



2.25/DPd*=WD

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
8/10	20°	6	1-3/4	48	.225	Disc	STF20-800-6
8/10	20°	6	1-3/4	48	.225	Deep C Bore	SDF20-800-6
9/11	20°	1.8	1/2	16	.205	Disc	STF20-900-H
9/11	20°	3	1-1/4	27	.205	Disc	STF20-900-3
9/11	20°	4	1-1/4	36	.205	Disc	STF20-900-4
10/12	20°	1.8	1/2	18	.188	Disc	STF20-010-H
10/12	20°	2	3/4	20	.188	Disc	STF20-010-S
10/12	20°	3	1-1/4	30	.188	Disc	STF20-010-3
10/12	20°	3	1-1/4	30	.188	Deep C Bore	SDF20-010-3
10/12	20°	4	1-1/4	40	.188	Disc	STF20-010-4
10/12	20°	4	1-1/4	40	.188	Deep C Bore	SDF20-010-4
10/12	20°	4	1-3/4	40	.188	Disc	STF20-010-4L
10/12	20°	5	1-3/4	50	.188	Disc	STF20-010-5
10/12	20°	5	1-3/4	50	.188	Deep C Bore	SDF20-010-5
12/14	20°	1.7	1/2	20	.161	Disc	STF20-012-H
12/14	20°	1.8	3/4	21	.161	Disc	STF20-012-S
12/14	20°	2.0	3/4	24	.161	Disc	STF20-012-SE
12/14	20°	2.0	3/4	24	.161	Deep C Bore	SDF20-012-SE
12/14	20°	3	1-1/4	36	.161	Disc	STF20-012-3
12/14	20°	3	1-1/4	36	.161	Deep C Bore	SDF20-012-3
12/14	20°	4	1-1/4	48	.161	Disc	STF20-012-4
12/14	20°	5	1-3/4	60	.161	Disc	STF20-012-5
14/18	20°	1.5	1/2	21	.125	Disc	STF20-014-H
14/18	20°	3	1-1/4	42	.125	Disc	STF20-014-3
14/18	20°	3	1-1/4	42	.125	Deep C Bore	SDF20-014-3
14/18	20°	4	1-1/4	56	.125	Disc	STF20-014-4
16/21	20°	1.4	1/2	22	.107	Disc	STF20-016-H
16/21	20°	2	3/4	32	.107	Disc	STF20-016-S
16/21	20°	2	3/4	32	.107	Deep C Bore	SDF20-016-S
16/21	20°	3	1-1/4	48	.107	Disc	STF20-016-3
16/21	20°	3	1-1/4	48	.107	Deep C Bore	SDF20-016-3
16/21	20°	4	1-1/4	64	.107	Disc	STF20-016-4
20/26	20°	2	3/4	40	.087	Deep C Bore	SDF20-020-S
20/26	20°	4	1-1/4	80	.087	Disc	STF20-020-4

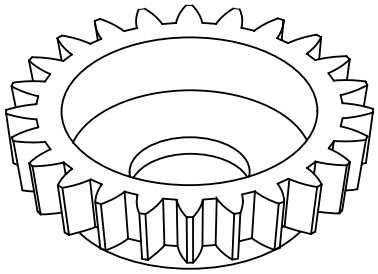
*DENOMINATOR OF SPLIT PITCH
The combination pitch (stub tooth) has a 20˚ pressure angle with a shorter addendum & dedendum. The stub tooth is expressed as a fraction. The numerator of the fraction is used to determine the pitch diameter, circular pitch and the tooth thickness. The denominator determines the addendum, dedendum, clearance and the depth of the tooth. Other sizes and finer pitch cutters can be furnished by "topping" standard stock cutters.

SPS20 Series

DP 20° PA Pre-Shave

Non-Topping

Disc Type



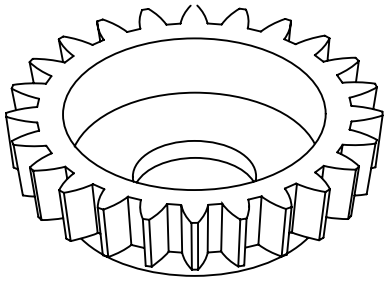
DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx")	Protuberance Approx.	Series
4	20°	4	1-1/4	16	.588	.004	.002	SPS20-400-4
5	20°	4	1-1/4	20	.490	.003	.002	SPS20-500-4
5	20°	5	1-3/4	25	.490	.003	.002	SPS20-500-5
6	20°	3	1-1/4	18	.408	.003	.002	SPS20-600-3
6	20°	4	1-1/4	24	.408	.003	.002	SPS20-600-4
6	20°	5	1-3/4	30	.408	.003	.002	SPS20-600-5
7	20°	4	1-1/4	28	.350	.003	.002	SPS20-700-4
8	20°	4	1-1/4	32	.306	.003	.001	SPS20-800-4
9	20°	4	1-1/4	36	.272	.003	.001	SPS20-900-4
10	20°	4	1-1/4	40	.245	.003	.001	SPS20-010-4
12	20°	3	1-1/4	36	.204	.003	.001	SPS20-012-3
12	20°	4	1-1/4	48	.204	.003	.001	SPS20-012-4
14	20°	3	1-1/4	42	.175	.003	.001	SPS20-014-3
16	20°	3	1-1/4	48	.153	.002	.001	SPS20-016-3
16	20°	4	1-1/4	64	.153	.002	.001	SPS20-016-4
18	20°	3	1-1/4	54	.133	.002	.001	SPS20-018-3E
20	20°	4	1-1/4	80	.122	.002	.000	SPS20-020-4
24	20°	3	1-1/4	72	.102	.002	.000	SPS20-024-3
32	20°	3	1-1/4	96	.077	.001	.000	SPS20-032-3
48	20°	3	1-1/4	144	.052	.001	.000	SPS20-048-3

SPG20 & SPGN20 Series

DP 20° PA Pre-Grind

Non-Topping

Disc Type



2.35/DP=WD

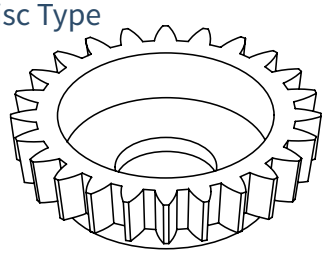
DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx ")	Protuberance Approx.	Series
3	20°	6	1-3/4	18	.783	.010	.006	SPG20-300-6
4	20°	4	1-1/4	16	.588	.010	.008	SPG20-400-4
4	20°	4	1-1/4	16	.588	.010	.000	SPGN20-400-4
4	20°	5	1-3/4	20	.588	.010	.008	SPG20-400-5
5	20°	4	1-1/4	20	.470	.011	.006	SPG20-500-4
6	20°	4	1-1/4	24	.392	.011	.006	SPG20-600-4
8	20°	4	1-1/4	32	.294	.011	.006	SPG20-800-4
9	20°	4	1-1/4	36	.261	.011	.006	SPG20-900-4
10	20°	4	1-1/4	40	.235	.011	.006	SPG20-010-4
10	20°	4	1-1/4	40	.235	.010	.000	SPGN20-010-4
12	20°	4	1-1/4	48	.196	.010	.007	SPG20-012-4
14	20°	4	1-1/4	56	.168	.010	.005	SPG20-014-4
14	20°	4	1-1/4	56	.168	.010	.000	SPGN20-014-4
16	20°	3	1-1/4	48	.147	.007	.005	SPG20-016-3
16	20°	4	1-1/4	64	.147	.007	.005	SPG20-016-4
16	20°	4	1-1/4	64	.147	.007	.000	SPGN20-016-4
20	20°	3	1-1/4	60	.122	.007	.000	SPG20-020-3
20	20°	4	1-1/4	80	.122	.007	.000	SPG20-020-4
24	20°	3	1-1/4	72	.102	.005	.000	SPG20-024-3
32	20°	3	1-1/4	96	.077	.005	.000	SPG20-032-3

S22 Series

DP 22.5° PA

Finishing, Non-Topping

Disc Type



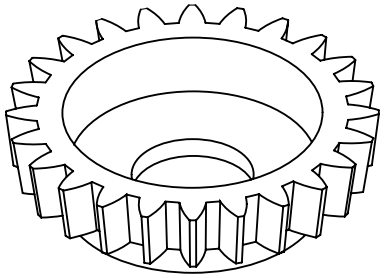
2.25/DP=WD

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
4	22.5°	4	1-1/4	16	.563	S22-400-4
5	22.5°	4	1-1/4	20	.450	S22-500-4
6	22.5°	4	1-1/4	24	.375	S22-600-4
7	22.5°	3	1-1/4	21	.321	S22-700-3
8	22.5°	4	1-1/4	32	.281	S22-800-4
9	22.5°	3	1-1/4	28	.250	S22-900-3
10	22.5°	3	1-1/4	30	.225	S22-010-3
11	22.5°	3	1-1/4	33	.205	S22-011-3
12	22.5°	3	1-1/4	36	.188	S22-012-3
13	22.5°	3	1-1/4	39	.173	S22-013-3
20	22.5°	3	1-1/4	60	.112	S22-020-3

S25 & SDC25 Series

DP 25° PA

Finishing
Non-Topping
Disc Type



2.25/DP=WD
20DP & finer - depth is 2.20/DP + .002

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
1-1/2	25°	7.3	1-3/4	11	1.500	Disc	S25-150-7
2	25°	4.5	1-1/4	9	1.125	Disc	S25-200-4
2	25°	6	1-3/4	12	1.125	Disc	S25-200-6
2	25°	7.5	1-3/4	15	1.125	Disc	S25-200-7
2-1/2	25°	5	1-3/4	13	.900	Disc	S25-250-5
2-1/2	25°	6	1-3/4	15	.900	Disc	S25-250-6
3	25°	4	1-1/4	12	.750	Disc	S25-300-4
3	25°	5	1-3/4	15	.750	Disc	S25-300-5
3	25°	6	1-3/4	18	.750	Disc	S25-300-6
3-1/2	25°	4	1-1/4	14	.643	Disc	S25-350-4
3-1/2	25°	5.1	1-3/4	18	.643	Disc	S25-350-5
3-1/2	25°	6	1-3/4	21	.643	Disc	S25-350-6
4	25°	2.3	3/4	9	.563	Disc	S25-400-S
4	25°	3	1-1/4	12	.563	Disc	S25-400-3
4	25°	4	1-1/4	16	.563	Disc	S25-400-4
4	25°	4	1-1/4	16	.563	Deep C Bore	SDC25-400-4
4	25°	5	1-3/4	20	.563	Disc	S25-400-5
4	25°	6	1-3/4	24	.563	Disc	S25-400-6
4-1/2	25°	4	1-1/4	18	.500	Disc	S25-450-4
4-1/2	25°	5.1	1-3/4	23	.500	Disc	S25-450-5
5	25°	2	3/4	10	.450	Disc	S25-500-S
5	25°	3	1-1/4	15	.450	Disc	S25-500-3
5	25°	4	1-1/4	20	.450	Disc	S25-500-4
5	25°	4	1-1/4	20	.450	Deep C Bore	SDC25-500-4
5	25°	5	1-3/4	25	.450	Disc	S25-500-5
5	25°	6	1-3/4	30	.450	Disc	S25-500-6
5-1/2	25°	4	1-1/4	22	.409	Disc	S25-550-4
6	25°	2	3/4	12	.375	Disc	S25-600-S
6	25°	3	1-1/4	18	.375	Disc	S25-600-3
6	25°	4	1-1/4	24	.375	Disc	S25-600-4
6	25°	4	1-1/4	24	.375	Deep C Bore	SDC25-600-4
6	25°	5	1-3/4	30	.375	Disc	S25-600-5
6-1/2	25°	4	1-1/4	26	.346	Disc	S25-650-4
7	25°	4	1-1/4	28	.321	Disc	S25-700-4
7	25°	5	1-3/4	35	.321	Disc	S25-700-5
8	25°	1.8	1/2	14	.281	Disc	S25-800-H
8	25°	1.9	3/4	15	.281	Disc	S25-800-S
8	25°	3	1-1/4	24	.281	Disc	S25-800-3
8	25°	3	1-1/4	24	.281	Deep C Bore	SDC25-800-3
8	25°	4	1-1/4	32	.281	Disc	S25-800-4
8	25°	4	1-1/4	32	.281	Deep C Bore	SDC25-800-4
8	25°	5	1-3/4	40	.281	Disc	S25-800-5
9	25°	3	1-1/4	27	.250	Disc	S25-900-3
9	25°	3	1-1/4	27	.250	Deep C Bore	SDC25-900-3
9	25°	4	1-1/4	36	.250	Disc	S25-900-4
10	25°	1.6	1/2	16	.225	Disc	S25-010-H
10	25°	2	3/4	20	.225	Disc	S25-010-S
10	25°	3	1-1/4	30	.225	Disc	S25-010-3
10	25°	3	1-1/4	30	.225	Deep C Bore	SDC25-010-3
10	25°	4	1-1/4	40	.225	Disc	S25-010-4
10	25°	4	1-1/4	40	.225	Deep C Bore	SDC25-010-4
10	25°	5	1-3/4	50	.225	Disc	S25-010-5

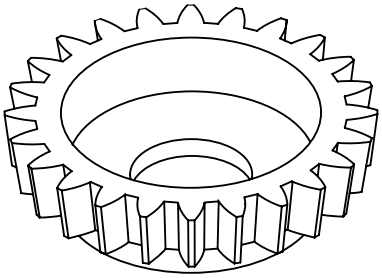
SERIES CONTINUED ON NEXT PAGE ->

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
10	25°	6	1-3/4	60	.225	Disc	S25-010-6
11	25°	3	1-1/4	33	.205	Disc	S25-011-3
12	25°	1.5	1/2	18	.188	Disc	S25-012-H
12	25°	3	1-1/4	36	.188	Disc	S25-012-3
12	25°	3	1-1/4	36	.188	Deep C Bore	SDC25-012-3
12	25°	4	1-1/4	48	.188	Disc	S25-012-4
12	25°	5	1-3/4	60	.188	Disc	S25-012-5
12	25°	6	1-3/4	72	.188	Disc	S25-012-6
13	25°	3	1-1/4	39	.173	Disc	S25-013-3
14	25°	1.7	1/2	24	.161	Disc	S25-014-H
14	25°	3	1-1/4	42	.161	Disc	S25-014-3
14	25°	3	1-1/4	42	.161	Deep C Bore	SDC25-014-3
14	25°	4	1-1/4	56	.161	Disc	S25-014-4
14	25°	5	1-3/4	70	.161	Disc	S25-014-5
16	25°	1.5	1/2	24	.141	Disc	S25-016-H
16	25°	2	3/4	32	.141	Disc	S25-016-S
16	25°	3	1-1/4	48	.141	Disc	S25-016-3
16	25°	3	1-1/4	48	.141	Deep C Bore	SDC25-016-3
16	25°	4	1-1/4	64	.141	Disc	S25-016-4
18	25°	1.4	1/2	26	.125	Disc	S25-018-H
18	25°	3	1-1/4	54	.125	Disc	S25-018-3
18	25°	3	1-1/4	54	.125	Deep C Bore	SDC25-018-3
18	25°	4	1-1/4	72	.125	Disc	S25-018-4
20	25°	1.5	1/2	30	.112	Disc	S25-020-H
20	25°	1.5	1/2	30	.112	Deep C Bore	SDC25-020-H
20	25°	3	1-1/4	60	.112	Disc	S25-020-3
20	25°	3	1-1/4	60	.112	Deep C Bore	SDC25-020-3
22	25°	3	1-1/4	66	.102	Disc	S25-022-3
24	25°	1.5	1/2	36	.094	Disc	S25-024-HA
24	25°	3	1-1/4	72	.094	Disc	S25-024-3
24	25°	3	1-1/4	72	.094	Deep C Bore	SDC25-024-3
24	25°	4	1-1/4	96	.094	Disc	S25-024-4
26	25°	3	1-1/4	78	.087	Disc	S25-026-3
28	25°	1.5	1/2	42	.084	Disc	S25-028-H
28	25°	3	1-1/4	84	.084	Disc	S25-028-3
30	25°	1.5	1/2	45	.075	Deep C Bore	SDC25-030-H
30	25°	3	1-1/4	90	.075	Disc	S25-030-3
32	25°	1.5	1/2	48	.071	Disc	S25-032-HA
32	25°	3	1-1/4	96	.071	Deep C Bore	SDC25-032-3
32	25°	3	1-1/4	96	.071	Disc	S25-032-3
32	25°	4	1-1/4	128	.071	Disc	S25-032-4
36	25°	1.5	1/2	54	.063	Disc	S25-036-H
36	25°	2	3/4	72	.063	Disc	S25-036-2
40	25°	1.5	1/2	60	.057	Disc	S25-040-H
40	25°	1.7	1/2	68	.057	Deep C Bore	SDC25-040H
40	25°	3	1-1/4	120	.057	Disc	S25-040-3
44	25°	1.5	1/2	66	.051	Disc	S25-044-H
48	25°	1.5	1/2	72	.048	Disc	S25-048-H
48	25°	3	1-1/4	120	.047	Disc	S25-048-2E
48	25°	3	1-1/4	144	.048	Disc	S25-048-3
64	25°	1.5	1/2	96	.036	Disc	S25-064-H

S25 & SDC25 Series

DP 25° PA

Finishing
Non-Topping
Disc Type



2.25/DP=WD
20DP & finer - depth is 2.20/DP + .002

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
6	25°	5	1-3/4	30	.375	STP25-600-5

STP25 Series

DP 25° PA

Finishing, Topping

Disc Type

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
2	25°	6	1-3/4	12	1.168	SR25-200-6
2-1/4	25°	6	1-3/4	12	1.038	SR25-225-6
2-1/2	25°	5	1-3/4	13	.934	SR25-250-5
3	25°	4	1-1/4	12	.778	SR25-300-4
3-1/2	25°	4.8	1-3/4	17	.667	SR25-350-5E
3-1/2	25°	5	1-3/4	18	.667	SR25-350-5
4	25°	4	1-1/4	16	.584	SR25-400-4
4	25°	5	1-3/4	20	.584	SR25-400-5
4-1/2	25°	4	1-1/4	18	.519	SR25-450-4
5	25°	4	1-1/4	20	.467	SR25-500-4
6	25°	4	1-1/4	24	.389	SR25-600-4
7	25°	4	1-1/4	28	.334	SR25-700-4
8	25°	4	1-1/4	32	.292	SR25-800-4
8	25°	5	1-3/4	40	.292	SR25-800-5
10	25°	3	1-1/4	30	.234	SR25-010-3
10	25°	4	1-1/4	40	.234	SR25-010-4
12	25°	3	1-1/4	36	.195	SR25-012-3
16	25°	3	1-1/4	48	.146	SR25-016-3
16	25°	4	1-1/4	64	.146	SR25-016-4
20	25°	4	1-1/4	80	.117	SR25-020-4

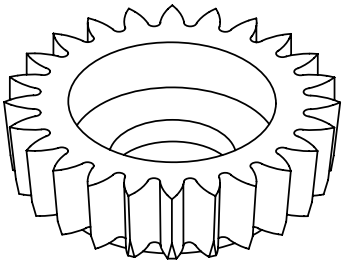
SR25 Series

Full Fillet DP 25° PA

Finishing

Non-Topping

Disc Type



2.335/DP=WD

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx")	Protuberance Approx.	Series
4	25°	4	1-1/4	16	.575	.004	.002	SPS25-400-4
5	25°	4	1-1/4	20	.460	.003	.002	SPS25-500-4
10	25°	4	1-1/4	40	.240	.003	.001	SPS25-010-4
16	25°	3	1-1/4	48	.150	.002	.001	SPS25-016-3
20	25°	3	1-1/4	60	.122	.002	.000	SPS25-020-3
24	25°	3	1-1/4	72	.102	.002	.000	SPS25-024-3

SPS25 Series

DP 25° PA

Pre-Shave, Non-Topping

Disc Type

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx")	Protuberance Approx.	Series
1-1/2	25°	7.3	1-3/4	11	1.500	.018	.011	SPG25-150-7
4	25°	4	1-1/4	16	.588	.010	.008	SPG25-400-4
6	25°	4	1-1/4	24	.383	.011	.006	SPG25-600-4E
6	25°	6	1-3/4	36	.392	.011	.006	SPG25-600-6
8	25°	4	1-1/4	32	.306	.011	.006	SPG25-800-4E
12	25°	4	1-1/4	48	.196	.010	.006	SPG25-012-4
16	25°	3	1-1/4	48	.156	.007	.005	SPG25-016-3

SPG25 Series

DP 25° PA

Pre-Grind

Non-Topping

Disc Type

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
16	15.3°	4	1-1/4	64	.141	SFC15-016-4

SFC15 Series

DP 15.3° PA

Fellows Tri-Lobe Gear Cutters

Finishing

Non-Topping

Disc Type

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
4	25°	4	1-1/4	16	.563	S28-400-4
5	25°	4	1-1/4	20	.450	S28-500-4
6	25°	4	1-1/4	24	.375	S28-600-4
7	25°	3	1-1/4	21	.296	S28-700-3
8	25°	3	1-1/4	24	.281	S28-800-3
10	25°	3	1-1/4	30	.225	S28-010-3E

S28 Series

DP 28° PA

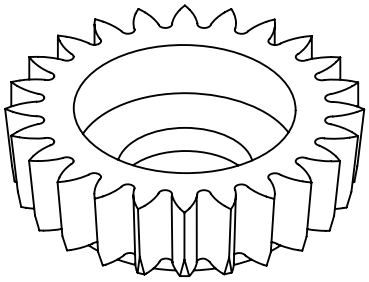
Finishing
Non-Topping
Disc Type

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
4	30°	4	1-1/4	16	.539	S30-400-4
5	30°	3	1-1/4	15	.431	S30-500-3
5	30°	4	1-1/4	20	.431	S30-500-4
6	30°	3	1-1/4	18	.360	S30-600-3
6	30°	4	1-1/4	24	.360	S30-600-4
7	30°	3	1-1/4	21	.308	S30-700-3
8	30°	3	1-1/4	24	.270	S30-800-3
8	30°	4	1-1/4	32	.270	S30-800-4
10	30°	3	1-1/4	30	.216	S30-010-3
10	30°	4	1-1/4	40	.216	S30-010-4
12	30°	3	1-1/4	36	.180	S30-012-3
12	30°	4	1-1/4	48	.180	S30-012-4
16	25°	3	1-1/4	48	.135	S30-016-3

S30 Series

DP 30° PA

Finishing
Non-Topping
Disc Type



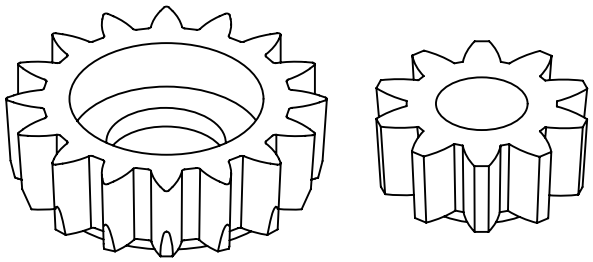
2.157/DP=WD

DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
2.5/5	30°	5	1-3/4	13	.560	Disc	SFF30-250-5
2.5/5	30°	6	1-3/4	15	.560	Disc	SFF30-250-6
3/6	30°	3	3/4	9	.467	Disc	SFF30B-03-9S
3/6	30°	3	1-1/4	9	.467	Disc	SFF30-300-3
3/6	30°	4	1-1/4	12	.467	Disc	SFF30-300-4
3/6	30°	4	1-1/4	12	.467	Deep C Bore	SDF30-300-4
3/6	30°	5	1-3/4	15	.467	Disc	SFF30-300-5
3/6	30°	6	1-3/4	18	.467	Disc	SFF30-300-6
4/8	30°	1.5	1/2	6	.350	Disc	SFF30B-04-6H
4/8	30°	2	1/2	8	.350	Disc	SFF30B-04-8H
4/8	30°	2	3/4	8	.350	Deep C Bore	SDF30B-04-8S
4/8	30°	2.3	3/4	9	.350	Disc	SFF30B-04-9S
4/8	30°	3	1-1/4	12	.350	Disc	SFF30-400-3
4/8	30°	3	1-1/4	12	.350	Deep C Bore	SDF30-400-3
4/8	30°	4	1-1/4	16	.350	Disc	SFF30-400-4
4/8	30°	4	1-1/4	16	.350	Deep C Bore	SDF30-400-4
4/8	30°	5	1-3/4	20	.350	Disc	SFF30-400-5
4/8	30°	6	1-3/4	24	.350	Disc	SFF30-400-6
5/10	30°	1.6	1/2	8	.280	Disc	SFF30B-05-8H
5/10	30°	1.8	3/4	9	.280	Disc	SFF30B-05-9S
5/10	30°	2.0	3/4	10	.280	Disc	SFF30B-05-10S
5/10	30°	3	1-1/4	15	.280	Disc	SFF30-500-3

SFF30, SFF30B SDF30 & SDF30B Series

Full Fillet DP 30° PA

Involute Spline
Non-Chamfering
Disc & Button Type



ANSI B92.1-1970/6
For chamfering full fillet inquire on SCF30 series.

SERIES CONTINUED ON NEXT PAGE ->

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
5/10	30°	3	1-1/4	15	.280	Deep C Bore	SDF30-500-3
5/10	30°	4	1-1/4	20	.280	Disc	SFF30-500-4
5/10	30°	5	1-3/4	25	.280	Disc	SFF30-500-5
5/10	30°	6	1-3/4	30	.280	Disc	SFF30-500-6
6/12	30°	1.5	1/2	9	.233	Disc	SFF30B-06-9H
6/12	30°	2	3/4	12	.233	Disc	SFF30B-06-12S
6/12	30°	3	1-1/4	18	.233	Disc	SFF30-600-3
6/12	30°	3	1-1/4	18	.233	Deep C Bore	SDF30-600-3
6/12	30°	4	1-1/4	24	.233	Disc	SFF30-600-4
6/12	30°	4	1-1/4	24	.233	Deep C Bore	SDF30-600-4
6/12	30°	5	1-3/4	30	.233	Disc	SFF30-600-5
6/12	30°	6	1-3/4	36	.233	Disc	SFF30-600-6
7/16	30°	4	1-1/4	28	.175	Disc	SFF30-700-4
8/16	30°	1.5	1/2	12	.175	Disc	SFF30B-08-12H
8/16	30°	1.8	3/4	14	.175	Disc	SFF30B-08-14S
8/16	30°	2	3/4	16	.175	Disc	SFF30B-08-16S
8/16	30°	3	1-1/4	24	.175	Disc	SFF30-800-3
8/16	30°	3	1-1/4	24	.175	Deep C Bore	SDF30-800-3
8/16	30°	4	1-1/4	32	.175	Disc	SFF30-800-4
8/16	30°	4	1-1/4	32	.175	Deep C Bore	SDF30-800-4
8/16	30°	5	1-3/4	40	.175	Disc	SFF30-800-5
8/16	30°	5	1-3/4	40	.175	Deep C Bore	SDF30-800-5
8/16	30°	6	1-3/4	48	.175	Disc	SFF30-800-6
10/20	30°	1.4	1/2	14	.140	Disc	SFF30B-10-14H
10/20	30°	1.5	3/4	15	.140	Disc	SFF30B-10-15S
10/20	30°	1.8	3/4	18	.140	Disc	SFF30B-10-18S
10/20	30°	1.8	3/4	18	.140	Deep C Bore	SDF30B-10-18S
10/20	30°	2.4	3/4	24	.140	Disc	SFF30B-10-24S
10/20	30°	3	1-1/4	30	.140	Disc	SFF30-010-3
10/20	30°	3	1-1/4	30	.140	Deep C Bore	SDF30-010-3
10/20	30°	4	1-1/4	40	.140	Disc	SFF30-010-4
10/20	30°	4	1-1/4	40	.140	Deep C Bore	SDF30-010-4
10/20	30°	5	1-3/4	50	.140	Disc	SFF30-010-5
10/20	30°	5	1-3/4	50	.140	Deep C Bore	SDF30-010-5
12/24	30°	1.3	1/2	15	.117	Disc	SFF30B-12-15H
12/24	30°	1.3	1/2	15	.117	Deep C Bore	SDF30B-12-15H
12/24	30°	1.3	1/2	15	.120	Deep C Bore	SDF30B-12-15HE
12/24	30°	1.5	1/2	18	.117	Disc	SFF30B-12-18H
12/24	30°	1.5	3/4	18	.117	Disc	SFF30B-12-18S
12/24	30°	1.5	3/4	18	.125	Disc	SFF30B-12-18SE
12/24	30°	1.8	3/4	21	.117	Disc	SFF30B-12-21S
12/24	30°	2	3/4	24	.117	Disc	SFF30B-12-24S
12/24	30°	3	1-1/4	30	.117	Deep C Bore	SDF30-012-2E
12/24	30°	3	1-1/4	36	.117	Disc	SFF30-012-3

SFF30, SFF30B, SDF30 & SDF30B Series

Full Fillet DP 30° PA

Involute Spline, Non-Chamfering
Disc & Button Type, ANSI B92.1-1970/6

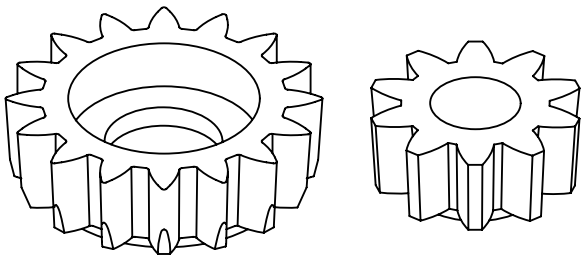
Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
12/24	30°	3	1-1/4	36	.117	Deep C Bore	SDF30-012-3
12/24	30°	4	1-1/4	48	.117	Disc	SFF30-012-4
12/24	30°	4	1-1/4	48	.117	Deep C Bore	SDF30-012-4
12/24	30°	5	1-3/4	60	.117	Disc	SFF30-012-5
12/24	30°	5	1-3/4	60	.117	Deep C Bore	SDF30-012-5
14/28	30°	1.5	1/2	21	.107	Disc	SFF30B-14-21H
16/32	30°	1.3	1/2	20	.094	Deep C Bore	SDF30B-16-20H
16/32	30°	1.5	1/2	24	.094	Disc	SFF30B-16-24H
16/32	30°	1.8	3/4	30	.094	Disc	SFF30B-16-30S
16/32	30°	1.8	3/4	30	.094	Deep C Bore	SDF30B-16-30S
16/32	30°	2	3/4	32	.094	Disc	SFF30B-16-32S
16/32	30°	2	3/4	32	.094	Deep C Bore	SDF30B-16-32S
16/32	30°	3	1-1/4	48	.094	Disc	SFF30-016-3
16/32	30°	3	1-1/4	48	.094	Deep C Bore	SDF30-016-3
16/32	30°	4	1-1/4	64	.094	Disc	SFF30-016-4
16/32	30°	4	1-1/4	64	.094	Deep C Bore	SDF30-016-4
16/32	30°	5	1-3/4	80	.094	Disc	SFF30-016-5
16/32	30°	5	1-3/4	80	.094	Deep C Bore	SDF30-016-5
16/32	30°	6	1-3/4	96	.094	Disc	SFF30-016-6
20/30	30°	1.5	1/2	30	.087	Disc	SFF30B-23-30H
20/30	30°	1.8	3/4	36	.087	Disc	SFF30B-23-36S
20/30	30°	3	1-1/4	60	.087	Disc	SFF30-023-3
20/30	30°	3	1-1/4	60	.089	Deep C Bore	SDF30-023-3E
20/30	30°	4	1-1/4	80	.087	Disc	SFF30-023-4
20/40	30°	1.4	1/2	28	.075	Disc	SFF30B-20-28H
20/40	30°	1.5	1/2	30	.075	Deep C Bore	SDF30B-20-30H
20/40	30°	2	3/4	40	.075	Disc	SFF30B-20-40S
20/40	30°	3	1-1/4	60	.075	Disc	SFF30-020-3
20/40	30°	3	1-1/4	60	.075	Deep C Bore	SDF30-020-3
20/40	30°	4	1-1/4	80	.075	Disc	SFF30-020-4
20/40	30°	4	1-1/4	80	.075	Deep C Bore	SDF30-020-4
20/40	30°	5	1-3/4	100	.075	Disc	SFF30-020-5
20/40	30°	6	1-3/4	120	.075	Disc	SFF30-020-6
24/48	30°	1.3	1/2	32	.063	Disc	SFF30B-24-32H
24/48	30°	1.3	1/2	32	.063	Deep C Bore	SDF30B-24-32H
24/48	30°	1.5	1/2	36	.063	Disc	SFF30B-24-36H
24/48	30°	3	1-1/4	72	.063	Disc	SFF30-024-3
24/48	30°	3	1-1/4	72	.063	Deep C Bore	SDF30-024-3

Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	WD	Type	Series
24/48	30°	4	1-1/4	96	.063	Disc	SFF30-024-4
24/48	30°	6	1-3/4	144	.063	Disc	SFF30-024-6
32/64	30°	1.25	1/2	40	.047	Disc	SFF30B-32-40H
32/64	30°	1.25	1/2	40	.047	Deep C Bore	SDF30B-32-40H
32/64	30°	1.5	1/2	48	.047	Disc	SFF30B-32-48H
32/64	30°	3	1-1/4	96	.047	Disc	SFF30-032-3
32/64	30°	3	1-1/4	96	.047	Deep C Bore	SDF30-032-3
32/64	30°	4	1-1/4	128	.047	Disc	SFF30-032-4
32/64	30°	5	1-3/4	160	.047	Disc	SFF30-032-5
40/80	30°	1.25	1/2	50	.038	Disc	SFF30B-40-50H
40/80	30°	1.5	1/2	60	.038	Disc	SFF30B-40-60H
40/80	30°	3	1-1/4	120	.038	Disc	SFF30-040-3
40/80	30°	5	1-3/4	200	.038	Disc	SFF30-040-5
48/96	30°	1.5	1/2	72	.031	Disc	SFF30B-48-72H
48/96	30°	3	1-1/4	144	.031	Disc	SFF30-048-3
48/96	30°	3	1-1/4	144	.031	Deep C Bore	SDF30-048-3
48/96	30°	4	1-1/4	192	.031	Disc	SFF30-048-4

SFF30, SFF30B, SDF30 & SDF30B Series

Full Fillet DP 30° PA

Involute Spline, Non-Chamfering
Disc & Button Type
ANSI B92.1-1970/6

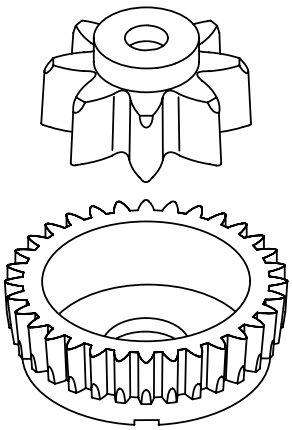


DP	PA	Pitch Dia.	Bore	No. Teeth	Type	ASA B5.15-1950 WD	Series	ANSI B92.1-1970 WD	Series
2.5/5	30°	3	1-1/4	8	Disc	-	-	.470	S7N30-250-3
2.5/5	30°	4	1-1/4	10	Disc	.442	S5N30-250-4	.470	S7N30-250-4
2.5/5	30°	5	1-3/4	13	Disc	.442	S5N30-250-5	.470	S7N30-250-5
2.5/5	30°	6	1-3/4	15	Disc	.442	S5N30-250-6	.470	S7N30-250-6
2.5/5	30°	8	4	20	Disc	.442	S5N30-250-8	.470	S7N30-250-8
3/6	30°	2.7	3/4	8	Disc	.369	S5N30B-3-8S	.392	S7N30B-3-8S
3/6	30°	2.7	3/4	8	Deep C Bore	.369	SDL30B-3-8SE	-	-
3/6	30°	3	1-1/4	9	Disc	.369	S5N30-300-3	.392	S7N30-300-3
3/6	30°	4	1-1/4	12	Disc	-	-	.392	S7N30-300-4
3/6	30°	5	1-3/4	15	Disc	.369	S5N30-300-5	.392	S7N30-300-5
3/6	30°	5	1-3/4	15	Deep C Bore	-	-	.392	SDL30-03-5
3/6	30°	6	1-3/4	18	Disc	.369	S5N30-300-6	.392	S7N30-300-6
3/6	30°	8	4	24	Disc	-	-	.392	S7N30-300-8
4/8	30°	2	1/2	8	Disc	.277	S5N30B-4-8H	.294	S7N30B-4-8H
4/8	30°	2	3/4	8	Disc	.277	S5N30B-4-8S	.294	S7N30B-4-8S
4/8	30°	2.25	3/4	9	Disc	.277	S5N30B-4-9S	.294	S7N30B-4-9S
4/8	30°	3	1-1/4	12	Disc	.277	S5N30-400-3	.294	S7N30-400-3
4/8	30°	4	1-1/4	16	Disc	.277	S5N30-400-4	.294	S7N30-400-4
4/8	30°	4	1-1/4	16	Deep C Bore	-	-	.294	SDL30-04-4
4/8	30°	5	1-3/4	20	Disc	-	-	.294	S7N30-400-5
4/8	30°	5	1-3/4	20	Deep C Bore	-	-	.294	SDL30-04-5
4/8	30°	6	1-3/4	24	Disc	-	-	.294	S7N30-400-6
4/8	30°	8	4	32	Disc	-	-	.294	S7N30-400-8
5/10	30°	1.8	1/2	9	Disc	.222	S5N30B-5-9H	.235	S7N30B-5-9H
5/10	30°	1.8	3/4	9	Disc	.222	S5N30B-5-9S	.235	S7N30B-5-9S

S7N30, S5N30, S7N30B, S5N30B & SDL30 Series

DP 30° Flat Root

Involute Spline
Non-Chamfering



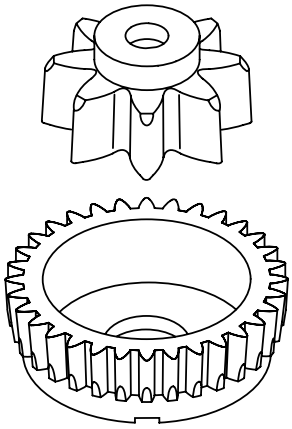
SERIES CONTINUED ON NEXT PAGE ->

S7N30, S5N30, S7N30B, S5N30B & SDL30 Series

DP 30° Flat Root

Involute Spline

Non-Chamfering



Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Type	ASA B5.15-1950 WD	Series	ANSI B92.1-1970 WD	Series
5/10	30°	2	3/4	10	Disc	-	-	.235	S7N30B-5-10S
5/10	30°	2	3/4	10	Deep C Bore	-	-	.235	SDL30B-5-10S
5/10	30°	3	1-1/4	15	Disc	.222	S5N30-500-3	.235	S7N30-500-3
5/10	30°	3	1-1/4	15	Deep C Bore	-	-	.235	SDL30-05-3
5/10	30°	4	1-1/4	20	Disc	.222	S5N30-500-4	.235	S7N30-500-4
5/10	30°	4	1-1/4	20	Deep C Bore	-	-	.235	SDL30-05-4
5/10	30°	5	1-3/4	25	Disc	-	-	.235	S7N30-500-5
5/10	30°	6	1-3/4	30	Disc	.222	S5N30-500-6	.235	S7N30-500-6
6/12	30°	1.7	1/2	10	Disc	.185	S5N30B-6-10H	.196	S7N30B-6-10H
6/12	30°	2	3/4	12	Disc	.185	S5N30B-6-12S	.196	S7N30B-6-12S
6/12	30°	3	1-1/4	18	Disc	-	-	.196	S7N30-600-3
6/12	30°	3	1-1/4	18	Deep C Bore	-	-	.196	SDL30-06-3
6/12	30°	4	1-1/4	24	Disc	.185	S5N30-600-4	.196	S7N30-600-4
6/12	30°	4	1-1/4	24	Deep C Bore	-	-	.196	SDL30-06-4
6/12	30°	5	1-3/4	30	Disc	-	-	.196	S7N30-600-5
6/12	30°	5	1-3/4	30	Deep C Bore	-	-	.196	SDL30-06-5
6/12	30°	6	1-3/4	36	Disc	-	-	.196	S7N30-600-6
7/16	30°	3	1-1/4	21	Disc	.140	S5N30-700-3	.147	S7N30-700-3
7/16	30°	4	1-1/4	28	Disc	.140	S5N30-700-4	.147	S7N30-700-4
8/16	30°	1.5	1/2	12	Disc	.140	S5N30B-8-12H	.147	S7N30B-8-12H
8/16	30°	1.5	1/2	14	Disc	-	-	.147	S7N30B-8-14H
8/16	30°	1.8	3/4	14	Disc	-	-	.147	S7N30B-8-14S
8/16	30°	2	3/4	16	Disc	.140	S5N30B-8-16S	.147	S7N30B-8-16S
8/16	30°	2.5	3/4	20	Disc	.140	S5N30B-8-20S	.147	S7N30B-8-20S
8/16	30°	3	1-1/4	24	Disc	.140	S5N30-800-3	.147	S7N30-800-3
8/16	30°	3	1-1/4	24	Deep C Bore	-	-	.147	SDL30-08-3
8/16	30°	4	1-1/4	32	Disc	.140	S5N30-800-4	.147	S7N30-800-4
8/16	30°	4	1-1/4	32	Deep C Bore	.140	SDL30-08-4E	.147	SDL30-08-4
8/16	30°	5	1-3/4	40	Disc	.140	S5N30-800-5	.147	S7N30-800-5
8/16	30°	6	1-3/4	48	Disc	.140	S5N30-800-6	.147	S7N30-800-6
10/20	30°	1.4	1/2	14	Disc	-	-	.118	S7N30B-10-14H
10/20	30°	1.4	1/2	15	Disc	.112	S5N30B-10-15H	-	-
10/20	30°	1.6	3/4	16	Disc	.112	S5N30B-10-16S	.118	S7N30B-10-16S
10/20	30°	1.8	3/4	18	Disc	-	-	.118	S7N30B-10-18S
10/20	30°	1.8	3/4	18	Deep C Bore	-	-	.118	SDL30B-10-18S
10/20	30°	2.4	3/4	25	Disc	-	-	.118	S7N30B-10-24S
10/20	30°	2.4	3/4	25	Deep C Bore	-	-	.118	SDL30B-10-24S
10/20	30°	3	1-1/4	30	Disc	.112	S5N30-010-3	.118	S7N30-010-3
10/20	30°	3	1-1/4	30	Deep C Bore	-	-	.118	SDL30-10-3
10/20	30°	4	1-1/4	40	Disc	.112	S5N30-010-4	.118	S7N30-010-4
10/20	30°	4	1-1/4	40	Deep C Bore	-	-	.118	SDL30-10-4
10/20	30°	5	1-3/4	50	Disc	-	-	.118	S7N30-010-5
10/20	30°	6	1-3/4	60	Disc	-	-	.118	S7N30-010-6
12/24	30°	1.4	1/2	17	Disc	.094	S5N30B-12-17H	.098	S7N30B-12-17H
12/24	30°	1.5	3/4	18	Disc	-	-	.098	S7N30B-12-18S
12/24	30°	1.8	3/4	21	Disc	.094	S5N30B-12-21S	.098	S7N30B-12-21S

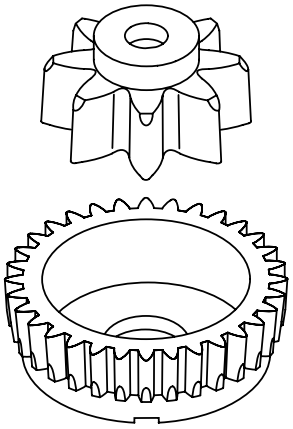
SERIES CONTINUED ON NEXT PAGE ->

S7N30, S5N30, S7N30B, S5N30B & SDL30 Series

DP 30° Flat Root

Involute Spline

Non-Chamfering



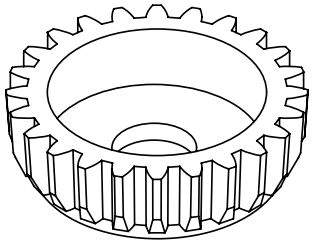
Diam. Pitch	PA	Pitch Dia.	Bore	No. Teeth	Type	ASA B5.15-1950 WD	Series	ANSI B92.1-1970 WD	Series
12/24	30°	1.8	3/4	21	Deep C Bore	-	-	.098	SDL30B-12-21S
12/24	30°	3	1-1/4	36	Disc	.094	S5N30-012-3	.098	S7N30-012-3
12/24	30°	3	1-1/4	36	Deep C Bore	-	-	.098	SDL30-12-3
12/24	30°	4	1-1/4	48	Disc	-	-	.098	S7N30-012-4
12/24	30°	4	1-1/4	48	Deep C Bore	-	-	.098	SDL30-12-4
12/24	30°	5	1-3/4	60	Disc	-	-	.098	S7N30-012-5
12/24	30°	6	1-3/4	72	Disc	-	-	.098	S7N30-012-6
16/32	30°	1.5	1/2	24	Disc	.071	S5N30B-16-24H	.073	S7N30B-16-24H
16/32	30°	2	3/4	32	Disc	.071	S5N30B-16-32S	.073	S7N30B-16-32S
16/32	30°	2	3/4	32	Deep C Bore	-	-	.073	SDL30B-16-32S
16/32	30°	3	1-1/4	48	Disc	.071	S5N30-016-3	.073	S7N30-016-3
16/32	30°	3	1-1/4	48	Deep C Bore	-	-	.073	SDL30-16-3
16/32	30°	4	1-1/4	64	Disc	.071	S5N30-016-4	.073	S7N30-016-4
16/32	30°	4	1-1/4	64	Deep C Bore	-	-	.073	SDL30-16-4
16/32	30°	5	1-3/4	80	Disc	-	-	.073	S7N30-016-5
16/32	30°	5	1-3/4	80	Deep C Bore	-	-	.073	SDL30-16-5
16/32	30°	6	1-3/4	96	Disc	.071	S5N30-016-6	.073	S7N30-016-6
20/30	30°	3	1-1/4	60	Disc	.061	S5N30-023-3	.064	S7N30-023-3
20/30	30°	4	1-1/4	80	Disc	.061	S5N30-023-4	.064	S7N30-023-4
20/40	30°	1.4	1/2	28	Disc	.057	S5N30B-20-28H	.059	S7N30B-20-28H
20/40	30°	1.4	1/2	28	Deep C Bore	.057	SDL30-20-28HE	-	-
20/40	30°	1.5	1/2	30	Disc	.057	S5N30B-20-30H	.059	S7N30B-20-30H
20/40	30°	1.5	3/4	30	Deep C Bore	-	-	.059	SDL30B-20-30S
20/40	30°	3	1-1/4	60	Disc	.057	S5N30-020-3	.059	S7N30-020-3
20/40	30°	3	1-1/4	60	Deep C Bore	-	-	.059	SDL30-20-3
20/40	30°	4	1-1/4	80	Disc	.057	S5N30-020-4	.059	S7N30-020-4
20/40	30°	5	1-3/4	100	Disc	.057	S5N30-020-5	.059	S7N30-020-5
20/40	30°	6	1-3/4	120	Disc	.057	S5N30-020-6	.059	S7N30-020-6
24/48	30°	1.5	1/2	36	Disc	.048	S5N30B-24-36H	.049	S7N30B-24-36H
24/48	30°	3	1-1/4	72	Disc	.048	S5N30-024-3	.049	S7N30-024-3
24/48	30°	3	1-1/4	72	Deep C Bore	-	-	.049	SDL30-24-3
24/48	30°	4	1-1/4	96	Disc	.048	S5N30-024-4	.049	S7N30-024-4
24/48	30°	4	1-1/4	96	Deep C Bore	-	-	.049	SDL30-24-4
32/64	30°	1.3	1/2	40	Disc	.036	S5N30B-32-40H	.037	S7N30B-32-40H
32/64	30°	1.25	1/2	48	Disc	.036	S5N30B-32-48H	.037	S7N30B-32-48H
32/64	30°	3	1-1/4	96	Disc	.036	S5N30-032-3	.037	S7N30-032-3
32/64	30°	3	1-1/4	96	Deep C Bore	-	-	.037	SDL30-32-3
32/64	30°	4	1-1/4	128	Disc	.036	S5N30-032-4	.037	S7N30-032-4
40/80	30°	1.5	1/2	60	Disc	.030	S5N30B-40-60H	.030	S7N30B-40-60H
48/96	30°	1.5	1/2	72	Disc	.025	S5N30B-48-72H	-	-
40/80	30°	3	1-1/4	120	Disc	.030	S5N30-040-3	.030	S7N30-040-3
40/80	30°	3	1-1/4	120	Deep C Bore	-	-	.030	SDL30-40-3
48/96	30°	3	1-1/4	144	Disc	.025	S5N30-048-3	.025	S7N30-048-3
48/96	30°	3	1-1/4	144	Deep C Bore	-	-	.025	SDL30-48-3
48/96	30°	4	1-1/4	192	Disc	.025	S5N30-048-4	.025	S7N30-048-4

S7C30 & S5C30 Series

DP 30° Flat Root

Involute Spline

Chamfering



DP	PA	Pitch Dia.	Bore	No. Teeth	ASA B5.15-1950		ANSI B92.1-1970	
					WD	Series	WD	Series
2.5/5	30°	4	1-1/4	10	.442	S5C30-250-4	.470	-
2.5/5	30°	5	1-3/4	13	.442	S5C30-250-5	.470	-
3/6	30°	4	1-1/4	12	.369	S5C30-300-4	.392	-
3/6	30°	5	1-3/4	15	.369	S5C30-300-5	.392	-
3/6	30°	6	1-3/4	18	.369	S5C30-300-6	.392	-
4/8	30°	3	1-1/4	12	.277	-	.294	S7C30-400-3
4/8	30°	4	1-1/4	16	.277	S5C30-400-4	.294	S7C30-400-4
5/10	30°	3	1-1/4	15	.222	S5C30-500-3	.235	-
5/10	30°	4	1-1/4	20	.222	S5C30-500-4	.235	-
5/10	30°	5	1-3/4	25	.222	S5C30-500-5	.235	-
6/12	30°	3	1-1/4	18	.185	S5C30-600-3	.196	-
6/12	30°	4	1-1/4	24	.185	S5C30-600-4	.196	S7C30-600-4
6/12	30°	5	1-3/4	30	.185	S5C30-600-5	.196	-
7/16	30°	4	1-1/4	28	.140	S5C30-700-4	.147	-
8/16	30°	3	1-1/4	24	.140	-	.147	S7C30-800-3
8/16	30°	4	1-1/4	32	.140	-	.147	S7C30-800-4
8/16	30°	5	1-3/4	40	.140	-	.147	S7C30-800-5
10/20	30°	4	1-1/4	40	.112	S5C30-010-4	.118	S7C30-010-4
10/20	30°	5	1-3/4	50	.112	S5C30-010-5	.118	-
12/24	30°	3	1-1/4	36	.094	S5C30-012-3	.098	S7C30-012-3
12/24	30°	4	1-1/4	48	.094	S5C30-012-4	.098	S7C30-012-4
16/32	30°	3	1-1/4	48	.071	S5C30-016-3	.073	S7C30-016-3
16/32	30°	4	1-1/4	64	.071	S5C30-016-4	.073	S7C30-016-4
16/32	30°	5	1-3/4	80	.071	S5C30-016-5	.073	S7C30-016-5
20/40	30°	3	1-1/4	60	.057	S5C30-020-3	.059	-
20/40	30°	4	1-1/4	80	.057	S5C30-020-4	.059	S7C30-020-4
20/40	30°	5	1-3/4	100	.057	S5C30-020-5	.059	-
20/40	30°	6	1-3/4	120	.057	S5C30-020-6	.059	-
24/48	30°	4	1-1/4	96	.048	-	.049	S7C30-024-4
24/48	30°	7	1-3/4	160	.048	S5C30-024-7	.049	-
32/64	30°	4	1-1/4	128	.036	S5C30-032-4	.037	S7C30-032-4
40/80	30°	3	1-1/4	120	.030	S5C30-040-3	-	-
48/96	30°	3	1-1/4	144	.025	S5C30-048-3	-	-

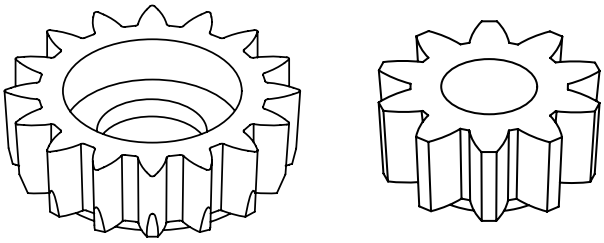
SJI30 Series

DP 30° Flat Root

Major Diameter

Involute Spline

Non-Chamfering

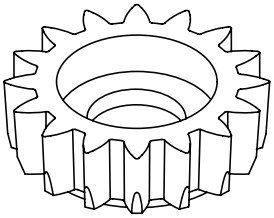


DP	PA	Pitch Dia.	Bore	# of Teeth	WD	Series
3/6	30°	2.6	3/4	8	.333	SJI30-300-S
3/6	30°	3	1-1/4	9	.333	SJI30-300-3
3/6	30°	4	1-1/4	12	.333	SJI30-300-4
3/6	30°	5	1-3/4	15	.333	SJI30-300-5
4/8	30°	2.3	3/4	9	.250	SJI30-400-S
4/8	30°	3	1-1/4	12	.250	SJI30-400-3
4/8	30°	4	1-1/4	16	.250	SJI30-400-4
4/8	30°	6	1-3/4	24	.250	SJI30-400-6
5/10	30°	1.8	3/4	9	.200	SJI30-500-S
5/10	30°	3	1-1/4	15	.200	SJI30-500-3
5/10	30°	4	1-1/4	20	.200	SJI30-500-4
6/12	30°	1.5	1/2	9	.167	SJI30-600-H
6/12	30°	2	3/4	12	.167	SJI30-600-S
6/12	30°	3	1-1/4	18	.167	SJI30-600-3
6/12	30°	4	1-1/4	24	.167	SJI30-600-4
6/12	30°	6	1-3/4	36	.167	SJI30-600-6
8/16	30°	1.5	1/2	12	.125	SJI30-800-H
8/16	30°	2	3/4	16	.125	SJI30-800-S
8/16	30°	3	1-1/4	24	.125	SJI30-800-3
8/16	30°	4	1-1/4	32	.125	SJI30-800-4
8/16	30°	5	1-3/4	40	.125	SJI30-800-5
10/20	30°	1.5	1/2	15	.100	SJI30-010-H
10/20	30°	1.8	3/4	18	.100	SJI30-010-S
10/20	30°	3	1-1/4	30	.100	SJI30-010-3
10/20	30°	4	1-1/4	40	.100	SJI30-010-4
12/24	30°	1.3	1/2	15	.083	SJI30-012-H
12/24	30°	1.5	1/2	18	.083	SJI30-012-HE
12/24	30°	1.8	3/4	21	.083	SJI30-012-S
12/24	30°	3	1-1/4	36	.083	SJI30-012-3
12/24	30°	4	1-1/4	48	.083	SJI30-012-4
14/28	30°	3	1-1/4	42	.071	SJI30-014-3
16/32	30°	1.5	1/2	24	.063	SJI30-016-H
16/32	30°	1.8	3/4	32	.063	SJI30-016-S
16/32	30°	3	1-1/4	48	.063	SJI30-016-3
20/40	30°	1.5	1/2	30	.050	SJI30-020-H
20/40	30°	3	1-1/4	60	.050	SJI30-020-3

SI37 Series

DP 37° PA Full Fillet

Involute Spline
Non-Topping
ANSI B92.1-1970

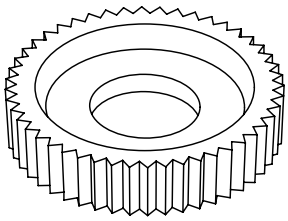


DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
4/8	37-1/2°	3	1-1/4	12	.316	SI37-400-3
5/10	37-1/2°	3	1-1/4	15	.253	SI37-500-3
6/12	37-1/2°	3	1-1/4	18	.211	SI37-600-3
8/16	37-1/2°	1.5	1/2	12	.158	SI37-800-H
8/16	37-1/2°	3	1-1/4	24	.158	SI37-800-3
10/20	37-1/2°	1.5	1/2	15	.125	SI37-010-H
10/20	37-1/2°	3	1-1/4	30	.120	SI37-010-3
10/20	37-1/2°	4	1-1/4	40	.120	SI37-010-4
12/24	37-1/2°	1.5	1/2	18	.104	SI37-012-H
12/24	37-1/2°	3	1-1/4	36	.104	SI37-012-3
16/32	37-1/2°	1.5	1/2	24	.079	SI37-016-H
16/32	37-1/2°	3	1-1/4	48	.079	SI37-016-3
20/40	37-1/2°	1.5	1/2	30	.061	SI37-020-H
20/40	37-1/2°	3	1-1/4	60	.068	SI37-020-3
20/40	37-1/2°	4	1-1/4	80	.068	SI37-020-4
24/48	37-1/2°	1.5	1/2	36	.051	SI37-024-H
24/48	37-1/2°	3	1-1/4	72	.051	SI37-024-3
24/48	37-1/2°	4	1-1/4	96	.051	SI37-024-4
32/64	37-1/2°	1.5	1/2	48	.039	SI37-032-H
32/64	37-1/2°	3	1-1/4	96	.039	SI37-032-3
32/64	37-1/2°	4	1-1/4	128	.039	SI37-032-4
40/80	37-1/2°	1.5	1/2	60	.032	SI37-040-H
40/80	37-1/2°	2.5	1-1/4	100	.032	SI37-040-2
48/96	37-1/2°	1.5	1/2	72	.027	SI37-048-H
48/96	37-1/2°	2.5	1-1/4	120	.027	SI37-048-2

SI45 Series

DP 45° PA Full Fillet

Involute Spline
Non-Topping
ANSI B92.1-1970

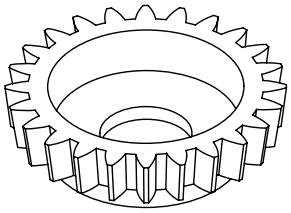


DP	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
10/20	45°	1.5	1/2	15	.105	SI45-010-H
10/20	45°	3	1-1/4	30	.105	SI45-010-3
10/20	45°	4	1-1/4	40	.105	SI45-010-4
10/20	45°	5	1-3/4	50	.105	SI45-010-5
12/24	45°	2	3/4	24	.090	SI45-012-S
12/24	45°	3	1-1/4	36	.090	SI45-012-3
12/24	45°	4	1-1/4	48	.090	SI45-012-4
16/32	45°	1.5	1/2	24	.066	SI45-016-H
16/32	45°	3	1-1/4	48	.066	SI45-016-3
16/32	45°	4	1-1/4	64	.066	SI45-016-4
16/32	45°	5	1-3/4	80	.066	SI45-016-5
20/40	45°	1.5	1/2	30	.053	SI45-020-H
20/40	45°	3	1-1/4	60	.053	SI45-020-3
20/40	45°	4	1-1/4	80	.053	SI45-020-4
24/48	45°	1.5	1/2	36	.044	SI45-024-H
24/48	45°	3	1-1/4	72	.044	SI45-024-3
24/48	45°	4	1-1/4	96	.044	SI45-024-4
24/48	45°	5	1-3/4	120	.044	SI45-024-5
32/64	45°	1.5	1/2	48	.033	SI45-032-H
32/64	45°	3	1-1/4	96	.033	SI45-032-3
32/64	45°	4	1-1/4	128	.033	SI45-032-4
32/64	45°	6	1-3/4	192	.033	SI45-032-6
40/80	45°	1.5	1/2	60	.027	SI45-040-H
40/80	45°	3	1-1/4	120	.027	SI45-040-3
40/80	45°	4	1-1/4	160	.027	SI45-040-4
48/96	45°	1.5	1/2	72	.023	SI45-048-H
48/96	45°	3	1-1/4	144	.023	SI45-048-3
48/96	45°	4	1-1/4	192	.023	SI45-048-4
64/128	45°	1.5	1/2	96	.017	SI45-064-H
64/128	45°	3.0	1-1/4	192	.017	SI45-064-3
80/160	45°	1.5	1/2	120	.014	SI45-080-H
80/160	45°	2-1/2	1-1/4	200	.014	SI45-080-2
80/160	45°	3	1-1/4	240	.014	SI45-080-3
96/192	45°	1.5	1/2	144	.011	SI45-096-H

SM14 Series

Module 14.5° PA

Finishing
Non-Topping
Disc Type



2.25/DP = WD

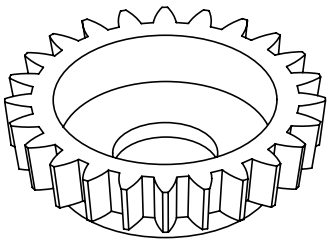
Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.75	14-1/2°	1.5	1/2	48	.066	SM14-075-H
1	14-1/2°	3	1-1/4	76	.089	SM14-100-3
1.25	14-1/2°	3	1-1/4	60	.111	SM14-125-3
1.25	14-1/2°	4	1-1/4	80	.111	SM14-125-4
1.5	14-1/2°	1.5	1/2	25	.133	SM14-150-H
1.5	14-1/2°	3	1-1/4	51	.133	SM14-150-3
1.5	14-1/2°	4	1-1/4	68	.133	SM14-150-4
1.75	14-1/2°	3	1-1/4	44	.155	SM14-175-3
1.75	14-1/2°	4	1-1/4	58	.155	SM14-175-4
2	14-1/2°	1.5	1/2	19	.177	SM14-200-H
2	14-1/2°	3	1-1/4	38	.177	SM14-200-3
2	14-1/2°	4	1-1/4	50	.177	SM14-200-4
2.25	14-1/2°	3	1-1/4	34	.199	SM14-225-3
2.5	14-1/2°	1.5	1/2	15	.222	SM14-250-H
2.5	14-1/2°	3	1-1/4	30	.222	SM14-250-3
2.5	14-1/2°	4	1-1/4	40	.222	SM14-250-4
2.75	14-1/2°	3	1-1/4	28	.244	SM14-275-3
2.75	14-1/2°	4	1-1/4	36	.244	SM14-275-4
3	14-1/2°	1.5	1/2	13	.266	SM14-300-H
3	14-1/2°	3	1-1/4	25	.266	SM14-300-3
3	14-1/2°	4	1-1/4	34	.266	SM14-300-4

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
3.5	14-1/2°	3	1-1/4	22	.310	SM14-350-3
3.5	14-1/2°	4	1-1/4	29	.310	SM14-350-4
4	14-1/2°	2	3/4	11	.354	SM14-400-S
4	14-1/2°	3	1-1/4	19	.354	SM14-400-3
4	14-1/2°	4	1-1/4	26	.354	SM14-400-4
4	14-1/2°	5	1-3/4	32	.354	SM14-400-5
4.25	14-1/2°	4	1-1/4	24	.377	SM14-425-4
4.5	14-1/2°	4	1-1/4	22	.399	SM14-450-4
4.75	14-1/2°	4	1-1/4	21	.421	SM14-475-4
5	14-1/2°	2	3/4	10	.443	SM14-500-S
5	14-1/2°	3	1-1/4	15	.443	SM14-500-3
5	14-1/2°	4	1-1/4	20	.443	SM14-500-4
5	14-1/2°	5	1-3/4	25	.443	SM14-500-5
5.5	14-1/2°	4	1-1/4	18	.487	SM14-550-4
6	14-1/2°	2.4	3/4	10	.532	SM14-600-S
6	14-1/2°	4	1-1/4	17	.532	SM14-600-4
8	14-1/2°	2.5	3/4	8	.709	SM14-800-S
8	14-1/2°	4	1-1/4	13	.709	SM14-800-4
9	14-1/2°	4	1-1/4	11	.797	SM14-900-4
10	14-1/2°	4	1-1/4	10	.886	SM14-1000-4

SM15 Series

Module 15° PA

Finishing
Non-Topping
Disc Type



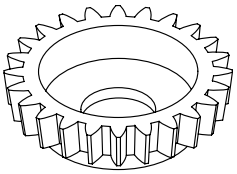
2.25/DP = WD

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
1	15°	3	1-1/4	76	.089	SM15-100-3
1	15°	4	1-1/4	102	.089	SM15-100-4
1.25	15°	3	1-1/4	61	.111	SM15-125-3
1.25	15°	4	1-1/4	80	.111	SM15-125-4
1.5	15°	3	1-1/4	51	.133	SM15-150-3
1.5	15°	4	1-1/4	68	.133	SM15-150-4
1.75	15°	4	1-1/4	58	.155	SM15-175-4
2	15°	3	1-1/4	38	.177	SM15-200-3
2.5	15°	3	1-1/4	30	.222	SM15-250-3
3	15°	3	1-1/4	26	.266	SM15-300-3
3	15°	4	1-1/4	34	.266	SM15-300-4
3.5	15°	3	1-1/4	22	.310	SM15-350-3
3.5	15°	4	1-1/4	29	.310	SM15-350-4
4	15°	4	1-1/4	25	.354	SM15-400-4
6	15°	4	1-1/4	17	.532	SM15-600-4

SM20 & SM84 Series

Module 20° PA

Finishing
Non-Topping
Disc Type



2.25/DP = WD

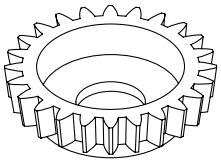
Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.25	20°	1.5	1/2	152	.024	SM20-025-H
.3	20°	1.5	1/2	128	.028	SM20-030-H
.35	20°	1.5	1/2	108	.032	SM20-035-H
.4	20°	1.5	1/2	96	.037	SM20-040-H
.4	20°	2.5	1-1/4	160	.037	SM20-040-2
.4	20°	3	1-1/4	180	.037	SM20-040-3
.45	20°	1.5	1/2	84	.041	SM20-045-H
.5	20°	1.5	1/2	80	.045	SM20-050-H
.5	20°	3	1-1/4	150	.045	SM20-050-3
.5	20°	4	1-1/4	200	.045	SM20-050-4
.5	20°	5	1-3/4	254	.045	SM20-050-5
.55	20°	1.5	1/2	70	.050	SM20-055-H
.6	20°	1.5	1/2	62	.054	SM20-060-H
.6	20°	3	1-1/4	128	.054	SM20-060-3
.65	20°	1.5	1/2	60	.058	SM20-065-H
.7	20°	1.3	1/2	45	.063	SM20-070-HA
.7	20°	1.5	1/2	54	.063	SM20-070-H
.7	20°	3	1-1/4	108	.063	SM20-070-3
.75	20°	1.5	1/2	50	.067	SM20-075-H
.75	20°	3	1-1/4	100	.067	SM20-075-3
.75	20°	4	1-1/4	128	.067	SM20-075-4
.8	20°	1.5	1/2	46	.071	SM20-080-H
.8	20°	2.0	3/4	46	.071	SM20-080-S
.8	20°	3	1-1/4	96	.071	SM20-080-3
.85	20°	1.5	1/2	45	.076	SM20-085-H
.9	20°	1.5	1/2	42	.080	SM20-090-H
.9	20°	3	1-1/4	84	.080	SM20-090-3
1	20°	1.5	1/2	38	.089	SM20-100-H
1	20°	3	1-1/4	76	.089	SM20-100-3
1	20°	4	1-1/4	100	.089	SM20-100-4
1	20°	4	1-3/4	100	.089	SM20-100-4L
1	20°	5	1-3/4	128	.089	SM20-100-5
1.125	20°	3	1-1/4	76	.100	SM20-112-3
1.125	20°	4	1-1/4	90	.100	SM20-112-4L
1.25	20°	1.5	1/2	30	.111	SM20-125-H
1.25	20°	3	1-1/4	60	.111	SM20-125-3
1.25	20°	4	1-1/4	80	.111	SM20-125-4
1.25	20°	4	1-3/4	80	.111	SM20-125-4L
1.375	20°	3	1-1/4	54	.122	SM20-137-3
1.375	20°	4	1-3/4	74	.122	SM20-137-4L
1.5	20°	1.5	1/2	26	.133	SM20-150-H
1.5	20°	3	1-1/4	51	.133	SM20-150-3
1.5	20°	4	1-1/4	68	.133	SM20-150-4
1.5	20°	4	1-3/4	68	.133	SM20-150-4L
1.5	20°	5	1-3/4	84	.133	SM20-150-5
1.75	20°	1.5	1/2	22	.155	SM20-175-H
1.75	20°	3	1-1/4	44	.155	SM20-175-3
1.75	20°	4	1-1/4	58	.155	SM20-175-4
1.75	20°	4	1-3/4	58	.155	SM20-175-4L
2	20°	1.5	1/2	19	.177	SM20-200-H
2	20°	3	1-1/4	38	.177	SM20-200-3
2	20°	4	1-1/4	50	.177	SM20-200-4
2	20°	4	1-3/4	50	.177	SM20-200-4L
2	20°	5	1-3/4	64	.177	SM20-200-5
2.25	20°	1.5	1/2	17	.199	SM20-225-H
2.25	20°	3	1-1/4	34	.199	SM20-225-3
2.25	20°	4	1-1/4	45	.199	SM20-225-4
2.25	20°	4	1-3/4	45	.199	SM20-225-4L
2.5	20°	1.5	1/2	15	.221	SM20-250-H
2.5	20°	3	1-1/4	30	.221	SM20-250-3
2.5	20°	4	1-1/4	40	.221	SM20-250-4
2.5	20°	5	1-3/4	50	.221	SM20-250-5
2.75	20°	1.5	1/2	14	.244	SM20-275-H
2.75	20°	3	1-1/4	28	.244	SM20-275-3
2.75	20°	4	1-1/4	36	.244	SM20-275-4
2.75	20°	4	1-3/4	36	.244	SM20-275-4L
2.75	20°	5	1-3/4	46	.244	SM20-275-5
3	20°	1.5	1/2	13	.266	SM20-300-HE
3	20°	1.5	1/2	14	.266	SM20-300-H
3	20°	3	1-1/4	25	.266	SM20-300-3
3	20°	4	1-1/4	34	.266	SM20-300-4
3	20°	4	1-3/4	34	.266	SM20-300-4L
3	20°	5	1-3/4	42	.266	SM20-300-5
3.25	20°	1.5	1/2	12	.288	SM20-325-H
3.25	20°	3	1-1/4	24	.288	SM20-325-3
3.25	20°	4	1-1/4	32	.288	SM20-325-4
3.25	20°	4	1-3/4	32	.288	SM20-325-4L
3.5	20°	2	1/2	13	.310	SM20-350-H
3.5	20°	2	1/2	14	.310	SM20-350-HE
3.5	20°	3	1-1/4	22	.310	SM20-350-3
3.5	20°	4	1-1/4	29	.310	SM20-350-4
3.5	20°	4	1-3/4	29	.310	SM20-350-4L
3.5	20°	5	1-3/4	36	.310	SM20-350-5
3.75	20°	2	3/4	14	.332	SM20-375-S
3.75	20°	3	1-1/4	20	.332	SM20-375-3
3.75	20°	4	1-1/4	27	.332	SM20-375-4
3.75	20°	4	1-3/4	27	.332	SM20-375-4L
4	20°	1.6	1/2	10	.354	SM20-400-H
4	20°	2.2	3/4	14	.354	SM20-400-S
4	20°	3	1-1/4	19	.354	SM20-400-3
4	20°	4	1-1/4	25	.354	SM20-400-4
4	20°	5	1-3/4	32	.354	SM20-400-5
4	20°	6	1-3/4	38	.354	SM20-400-6
4	20°	8	4	51	.354	SM84-400
4.25	20°	3	1-1/4	18	.377	SM20-425-3
4.25	20°	4	1-1/4	24	.377	SM20-425-4
4.25	20°	4	1-3/4	24	.377	SM20-425-4L
4.5	20°	2	3/4	11	.399	SM20-450-S
4.5	20°	3	1-1/4	18	.399	SM20-450-3
4.5	20°	4	1-1/4	22	.399	SM20-450-4
4.5	20°	4	1-3/4	22	.399	SM20-450-4L
4.5	20°	5	1-3/4	28	.399	SM20-450-5
4.75	20°	3	1-1/4	16	.421	SM20-475-3
4.75	20°	4	1-1/4	21	.421	SM20-475-4
5	20°	2	3/4	10	.443	SM20-500-S
5	20°	3	1-1/4	15	.443	SM20-500-3
5	20°	4	1-1/4	20	.443	SM20-500-4
5	20°	5	1-3/4	25	.443	SM20-500-5
5	20°	6	1-3/4	30	.443	SM20-500-6
5	20°	7.9	4	40	.443	SM84-500

SERIES CONTINUED ON NEXT PAGE ->

SM20 & SM84 Series

Module 20° PA

Finishing
Non-Topping
Disc Type



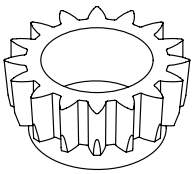
2.25/DP = WD

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
5.25	20°	4	1-1/4	20	.465	SM20-525-4
5.25	20°	4	1-3/4	20	.465	SM20-525-4L
5.5	20°	2.2	3/4	10	.487	SM20-550-S
5.5	20°	3	1-1/4	14	.487	SM20-550-3
5.5	20°	4	1-1/4	18	.487	SM20-550-4
5.5	20°	4	1-3/4	18	.487	SM20-550-4L
5.5	20°	5	1-3/4	23	.487	SM20-550-5
5.75	20°	3	1-1/4	13	.509	SM20-575-3
5.75	20°	4	1-1/4	17	.509	SM20-575-4
6	20°	2.4	3/4	10	.532	SM20-600-S
6	20°	4	1-1/4	17	.532	SM20-600-4
6	20°	5	1-3/4	22	.532	SM20-600-5
6	20°	6	1-3/4	25	.532	SM20-600-6
6	20°	8	4	34	.532	SM84-600
6.5	20°	2.3	3/4	8	.576	SM20-650-S
6.5	20°	4	1-1/4	16	.576	SM20-650-4
6.5	20°	4	1-3/4	16	.576	SM20-650-4L
6.5	20°	5	1-3/4	20	.576	SM20-650-5
6.5	20°	6	1-3/4	24	.576	SM20-650-6
7	20°	2.75	3/4	10	.620	SM20-700-S
7	20°	4	1-1/4	15	.620	SM20-700-4
7	20°	5	1-3/4	18	.620	SM20-700-5
7	20°	6	1-3/4	22	.620	SM20-700-6
7	20°	8	4	29	.620	SM84-700
7.5	20°	4	1-1/4	14	.664	SM20-750-4
8	20°	2.6	3/4	8	.709	SM20-800-S
8	20°	4	1-1/4	13	.709	SM20-800-4
8	20°	4	1-3/4	13	.709	SM20-800-4L
8	20°	5	1-3/4	16	.709	SM20-800-5
8	20°	6	1-3/4	19	.709	SM20-800-6
8	20°	7.9	4	25	.709	SM84-800
9	20°	2.6	3/4	7	.797	SM20-900-S
9	20°	4	1-1/4	12	.797	SM20-900-4
9	20°	5	1-3/4	14	.797	SM20-900-5
9	20°	8.1	4	23	.797	SM84-900
10	20°	4	1-1/4	10	.886	SM20-1000-4
10	20°	5	1-3/4	13	.886	SM20-1000-5
10	20°	6	1-3/4	15	.886	SM20-1000-6
10	20°	7.9	4	20	.886	SM84-010
11	20°	4	1-1/4	9	.974	SM20-1100-4
11	20°	5	1-3/4	12	.974	SM20-1100-5
12	20°	5	1-3/4	11	1.063	SM20-1200-5
12	20°	6	1-3/4	13	1.063	SM20-1200-6
12	20°	8	4	17	1.063	SM84-012
13	20°	6	1-3/4	12	1.152	SM20-1300-6
14	20°	6.6	1-3/4	12	1.240	SM20-1400-6
14	20°	8	4	15	1.240	SM84-014
16	20°	7	1-3/4	12	1.417	SM20-1600-7
16	20°	8.2	4	13	1.417	SM84-016
18	20°	8.5	4	12	1.595	SM84-018
20	20°	8.7	4	11	1.771	SM84-020
22	20°	8.7	4	10	1.949	SM84-022

SMD20 Series

Module 20° PA

Finishing
Non-Topping
Deep Counter Bore Type



2.25/DP = WD

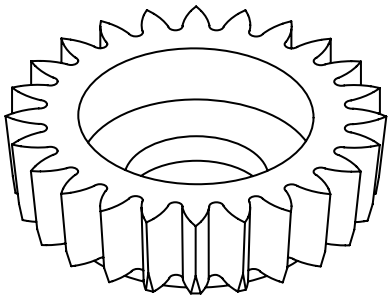
Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.75	20°	3	1-1/4	100	.067	SMD20-075-3
1	20°	1.5	1/2	38	.089	SMD20-100-H
1	20°	3	1-1/4	76	.089	SMD20-100-3
1.25	20°	3	1-1/4	60	.111	SMD20-125-3
1.5	20°	1.5	1/2	26	.133	SMD20-150-H
1.5	20°	4	1-3/4	68	.133	SMD20-150-4L
1.75	20°	3	1-1/4	44	.155	SMD20-175-3
2	20°	1.5	1/2	19	.177	SMD20-200-H
2	20°	1.9	3/4	24	.177	SMD20-200-S
2	20°	3	1-1/4	38	.177	SMD20-200-3
2	20°	4	1-1/4	50	.177	SMD20-200-4
2.25	20°	3	1-1/4	34	.199	SMD20-225-3
2.5	20°	1.5	1/2	15	.221	SMD20-250-H
2.5	20°	3	1-1/4	30	.221	SMD20-250-3
2.75	20°	1.5	1/2	14	.244	SMD20-275-H
3	20°	1.5	1/2	14	.266	SMD20-300-H
3	20°	4	1-1/4	34	.266	SMD20-300-4
3.25	20°	3	1-1/4	24	.288	SMD20-325-3
3.5	20°	2	3/4	13	.310	SMD20-350-S
3.5	20°	3	1-1/4	22	.310	SMD20-350-3
3.5	20°	4	1-1/4	29	.310	SMD20-350-4
3.75	20°	3	1-1/4	20	.332	SMD20-375-3
4	20°	2	3/4	12	.354	SMD20-400-S
4	20°	3	1-1/4	19	.354	SMD20-400-3
4	20°	4	1-1/4	25	.354	SMD20-400-4
4	20°	6.3	1-3/4	40	.354	SMD20-400-6E
4.5	20°	4	1-1/4	22	.399	SMD20-450-4
4.75	20°	4	1-1/4	21	.421	SMD20-475-4
5	20°	2	3/4	10	.443	SMD20-500-S
5	20°	4	1-1/4	20	.443	SMD20-500-4
5.5	20°	4	1-1/4	18	.487	SMD20-550-4
6	20°	4	1-1/4	17	.532	SMD20-600-4
6.5	20°	4	1-1/4	16	.576	SMD20-650-4
7	20°	4	1-1/4	15	.620	SMD20-700-4
8	20°	5	1-3/4	16	.709	SMD20-800-5
9	20°	4	1-1/4	12	.797	SMD20-900-4
10	20°	5	1-3/4	13	.886	SMD20-1000-5

Module	PA	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
1/1.75	20°	3	1-1/4	76	.067	SMF20-100-3
1.25/1	20°	3	1-1/4	60	.089	SMF20-125-3
1.5/1.25	20°	3	1-1/4	51	.107	SMF20-150-3
1.5/1.25	20°	4	1-1/4	68	.107	SMF20-150-4
1.75/1.5	20°	3	1-1/4	43	.133	SMF20-175-3
1.75/1.5	20°	4	1-1/4	58	.133	SMF20-175-4
2/1.75	20°	3	1-1/4	38	.155	SMF20-200-3
2/1.75	20°	4	1-1/4	50	.155	SMF20-200-4
2.5/2	20°	3	1-1/4	30	.177	SMF20-250-3
3/2.25	20°	3	1-1/4	25	.199	SMF20-300-3
3/2.25	20°	4	1-1/4	34	.199	SMF20-300-4
3.25/2.5	20°	3	1-1/4	24	.221	SMF20-325-3
3.5/2.5	20°	4	1-1/4	29	.222	SMF20-350-4
3.75/2.75	20°	4	1-1/4	27	.244	SMF20-375-4
4/3	20°	4	1-1/4	25	.266	SMF20-400-4
5/3.75	20°	4	1-1/4	20	.331	SMF20-500-4
5.25/4	20°	4	1-3/4	19	.354	SMF20-525-4L
6/4.5	20°	4	1-1/4	17	.399	SMF20-600-4
7/5.25	20°	4	1-1/4	15	.465	SMF20-700-4
8/6	20°	4	1-1/4	13	.532	SMF20-800-4

SMF20 Series

Module 20° PA Stub

Combination Pitch
Finishing, Non-Topping
Disc Type



2.25/DP*=WD

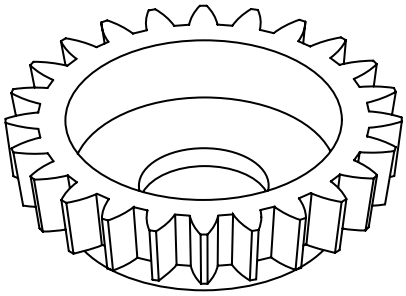
**Denominator*
The combination pitch (stub tooth) has a 20° pressure angle with a shorter addendum & dedendum. The stub tooth is expressed as a fraction. The numerator of the fraction is used to determine the pitch diameter, circular pitch and the tooth thickness. The denominator determines the addendum, dedendum, clearance and the depth of the tooth.

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx ")	Protuberance Approx.	Series
1	20°	3	1-1/4	76	.097	.006	.000	SMG20-100-3
1.25	20°	3	1-1/4	60	.116	.006	.000	SMG20-125-3
1.5	20°	3	1-1/4	51	.139	.006	.000	SMG20-150-3
2	20°	4	1-1/4	50	.185	.008	.000	SMG20-200-4
2.25	20°	3	1-1/4	34	.208	.008	.006	SMG20-225-3
2.5	20°	3	1-1/4	30	.231	.008	.006	SMG20-250-3
2.5	20°	4	1-1/4	40	.231	.010	.006	SMG20-250-4
3	20°	4	1-1/4	34	.278	.012	.006	SMG20-300-4
3.5	20°	4	1-1/4	29	.324	.012	.006	SMG20-350-4
4	20°	4	1-1/4	25	.370	.012	.006	SMG20-400-4
4.25	20°	4	1-1/4	24	.393	.012	.006	SMG20-425-4
4.5	20°	4	1-1/4	22	.416	.012	.006	SMG20-450-4
5	20°	4	1-1/4	20	.463	.012	.006	SMG20-500-4
6	20°	4	1-1/4	17	.555	.014	.007	SMG20-600-4
8	20°	5	1-3/4	16	.740	.015	.008	SMG20-800-5

SMG20 Series

Module 20° PA Pre-Grind

Non-Topping
Disc Type



2.35/DP = WD

SMS20 Series

Module 20° PA Pre-Shave

Non-Topping

Disc Type

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Thin (Approx “)	Protuberance Approx.	Series
1	20°	3	1-1/4	76	.097	.002	.000	SMS20-100-3
1.5	20°	3	1-1/4	51	.145	.002	.001	SMS20-150-3
2	20°	4	1-1/4	50	.193	.002	.001	SMS20-200-4
2.5	20°	4	1-1/4	40	.241	.002	.002	SMS20-250-4
3	20°	4	1-1/4	34	.289	.003	.002	SMS20-300-4
4	20°	4	1-1/4	25	.386	.003	.002	SMS20-400-4

SM25 Series

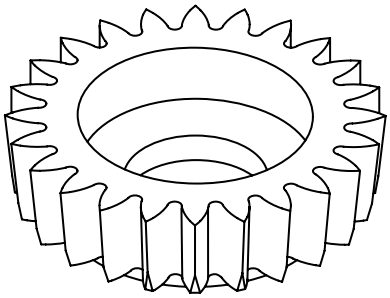
Module 25° PA

Finishing

Non-Topping

Disc Type

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.6	25°	1.5	1/2	64	.054	SM25-060-H
.75	25°	3	1-1/4	100	.067	SM25-075-3
1	25°	1.5	1/2	38	.089	SM25-100-H
1	25°	3	1-1/4	76	.089	SM25-100-3
1.25	25°	3	1-1/4	60	.111	SM25-125-3
1.5	25°	1.5	1/2	25	.133	SM25-150-H
1.5	25°	4	1-1/4	68	.133	SM25-150-4
1.75	25°	1.5	1/2	22	.155	SM25-175-H
1.75	25°	3	1-1/4	44	.155	SM25-175-3
2	25°	1.5	1/2	19	.177	SM25-200-H
2	25°	3	1-1/4	38	.177	SM25-200-3
2	25°	4	1-1/4	50	.177	SM25-200-4
2.25	25°	1.5	1/2	17	.199	SM25-225-H
2.25	25°	3	1-1/4	34	.199	SM25-225-3
2.5	25°	1.5	1/2	15	.222	SM25-250-H
2.5	25°	3	1-1/4	30	.222	SM25-250-3
2.5	25°	4	1-1/4	40	.222	SM25-250-4
3	25°	1.5	1/2	14	.266	SM25-300-H
3	25°	3	1-1/4	25	.266	SM25-300-3
3	25°	4	1-1/4	34	.266	SM25-300-4
3.5	25°	3	1-1/4	22	.310	SM25-350-3
3.5	25°	4	1-1/4	29	.310	SM25-350-4
4	25°	2.5	3/4	14	.354	SM25-400-S
4	25°	3	1-1/4	19	.354	SM25-400-3
4	25°	4	1-1/4	25	.354	SM25-400-4
4	25°	5	1-1/4	32	.354	SM25-400-5
4.5	25°	3	1-1/4	17	.398	SM25-450-3
5	25°	3	1-1/4	15	.443	SM25-500-3
5	25°	4	1-1/4	20	.443	SM25-500-4
5.75	25°	4	1-1/4	18	.491	SM25-575-4
6	25°	4	1-1/4	17	.532	SM25-600-4
6	25°	5	1-3/4	21	.532	SM25-600-5
8	25°	4	1-1/4	13	.709	SM25-800-4
8	25°	5	1-3/4	16	.709	SM25-800-5
10	25°	5	1-3/4	13	.886	SM25-1000-5
11	25°	6	1-3/4	14	.974	SM25-1100-6
12	25°	6	1-3/4	13	1.063	SM25-1200-6



2.25/DP = WD

1 MOD and finer, WD=2.2/DP+.002

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
1.5	25°	3	1-1/4	51	.138	SMR25-150-3
1.5	25°	4	1-1/4	68	.138	SMR25-150-4
1.75	25°	3	1-1/4	44	.161	SMR25-175-3
2	25°	3	1-1/4	38	.184	SMR25-200-3
2.5	25°	3	1-1/4	30	.230	SMR25-250-3
3	25°	4	1-1/4	34	.276	SMR25-300-4
3.5	25°	4	1-1/4	29	.322	SMR25-350-4
4	25°	5	1-3/4	32	.368	SMR25-400-5
4.25	25°	4	1-1/4	24	.391	SMR25-425-4
5	25°	4	1-1/4	20	.460	SMR25-500-4
6	25°	4	1-1/4	17	.552	SMR25-600-4
8	25°	4	1-1/4	13	.735	SMR25-800-4

SMR25 Series

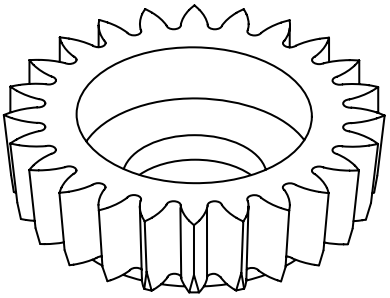
Module DP 25° PA

Full Fillet

Finishing

Non-Topping

Disc Type



2.335/DP = WD

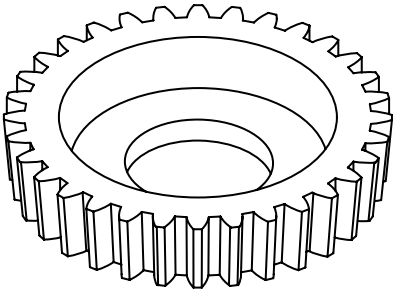
Module	Pressure Angle	Pitch Dia.	Bore	No. Teeth	WD	Spline Type	Series
1	20°	3	1-1/4	76	.047	External	SMJA-100-3
1	20°	4	1-1/4	102	.047	External	SMJA-100-4
1.25	20°	3	1-1/4	61	.059	External	SMJA-125-3
1.25	20°	4	1-1/4	81	.059	External	SMJA-125-4
1.5	20°	3	1-1/4	51	.071	External	SMJA-150-3
1.5	20°	4	1-1/4	68	.071	External	SMJA-150-4
1.66	20°	3	1-1/4	46	.079	External	SMJA-166-3
1.66	20°	4	1-1/4	62	.079	External	SMJA-166-4
2.0	20°	3	1-1/4	39	.095	External	SMJA-200-3
2	20°	4	1-1/4	51	.095	External	SMJA-200-4
2.5	20°	3	1-1/4	31	.118	External	SMJA-250-3
2.5	20°	4	1-1/4	41	.118	External	SMJA-250-4
3	20°	3	1-1/4	26	.142	External	SMJA-300-3
3.75	20°	3	1-1/4	21	.177	External	SMJA-375-3
3.75	20°	4	1-1/4	27	.177	External	SMJA-375-4
4.5	20°	3	1-1/4	17	.213	External	SMJA-450-3
4.5	20°	4	1-1/4	23	.213	External	SMJA-450-4
5	20°	2	3/4	10	.236	External	SMJA-500-S
5	20°	2	3/4	10	.195	Internal	SMJI-500-S
5	20°	4	1-1/4	21	.236	External	SMJA-500-4
5	20°	4	1-1/4	20	.223	Internal	SMJI-500-4

SMJA Series

Module Japanese/French Industrial Standard

Involute Spline

Disc Type



1.2/DP = WD

Module	Pressure Angle	Pitch Dia.	Bore	No. Teeth	Whole Depth	Series
.5	30°	1.5	1/2	75	.0216	SM30-050-H
.6	30°	1.5	1/2	64	.0259	SM30-060-H
.75	30°	1.5	1/2	50	.0324	SM30-075-H
.8	30°	1.5	1/2	46	.0346	SM30-080-H
.8	30°	3	1-1/4	96	.0346	SM30-080-3
1	30°	1.5	1/2	38	.0433	SM30-100-H
1	30°	3	1-1/4	76	.0433	SM30-100-3
1	30°	4	1-1/4	100	.0433	SM30-100-4
1.25	30°	1.5	1/2	30	.0541	SM30-125-H
1.25	30°	3	1-1/4	60	.0541	SM30-125-3
1.25	30°	4	1-1/4	80	.0541	SM30-125-4
1.5	30°	1.5	1/2	26	.0649	SM30-150-H
1.5	30°	3	1-1/4	51	.0649	SM30-150-3
1.5	30°	4	1-1/4	68	.0649	SM30-150-4
1.75	30°	1.5	1/2	22	.0757	SM30-175-H
1.75	30°	3	1-1/4	44	.0757	SM30-175-3
2	30°	1.5	1/2	20	.0866	SM30-200-H
2	30°	3	1-1/4	38	.0866	SM30-200-3
2	30°	4	1-1/4	50	.0866	SM30-200-4
2	30°	5	1-3/4	64	.0866	SM30-200-5
2.25	30°	3	1-1/4	34	.0974	SM30-225-3
2.5	30°	1.5	1/2	15	.1082	SM30-250-H
2.5	30°	3	1-1/4	30	.1082	SM30-250-3
2.5	30°	4	1-1/4	40	.1082	SM30-250-4
2.75	30°	1.5	1/2	14	.1190	SM30-275-H
2.75	30°	3	1-1/4	28	.1190	SM30-275-3
3	30°	1.5	1/2	14	.1299	SM30-300-H
3	30°	3	1-1/4	25	.1299	SM30-300-3
3	30°	4	1-1/4	34	.1299	SM30-300-4
3.5	30°	3	1-1/4	22	.1299	SM30-350-3
4	30°	2	3/4	12	.1732	SM30-400-S
4	30°	3	1-1/4	19	.1732	SM30-400-3
4	30°	4	1-1/4	25	.1732	SM30-400-4
5	30°	2	3/4	10	.2165	SM30-500-S
5	30°	3	1-1/4	15	.2165	SM30-500-3
5	30°	4	1-1/4	20	.2165	SM30-500-4
5	30°	5	1-3/4	25	.2165	SM30-500-5
6	30°	2	3/4	9	.2598	SM30-600-S
6	30°	3	1-1/4	13	.2598	SM30-600-3
6	30°	4	1-1/4	17	.2598	SM30-600-4
6	30°	5	1-3/4	21	.2598	SM30-600-5
8	30°	2.5	3/4	8	.3464	SM30-800-S
8	30°	4	1-1/4	13	.3464	SM30-800-4
8	30°	5	1-3/4	16	.3464	SM30-800-5
10	30°	4	1-1/4	10	.4330	SM30-1000-4
10	30°	5	1-3/4	13	.4330	SM30-1000-5

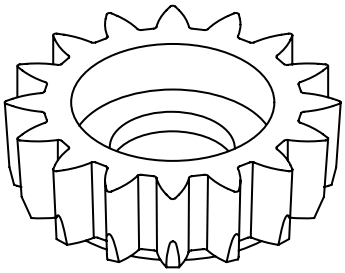
SM30 Series

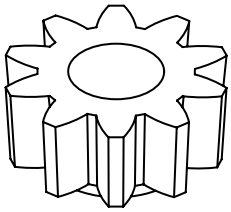
Module DIN 5480

Flat Root

Involute Spline

Disc Type





1.1/DP = WD
.45/DP = Addendum of part
.65/DP= Dedendum of part

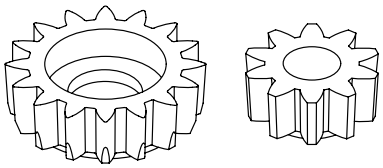
SMA30 Series

Module ANSI B92.2M-1980

Flat Root

Involute Spline

Disc Type



ANSI B92.2M-1980,
1.25/DP = WD

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.4	30°	1.5	1/2	96	.020	SMA30-040-H
.5	30°	1.5	1/2	75	.025	SMA30-050-H
.7	30°	1.5	1/2	54	.034	SMA30-070-H
.75	30°	1.5	1/2	50	.037	SMA30-075-H
.75	30°	3	1-1/4	102	.037	SMA30-075-3
1	30°	1.5	1/2	38	.049	SMA30-100-H
1	30°	3	1-1/4	76	.049	SMA30-100-3
1	30°	4	1-1/4	100	.049	SMA30-100-4
1.25	30°	1.5	1/2	30	.062	SMA30-125-H
1.25	30°	3	1-1/4	60	.062	SMA30-125-3
1.25	30°	4	1-1/4	80	.062	SMA30-125-4
1.5	30°	1.5	1/2	26	.074	SMA30-150-H
1.5	30°	3	1-1/4	51	.074	SMA30-150-3
1.5	30°	4	1-1/4	68	.074	SMA30-150-4
1.75	30°	1.5	1/2	22	.086	SMA30-175-H
1.75	30°	3	1-1/4	44	.086	SMA30-175-3
1.75	30°	4	1-1/4	58	.086	SMA30-175-4
2	30°	1.5	1/2	20	.098	SMA30-200-H
2	30°	3	1-1/4	38	.098	SMA30-200-3
2	30°	4	1-1/4	50	.098	SMA30-200-4
2	30°	5	1-3/4	64	.098	SMA30-200-5
2.25	30°	1.5	1/2	17	.111	SMA30-225-H
2.25	30°	3	1-1/4	34	.111	SMA30-225-3
2.5	30°	1.5	1/2	15	.123	SMA30-250-H
2.5	30°	3	1-1/4	30	.123	SMA30-250-3
2.5	30°	4	1-1/4	40	.123	SMA30-250-4
2.5	30°	5	1-3/4	50	.123	SMA30-250-5
3	30°	1.5	1/2	14	.148	SMA30-300-H
3	30°	3	1-1/4	25	.148	SMA30-300-3
3	30°	4	1-1/4	34	.148	SMA30-300-4
3	30°	5	1-3/4	42	.148	SMA30-300-5
3.5	30°	3	1-1/4	22	.172	SMA30-350-3
4	30°	2	3/4	12	.197	SMA30-400-S
4	30°	3	1-1/4	19	.197	SMA30-400-3
4	30°	4	1-1/4	25	.197	SMA30-400-4
4	30°	5	1-3/4	32	.197	SMA30-400-5
5	30°	2	3/4	10	.246	SMA30-500-S
5	30°	3	1-1/4	15	.246	SMA30-500-3
5	30°	4	1-1/4	20	.246	SMA30-500-4
5	30°	5	1-3/4	25	.246	SMA30-500-5
6	30°	3	1-1/4	13	.295	SMA30-600-3
6	30°	4	1-1/4	17	.295	SMA30-600-4
8	30°	2.5	3/4	8	.394	SMA30-800-S
8	30°	4	1-1/4	13	.394	SMA30-800-4
10	30°	4	1-1/4	10	.492	SMA30-1000-4
10	30°	5	1-3/4	13	.492	SMA30-1000-5

Module	PA	# Teeth in Part	Pitch Dia.	Bore	No. Teeth	WD	Series
1.6	30°	8-14	1.5	1/2	24	.059	S2ME30-160-H
1.6	30°	8-14	3	1-1/4	48	.065	S2ME30-160-3
1.75	30°	15-18	1.5	1/2	22	.079	S2ME30-175-H
1.75	30°	15-18	3	1-1/4	44	.079	S2ME30-175-3
1.90	30°	19-21	1.5	1/2	20	.079	S2ME30-190-H
1.90	30°	19-21	3	1-1/4	40	.079	S2ME30-190-3
1.90	30°	19-21	5	1-3/4	66	.079	S2ME30-190-5
2	30°	22-28	1.5	1/2	19	.108	S2ME30-200-H
2	30°	22-28	3	1-1/4	38	.108	S2ME30-200-3
2	30°	22-28	5	1-3/4	63	.108	S2ME30-200-5
2.1	30°	29-36	1.5	1/2	20	.114	S2ME30-210-H
2.1	30°	29-36	3	1-1/4	36	.114	S2ME30-210-3
2.1	30°	29-36	5	1-3/4	60	.114	S2ME30-210-5
2.25	30°	37-44	1.5	1/2	18	.114	S2ME30-225-H
2.25	30°	37-44	3	1-1/4	34	.114	S2ME30-225-3
2.25	30°	37-44	4	1-1/4	45	.114	S2ME30-225-4
2.25	30°	37-44	5	1-3/4	56	.114	S2ME30-225-4

S2ME30 Series

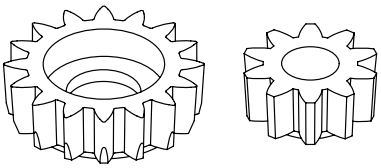
Module DIN 5482

Flat Root

Involute Spline

Disc Type

Non-Chamfering for External



Module	PA	# Teeth in Part	Pitch Dia.	Bore	No. Teeth	WD	Series
1.6	30°	use shank shaper					
1.75	30°						
1.90	30°						
2	30°	24-25	1.5	1/2	19	.098	S2MI30-200-24H
2	30°	25	1.5	1/2	19	.093	S2MI30-200-25HE
2	30°	26-28	1.5	1/2	19	.093	S2MI30-200-26H
2.1	30°	29-30	1.8	3/4	22	.098	S2MI30-210-S
2.1	30°	31-36	2	3/4	24	.121	S2MI30-210-SE
2.25	30°	37-44	1.5	1/2	18	.114	S2MI30-225-H
2.25	30°	37-44	2.0	3/4	24	.120	S2MI30-225-S

S2MI30 Series

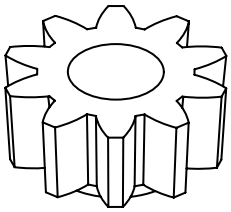
Module DIN 5482

Flat Root

Involute Spline

Disc Type

Chamfering for Internal

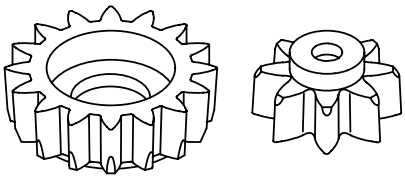


Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.4	30°	1.5	1/2	96	.022	SMF30-040-H
.5	30°	1.5	1/2	75	.028	SMF30-050-H
.6	30°	1.5	1/2	64	.033	SMF30-060-H
.7	30°	1.5	1/2	54	.039	SMF30-070-H
.75	30°	1.5	1/2	50	.041	SMF30-075-H
.75	30°	3	1-1/4	102	.041	SMF30-075-3
.75	30°	4	1-1/4	150	.041	SMF30-075-4
.8	30°	1.5	1/2	46	.044	SMF30-080-H
.9	30°	1.5	1/2	42	.050	SMF30-090-H
1	30°	1.5	1/2	38	.055	SMF30-100-H
1	30°	3	1-1/4	76	.055	SMF30-100-3
1	30°	4	1-1/4	100	.055	SMF30-100-4
1.25	30°	1.5	1/2	30	.069	SMF30-125-H
1.25	30°	3	1-1/4	60	.069	SMF30-125-3
1.25	30°	4	1-1/4	80	.069	SMF30-125-4
1.5	30°	1.5	1/2	26	.083	SMF30-150-H
1.5	30°	3	1-1/4	51	.083	SMF30-150-3
1.5	30°	4	1-1/4	68	.083	SMF30-150-4
1.75	30°	1.5	1/2	22	.097	SMF30-175-H
1.75	30°	3	1-1/4	44	.097	SMF30-175-3
1.75	30°	4	1-1/4	58	.097	SMF30-175-4
2	30°	1.5	1/2	19	.110	SMF30-200-H
2	30°	3	1-1/4	38	.110	SMF30-200-3
2	30°	4	1-1/4	50	.110	SMF30-200-4
2	30°	5	1-3/4	64	.110	SMF30-200-5
2.25	30°	3	1-1/4	34	.124	SMF30-225-3
2.25	30°	4	1-1/4	45	.124	SMF30-225-4
2.5	30°	3	1-1/4	30	.138	SMF30-250-3
2.5	30°	4	1-1/4	40	.138	SMF30-250-4
3	30°	1.5	1/2	14	.165	SMF30-300-H
3	30°	3	1-1/4	25	.165	SMF30-300-3
3	30°	4	1-1/4	34	.165	SMF30-300-4
3	30°	5	1-3/4	42	.165	SMF30-300-5
4	30°	3	1-1/4	19	.221	SMF30-400-3
4	30°	4	1-1/4	25	.221	SMF30-400-4
5	30°	1.5	1/2	8	.276	SMF30-500-H
5	30°	4	1-1/4	20	.276	SMF30-500-4
6	30°	4	1-1/4	17	.331	SMF30-600-4
8	30°	2.5	3/4	8	.441	SMF30-800-S
8	30°	4	1-1/4	13	.441	SMF30-800-4
10	30°	5	1-3/4	13	.551	SMF30-1000-5

SMF30 Series

Module 30° PA
ANSI B92.2m-1980
Fillet Root

Involute Spline
Disc Type

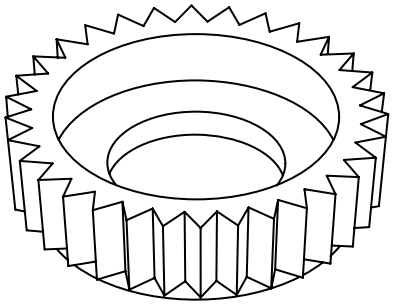


ANSI B92.2M-1980
1.4/DP = WD

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.5	37.5°	1.5	1/2	75	.023	SM37-050-H
.75	37.5°	1.5	1/2	48	.034	SM37-075-H
.75	37.5°	3	1-1/4	100	.034	SM37-075-3
.75	37.5°	4	1-1/4	135	.034	SM37-075-4
1	37.5°	1.5	1/2	38	.045	SM37-100-H
1	37.5°	3	1-1/4	76	.045	SM37-100-3
1.25	37.5°	1.5	1/2	30	.057	SM37-125-H
1.25	37.5°	3	1-1/4	60	.057	SM37-125-3
1.5	37.5°	1.5	1/2	25	.068	SM37-150-H
1.5	37.5°	3	1-1/4	50	.068	SM37-150-3
2	37.5°	1.5	1/2	19	.091	SM37-200-H
2	37.5°	3	1-1/4	38	.091	SM37-200-3
2	37.5°	4	1-1/4	50	.091	SM37-200-4
2.5	37.5°	3	1-1/4	30	.113	SM37-250-3
3	37.5°	3	1-1/4	25	.136	SM37-300-3
4	37.5°	3	1-1/4	19	.181	SM37-400-3
4	37.5°	4	1-1/4	25	.181	SM37-400-4
5	37.5°	4	1-1/4	20	.226	SM37-500-4
6	37.5°	4	1-1/4	16	.272	SM37-600-4

SM37 Series

Module 37.5° PA
ANSI B92.2m-1980
Fillet Root
Involute Spline
Disc Type

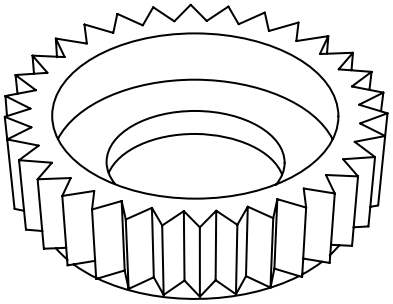


ANSI B92.2M-1980
1.15/DP = WD

Module	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
.4	45°	1.5	1/2	96	.016	SM45-040-H
.5	45°	1.5	1/2	75	.020	SM45-050-H
.6	45°	1.5	1/2	62	.025	SM45-060-H
.6	45°	3	1-1/4	127	.025	SM45-060-3
.7	45°	1.5	1/2	54	.028	SM45-070-H
.75	45°	1.5	1/2	48	.030	SM45-075-H
.75	45°	3	1-1/4	102	.030	SM45-075-3
.8	45°	1.5	1/2	46	.032	SM45-080-H
1	45°	1.5	1/2	38	.039	SM45-100-H
1	45°	2.5	1-1/4	64	.039	SM45-100-3
1	45°	4.0	1-1/4	100	.039	SM45-100-4
1.25	45°	1.5	1/2	30	.049	SM45-125-H
1.25	45°	2.5	1-1/4	51	.049	SM45-125-3
1.5	45°	1.5	1/2	25	.059	SM45-150-H
1.5	45°	3	1-1/4	51	.059	SM45-150-3
1.75	45°	1.5	1/2	22	.069	SM45-175-H
1.75	45°	3	1-1/4	44	.069	SM45-175-3
2	45°	1.5	1/2	19	.079	SM45-200-H
2	45°	3	1-1/4	38	.079	SM45-200-3
2.25	45°	3	1-1/4	34	.089	SM45-225-3
2.5	45°	3	1-1/4	30	.098	SM45-250-3

SM45 Series

Module 45° PA
ANSI B92.2m-1980
Fillet Root
Involute Spline
Disc Type

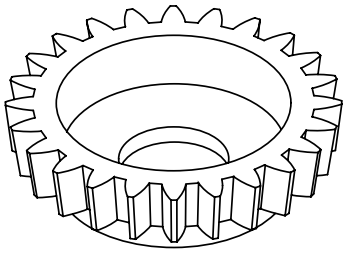


ANSI B92.2M-1980
1.00/DP = WD

SC14 Series

Circular Pitch 14.5° PA

Finishing
Non-Topping
Disc Type

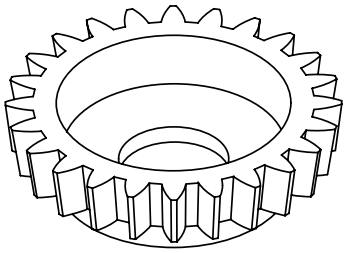


CP (Fraction)	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
1/16	14.5°	3	1-1/4	150	.046	SC14-006-3
1/10	14.5°	1.5	1/2	47	.072	SC14-010-H
1/10	14.5°	3	1-1/4	94	.072	SC14-010-3
1/10	14.5°	4	1-1/4	126	.072	SC14-010-4
1/8	14.5°	1.5	1/2	38	.090	SC14-012-H
1/8	14.5°	3	1-1/4	76	.090	SC14-012-3
1/8	14.5°	4	1-1/4	100	.090	SC14-012-4
1/8	14.5°	5	1-3/4	125	.090	SC14-012-5
1/6	14.5°	3	1-1/4	56	.119	SC14-016-3
3/16	14.5°	3	1-1/4	50	.134	SC14-018-3
1/5	14.5°	3	1-1/4	47	.143	SC14-020-3
1/4	14.5°	3	1-1/4	38	.179	SC14-025-3
1/4	14.5°	4	1-1/4	50	.179	SC14-025-4
1/4	14.5°	5	1-3/4	64	.179	SC14-025-5
5/16	14.5°	3	1-1/4	30	.224	SC14-031-3
1/3	14.5°	3	1-1/4	28	.239	SC14-033-3
1/3	14.5°	4	1-1/4	38	.239	SC14-033-4
3/8	14.5°	4	1-1/4	34	.269	SC14-037-4
7/16	14.5°	3	1-1/4	21	.313	SC14-043-3
7/16	14.5°	4	1-1/4	29	.313	SC14-043-4
1/2	14.5°	3	1-1/4	19	.358	SC14-050-3
1/2	14.5°	4	1-1/4	25	.358	SC14-050-4
1/2	14.5°	5	1-3/4	31	.358	SC14-050-5
9/16	14.5°	4	1-1/4	22	.403	SC14-056-4
5/8	14.5°	3	1-1/4	15	.448	SC14-062-3
5/8	14.5°	4	1-1/4	20	.448	SC14-062-4
3/4	14.5°	4	1-1/4	17	.537	SC14-075-4
3/4	14.5°	5	1-3/4	21	.537	SC14-075-5
7/8	14.5°	4	1-1/4	14	.627	SC14-087-4
1	14.5°	4	1-1/4	13	.716	SC14-100-4
1-1/8	14.5°	4	1-1/4	11	.806	SC14-112-4
1-1/4	14.5°	4	1-1/4	10	.895	SC14-125-4
1-3/8	14.5°	5	1-3/4	11	.985	SC14-137-5
1-1/2	14.5°	5	1-3/4	11	1.074	SC14-150-5
1-1/2	14.5°	6	1-3/4	13	1.074	SC14-150-6
1-3/4	14.5°	7	1-3/4	12	1.253	SC14-175-7
2	14.5°	7	1-3/4	11	1.426	SC14-200-7

SC20 Series

Circular Pitch 20° PA

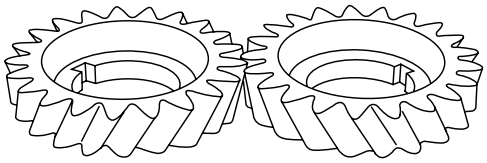
Finishing
Non-Topping
Disc Type



CP (Fraction)	PA	Pitch Dia.	Bore	No. Teeth	WD	Series
1/20	20°	1.5	1/2	96	.037	SC20-005-H
1/16	20°	3	1-1/4	150	.046	SC20-006-3
1/10	20°	1.5	1/2	47	.072	SC20-010-H
1/10	20°	3	1-1/4	94	.072	SC20-010-3
1/8	20°	1.5	1/2	38	.090	SC20-012-H
1/8	20°	3	1-1/4	76	.090	SC20-012-3
1/8	20°	4	1-1/4	100	.090	SC20-012-4
1/8	20°	5	1-3/4	125	.090	SC20-012-5
1/6	20°	3	1-1/4	56	.119	SC20-016-3
3/16	20°	3	1-1/4	50	.134	SC20-018-3
1/5	20°	1.5	1/2	24	.143	SC20-020-H
1/5	20°	3	1-1/4	47	.143	SC20-020-3
1/5	20°	3	1-1/4	48	.143	SC20-020-3E
1/5	20°	4	1-1/4	64	.143	SC20-020-4
1/4	20°	3	1-1/4	38	.179	SC20-025-3
1/4	20°	4	1-1/4	50	.179	SC20-025-4
1/4	20°	5	1-3/4	64	.179	SC20-025-5
5/16	20°	3	1-1/4	30	.224	SC20-031-3
1/3	20°	3	1-1/4	25	.239	SC20-033-3
1/3	20°	4	1-1/4	38	.239	SC20-033-4
3/8	20°	3	1-1/4	25	.269	SC20-037-3
3/8	20°	4	1-1/4	34	.269	SC20-037-4
7/16	20°	3	1-1/4	21	.313	SC20-043-3
7/16	20°	4	1-1/4	29	.313	SC20-043-4
1/2	20°	4	1-1/4	25	.358	SC20-050-4
1/2	20°	5	1-3/4	31	.358	SC20-050-5
9/16	20°	3	1-1/4	17	.403	SC20-056-3
5/8	20°	4	1-1/4	20	.448	SC20-062-4
3/4	20°	4	1-1/4	17	.537	SC20-075-4
7/8	20°	4	1-1/4	14	.627	SC20-087-4
1	20°	4	1-1/4	13	.716	SC20-100-4
1	20°	5	1-3/4	16	.716	SC20-100-5
1-1/8	20°	4	1-1/4	11	.806	SC20-112-4
1-1/4	20°	4	1-1/4	10	.895	SC20-125-4
1-1/4	20°	5	1-3/4	13	.895	SC20-125-5
1-1/2	20°	5	1-3/4	11	1.074	SC20-150-5
1-3/4	20°	7	1-3/4	12	1.254	SC20-175-7
2	20°	7	1-3/4	13	1.425	SC20-200-7

RR30 Series

DP 20° TPA 30° Helix Angle
Herringbone Disc Type Cutters
Finishing, Non-Topping
Right and Left Hand Per Set



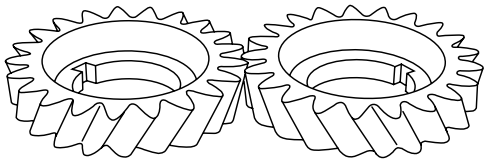
1.95/TDP = WD

Transverse Diametral Pitch	TPA	Pitch Dia.	No. Teeth	Bore	WD	Series
1.5	20°	6	9	3	1.300	RR30-150-6
1.5	20°	6	9	3-1/2	1.300	RR30-150-6L
2	20°	6	12	3	.975	RR30-200-6
2	20°	6	12	3-1/2	.975	RR30-200-6L
2.5	20°	6	15	3	.780	RR30-250-6
2.5	20°	6	15	3-1/2	.780	RR30-250-6L
3	20°	4	12	2-5/16	.650	RR30-300-4
3	20°	6	18	3	.650	RR30-300-6
3	20°	6	18	3-1/2	.650	RR30-300-6L
3.5	20°	4	14	2-5/16	.557	RR30-350-4
3.5	20°	6	21	3	.557	RR30-350-6
4	20°	4	16	2-5/16	.488	RR30-400-4
4	20°	6	24	3	.488	RR30-400-6
4	20°	6	24	3-1/2	.488	RR30-400-6L
4.5	20°	4	18	2-5/16	.433	RR30-450-4
5	20°	4	20	2-5/16	.390	RR30-500-4
5	20°	6	30	3	.390	RR30-500-6
5	20°	6	30	3-1/2	.390	RR30-500-6L
5.5	20°	6	33	3-1/2	.354	RR30-550-6L
6	20°	4	24	2-5/16	.325	RR30-600-4
6	20°	6	36	3	.325	RR30-600-6
6	20°	6	36	3-1/2	.325	RR30-600-6L

Transverse Diametral Pitch	TPA	Pitch Dia.	No. Teeth	Bore	WD	Series
7	20°	4	28	2-5/16	.279	RR30-700-4
7	20°	6	42	3	.279	RR30-700-6
7.5	20°	4	30	2-5/16	.260	RR30-750-4
8	20°	4	32	2-5/16	.244	RR30-800-4
8	20°	6	48	3	.244	RR30-800-6
8	20°	6	48	3-1/2	.244	RR30-800-6L
9	20°	4	36	2-5/16	.217	RR30-900-4
9	20°	6	54	3	.217	RR30-900-6
10	20°	4	40	2-5/16	.195	RR30-010-4
10	20°	6	60	3	.195	RR30-010-6
11	20°	4	44	2-5/16	.177	RR30-011-4
12	20°	4	48	2-5/16	.163	RR30-012-4
12	20°	6	72	3	.163	RR30-012-6
14	20°	4	56	2-5/16	.139	RR30-014-4
14	20°	6	84	3	.139	RR30-014-6
16	20°	4	64	2-5/16	.122	RR30-016-4
16	20°	6	96	3	.122	RR30-016-6
17	20°	4	68	2-5/16	.115	RR30-017-4
18	20°	4	72	2-5/16	.108	RR30-018-4
20	20°	4	80	2-5/16	.098	RR30-020-4
24	20°	4	96	2-5/16	.079	RR30-024-4

RRM30 Series

Module 20° TPA 30° Helix Angle
Herringbone Disc Type Cutters
Finishing, Non-Topping
Right and Left Hand Per Set

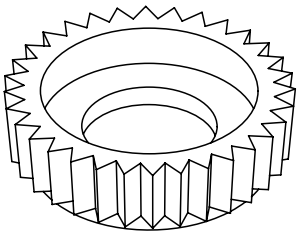


Trans. Mod. Pitch	TPA	Approx. Pitch Dia.	No. Teeth	Bore	WD	Series
5	20°	6	30	3	.384	RRM30-500-6
6	20°	6	25	3	.461	RRM30-600-6
8	20°	6	19	3	.614	RRM30-800-6
10	20°	6	15	3	.768	RRM30-010-6
12	20°	6	13	3	.921	RRM30-012-6

Nom. Dia.	Pitch Dia.	Bore	No. Teeth	WD	Series
3/16	1.5	1/2	288	.006	SS36-187-H
1/4	1.5	1/2	216	.008	SS36-250-H
1/4	3	1-1/4	432	.008	SS36-250-3
5/16	1.5	1/2	180	.010	SS36-312-H
5/16	2.25	1-1/4	260	.010	SS36-312-2
3/8	1.5	1/2	144	.013	SS36-375-H
3/8	2.25	1-1/4	228	.013	SS36-375-2
3/8	3	1-1/4	300	.013	SS36-375-3
1/2	1.5	1/2	108	.016	SS36-500-H
1/2	3	1-1/4	225	.016	SS36-500-3
9/16	1.5	1/2	96	.019	SS36-563-H
5/8	1.5	1/2	93	.022	SS36-625-H
5/8	3	1-1/4	180	.022	SS36-625-3
3/4	1.5	1/2	72	.027	SS36-750-H
3/4	3	1-1/4	144	.027	SS36-750-3
7/8	1.5	1/2	64	.036	SS36-875-H
7/8	3	1-1/4	128	.036	SS36-875-3
1	1.5	1/2	54	.035	SS36-010-H
1	3	1-1/4	108	.035	SS36-010-3

SS36 Series

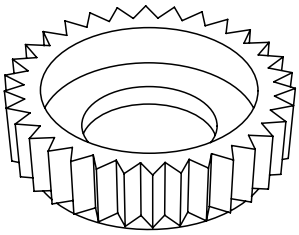
36 Tooth SAE 45°
Straight Sided Serrations
Finishing
Non-Topping
Disc Type



Nom. Dia.	Pitch Dia.	Bore	No. Teeth	WD	Series
1/2	1.5	1/2	150	.013	SS48-500-H
3/4	1.5	1/2	90	.019	SS48-750-H
3/4	3	1-1/4	192	.019	SS48-750-3
7/8	1.5	1/2	80	.023	SS48-875-H
7/8	3	1-1/4	160	.023	SS48-875-3
1	3	1-1/4	150	.026	SS48-010-3
1-1/8	3	1-1/4	144	.029	SS48-011-3
1-1/4	3	1-1/4	120	.035	SS48-012-3
1-1/2	3	1-1/4	96	.037	SS48-015-3
1-3/4	4	1-1/4	112	.051	SS48-017-4

SS48 Series

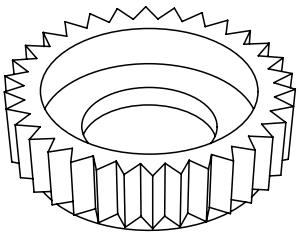
48 Tooth SAE 45°
Straight Sided Serrations
Finishing
Non-Topping
Disc Type



Part		Cutter			WD	Series
Nominal Diam.	Serrations	Pitch Diam.	Bore	No. Teeth		
3/8	16	3	1-1/4	136	.028	SBS16-037-3
1/2	16	3	1-1/4	96	.037	SBS16-050-3
5/8	20	3	1-1/4	100	.039	SBS20-062-3
3/4	20	3	1-1/4	85	.048	SBS20-075-3
7/8	20	3	1-1/4	72	.054	SBS20-087-3
1	24	3	1-1/4	80	.052	SBS24-100-3
1-1/8	24	3	1-1/4	68	.059	SBS24-112-3
1-1/4	24	3	1-1/4	60	.065	SBS24-125-3
1-3/8	24	3	1-1/4	54	.072	SBS24-137-3
1-1/2	24	3	1-1/4	50	.078	SBS24-150-3
2	36	3	1-1/4	56	.070	SBS36-200-3

SBS Series

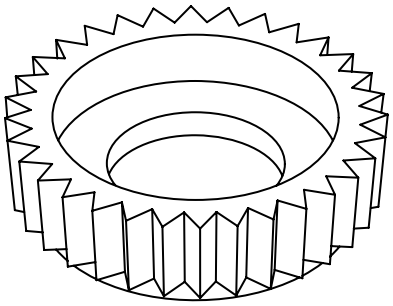
British (BS 2059-1953)
Straight Sided Serrations
Finishing
Non-Topping
Disc Type



Nom. Diam. (mm)	No. Teeth in Part	Included Angle	Pitch Dia.	Bore	No. of Teeth	Whole Depth	Series
8x7	28	60°	1.5	1/2	144	.018	SME81-8-7H
10x8	28	60°	1.5	1/2	120	.031	SME81-10-8H
12x10	30	60°	1.5	1/2	104	.029	SME81-12-10H
14x12	31	60°	3	1-1/4	180	.036	SME81-14-12-3
17x15	32	60°	3	1-1/4	152	.039	SME81-17-15-3
20x17	33	60°	3	1-1/4	136	.046	SME81-20-17-3
24x21	34	60°	3	1-1/4	116	.056	SME81-24-21-3
30x26	35	60°	3	1-1/4	96	.065	SME81-30-26-3
34x30	36	60°	3	1-1/4	84	.065	SME81-34-30-3
40x36	37	60°	3	1-1/4	74	.072	SME81-40-36-3
44x40	38	60°	3	1-1/4	68	.078	SME81-44-40-3
50x45	39	60°	3	1-1/4	62	.093	SME81-50-45-3
55x50	40	60°	3	1-1/4	58	.095	SME81-55-50-3
60x55	42	60°	3	1-1/4	55	.097	SME81-60-55-3
65x60 - 125x120	41-81	55°	3	1-1/4	51	.099	SME81-65-60-3

SME81 Series

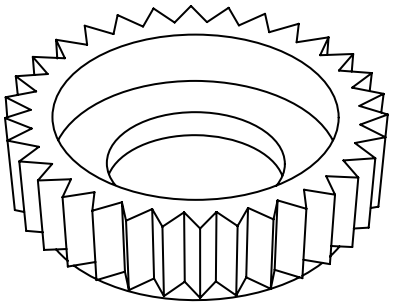
DIN5481
Straight Sided
External Serrations
Finishing
Non-Topping
Disc Type



Nom. Diam. (mm)	No. Teeth in Part	Included Angle	Pitch Dia.	Bore	No. of Teeth	Whole Depth	Series
44x40	38	60°	1.2	1/2	26	.081	SMI81-44-40H
50x45	39	60°	1.3	1/2	27	.096	SMI81-50-45H
55x50	40	60°	1.5	1/2	28	.097	SMI81-55-50H
60x55	42	60°	1.7	1/2	30	.099	SMI81-60-55H
65x60 - 80x75	41-54	55°	1.5	1/2	26	.100	SMI81-65-60H
70x65	45	55°	1.5	1/2	26	.100	SMI81-70-65HE
75x70	48	55°	1.5	1/2	26	.100	SMI81-75-70HE
80x75	51	55°	1.5	1/2	26	.099	SMI81-80-75H
105x100 - 105x100	68	55°	3	1-1/4	50	.098	SMI81-105-100

SMI81 Series

DIN5481
Straight Sided
Internal Serrations
Finishing
Non-Topping
Disc Type

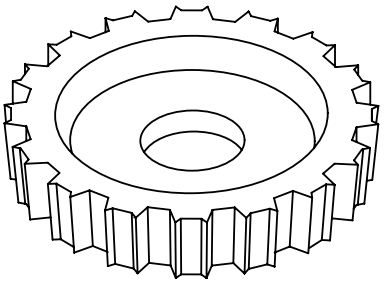


Major Diam.	Fit	Minor Diam.	Key Width	Pitch Diam.	Bore	No. Teeth	Series
.625	B	.529	.152	3	1-1/4	28	S6-062B-3
.625	C	.497	.152	3	1-1/4	28	S6-062C-3
.750	B	.635	.185	3	1-1/4	24	S6-075B-3
.750	C	.597	.185	3	1-1/4	24	S6-075C-3
.875	C	.696	.215	3	1-1/4	20	S6-087C-3
1.000	B	.847	.246	3	1-1/4	18	S6-100B-3
1.000	C	.796	.246	3	1-1/4	18	S6-100C-3
1.125	B	.953	.277	4	1-1/4	21	S6-112B-4
1.250	A	1.126	.313	4	1-1/4	19	S6-125A-4
1.250	B	1.060	.309	4	1-1/4	19	S6-125B-4
1.250	C	.996	.309	4	1-1/4	19	S6-125C-4
1.375	B	1.165	.340	4	1-1/4	17	S6-137B-4
1.375	C	1.096	.340	4	1-1/4	17	S6-137C-4
1.500	A	1.350	.375	4	1-1/4	16	S6-150A-4
1.500	B	1.271	.371	4	1-1/4	16	S6-150B-4
1.500	C	1.196	.371	4	1-1/4	16	S6-150C-4
1.625	B	1.378	.402	4	1-1/4	15	S6-162B-4
1.750	A	1.577	.438	4	1-1/4	14	S6-175A-4
1.750	B	1.485	.434	4	1-1/4	14	S6-175B-4
1.750	C	1.396	.434	4	1-1/4	14	S6-175C-4
2.000	B	1.696	.495	4	1-1/4	12	S6-200B-4

S6 Series

6 Parallel Sided Splines

Finishing
Semi-Topping with Lugs
Disc Type

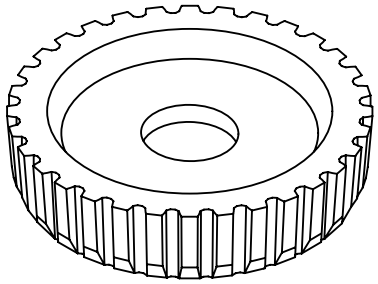


Major Diam.	Fit	Minor Diam.	Straight Line Dia.	Key Width	Pitch Diam.	Bore	No. Teeth	Series
.750	B	.601	.644	.114	3	1-1/4	40	S10-750B-3
.750	C	.550	.607	.114	3	1-1/4	40	S10-750C-3
.875	B	.706	.753	.134	3	1-1/4	34	S10-087B-3
1.000	C	.734	.809	.153	3	1-1/4	30	S10-100C-3
1.125	B	.904	.967	.173	4	1-1/4	35	S10-112B-4
1.125	C	.824	.911	.173	3	1-1/4	27	S10-112C-3
1.250	A	1.139	1.137	.195	4	1-1/4	32	S10-125A-4
1.250	B	1.002	1.074	.192	4	1-1/4	32	S10-125B-4
1.250	C	.916	1.012	.192	3	1-1/4	24	S10-125C-3
1.375	B	1.107	1.182	.212	4	1-1/4	28	S10-137B-4
1.375	C	1.008	1.113	.212	4	1-1/4	21	S10-137C-3
1.500	A	1.366	1.364	.235	4	1-1/4	26	S10-150A-4
1.500	B	1.200	1.289	.231	3	1-1/4	20	S10-150B-3
1.500	C	1.100	1.214	.231	3	1-1/4	20	S10-150C-3
1.625	B	1.305	1.397	.251	4	1-1/4	24	S10-162B-4
1.750	B	1.408	1.504	.270	4	1-1/4	22	S10-175B-4
1.750	C	1.282	1.417	.270	4	1-1/4	22	S10-175C-4
2.000	A	1.821	1.818	.313	4	1-1/4	20	S10-200A-4
2.000	B	1.608	1.718	.307	4	1-1/4	20	S10-200B-4
2.000	C	1.461	1.618	.307	4	1-1/4	20	S10-200C-4

S10 Series

10 Parallel Sided Splines

Finishing
Semi-Topping
Disc Type



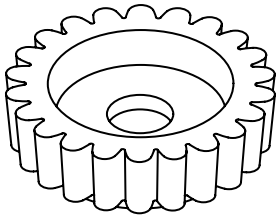
SRC & STC Series

Roller Chain

American Standard Sprockets

Finishing for 12 teeth & over

Disc Type



Chain No.	Circle Pitch	Roller Diam.	Pitch Diam.	Bore	No. Teeth	Type	Series
special	.148	.090	3	1-1/4	64	Non-Topping	SRC-1475-3
25	1/4	.130	3	1-1/4	36	Non-Topping	SRC-25-3
25	1/4	.130	4	1-1/4	50	Non-Topping	SRC-25-4
special	1/4	.134	3	1-1/4	38	Non-Topping	SRC-26-3
special	1/4	.134	4	1-1/4	50	Non-Topping	SRC-26-4
35	3/8	.200	3	1-1/4	25	Non-Topping	SRC-35-3
35	3/8	.200	4	1-1/4	32	Non-Topping	SRC-35-4
40	1/2	.312	3	1-1/4	19	Non-Topping	SRC-40-3
40	1/2	.312	4	1-1/4	24	Non-Topping	SRC-40-4
40	1/2	.312	4	1-1/4	24	Topping	SRCT-40-4
40	1/2	.312	5	1-3/4	32	Non-Topping	SRC-40-5
40	1/2	.312	5	1-3/4	32	Topping	SRCT-40-5
special	1/2	.306	3	1-1/4	19	Non-Topping	SRC-41-3
special	1/2	.306	4	1-1/4	24	Non-Topping	SRC-41-4
special	1/2	.306	4	1-3/4	25	Non-Topping	SRC-41-4L
special	1/2	.306	4	1-3/4	25	Topping	SRCT-41-4L
50	5/8	.400	3	1-1/4	16	Non-Topping	SRC-50-3
50	5/8	.400	4	1-1/4	20	Non-Topping	SRC-50-4
50	5/8	.400	5	1-3/4	25	Non-Topping	SRC-50-5
50	5/8	.400	5	1-3/4	25	Topping	SRCT-50-5
60	3/4	.469	4	1-1/4	16	Non-Topping	SRC-60-4
60	3/4	.469	4	1-1/4	17	Non-Topping	SRC-60-4E
60	3/4	.469	5	1-3/4	21	Non-Topping	SRC-60-5
80	1	.625	4	1-1/4	12	Non-Topping	SRC-80-4
80	1	.625	5	1-3/4	15	Non-Topping	SRC-80-5
80	1	.625	6	1-3/4	18	Non-Topping	SRC-80-6
80	1	.625	8	4	24	Non-Topping	SRC-80-8
100	1-1/4	.750	4	1-1/4	10	Non-Topping	SRC-100-4
100	1-1/4	.750	5	1-3/4	13	Non-Topping	SRC-100-5
100	1-1/4	.750	6	1-3/4	15	Non-Topping	SRC-100-6
120	1-1/2	.875	4	1-1/4	9	Non-Topping	SRC-120-4
120	1-1/2	.875	5	1-3/4	11	Non-Topping	SRC-120-5
120	1-1/2	.875	6	1-3/4	13	Non-Topping	SRC-120-6
120	1-1/2	.875	7	1-3/4	14	Non-Topping	SRC-120-7
140	1-3/4	1.000	5	1-3/4	9	Non-Topping	SRC-140-5
140	1-3/4	1.000	7	1-3/4	12	Non-Topping	SRC-140-8
160	2	1.125	7	1-3/4	11	Non-Topping	SRC-160-8
200	2-1/2	1.563	7	1-3/4	9	Non-Topping	SRC-200-9

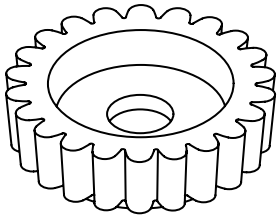
SEC Series

Roller Chain

English Standard Sprockets

Finishing for 12 teeth & over

Disc Type



Chain No.	Circle Pitch	Roller Diam.	Pitch Diam.	Bore	No. Teeth	Series
36	3/8	.250	3	1-1/4	25	SEC-36-3
36	3/8	.250	4	1-1/4	34	SEC-36-4
42	1/2	.335	3	1-1/4	19	SEC-42-3
42	1/2	.335	4	1-1/4	25	SEC-42-4
51	5/8	.400	4	1-1/4	20	SEC-51-4
61	3/4	.475	4	1-1/4	16	SEC-61-4
61	3/4	.475	4	1-3/4	17	SEC-61-4L
61	3/4	.475	5	1-3/4	21	SEC-61-5

SRCM Series

Roller Chain

Metric Standard Sprockets

Finishing for 12 teeth & over, Disc Type

Circle Pitch (mm)	Roller Diam (mm)	Pitch Diam.	Bore	No. Teeth	Series
6	4	3	1-1/4	40	SRCM-06-3
6	4	4	1-1/4	52	SRCM-06-4
8	5	3	1-1/4	30	SRCM-08-3
8	5	4	1-1/4	40	SRCM-08-4

SSC Series

Silent Chain

Standard Sprockets

Finishing , Topping, Disc Type

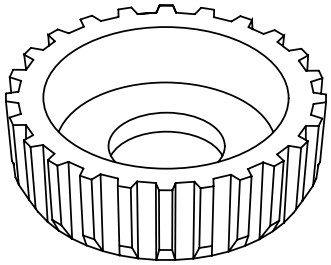
Pitch	Tooth Range	PD	Bore	No. Teeth	Approx. Depth	Series
3/16	20-50	3	1-1/4	54	.112	SSC-1-19-3
3/8	20-50	3	1-1/4	25	.255	SSC-3-20-3
3/8	20-50	4	1-1/4	34	.258	SSC-3-20-4
3/8	51-150	4	1-1/4	34	.250	SSC-3-51-4
1/2	20-50	3	1-1/4	20	.344	SSC-4-20-3
1/2	20-50	4	1-1/4	26	.344	SSC-4-20-4
1/2	50-150	3	1-1/4	19	.344	SSC-4-51-3
1/2	51-150	4	1-1/4	26	.344	SSC-4-51-4
5/8	20-50	4	1-1/4	20	.425	SSC-5-20-4
5/8	51-100	4	1-1/4	20	.425	SSC-5-51-4
3/4	20-50	4	1-1/4	17	.516	SSC-6-20-4
3/4	51-150	4	1-1/4	17	.516	SSC-6-51-4
1	20-50	4	1-1/4	13	.688	SSC-8-20-4
1	51-150	4	1-1/4	13	.687	SSC-8-51-4

CP	Tooth Range	Approx. P.D.	Bore	No. Teeth	Approx. Depth	Series
3/16	10 ∞	3	1-1/4	50	.060	STGY-188-3
1/5	10 ∞	3	1-1/4	47	.064	STGY-200-3
3/8	10 ∞	3	1-1/4	25	.103	STGY-375-3
3/8	10-19	4	1-1/4	34	.105	STGY-375-4-10
1/2	17-19	3	1-1/4	19	.118	STGY-500-3-17
1/2	20-50	3	1-1/4	19	.118	STGY-500-3-20
1/2	51 ∞	3	1-1/4	19	.118	STGY-500-3-51
7/8	18 ∞	4	1-1/4	14	.281	STGY-875-4

STGY Series

Goodyear Timing Belt

Finishing
Topping
Disc Type

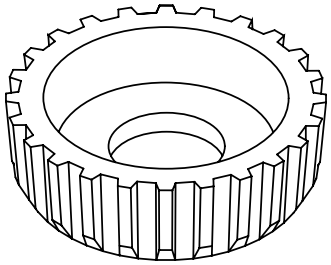


Pitch (mm)	Tooth Range	Approx. P.D.	Bore	No. Teeth	Approx. Depth	Series
2.5	10 ∞	3	1-1/4	96	.036	STMY-025-3
3	10 ∞	3	1-1/4	80	.042	STMY-030-3
4.5	12 ∞	3	1-1/4	54	.063	STMY-045-3
5	12 ∞	3	1-1/4	48	.070	STMY-050-3
5	12 ∞	4	1-1/4	64	.070	STMY-050-4
6	16 ∞	3	1-1/4	40	.084	STMY-060-3
8	20 ∞	4	1-1/4	40	.111	STMY-080-4
14	28 ∞	3	1-1/4	17	.195	STMY-140-3

STMY Series

Metric Goodyear Timing Belt

Finishing
Topping
Disc Type

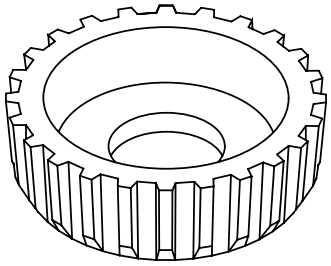


Belt	CP	Tooth Range	Approx. P.D.	Bore	No. Teeth	Approx. Depth	Series
MXL	.080	12-23	1.5	1/2	60	.026	STM-080-H-12
MXL	.080	12-23	3	1-1/4	116	.026	STM-080-3-12
MXL	.080	24 ∞	1.5	1/2	60	.026	STM-080-H-24
MXL	.080	24 ∞	3	1-1/4	116	.026	STM-080-3-24
XL	1/5	10 ∞	3	1-1/4	48	.056	STM-200-3
XL	1/5	10 ∞	4	1-1/4	64	.056	STM-200-4
L	3/8	10 ∞	3	1-1/4	25	.085	STM-375-3
L	3/8	10 ∞	4	1-1/4	34	.085	STM-375-4
H	1/2	14-19	3	1-1/4	20	.103	STM-500-3-14
H	1/2	14-19	4	1-1/4	26	.103	STM-500-4-14
H	1/2	14-19	5	1-3/4	32	.103	STM-500-5-14
H	1/2	20 ∞	3	1-1/4	19	.103	STM-500-3-20
H	1/2	20 ∞	4	1-1/4	26	.103	STM-500-4-20
H	1/2	20 ∞	5	1-3/4	32	.103	STM-500-5-20
XH	7/8	18 ∞	4	1-1/4	14	.287	STM-875-4
XH	7/8	18 ∞	5	1-3/4	18	.287	STM-875-5
XH	7/8	18 ∞	6	1-3/4	22	.272	STM-875-6
XXH	1-1/4	18 ∞	5	1-3/4	13	.435	STM-1250-5
XXH	1-1/4	18 ∞	6	1-3/4	15	.435	STM-1250-6

STM Series

Timing Belt
American Standard

Finishing
Topping
Disc Type



Pitch (mm)	Tooth Range	Approx. PD	Bore	No. Teeth	Approx. Depth	Series
3	9 - 13	3	1-1/4	80	.047	STMU-030-3-9
3	14 - 25	3	1-1/4	80	.046	STMU-030-3-14
3	26 - 80	3	1-1/4	80	.048	STMU-030-3-26
3	81 ∞	3	1-1/4	80	.049	STMU-030-3-81
3	81 ∞	4	1-1/4	108	.049	STMU-030-4-81
5	12 - 16	3	1-1/4	48	.080	STMU-050-3-12
5	17 - 31	3	1-1/4	48	.080	STMU-050-3-17
5	32 - 79	3	1-1/4	48	.080	STMU-050-3-32
5	80 ∞	3	1-1/4	48	.081	STMU-050-3-80
5	12 - 16	3	1-1/4	64	.080	STMU-050-4-12
5	17 - 31	4	1-1/4	64	.080	STMU-050-4-17
5	32 - 79	4	1-1/4	64	.080	STMU-050-4-32
5	80 ∞	4	1-1/4	64	.081	STMU-050-4-80
8	19 - 27	3	1-1/4	30	.130	STMU-080-3-19
8	28 - 89	3	1-1/4	30	.142	STMU-080-3-28
8	90 ∞	3	1-1/4	30	.143	STMU-080-3-90
8	18 - 27	4	1-1/4	40	.130	STMU-080-4-18
8	28 - 36	4	1-1/4	40	.143	STMU-080-4-28
8	37 -80	4	1-1/4	40	.144	STMU-080-4-37
8	81 ∞	4	1-1/4	40	.143	STMU-080-4-81
14	19 - 27	4	1-1/4	24	.249	STMU-014-4-19
14	28 - 36	4	1-1/4	24	.249	STMU-014-4-28
14	37 - 89	4	1-1/4	24	.244	STMU-014-4-37
14	90 ∞	4	1-1/4	24	.250	STMU-014-4-90
14	28 - 36	5	1 3/4	30	.249	STMU-014-5-28
14	37 - 89	5	1 3/4	24	.244	STMU-014-5-37
14	90 ∞	5	1 3/4	30	.244	STMU-014-5-90
20	32 - 45	4	1-1/4	16	.340	STMU-020-4-32
20	46 - 100	4	1-1/4	16	.338	STMU-020-4-46
20	101 ∞	4	1-1/4	16	.342	STMU-020-4-101

STMU Series

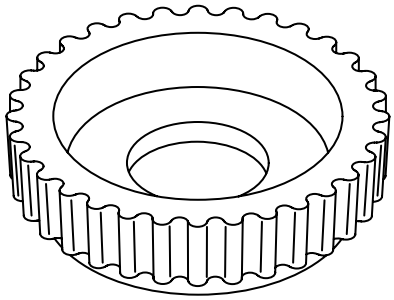
Timing Belt

Gates High Torque Drive(HTD)

Finishing

Topping

Disc Type



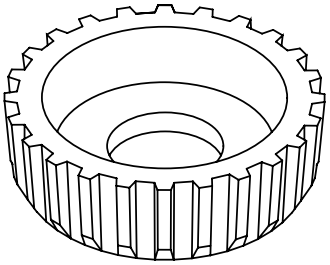
Pitch (mm)	Tooth Range	PD	Bore	No. Teeth	Approx. Depth	Series
2	10-12	3	1-1/4	120	.030	STGT-02-3-10
2	13-18	3	1-1/4	120	.030	STGT-02-3-13
2	19-35	3	1-1/4	120	.030	STGT-02-3-19
2	36-60	3	1-1/4	120	.030	STGT-02-3-36
2	61 ∞	3	1-1/4	120	.030	STGT-02-3-61
3	15-27	3	1-1/4	82	.045	STGT-03-3-15
3	28-56	3	1-1/4	80	.046	STGT-03-3-28
3	57-140	3	1-1/4	80	.047	STGT-03-3-57
3	141 ∞	3	1-1/4	80	.047	STGT-03-3-141
3	15-27	4	1-1/4	106	.045	STGT-03-4-15
3	28-56	4	1-1/4	106	.046	STGT-03-4-37
5	12-15	3	1-1/4	50	.074	STGT-05-3-12
5	16-32	3	1-1/4	50	.076	STGT-05-3-16
5	33-60	3	1-1/4	48	.077	STGT-05-3-33
5	16-32	4	1-1/4	64	.076	STGT-05-4-16
5	33-60	4	1-1/4	64	.077	STGT-05-4-33
5	61-140	4	1-1/4	64	.078	STGT-05-4-61
8	16-19	3	1-1/4	30	.142	STGT-08-3-16
8	20-27	3	1-1/4	30	.140	STGT-08-3-20
8	28-37	3	1-1/4	30	.139	STGT-08-3-28
8	51-119	3	1-1/4	30	.137	STGT-08-3-51

STGT Series

Timing Belt

Gates Power Grip GT (PGGT)

Finishing
Topping
Disc Type

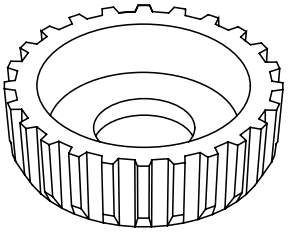


Pitch (mm)	Tooth Range	Approx. P.D.	Bore	No. Teeth	Approx. Depth	Series
8	20-27	4	1-1/4	40	.140	STPY-08M-4-20
8	28-37	4	1-1/4	40	.139	STPY-08M-4-28
8	38-58	4	1-1/4	40	.137	STPY-08M-4-38
8	59-89	4	1-1/4	40	.137	STPY-08M-4-59
8	90-224	4	1-1/4	40	.136	STPY-08M-4-90
14	28-38	4	1-1/4	23	.242	STPY-14M-4-28
14	39-60	4	1-1/4	23	.240	STPY-14M-4-39
14	61-89	4	1-1/4	23	.239	STPY-14M-4-61
14	90-140	4	1-1/4	23	.239	STPY-14M-4-90

STPY Series

Poly Chain GT (PCGT)

Finishing
Topping
Disc Type



STX, STXN Series

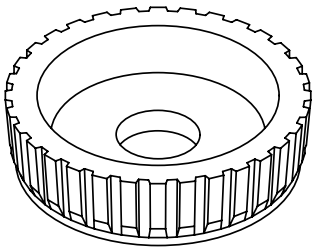
Timing Belt

Synchroflex T & T-0 DIN7721

Finishing

Topping

Disc Type



Pitch mm	Tooth Range	PD	No. Teeth	Approx. Depth	Type	Series	Series
2	10 - 20	3	120	.026	T- Backlash	STX-020-3-10	-
2	21 ∞	3	120	.031	T- Backlash	STX-020-3-21	-
2.5	≤ 20	3	96	.031	T- Backlash	STX-025-3-20	-
2.5	21 ∞	3	96	.040	T- Backlash	STX-025-3-21	-
2.5	21 ∞	4	126	.040	T- Backlash	STX-025-4-21	-
5	≤ 20	3	50	.050	T- Backlash	STX-050-3-20	-
5	≤ 20	4	64	.050	T- Backlash	STX-050-4-20	-
5	≤ 20	4	70	.050	No Backlash	-	STXN-050-4-20
5	21 ∞	3	50	.078	T- Backlash	STX-050-3-21	-
5	21∞	4	64	.078	T- Backlash	STX-050-4-21	-
5	21∞	4	70	.048	No Backlash	-	STXN-050-4-21
10	≤ 20	3	26	.104	T- Backlash	STX-100-3-20	-
10	≤ 20	4	32	.104	T- Backlash	STX-100-4-20	-
10	≤ 20	4	32	.099	No Backlash	-	STXN-100-4-20
10	21∞	3	25	.136	T- Backlash	STX-100-3-21	-
10	21∞	4	32	.136	T- Backlash	STX-100-4-21	-
10	21∞	4	32	.099	No Backlash	-	STXN-100-4-21
20	≤ 20	4	16	.207	T- Backlash	STX-200-4-20	-
20	21∞	4	16	.247	T- Backlash	STX-200-4-21	-

STXA, STXAN Series

Timing Belt

Synchroflex AT style

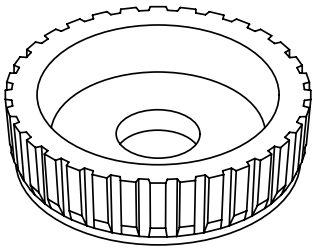
Standard & No Backlash

DIN 7721

Finishing

Topping

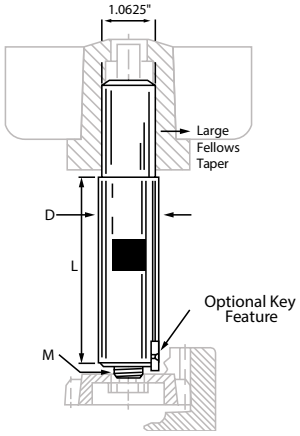
Disc Type



Pitch mm	Tooth Range	PD	No. Teeth	Approx. Depth	Type	Series	Series
3	15-25	3	82	.038	AT	STXA-030-3-15	-
3	26 ∞	3	82	.039	AT	STXA-030-3-26	-
3	26 ∞	3	82	.039	AT-0	-	STXAN-030-3-26
5	≤ 20	3	50	.042	AT	STXA-050-3-20	
5	≤ 20	3	50	.042	AT-0	-	STXAN-5-3-20
5	≤ 20	4	64	.042	AT	STXA-050-4-20	-
5	≤ 20	4	64	.042	AT-0	-	STXAN-5-4-20
5	21∞	3	50	.042	AT	STXA-050-3-21	-
5	21∞	4	64	.042	AT	STXA-050-4-21	-
5	21∞	4	64	.044	AT-0	-	STXAN-5-4-21
10	≤ 20	4	32	.092	AT	STXA-100-4-20	-
10	15-20	4	32	.092	AT-0	-	STXAN-100-4-20
10	21 ∞	4	32	.092	AT	STXA-100-4-21	-
10	21 ∞	4	32	.092	AT-0	-	STXAN-100-4-21
20	20 ∞	4	16	.182	AT	STXA-200-4-20	-
20	≤ 20	4	16	.182	AT-0	-	STXAN-200-4-20
20	21 ∞	4	16	.182	AT	STXA-200-4-21	-
20	21 ∞	4	16	.182	AT-0	-	STXAN-200-4-21

ADH Series
1/2" Bore Button Shapers

Diam. (M)	Length (L)	Body Diam. (D)	Series
1/2	1/2	1-1/16	ADH-050
1/2	1	1-1/16	ADH-100
1/2	1-1/2	1-1/16	ADH-150
1/2	1-3/4	1-1/8	ADH-175E
1/2	2	1-1/16	ADH-200
1/2	2-1/4	1-1/16	ADH-225
1/2	2-1/2	1-1/16	ADH-250
1/2	2-3/4	1-1/16	ADH-275
1/2	3-1/4	1-1/16	ADH-325
1/2	3-1/2	1-1/16	ADH-350
1/2	3-3/4	1-1/16	ADH-375
1/2	4	1-1/16	ADH-400
1/2	5	1-1/16	ADH-500
1/2	6	1-1/16	ADH-600

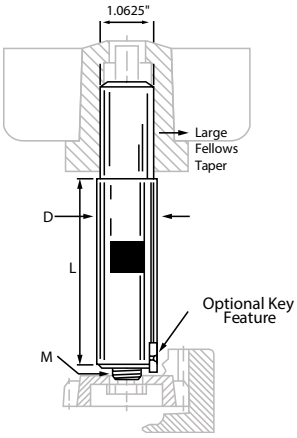


1/2 X 13 Threads mounting Diam. ID/taper ID Standard Fellows taper (.6235/Ft.)
1.062 Diam. taper (large end).

ADS Series
3/4" Bore Button Shapers

Diam. (M)	Length (L)	Body Diam. (D)	Series
3/4	3/4	1-1/4	ADS-075
3/4	1-1/2	1-1/4	ADS-150
3/4	2	1-1/4	ADS-200
3/4	2-1/2	1-1/4	ADS-250E
3/4	2-3/4	1-1/4	ADS-275
3/4	3-1/2	1-1/4	ADS-350
3/4	4	1-5/16	ADS-400
3/4	4-1/2	1-3/8	ADS-450
3/4	5-1/2	1-1/2	ADS-550
3/4	6-1/2	1-1/2	ADS-650

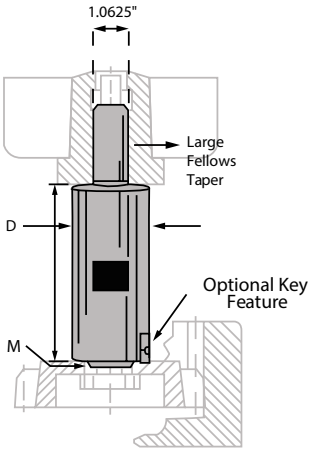
1/2 X 13 Threads mounting Diam. ID/taper ID Standard Fellows taper (.6255/Ft). 1.062 Diam. taper (large end).



ADL Series
1-3/4" Bore Shapers

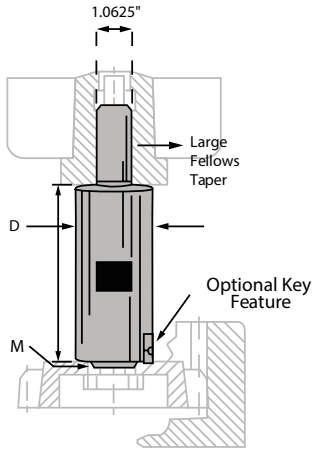
Diam. (M)	Length (L)	Body Diam. (D)	Series
1-3/4	1/2	2-1/4	ADL-050
1-3/4	1/2	3-1/4	ADL-050B
1-3/4	1	2-1/4	ADL-100
1-3/4	1	3-1/4	ADL-100B
1-3/4	2	2-1/4	ADL-200
1-3/4	2	3-1/4	ADL-200B
1-3/4	3	2-1/4	ADL-300
1-3/4	3	3-1/4	ADL-300B
1-3/4	4	2-1/4	ADL-400
1-3/4	4	3-1/4	ADL-400B
1-3/4	5	2-1/4	ADL-500
1-3/4	5	3-1/4	ADL-500B

Standard Large Fellows Taper - (.6255/FT). 1.062” large end.
1/2 - 13 thread - draw bar (ID). 5/8 - 11 thread - cutter end (ID).



AD Series
1-1/4" Bore

Diam. (M)	Length (L)	Body Diam. (D)	Series
1-1/4	1/2	2-1/4	AD-050
1-1/4	1/2	3	AD-050B
1-1/4	1	2-1/4	AD-100
1-1/4	1	3	AD-100B
1-1/4	2	2-1/4	AD-200
1-1/4	2	3	AD-200B
1-1/4	3	2-1/4	AD-300
1-1/4	3	3	AD-300B
1-1/4	4	2-1/4	AD-400
1-1/4	4	3	AD-400B
1-1/4	5	2-1/4	AD-500
1-1/4	5	3	AD-500B
1-1/4	6	2-1/4	AD-600
1-1/4	6	3	AD-600B

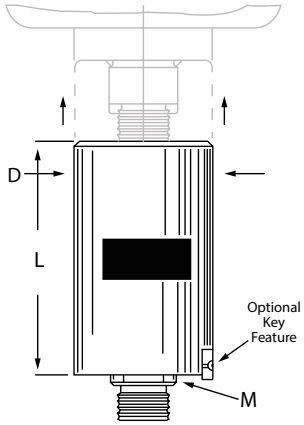


Standard Large Fellows Taper - (.6235/FT). 1.062” large end.
1/2 - 13 thread - draw bar (ID). 5/8 - 11thread - cutter end (ID).
The 2-1/4” is standard. The large 3” diameter should be used with coarse pitch large 3” diameter cutters.

ADE Series
Spindle Extension

Diam. (M)	Length (L)	Body Diam. (D)	Series
1-1/4	2-1/4	2-1/4	ADE-200
1-3/4	2-1/4	3	ADE-200L
1-1/4	3	2-1/4	ADE-300
1-3/4	3	3	ADE-300L
1-1/4	4	2-1/4	ADE-400
1-3/4	4	3	ADE-400L
1-1/4	5	2-1/4	ADE-500
1-3/4	5	3	ADE-500L
1-1/4	6	2-1/4	ADE-600
1-3/4	6	3	ADE-600L

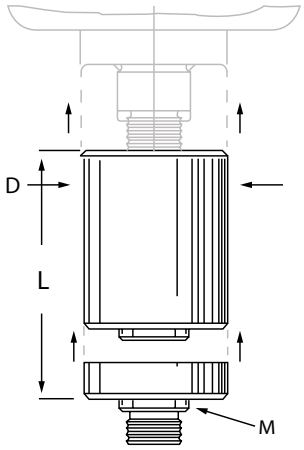
Fits standard 1-1/4 Solid spindle with 1"-10 thread.



ADEP Series
Precision Spindle Extension

Diam. (M)	Length (L)	Body Diam. (D)	Series
1-1/4	2	2-1/2	ADEP-200
1-1/4	3	2-1/2	ADEP-300
1-1/4	4	2-1/2	ADEP-400
1-1/4	5	2-1/2	ADEP-500

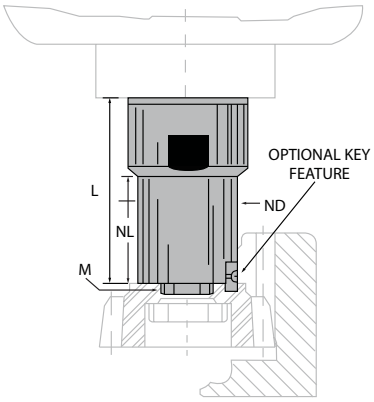
Fits standard 1-1/4 Solid spindle with 1"-10 thread.



Mounting Diam. (M)	Neck Length (NL)	Neck Diam. (ND)	Overall Length (L)	Series
1/2	1	1.35	2.75	ADB-501
1/2	2-1/4	1.25	3.80	ADB-502
1/2	3-1/4	1.25	5.48	ADB-503
1/2	4	1.25	5.56	ADB-504
1/2	5	1.25	6.75	ADB-505
3/4	1	1.35	2.56	ADB-751
3/4	2	1.35	4.25	ADB-752
3/4	3	1.35	4.75	ADB-753
3/4	4	1.35	5.55	ADB-754
3/4	5	1.35	6.50	ADB-755
3/4	6	1.35	7.50	ADB-756

ADB Series

Solid Spindle Adapter for Button Shaper Cutters

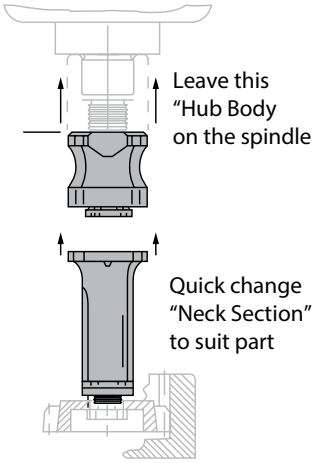


Mounting Diam. (M)	Neck Length (NL)	Overall Length (L)	Series
1/2	1	3-1/2	APD-100H
3/4	1	3-1/2	APD-100S
1/2	2	4-1/2	APD-200H
3/4	2	4-1/2	APD-200S
1/2	3	5-1/2	APD-300H
3/4	4	6-1/2	APD-400S
1/2	5	7-1/2	APD-500H
HUB			HUB

Hub bodies are 1-3/4" O.A.L and are interchangeable with all the "neck" sections. Hub and extensions sold separately. Washer and screw come with extension.

APD Series

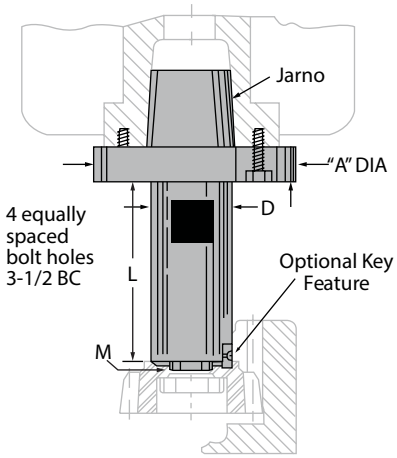
Solid Spindle Adapter to Hold Button Type Shapers



Shaper Hole (M)	Jarno	Flange Diam. (A)	Length (L)	Body Diam. (D)	Series
1/2	16	4	2-1/2	1-1/4	ADH36A-250
1/2	16	4	4-1/2	1-1/4	ADH36A-450
1/2	18	5	1-1/2	1-1/4	ADH36-150
1/2	18	5	2-1/2	1-1/4	ADH36-250
1/2	18	5	4-1/2	1-1/4	ADH36-450
3/4	16	4	2-1/2	1-1/4	ADS36A-250
3/4	16	4	4-1/2	1-3/8	ADS36A-450
3/4	18	5	1-1/2	1-1/4	ADS36-150
3/4	18	5	2-1/2	1-1/4	ADS36-250
3/4	18	5	4-1/2	1-3/8	ADS36-450

ADH36 & ADS36 Series

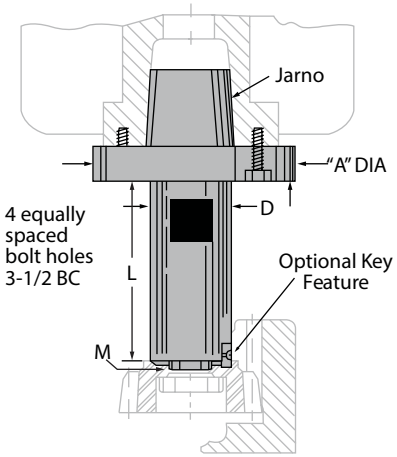
Hollow Spindle Adapters for Button Shaper Cutters



Shaper Hole (M)	Jarno	Flange Diam. (A)	Length (L)	Body Diam. (D)	Series
1-1/4	16	4	1-1/2	2-1/4	AD36A-150
1-1/4	16	4	1-1/2	3	AD36A-150B
1-1/4	16	4	2-1/2	2-1/4	AD36A-250
1-1/4	16	4	2-1/2	3	AD36A-250B
1-1/4	16	4	3-1/2	2-1/4	AD36A-350
1-1/4	16	4	4-1/2	2-1/4	AD36A-450
1-1/4	18	5	1	2-1/4	AD36-150
1-1/4	18	5	1-1/2	3	AD36-150B
1-1/4	18	5	2-1/2	2-1/4	AD36-250
1-1/4	18	5	2-1/2	3	AD36-250B
1-1/4	18	5	3-1/2	2-1/4	AD36-350
1-1/4	18	5	6	2-1/4	AD36-600
1-1/4	18	5	8	2-1/4	AD36-800
1-3/4	16	4	1-1/2	3-1/4	ADL36A-150
1-3/4	16	4	3-1/2	3-1/4	ADL36A-350
1-3/4	18	5	3/4	3-1/4	ADL36-075
1-3/4	18	5	1-1/2	3-1/4	ADL36-150
1-3/4	18	5	2-1/2	3-1/4	ADL36-250
1-3/4	18	5	3-1/2	3-1/4	ADL36-350

AD36 Series

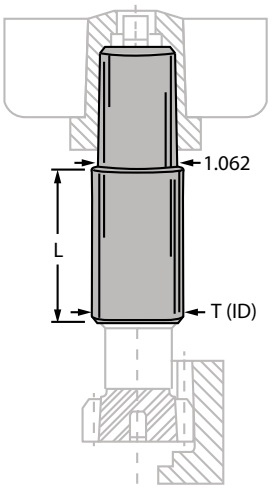
Hollow Spindle Adapters for Disc Shaper Cutters



Internal Taper (T)	Extension Length (L)	Series
#1 Morse	1/4	ADR-012
#1 Morse	3/4	ADR-075
#1 Morse	1-1/2	ADR-150
#2 Jarno	3/4	ADR-007
#2 Morse	1/4	ADR-125
#2 Morse	3/4	ADR-750
#2 Morse	1-1/4	ADR-225
#2 Morse	2	ADR-235
#2 Morse	3	ADR-245
Fellows	2	ADT-200
Fellows	3	ADT-300
Fellows	4	ADT-400

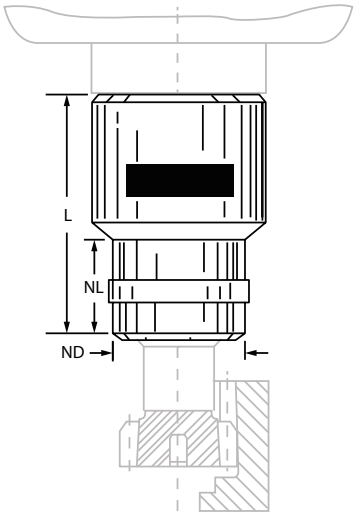
ADR & ADT Series

Large Fellows Taper Reduction & Spindle Extension



ADJ Series
Solid Spindle Adapter to Hold Shank Shapers

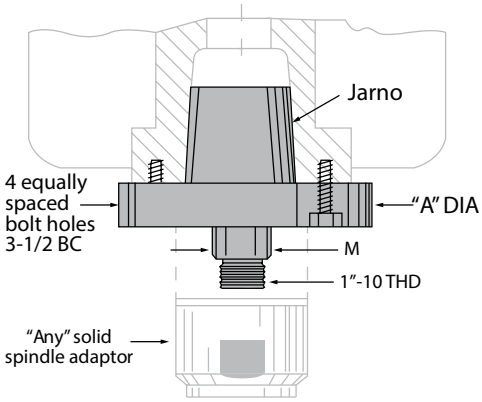
Internal Taper (T)	Neck Length (NL)	Neck Diam. (ND)	Overall Length (L)	Threads	Series
Fellows 1.062" major diameter	1-1/4	1-3/4	3-7/8	1-10"	ADJ-225
Fellows 1.062" major diameter	1-1/4	1-3/4	3-7/8	1-10"	ADJ-225P
Fellows 1.062" major diameter	1-1/4	1-3/4	3-7/8	M24x3	ADJ-225M
#2 Morse .700 major diameter	1-1/4	1-3/4	3-1/2	1-10"	ADJ-750



Fits standard 1-1/4" solid spindle

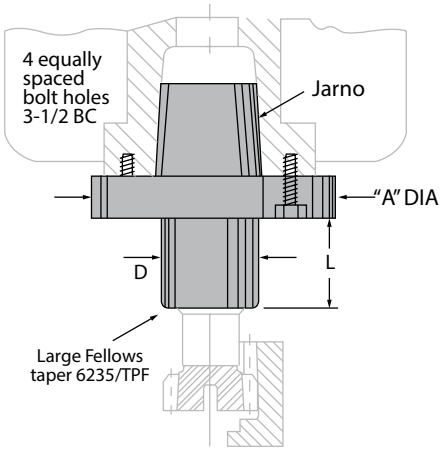
ADE36 Series
Conversion Adapter for #36 Fellows

Mounting Diam. (M)	Bolt Hole	Flange "A"	Jarno	Series
1-1/4	3-1/2	5	18	ADE36-125
1-1/4	3	4	16	ADE36A-125



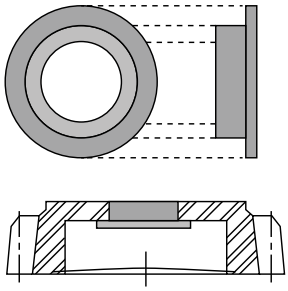
ADR36 Series
Adapter for #36 Fellows to hold Shank Shapers

"A" Flange	Bolt Hole	Length (L)	Body Diam. (D)	Jarno	Series
5	3-1/2	3/4	1-1/2	18	ADR36-075
4	3	3/4	1-1/2	16	ADR36A-075
5	3-1/2	2-1/2	1-9/16	18	ADR36-250
4	3	2-1/2	1-9/16	16	ADR36A-250
5	3-1/2	4	1-5/8	18	ADR36-450

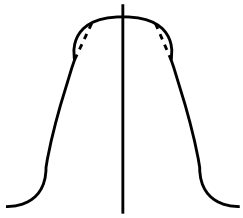


ASR Series
Disc Shaper Bore Reduction Ring

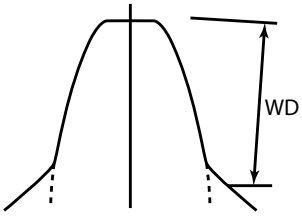
Exter. Diam.	Inter. Diam.	Type	Series
1-3/4	1-1/4	Flange	ASR-175
1-3/4	1-1/4	No Flange	ASR-175N



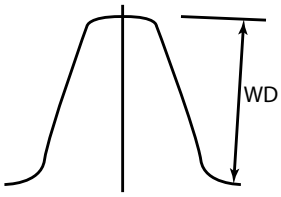
VARIOUS TYPES OF TOOTH MODIFICATIONS COMMON ON SHAPER CUTTERS



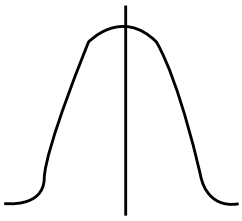
PROTUBERANCE TIP
Cutter tooth profile is built up on the tip to provide and undercut near the root of the gear being generated providing relief for subsequent finishing operations.



CHAMFERING OR SEMITOPPING
Root of cutter is filled in to generate a sharp corner break or chamfer on the tips of the gear.

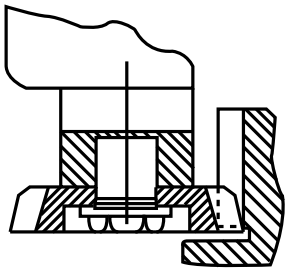


TOPPING
Cutter tooth depth os ground equal to the whole depth (WD) of the gear tooth. The outside diameer of the gear is topped to size when the teeth are cut. Frequently used for fine pitch gearing

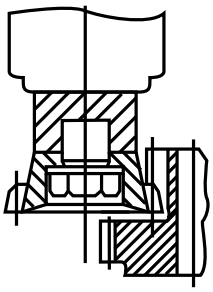


FULL FILLET RADIUS
Will produce a round bottom root on the gear being generated. This adds strength to the gear and will improve cutter life.

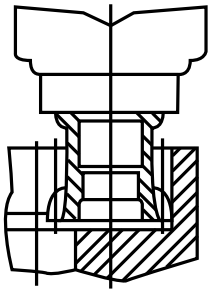
DIFFERENT METHODS OF MOUTING GEAR SHAPER CUTTERS



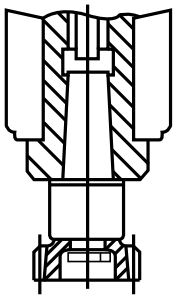
Typical Disk Cutter set up for cutting either external or internal gears.



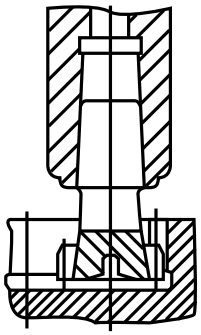
Typical Deep Counterbore type cutter set-up. This is necessary when the clamping nut cannot protrude beyond the cutting face at any time throughout the lofe of the cutter.



Typical Hub Type cutter set-up for an internal gear.

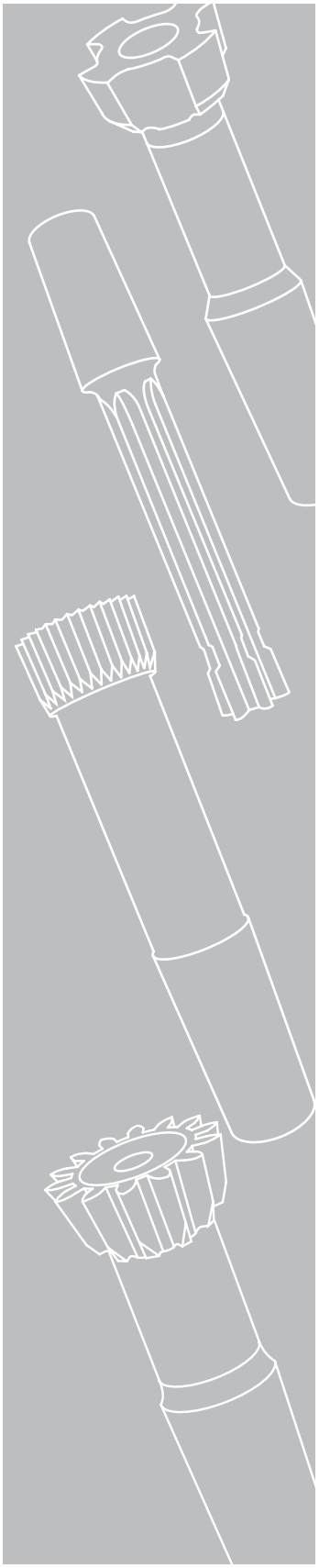


Internal gear being cut with a disc type cutter on an adapter. The adapter is mounted in a cutter-spindle having a tapered hole.



Taper Shank Cutter mountedin a cutter-spindle having a tapered hole. For cutting gears.

Shank Shaper Sort Index



Normal Diametral Pitch

- 14.5° 145
- 20° 145
- 25° 147
- Fillet Root 30° 148
- Full Fillet 30° 155
- Flat Root 30° 151
- 37.5° 155
- 45° 155

Normal Module Pitch

- 20° 156
- Flat Root 30° 157
- Full Fillet 30° 159
- 37.5° 160
- 45° 160

Parallel Splines

- 6 Spline 161
- 10 Spline 161

Metric Splines

- 6 Spline 161
- 8 Spline 162
- 10 Spline 162

Serrations

- 36 162
- 48 163
- DIN 5481 163
- British 163

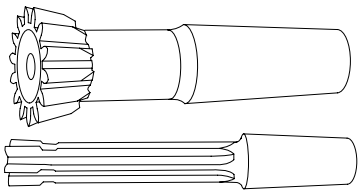
KDP14 Series

DP 14.5° PA

Finishing

Non-Topping

Shank Type



Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
4	14.5°	6	2-1/2	.563	KDP14-04-6
5	14.5°	8	3-1/4	.450	KDP14-05-8
6	14.5°	8	2	.375	KDP14-06-8S
6	14.5°	8	3-1/2	.375	KDP14-06-8
8	14.5°	8	1-3/4	.281	KDP14-08-8S
8	14.5°	8	2-1/2	.281	KDP14-08-8
8	14.5°	10	1-3/4	.281	KDP14-08-10S
10	14.5°	8	1-1/8	.225	KDP14-10-8
10	14.5°	10	1-3/4	.225	KDP14-10-10S
12	14.5°	8	2-1/2	.188	KDP14-12-8
14	14.5°	14	1-1/4	.161	KDP14-14-14
16	14.5°	12	2-1/2	.141	KDP14-16-12
16	14.5°	16	1-5/8	.141	KDP14-16-16S
16	14.5°	16	3-1/4	.141	KDP14-16-16
20	14.5°	10	1-3/4	.112	KDP14-20-10
20	14.5°	16	1-1/4	.112	KDP14-20-16S
24	14.5°	14	1-3/4	.094	KDP14-24-14
32	14.5°	16	1-3/8	.071	KDP14-32-16
32	14.5°	40	2-1/2	.071	KDP14-32-40
48	14.5°	16	1	.048	KDP14-48-16
64	14.5°	48	3/4	.036	KDP14-64-48

Stem design and stroke length vary

KSQ Series

Square Hole Generating

Shank Type

Square "	Approx. Stroke	Series
.250	3/4	KSQ-250
.500	1	KSQ-500

Internal Trimming Chart

14-1/2˚ PA

Teeth in Part	Max in Cutter
18	4
19	4
20	5
21	5
22	6
23	6
24	7
25	7
26	8
27	8
28	9
29	9
30	10
31	10
32	11
33	11

Teeth in Part	Max in Cutter
34	12
35	12
36	13
37	13
38	14
39	15
40	15
41	16
42	16
43	17
44	18
45	18
46	19
47	20
48	20

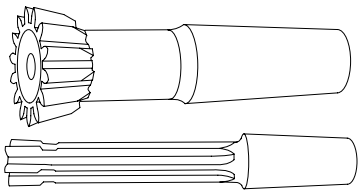
KDP20 Series

DP 20° PA

Finishing

Non-Topping

Shank Type



Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
3	20	6	3-1/4	.750	KDP20-03-6
4	20	6	3-1/4	.563	KDP20-04-6
4	20	8	2-3/4	.563	KDP20-04-8
5	20	7	3	.450	KDP20-05-7
5	20	8	2 5/8	.450	KDP20-05-8
5	20	8	3-1/2	.450	KDP20-05-8L
6	20	6	3	.375	KDP20-06-6
6	20	8	1-7/8	.375	KDP20-06-8S
6	20	8	3-3/4	.375	KDP20-06-8
6	20	9	4	.375	KDP20-06-9
6	20	10	2	.375	KDP20-06-10S
6	20	10	3	.375	KDP20-06-10
7	20	8	2-3/8	.321	KDP20-07-8
8	20	6	2	.281	KDP20-08-6
8	20	8	3-3/4	.281	KDP20-08-8L
8	20	9	2-1/8	.281	KDP20-08-9
8	20	10	3	.281	KDP20-08-10
8	20	12	3	.281	KDP20-08-12
9	20	7	2	.250	KDP20-09-7
9	20	10	2-1/2	.250	KDP20-09-10
9	20	12	1	.250	KDP20-09-12
10	20	6	2-1/8	.225	KDP20-10-6
10	20	7	1-3/4	.225	KDP20-10-7
10	20	8	2	.225	KDP20-10-8S
10	20	8	3-1/4	.225	KDP20-10-8
10	20	10	2-1/2	.225	KDP20-10-10
10	20	12	1	.225	KDP20-10-12S
10	20	12	2-5/8	.225	KDP20-10-12
11	20	8	1-1/2	.205	KDP20-11-8
12	20	8	2-5/8	.188	KDP20-12-8
12	20	9	2-5/8	.188	KDP20-12-9
12	20	9	3-1/8	.188	KDP20-12-9L
12	20	10	1-3/4	.188	KDP20-12-10
12	20	12	2	.188	KDP20-12-12S
12	20	12	2-5/8	.188	KDP20-12-12R
12	20	18	1-1/4	.188	KDP20-12-18S
12	20	18	2-1/2	.188	KDP20-12-18
14	20	10	2-7/8	.161	KDP20-14-10
14	20	12	1-7/8	.161	KDP20-14-12
16	20	8	1-3/8	.141	KDP20-16-8S
16	20	8	2	.141	KDP20-16-8
16	20	8	2-3/4	.141	KDP20-16-8L
16	20	10	1-3/8	.141	KDP20-16-10S
16	20	10	2-1/4	.141	KDP20-16-10
16	20	10	3	.141	KDP20-16-10L

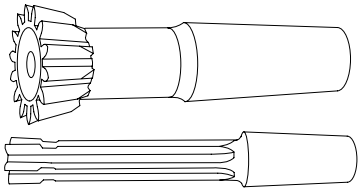
Stem design and stroke length vary

SERIES CONTINUED ON NEXT PAGE ->

KDP20 Series

DP 20° PA

Finishing
Non-Topping
Shank Type



Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
16	20	12	1-3/4	.141	KDP20-16-12S
16	20	12	2-3/4	.141	KDP20-16-12
16	20	12	3-1/2	.141	KDP20-16-12L
16	20	16	1-5/8	.141	KDP20-16-16S
16	20	16	2-1/4	.141	KDP20-16-16
16	20	24	2	.141	KDP20-16-24
16	20	30	2	.141	KDP20-16-30
18	20	8	2	.125	KDP20-18-8
18	20	16	1-3/8	.125	KDP20-18-16
20	20	8	1-1/2	.112	KDP20-20-8
20	20	10	1-3/8	.113	KDP20-20-10S
20	20	12	2	.113	KDP20-20-12
20	20	16	1-1/2	.113	KDP20-20-16
20	20	20	1-1/2	.113	KDP20-20-20
20	20	24	1-3/4	.113	KDP20-20-24
24	20	8	1-1/8	.094	KDP20-24-8
24	20	12	1-1/2	.094	KDP20-24-12
24	20	12	1-7/8	.094	KDP20-24-12L
24	20	16	2-1/2	.094	KDP20-24-16
24	20	24	1-3/4	.094	KDP20-24-24
28	20	18	1-3/4	.081	KDP20-28-18
28	20	24	1-1/2	.081	KDP20-28-24
30	20	12	1-3/8	.075	KDP20-30-12
30	20	16	1-1/4	.075	KDP20-30-16
32	20	12	1-3/4	.071	KDP20-32-12
32	20	16	1-3/4	.071	KDP20-32-16
32	20	20	2-1/8	.071	KDP20-32-20
32	20	24	1-1/8	.071	KDP20-32-24S
32	20	24	2	.071	KDP20-32-24
32	20	28	1-1/2	.071	KDP20-32-28
32	20	32	1-5/8	.071	KDP20-32-32
36	20	20	1-3/8	.063	KDP20-36-20
36	20	30	2	.063	KDP20-36-30
40	20	16	1-5/8	.057	KDP20-40-16
40	20	20	1-1/4	.057	KDP20-40-20S
40	20	20	1-3/4	.057	KDP20-40-20
40	20	20	2-3/4	.057	KDP20-40-20L
40	20	40	1-1/4	.057	KDP20-40-40
42	20	18	1-1/2	.054	KDP20-42-18
48	20	16	1-1/4	.048	KDP20-48-16
48	20	18	1-1/8	.048	KDP20-48-18
48	20	20	1-1/2	.048	KDP20-48-20
48	20	24	1-3/8	.048	KDP20-48-24
48	20	36	1-1/4	.048	KDP20-48-36S
48	20	36	1-1/2	.048	KDP20-48-36
48	20	36	3	.048	KDP20-48-36L
48	20	48	1-3/8	.048	KDP20-48-48
56	20	24	1-1/2	.041	KDP20-56-24

Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
60	20	36	1	.040	KDP20-60-36
64	20	16	1-1/8	.036	KDP20-64-16
64	20	24	1-1/4	.036	KDP20-64-24
64	20	30	1-1/2	.036	KDP20-64-30
64	20	30	2	.036	KDP20-64-30L
64	20	32	1-1/4	.036	KDP20-64-32
64	20	38	1-1/2	.036	KDP20-64-38
64	20	48	1-3/4	.036	KDP20-64-48
72	20	22	1-1/8	.033	KDP20-72-22
72	20	36	1-1/8	.033	KDP20-72-36
80	20	34	1-1/2	.030	KDP20-80-34
80	20	46	7/8	.030	KDP20-80-46
80	20	72	2	.030	KDP20-80-72
96	20	32	1/2	.025	KDP20-96-32S
96	20	32	1-3/4	.025	KDP20-96-32
96	20	48	1	.025	KDP20-96-48
120	20	32	5/8	.020	KDP20-120-32
120	20	48	1-1/2	.020	KDP20-120-48
120	20	70	7/8	.020	KDP20-120-70

Stem design and stroke length vary

Internal Trimming Chart
20° PA

Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter
13	4	36	18	59	41
14	4	37	19	60	42
15	5	38	20	61	43
16	5	39	21	62	44
17	6	40	22	63	45
18	6	41	23	64	46
19	7	42	24	65	47
20	7	43	25	66	48
21	8	44	26	67	49
22	8	45	27	68	50
23	9	46	28	69	51
24	10	47	29	70	52
25	10	48	30	71	53
26	11	49	31	72	54
27	12	50	32	73	55
28	12	51	33	74	56
29	13	52	34	75	57
30	13	53	35	76	58
31	14	54	36	77	59
32	14	55	37	78	60
33	15	56	38	79	61
34	16	57	39	80	62
35	17	58	40	81	63
				82	64

KCB20 Series

DP 20° PA

Combination Pitch Stub

Finishing , Non-Topping

Shank Type

Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
3/4	20	6	3-3/4	.563	KCB20-03-6
4/5	20	6	3	.450	KCB20-04-6
5/7	20	7	2-3/4	.321	KCB20-05-7
5/7	20	8	3-1/4	.321	KCB20-05-8
6/8	20	6	1-3/4	.281	KCB20-06-6S
6/8	20	6	3	.281	KCB20-06-6
6/8	20	8	2-1/8	.281	KCB20-06-8
6/8	20	10	3-7/8	.281	KCB20-06-10
7/9	20	7	2-1/4	.250	KCB20-07-7
7/9	20	8	1-3/4	.250	KCB20-07-8
8/10	20	6	1-7/8	.225	KCB20-08-6
8/10	20	7	2-1/4	.225	KCB20-08-7
8/10	20	8	1-1/2	.225	KCB20-08-8S
8/10	20	8	3	.225	KCB20-08-8
8/10	20	8	3-1/2	.225	KCB20-08-8L
8/10	20	10	3-1/4	.225	KCB20-08-10
8/10	20	12	1-7/8	.225	KCB20-08-12S
8/10	20	12	3	.225	KCB20-08-12
9/11	20	7	1-1/4	.205	KCB20-09-7
10/12	20	6	1-3/4	.188	KCB20-10-6S
10/12	20	7	2	.188	KCB20-10-7
10/12	20	8	2	.188	KCB20-10-8S
10/12	20	9	2-1/8	.188	KCB20-10-9
10/12	20	10	3	.188	KCB20-10-10
12/14	20	4	2	.161	KCB20-12-4
12/14	20	4	1-1/2	.161	KCB20-12-4S
12/14	20	6	1-1/4	.161	KCB20-12-6
12/14	20	8	2-1/2	.161	KCB20-12-8
12/14	20	10	1-3/4	.161	KCB20-12-10
12/14	20	11	2-1/4	.161	KCB20-12-11
12/14	20	12	1-3/4	.161	KCB20-12-12S
12/14	20	12	4	.161	KCB20-12-12L
14/16	20	8	1-1/2	.141	KCB20-14-8
14/16	20	12	2-7/8	.141	KCB20-14-12
16/21	20	8	1-5/8	.107	KCB20-16-8

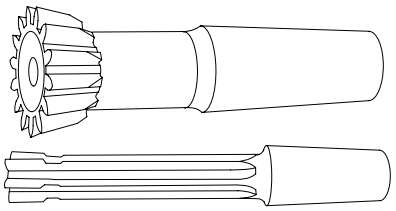
K25 Series

DP 25° PA

Finishing

Non-Topping

Shank Type



Diam. Pitch	PA	No. Teeth	Approx. Stroke	WD	Series
6	25	8	2-1/4	.375	K25-06-8
7	25	8	2-1/4	.321	K25-07-8
8	25	6	2-1/8	.281	K25-08-6
8	25	9	2-3/8	.281	K25-08-9
8	25	14	2	.281	K25-08-14
10	25	8	1-7/8	.225	K25-10-8
10	25	9	2	.225	K25-10-9
10	25	14	2-1/2	.225	K25-10-14
10	25	16	2-1/2	.225	K25-10-16
12	25	8	2	.188	K25-12-8
12	25	12	3	.188	K25-12-12
12	25	18	2	.188	K25-12-18
14	25	10	2	.161	K25-14-10
16	25	12	2-1/4	.141	K25-16-12
16	25	16	1-3/8	.141	K25-16-16S
20	25	14	2	.112	K25-20-14
24	25	16	1-3/4	.094	K25-24-16
32	25	24	2-1/2	.071	K25-32-24
32	25	40	5/8	.071	K25-32-40
36	25	36	1-5/8	.063	K25-36-36
48	25	18	1-1/2	.048	K25-48-18

Stem design and stroke length vary

Maximum Tooth Chart

25˚ PA

Teeth in Part	Max in Cutter
12	4
13	4
14	5
15	6
16	6
17	7
18	7
19	8

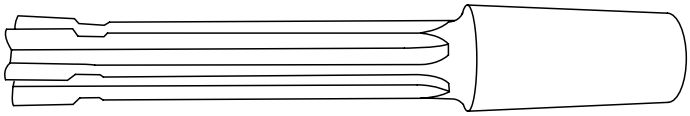
Teeth in Part	Max in Cutter
20	8
21	9
22	10
23	11
24	12
25	13
26	14
27	15

Teeth in Part	Max in Cutter
28	16
29	17
30	18
31	19
32	20
33	21
34	22
35	23
36	24

KFF30 Series

DP 30° PA

Fillet Root, Involute Spline
Shank Type



DP	PA	No. Teeth	Approx. Stroke	WD	Series
4/8	30	4	3-1/2	.350	KFF30-04-4L
4/8	30	6	5	.350	KFF30-04-6L
5/10	30	6	3	.280	KFF30-05-6
5/10	30	8	3-1/2	.280	KFF30-05-8
5/10	30	8	4	.280	KFF30-05-8L
6/12	30	4	1	.233	KFF30-06-4S
6/12	30	6	3-1/2	.233	KFF30-06-6L
6/12	30	7	2	.233	KFF30-06-7
6/12	30	8	4-1/8	.233	KFF30-06-8
6/12	30	9	2-1/2	.233	KFF30-06-9
6/12	30	10	5-1/4	.233	KFF30-06-10
8/16	30	4	1-1/2	.175	KFF30-08-4
8/16	30	4	2-5/8	.175	KFF30-08-4L
8/16	30	5	2-1/2	.175	KFF30-08-5
8/16	30	6	2	.175	KFF30-08-6
8/16	30	6	3-3/8	.175	KFF30-08-6L
8/16	30	7	2	.175	KFF30-08-7
8/16	30	8	1-7/8	.175	KFF30-08-8S
8/16	30	8	3	.175	KFF30-08-8
8/16	30	8	4-3/8	.175	KFF30-08-8L
8/16	30	9	1-3/4	.175	KFF30-08-9
8/16	30	10	1-1/4	.175	KFF30-08-10S
8/16	30	10	2-3/4	.175	KFF30-08-10
8/16	30	10	4-1/2	.175	KFF30-08-10L
8/16	30	11	2-1/4	.175	KFF30-08-11
8/16	30	12	1-3/4	.175	KFF30-08-12S
8/16	30	12	3-3/4	.175	KFF30-08-12
8/16	30	12	4-3/4	.175	KFF30-08-12L
10/20	30	4	1-3/4	.140	KFF30-10-4
10/20	30	4	2-1/4	.140	KFF30-10-4L
10/20	30	5	1-1/2	.140	KFF30-10-5
10/20	30	5	2-1/2	.140	KFF30-10-5L
10/20	30	6	4	.140	KFF30-10-6L
10/20	30	7	2	.140	KFF30-10-7
10/20	30	8	2-1/2	.140	KFF30-10-8S
10/20	30	8	4-1/2	.140	KFF30-10-8L
10/20	30	9	3	.140	KFF30-10-9
10/20	30	10	2	.140	KFF30-10-10S
10/20	30	10	4-1/2	.140	KFF30-10-10L
10/20	30	11	3	.140	KFF30-10-11
10/20	30	12	5	.140	KFF30-10-12L
10/20	30	14	2	.140	KFF30-10-14S
10/20	30	14	3-3/4	.140	KFF30-10-14
10/20	30	16	2-1/2	.140	KFF30-10-16
12/24	30	4	2-1/2	.117	KFF30-12-4L
12/24	30	5	2-1/8	.117	KFF30-12-5
12/24	30	5	1	.120	KFF30-12-5SE

DP	PA	No. Teeth	Approx. Stroke	WD	Series
12/24	30	6	2	.117	KFF30-12-6S
12/24	30	6	2-1/2	.117	KFF30-12-6
12/24	30	6	3-1/2	.117	KFF30-12-6L
12/24	30	7	2	.117	KFF30-12-7
12/24	30	8	1-3/8	.117	KFF30-12-8S
12/24	30	8	2-1/2	.117	KFF30-12-8LE
12/24	30	8	2-7/8	.117	KFF30-12-8L
12/24	30	9	1-1/4	.117	KFF30-12-9
12/24	30	10	2-1/2	.117	KFF30-12-10
12/24	30	10	3-3/4	.117	KFF30-12-10L
12/24	30	11	1-3/4	.117	KFF30-12-11
12/24	30	12	2-3/4	.117	KFF30-12-12
12/24	30	12	4	.117	KFF30-12-12L
12/24	30	12	5	.117	KFF30-12-12XL
12/24	30	14	3	.117	KFF30-12-14
12/24	30	16	2-1/2	.120	KFF30-12-16E
12/24	30	16	4	.120	KFF30-12-16LE

SERIES CONTINUED ON NEXT PAGE ->

Maximum Tooth Chart

30˚ PA Fillet Root

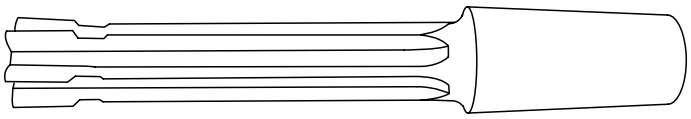
Teeth in Part	Max in Cutter
12	4
13	5
14	6
15	6
16	7
17	8
18	9
19	10
20	11
21	12
22	13
23	14
24	15
25	16
26	17
27	18
28	19
29	20
30	21
31	22
32	23
33	24
34	25
35	26
36	27
37	28
38	29

Teeth in Part	Max in Cutter
39	30
40	31
41	32
42	33
43	34
45	36
47	38
49	40
51	42
53	44
55	46
57	48
59	50
61	52
63	54
65	56
67	58
69	60
71	62
73	64
75	66
77	68
79	70
81	72
83	74
85	76
87	78
89	80

KFF30 Series

DP 30° PA

Fillet Root, Involute Spline
Shank Type



DP	PA	No. Teeth	Approx. Stroke	WD	Series
12/24	30	18	4	.120	KFF30-12-18
16/32	30	4	3/4	.094	KFF30-16-4
16/32	30	4	1-1/4	.094	KFF30-16-4L
16/32	30	5	1-1/4	.094	KFF30-16-5
16/32	30	5	2	.094	KFF30-16-5L
16/32	30	6	1-1/4	.094	KFF30-16-6S
16/32	30	6	2	.094	KFF30-16-6
16/32	30	6	2-1/2	.094	KFF30-16-6L
16/32	30	7	1-1/4	.094	KFF30-16-7
16/32	30	8	1-1/2	.094	KFF30-16-8S
16/32	30	8	2-1/4	.094	KFF30-16-8
16/32	30	8	2-3/4	.094	KFF30-16-8L
16/32	30	9	2	.094	KFF30-16-9
16/32	30	10	1-1/2	.094	KFF30-16-10S
16/32	30	10	2-1/2	.094	KFF30-16-10
16/32	30	10	3-1/4	.094	KFF30-16-10L
16/32	30	11	2-1/4	.094	KFF30-16-11
16/32	30	12	1-3/4	.094	KFF30-16-12S
16/32	30	12	3	.094	KFF30-16-12
16/32	30	12	4	.094	KFF30-16-12L
16/32	30	13	2-1/2	.094	KFF30-16-13
16/32	30	14	2-1/4	.094	KFF30-16-14
16/32	30	14	3-3/4	.094	KFF30-16-14L
16/32	30	15	2	.094	KFF30-16-15
16/32	30	16	3	.094	KFF30-16-16S
16/32	30	16	4	.094	KFF30-16-16
16/32	30	16	4-1/2	.094	KFF30-16-16L
16/32	30	18	3-1/4	.094	KFF30-16-18
16/32	30	20	2-3/4	.094	KFF30-16-20
16/32	30	20	5	.094	KFF30-16-20L
16/32	30	27	3	.094	KFF30-16-27
20/30	30	4	1-1/4	.082	KFF30-23-4
20/30	30	6	1-1/2	.087	KFF30-23-6
20/30	30	6	2-1/2	.087	KFF30-23-6L
20/30	30	8	2-1/2	.087	KFF30-23-8
20/30	30	8	2-3/4	.087	KFF30-23-8L
20/30	30	9	1-3/4	.087	KFF30-23-9
20/30	30	10	1-5/8	.087	KFF30-23-10S
20/30	30	10	2-3/8	.087	KFF30-23-10
20/30	30	12	2-3/4	.087	KFF30-23-12
20/30	30	14	1-7/8	.087	KFF30-23-14
20/30	30	20	2	.087	KFF30-23-20
20/30	30	24	2	.087	KFF30-23-24
20/40	30	4	1	.075	KFF30-20-4
20/40	30	5	1-1/8	.075	KFF30-20-5
20/40	30	5	1-5/8	.075	KFF30-20-5L

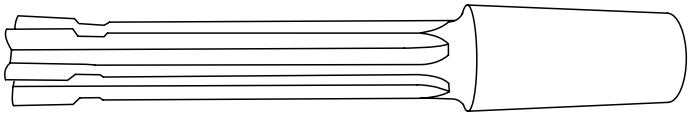
DP	PA	No. Teeth	Approx. Stroke	WD	Series
20/40	30	6	1-1/8	.075	KFF30-20-6
20/40	30	6	1-3/4	.075	KFF30-20-6L
20/40	30	7	1-1/4	.075	KFF30-20-7
20/40	30	7	1-3/4	.075	KFF30-20-7L
20/40	30	8	1-1/4	.075	KFF30-20-8
20/40	30	8	2-1/2	.075	KFF30-20-8L
20/40	30	9	1-1/4	.075	KFF30-20-9
20/40	30	10	1-1/2	.075	KFF30-20-10
20/40	30	10	2-1/4	.075	KFF30-20-10L
20/40	30	11	2-1/2	.075	KFF30-20-11
20/40	30	12	2-1/4	.075	KFF30-20-12
20/40	30	12	3	.075	KFF30-20-12L
20/40	30	14	3	.075	KFF30-20-14
20/40	30	16	2-1/4	.075	KFF30-20-16
20/40	30	16	3	.075	KFF30-20-16L
20/40	30	18	2	.075	KFF30-20-18
20/40	30	18	3	.075	KFF30-20-18L
20/40	30	20	2-1/2	.075	KFF30-20-20
20/40	30	24	2-1/4	.075	KFF30-20-24
20/40	30	26	1-5/8	.075	KFF30-20-26
24/48	30	5	3/4	.063	KFF30-24-5
24/48	30	6	3/4	.063	KFF30-24-6
24/48	30	6	1-1/4	.063	KFF30-24-6L
24/48	30	7	1-1/4	.063	KFF30-24-7
24/48	30	8	1-1/4	.063	KFF30-24-8S
24/48	30	8	2-1/4	.063	KFF30-24-8
24/48	30	9	1-1/2	.063	KFF30-24-9
24/48	30	10	2-1/4	.063	KFF30-24-10
24/48	30	10	3-1/4	.063	KFF30-24-10L
24/48	30	11	2	.063	KFF30-24-11
24/48	30	12	2-1/4	.063	KFF30-24-12
24/48	30	12	2-3/4	.063	KFF30-24-12L
24/48	30	14	1-1/2	.063	KFF30-24-14
24/48	30	15	2-1/2	.063	KFF30-24-15
24/48	30	16	2-1/4	.063	KFF30-24-16
24/48	30	16	3-1/4	.063	KFF30-24-16L
24/48	30	18	2-1/2	.063	KFF30-24-18
24/48	30	18	3-1/2	.063	KFF30-24-18L
24/48	30	20	2-1/2	.063	KFF30-24-20
24/48	30	20	4-1/8	.063	KFF30-24-20L
24/48	30	22	1-1/2	.063	KFF30-24-22S
24/48	30	22	2-1/2	.063	KFF30-24-22
24/48	30	22	3-1/2	.063	KFF30-24-22L
24/48	30	24	2-1/2	.063	KFF30-24-24
32/64	30	5	1/2	.044	KFF30-32-5
32/64	30	6	1	.047	KFF30-32-6

SERIES CONTINUED ON NEXT PAGE ->

KFF30 Series

DP 30° PA

Fillet Root, Involute Spline
Shank Type

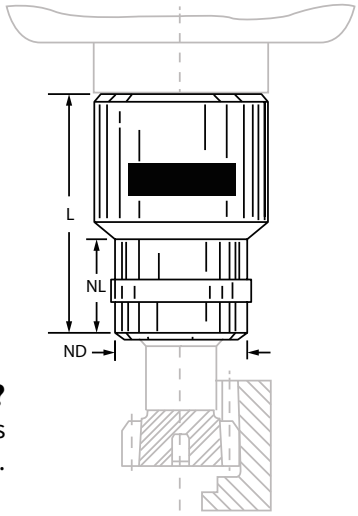


DP	PA	No. Teeth	Approx. Stroke	WD	Series
32/64	30	6	1-1/4	.047	KFF30-32-6L
32/64	30	7	1	.047	KFF30-32-7
32/64	30	8	1-1/4	.047	KFF30-32-8
32/64	30	8	2	.047	KFF30-32-8L
32/64	30	9	1-1/2	.047	KFF30-32-9
32/64	30	10	1-1/4	.047	KFF30-32-10
32/64	30	10	2-1/4	.047	KFF30-32-10L
32/64	30	12	1-3/4	.047	KFF30-32-12
32/64	30	14	1-3/4	.047	KFF30-32-14
32/64	30	16	1-3/8	.047	KFF30-32-16
32/64	30	16	2-1/4	.047	KFF30-32-16L
32/64	30	18	2-1/2	.047	KFF30-32-18
32/64	30	20	1-3/4	.047	KFF30-32-20
32/64	30	20	3	.047	KFF30-32-20L
32/64	30	24	2	.047	KFF30-32-24
32/64	30	24	2-3/4	.047	KFF30-32-24L
32/64	30	26	1-7/8	.047	KFF30-32-26
32/64	30	32	2	.047	KFF30-32-32
40/80	30	6	7/8	.035	KFF30-40-6
40/80	30	7	3/4	.038	KFF30-40-7
40/80	30	8	1	.038	KFF30-40-8
40/80	30	10	7/8	.038	KFF30-40-10
40/80	30	10	1-5/8	.038	KFF30-40-10L
40/80	30	12	1-1/8	.038	KFF30-40-12
40/80	30	18	1-3/4	.038	KFF30-40-18
40/80	30	22	1-3/4	.038	KFF30-40-22
40/80	30	26	1-1/2	.038	KFF30-40-26
48/96	30	8	3/4	.031	KFF30-48-8
48/96	30	8	1-1/8	.031	KFF30-48-8L
48/96	30	10	7/8	.031	KFF30-48-10
48/96	30	12	1-1/8	.031	KFF30-48-12
48/96	30	16	1-1/2	.031	KFF30-48-16
48/96	30	20	1	.031	KFF30-48-20
48/96	30	32	1-5/8	.031	KFF30-48-32
80/160	30	14	3/4	.015	KFF30-80-14
80/160	30	80	1-1/8	.015	KFF30-80-80

Maximum Tooth Chart
30° PA Fillet Root

Teeth in Part	Max in Cutter
12	4
13	5
14	6
15	6
16	7
17	8
18	9
19	10
20	11
21	12
22	13
23	14
24	15
25	16
26	17
27	18
28	19
29	20
30	21
31	22
32	23
33	24
34	25
35	26
36	27
37	28
38	29
39	30

Teeth in Part	Max in Cutter
40	31
41	32
42	33
43	34
45	36
47	38
49	40
51	42
53	44
55	46
57	48
59	50
61	52
63	54
65	56
67	58
69	60
71	62
73	64
75	66
77	68
79	70
81	72
83	74
85	76
87	78
89	80



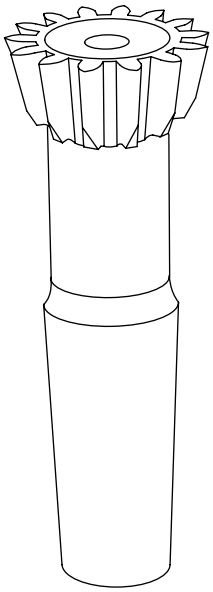
Need an Adaptor for your cutter?
Pages 139-144 offer multiple types of adaptors for your gear tooling needs.

DP	PA	No. Teeth	Approx. Stroke	ASA B5.15-1950		ANSI B92.1-1970	
				WD	Series	WD	Series
4/8	30	6	2-1/4	.277	K5L30-04-6	.294	K7L30-04-6
4/8	30	6	4-1/2	.277	K5L30-04-6L	.294	K7L30-04-6L
5/10	30	6	2-3/4	.222	-	.235	K7L30-05-6S
5/10	30	6	3-1/2	.222	-	.235	K7L30-05-6
5/10	30	6	4	.222	K5L30-05-6L	.235	K7L30-05-6L
5/10	30	8	2	.222	-	.235	K7L30-05-8S
5/10	30	8	3-1/4	.222	-	.235	K7L30-05-8
5/10	30	8	4-3/4	.222	K5L30-05-8L	.235	K7L30-05-8L
6/12	30	4	2-3/4	.185	-	.196	K7L30-06-4
6/12	30	5	1-1/4	.185	-	.196	K7L30-06-5S
6/12	30	5	2-1/2	.185	-	.196	K7L30-06-5
6/12	30	6	3-3/8	.185	-	.196	K7L30-06-6L
6/12	30	8	2	.185	-	.196	K7L30-06-8S
6/12	30	8	4-1/2	.185	-	.196	K7L30-06-8
6/12	30	8	5-1/2	.185	-	.196	K7L30-06-8L
6/12	30	9	2-5/8	.185	K5L30-06-9	.196	K7L30-06-9
6/12	30	10	3-1/2	.185	-	.196	K7L30-06-10
6/12	30	10	5	.185	-	.196	K7L30-06-10L
8/16	30	4	1-1/2	.140	-	.147	K7L30-08-4
8/16	30	4	2-1/4	.140	-	.147	K7L30-08-4L
8/16	30	5	1-1/4	.140	-	.147	K7L30-08-5
8/16	30	5	3	.140	-	.147	K7L30-08-5L
8/16	30	6	1-1/2	.140	K5L30-08-6	.147	K7L30-08-6
8/16	30	6	3	.140	K5L30-08-6L	.147	K7L30-08-6L
8/16	30	6	4	.140	-	.147	K7L30-08-6XL
8/16	30	7	1-1/2	.140	-	.147	K7L30-08-7S
8/16	30	7	1-1/2	.140	-	.147	K7L30-08-7
8/16	30	7	3-3/4	.140	-	.147	K7L30-08-7L
8/16	30	8	2-1/4	.140	K5L30-08-8S	.147	-
8/16	30	8	2-7/8	.140	K5L30-08-8	.147	K7L30-08-8
8/16	30	8	4-5/8	.140	K5L30-08-8L	.147	K7L30-08-8L
8/16	30	9	1-1/2	.140	-	.147	K7L30-08-9S
8/16	30	9	2-7/8	.140	-	.147	K7L30-08-9
8/16	30	9	3-1/4	.140	-	.147	K7L30-08-9L
8/16	30	10	1-1/4	.140	-	.147	K7L30-08-10S
8/16	30	10	3-1/4	.140	-	.147	K7L30-08-10
8/16	30	10	4-7/8	.140	-	.147	K7L30-08-10L
8/16	30	12	4	.140	-	.147	K7L30-08-12
8/16	30	12	4-3/4	.140	-	.147	K7L30-08-12L
8/16	30	14	3	.140	-	.147	K7L30-08-14
10/20	30	4	2	.112	-	.118	K7L30-10-4
10/20	30	5	2-3/8	.112	-	.118	K7L30-10-5
10/20	30	6	2-1/2	.112	-	.118	K7L30-10-6
10/20	30	6	3-1/2	.112	-	.118	K7L30-10-6L
10/20	30	7	2-1/4	.112	-	.118	K7L30-10-7
10/20	30	8	2-1/2	.112	-	.118	K7L30-10-8
10/20	30	8	3-3/4	.112	-	.118	K7L30-10-8L
10/20	30	9	2-3/4	.112	-	.118	K7L30-10-9
10/20	30	10	1-1/2	.112	-	.118	K7L30-10-10S
10/20	30	10	4-3/4	.112	-	.118	K7L30-10-10L

K5L30 & K7L30 Series

DP 30° PA

Flat Root Side Fit
Involute Spline
Shank Type



Stem design and stroke length vary

SERIES CONTINUED ON NEXT PAGE ->

K5L30 & K7L30 Series

DP 30° PA

Flat Root Side Fit
Involute Spline
Shank Type

Diam. Pitch	PA	No. Teeth	Approx. Stroke	ASA B5.15-1950		ANSI B92.1-1970	
				WD	Series	WD	Series
10/20	30	12	2	.112	-	.118	K7L30-10-12S
10/20	30	12	3-1/4	.112	-	.118	K7L30-10-12
10/20	30	12	5	.112	-	.118	K7L30-10-12L
10/20	30	14	2	.112	-	.118	K7L30-10-14S
10/20	30	14	3	.112	-	.118	K7L30-10-14
10/20	30	16	2-1/2	.112	-	.118	K7L30-10-16
12/24	30	4	1-1/4	.094	-	.098	K7L30-12-4
12/24	30	4	1-5/8	.094	-	.098	K7L30-12-4L
12/24	30	5	7/8	.094	-	.098	K7L30-12-5
12/24	30	6	2-5/8	.094	-	.098	K7L30-12-6S
12/24	30	6	1-3/8	.094	-	.098	K7L30-12-6
12/24	30	6	2-5/8	.094	-	.098	K7L30-12-6L
12/24	30	7	1-3/4	.094	K5L30-12-7	.098	K7L30-12-7
12/24	30	8	2-1/8	.094	K5L30-12-8	.098	K7L30-12-8
12/24	30	8	3-1/4	.094	K5L30-12-8L	.098	K7L30-12-8L
12/24	30	9	1-1/2	.094	-	.098	K7L30-12-9
12/24	30	10	1-3/4	.094	-	.098	K7L30-12-10S
12/24	30	10	2-1/2	.094	-	.098	K7L30-12-10
12/24	30	10	3-1/4	.094	-	.098	K7L30-12-10L
12/24	30	11	1-3/4	.094	-	.098	K7L30-12-11
12/24	30	12	2	.094	-	.098	K7L30-12-12S
12/24	30	12	3	.094	-	.098	K7L30-12-12
12/24	30	12	4	.094	-	.098	K7L30-12-12L
12/24	30	14	3-1/4	.094	-	.098	K7L30-12-14
12/24	30	16	2-1/2	.094	-	.098	K7L30-12-16
16/32	30	4	1-1/4	.071	-	.073	K7L30-16-4
16/32	30	5	1-1/4	.071	-	.073	K7L30-16-5S
16/32	30	5	1-3/4	.071	-	.073	K7L30-16-5
16/32	30	5	2-1/8	.071	-	.073	K7L30-16-5L
16/32	30	6	1-1/4	.071	K5L30-16-6	.073	K7L30-16-6
16/32	30	6	2-1/2	.071	K5L30-16-6L	.073	K7L30-16-6L
16/32	30	7	1-1/2	.071	-	.073	K7L30-16-7
16/32	30	8	1-1/2	.071	K5L30-16-8S	.073	K7L30-16-8S
16/32	30	8	2	.071	K5L30-16-8	.073	K7L30-16-8
16/32	30	8	2-3/4	.071	K5L30-16-8L	.073	K7L30-16-8L
16/32	30	9	1-1/2	.071	-	.073	K7L30-16-9
16/32	30	10	2	.071	-	.073	K7L30-16-10
16/32	30	10	2-3/4	.071	-	.073	K7L30-16-10L
16/32	30	11	2-1/4	.071	-	.073	K7L30-16-11
16/32	30	12	2-1/2	.071	K5L30-16-12	.073	K7L30-16-12
16/32	30	12	3-3/4	.071	-	.073	K7L30-16-12L
16/32	30	14	1-1/2	.071	-	.073	K7L30-16-14
16/32	30	14	3	.071	-	.073	K7L30-16-14L
16/32	30	15	1-1/2	.071	K5L30-16-15	.073	K7L30-16-15
16/32	30	15	3-3/4	.071	-	.073	K7L30-16-15L
16/32	30	16	1-3/4	.071	-	.073	K7L30-16-16S
16/32	30	16	3	.071	-	.073	K7L30-16-16
16/32	30	16	3-3/4	.071	-	.073	K7L30-16-16L
16/32	30	16	4-1/2	.071	-	.073	K7L30-16-16LL
16/32	30	18	3	.071	-	.073	K7L30-16-18

Maximum Tooth Chart
30˚ PA Flat Root

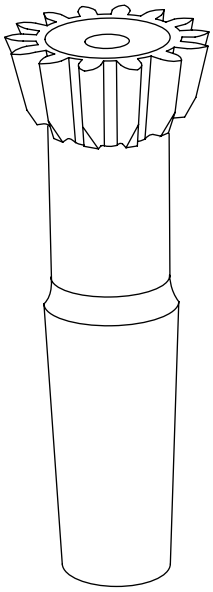
Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter
10	4	26	20
11	5	27	21
12	6	28	22
13	7	29	23
14	8	30	24
15	9	31	25
16	10	32	26
17	11	33	27
18	12	34	28
19	13	35	29
20	14	36	30
21	15	37	31
22	16	38	32
23	17	39	33
24	18	40	34
25	19	41	35

SERIES CONTINUED ON NEXT PAGE ->

K5L30 & K7L30 Series

DP 30° PA

Flat Root Side Fit
Involute Spline
Shank Type



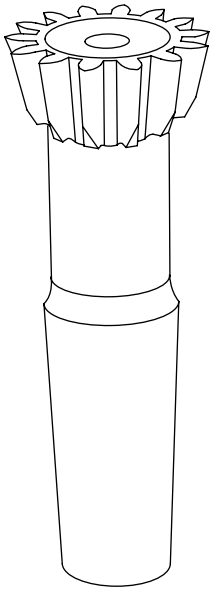
Stem design and stroke length vary

Diam. Pitch	PA	No. Teeth	Approx. Stroke	ASA B5.15-1950		ANSI B92.1-1970	
				WD	Series	WD	Series
16/32	30	20	2-3/4	.071	-	.073	K7L30-16-20
16/32	30	20	5	.071	-	.073	K7L30-16-20L
16/32	30	24	1-1/2	.071	-	.073	K7L30-16-24
20/40	30	4	1-1/4	.057	-	.059	K7L30-20-4
20/40	30	5	7/8	.057	-	.059	K7L30-20-5
20/40	30	6	1	.057	-	.059	K7L30-20-6
20/40	30	6	1-5/8	.057	-	.059	K7L30-20-6L
20/40	30	7	1-3/8	.057	K5L30-20-7	.059	K7L30-20-7
20/40	30	8	2-1/4	.057	-	.059	K7L30-20-8
20/40	30	10	1-3/8	.057	K5L30-20-10	.059	K7L30-20-10
20/40	30	12	2-1/2	.057	-	.059	K7L30-20-12
20/40	30	14	1-3/4	.057	-	.059	K7L30-20-14S
20/40	30	14	2-1/2	.057	-	.059	K7L30-20-14
20/40	30	14	3	.057	-	.059	K7L30-20-14L
20/40	30	16	2-1/4	.057	-	.059	K7L30-20-16
20/40	30	18	2-1/2	.057	-	.059	K7L30-20-18
24/48	30	5	1-1/8	.048	-	.049	K7L30-24-5
24/48	30	6	1-1/4	.048	-	.049	K7L30-24-6
24/48	30	8	1-1/2	.048	-	.049	K7L30-24-8
24/48	30	8	2	.048	K5L30-24-8L	.049	K7L30-24-8L
24/48	30	10	2-1/4	.048	-	.049	K7L30-24-10
24/48	30	10	3-1/4	.048	-	.049	K7L30-24-10L
24/48	30	11	2	.048	-	.049	K7L30-24-11
24/48	30	12	2-1/2	.048	K5L30-24-12	.049	K7L30-24-12
24/48	30	14	1-5/8	.048	-	.049	K7L30-24-14
24/48	30	16	2-1/4	.048	-	.049	K7L30-24-16
24/48	30	18	2-1/4	.048	K5L30-24-18	.049	K7L30-24-18
24/48	30	22	3-1/4	.048	-	.049	K7L30-24-22
32/64	30	6	1-1/4	.036	-	.037	K7L30-32-6
32/64	30	8	1-1/4	.036	-	.037	K7L30-32-8
32/64	30	8	1-7/8	.036	-	.037	K7L30-32-8L
32/64	30	10	1-5/8	.036	-	.037	K7L30-32-10
32/64	30	12	1-5/8	.036	-	.037	K7L30-32-12
32/64	30	14	1-3/4	.036	-	.037	K7L30-32-14
32/64	30	16	1-3/8	.036	-	.037	K7L30-32-16
32/64	30	20	1-3/4	.036	-	.037	K7L30-32-20
32/64	30	24	1-1/4	.036	-	.037	K7L30-32-24
32/64	30	24	2-5/8	.036	-	.037	K7L30-32-24L
40/80	30	7	1-3/8	.030	-	.030	K7L30-40-7
40/80	30	10	1-3/4	.030	-	.030	K7L30-40-10
40/80	30	12	1-3/4	.030	-	.030	K7L30-40-12
40/80	30	18	1-3/4	.030	-	.030	K7L30-40-18
40/80	30	22	1-3/4	.030	-	.030	K7L30-40-22
48/96	30	8	1	.025	-	.025	K7L30-48-8
48/96	30	10	1-1/8	.025	-	.025	K7L30-48-10
48/96	30	12	1-1/4	.025	-	.025	K7L30-48-12
48/96	30	16	1-1/4	.025	-	.025	K7L30-48-16
48/96	30	20	1-3/8	.025	-	.025	K7L30-48-20
48/96	30	32	1-5/8	.025	-	.025	K7L30-48-32

KJI30 Series

DP 30° PA

Flat Root Major Diameter Fit
Involute Spline
Shank Type



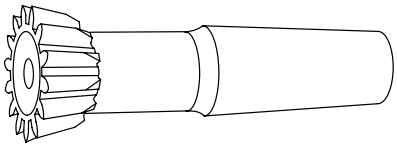
Stem design and stroke length vary

DP	PA	No. Teeth	Approx. Stroke	WD	Series
5/10	30°	6	2-1/2	.200	KJI30-05-6
5/10	30°	7	2-3/4	.200	KJI30-05-7
5/10	30°	8	4-3/4	.200	KJI30-05-8
6/12	30°	6	3-1/4	.167	KJI30-06-6
6/12	30°	8	3	.167	KJI30-06-8
6/12	30°	10	3-3/8	.167	KJI30-06-10
8/16	30°	6	2-7/8	.125	KJI30-08-6
8/16	30°	8	2-3/4	.125	KJI30-08-8
8/16	30°	12	4	.125	KJI30-08-12
8/16	30°	14	5	.125	KJI30-08-14
10/20	30°	6	2-1/2	.100	KJI30-10-6
10/20	30°	8	3	.100	KJI30-10-8
10/20	30°	9	2-3/4	.100	KJI30-10-9
10/20	30°	10	3	.100	KJI30-10-10
10/20	30°	12	3	.100	KJI30-10-12
12/24	30°	7	2-1/2	.083	KJI30-12-7
12/24	30°	8	2	.083	KJI30-12-8S
12/24	30°	8	2-3/4	.083	KJI30-12-8
12/24	30°	8	3-1/4	.083	KJI30-12-8L
12/24	30°	10	3-1/2	.083	KJI30-12-10
12/24	30°	12	3-1/4	.083	KJI30-12-12
12/24	30°	12	4-1/2	.083	KJI30-12-12L
16/32	30°	4	1-1/4	.063	KJI30-16-4
16/32	30°	6	1-1/4	.063	KJI30-16-6
16/32	30°	9	1-1/2	.063	KJI30-16-9
16/32	30°	10	2-1/2	.063	KJI30-16-10
16/32	30°	12	2-1/8	.063	KJI30-16-12
16/32	30°	12	3-3/4	.063	KJI30-16-12L
16/32	30°	14	1-3/4	.063	KJI30-16-14
16/32	30°	16	3-3/4	.063	KJI30-16-16L
16/32	30°	18	3-1/2	.063	KJI30-16-18
16/32	30°	22	2-7/8	.063	KJI30-16-22L
20/40	30°	8	1-7/8	.050	KJI30-20-8
20/40	30°	10	2-1/4	.050	KJI30-20-10
20/40	30°	12	2-3/4	.050	KJI30-20-12
24/48	30°	6	1-1/4	.042	KJI30-24-6
24/48	30°	8	1-1/2	.042	KJI30-24-8
24/48	30°	10	3-1/4	.042	KJI30-24-10L
24/48	30°	12	2-1/2	.042	KJI30-24-12
24/48	30°	16	2-1/2	.042	KJI30-24-16
32/64	30°	8	1-1/4	.031	KJI30-32-8
32/64	30°	10	1-5/8	.031	KJI30-32-10
32/64	30°	16	1-3/8	.031	KJI30-32-16

KFF37 Series*

DP 37.5° PA

Full Fillet
Involute Spline
Shank Type



DP	PA	No. Teeth	Approx. Stroke	WD	Series
10/20	37.5°	8	2-1/4	.132	KFF37-10-8
12/24	37.5°	10	2-1/2	.110	KFF37-12-10
16/32	37.5°	4	1-1/4	.079	KFF37-16-4
16/32	37.5°	10	2-1/8	.079	KFF37-16-10
16/32	37.5°	14	2-1/2	.079	KFF37-16-14
20/40	37.5°	5	1-1/2	.064	KFF37-20-5
20/40	37.5°	10	1-3/4	.064	KFF37-20-10
20/40	37.5°	14	2	.064	KFF37-20-14
20/40	37.5°	16	2-3/8	.065	KFF37-20-16
20/40	37.5°	24	3-3/8	.065	KFF37-20-24L
24/48	37.5°	8	1-1/2	.055	KFF37-24-8
24/48	37.5°	12	2-1/2	.055	KFF37-24-12
24/48	37.5°	18	2-1/4	.055	KFF37-24-18
32/64	37.5°	7	1-1/4	.045	KFF37-32-7
32/64	37.5°	10	1-1/4	.045	KFF37-32-10
32/64	37.5°	20	2-5/8	.045	KFF37-32-20
40/80	37.5°	7	1	.034	KFF37-40-7
40/80	37.5°	10	1-1/4	.034	KFF37-40-10
40/80	37.5°	22	1-1/4	.034	KFF37-40-22
48/96	37.5°	10	7/8	.029	KFF37-48-10

Maximum Tooth Chart 45˚ PA

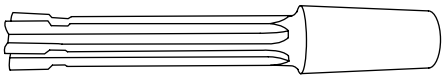
Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter
10	6	18	14	26	22	34	30
11	7	19	15	27	23	35	31
12	8	20	16	28	24	36	32
13	9	21	17	29	25	37	33
14	10	22	18	30	26	38	34
15	11	23	19	31	27		
16	12	24	20	32	28		
17	13	25	21	33	29		

*Stem design and stroke length vary

K45 Series*

DP 45° PA

Full Fillet
Involute Spline
Shank Type



DP	PA	No. Teeth	Approx. Stroke	WD	Series
10/20	45°	6	2	.104	K45-10-6
10/20	45°	8	2-1/2	.104	K45-10-8
12/24	45°	8	1-3/4	.086	K45-12-8
12/24	45°	12	1-1/2	.086	K45-12-12
16/32	45°	6	1-1/2	.066	K45-16-6
16/32	45°	8	1-3/4	.066	K45-16-8
16/32	45°	10	2	.066	K45-16-10
16/32	45°	10	2-1/8	.063	K45-16-10E
16/32	45°	14	2-1/2	.066	K45-16-14
20/40	45°	8	1-5/8	.054	K45-20-8
20/40	45°	12	1-1/2	.054	K45-20-12
20/40	45°	16	2-1/2	.054	K45-20-16
20/40	45°	20	3-3/4	.054	K45-20-20
24/48	45°	8	1-5/8	.045	K45-24-8
24/48	45°	10	1	.045	K45-24-10E
24/48	45°	12	1-1/2	.045	K45-24-12
24/48	45°	12	2-1/8	.045	K45-24-12L
24/48	45°	14	2	.045	K45-24-14
24/48	45°	18	2-3/4	.045	K45-24-18
24/48	45°	22	2-3/8	.045	K45-24-22S
24/48	45°	24	2-3/4	.045	K45-24-24
32/64	45°	9	1-1/4	.033	K45-32-9
32/64	45°	12	1-3/8	.033	K45-32-12
32/64	45°	16	1-3/4	.033	K45-32-16
32/64	45°	20	2-3/4	.033	K45-32-20L
32/64	45°	30	2-1/2	.033	K45-32-30
40/80	45°	10	3/4	.028	K45-40-10
40/80	45°	15	1-1/4	.030	K45-40-15E
40/80	45°	16	1-3/4	.028	K45-40-16
40/80	45°	20	1-3/4	.030	K45-40-20L
40/80	45°	22	1-3/4	.028	K45-40-22
40/80	45°	30	1-1/2	.028	K45-40-30
48/96	45°	8	3/4	.023	K45-48-8
48/96	45°	12	3/4	.023	K45-48-12
48/96	45°	12	5/8	.022	K45-48-12E
48/96	45°	18	1-1/4	.023	K45-48-18
48/96	45°	24	2 1/8	.023	K45-48-24
48/96	45°	32	1-3/4	.023	K45-48-32
48/96	45°	40	1-1/4	.023	K45-48-40S
64/128	45°	20	1-1/2	.016	K45-64-20
64/128	45°	28	1-3/4	.016	K45-64-28
80/160	45°	24	1	.014	K45-80-24
80/160	45°	38	1-1/4	.014	K45-80-38

Module	PA	No. Teeth	Approx. Stroke	WD	Series
.2	20°	28	7/8	.019	KM20-020-28
.25	20°	120	1-1/8	.024	KM20-025-120
.3	20°	20	3/4	.027	KM20-030-20
.3	20°	36	1	.027	KM20-030-36
.4	20°	32	1-1/2	.035	KM20-040-32
.5	20°	16	1-1/8	.044	KM20-050-16
.5	20°	28	1-3/8	.044	KM20-050-28
.6	20°	22	1-1/2	.053	KM20-060-22
.7	20°	14	1-1/4	.062	KM20-070-14
.7	20°	22	1-1/2	.062	KM20-070-22
.75	20°	10	1-1/4	.066	KM20-075-10
.75	20°	14	1-1/2	.066	KM20-075-14
.8	20°	12	1-1/2	.071	KM20-080-12
.8	20°	18	1-3/4	.071	KM20-080-18
.8	20°	26	2-1/8	.071	KM20-080-26
.9	20°	16	1-3/4	.080	KM20-090-16
1	20°	8	1-1/4	.089	KM20-100-8
1	20°	14	3-5/8	.089	KM20-100-14L
1	20°	16	2	.089	KM20-100-16
1	20°	16	2-1/2	.089	KM20-100-16L
1.25	20°	6	1	.111	KM20-125-6
1.25	20°	8	2-1/8	.111	KM20-125-8L
1.25	20°	12	1-5/8	.111	KM20-125-12
1.25	20°	16	1-5/8	.111	KM20-125-16
1.25	20°	20	1-7/8	.111	KM20-125-20
1.5	20°	6	1-1/8	.127	KM20-150-6
1.5	20°	6	2-1/4	.127	KM20-150-6L
1.5	20°	8	1-3/8	.133	KM20-150-8
1.5	20°	12	2-1/2	.133	KM20-150-12
1.5	20°	16	2-3/4	.133	KM20-150-16
1.75	20°	6	1	.155	KM20-175-6
1.75	20°	12	2	.155	KM20-175-12
1.75	20°	16	2-1/4	.155	KM20-175-16

KM20 Series

Module 20° PA

Finishing, Non-Topping, Shank Type

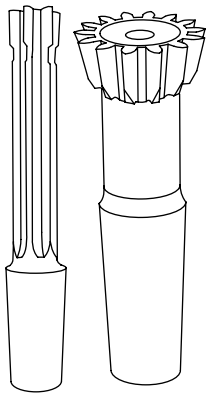
Module	PA	No. Teeth	Approx. Stroke	WD	Series
2	20°	6	1-3/8	.177	KM20-200-6
2	20°	8	1-1/8	.177	KM20-200-8
2	20°	8	2-3/4	.177	KM20-200-8L
2	20°	10	1-3/4	.177	KM20-200-10
2	20°	11	1-7/8	.177	KM20-200-11
2	20°	15	2-3/4	.177	KM20-200-15
2.25	20°	10	2-1/4	.199	KM20-225-10
2.5	20°	6	1-1/2	.221	KM20-250-6
2.5	20°	8	3-1/2	.221	KM20-250-8
2.5	20°	8	3-3/4	.221	KM20-250-8L
2.5	20°	10	2-3/8	.221	KM20-250-10S
2.5	20°	10	2-3/4	.221	KM20-250-10
2.5	20°	12	3-3/8	.221	KM20-250-12L
2.5	20°	16	2-5/8	.221	KM20-250-16
2.75	20°	10	1-1/8	.195	KM20-275-10E
3	20°	6	2	.266	KM20-300-6
3	20°	8	1-7/8	.266	KM20-300-8S
3	20°	8	2-1/2	.266	KM20-300-8
3	20°	9	2-1/2	.266	KM20-300-9
3	20°	10	2-3/4	.266	KM20-300-10
3.5	20°	10	3	.310	KM20-350-10
3.5	20°	12	3	.310	KM20-350-12
3.75	20°	8	3-1/8	.332	KM20-375-8
3.75	20°	12	3	.332	KM20-375-12
4	20°	8	3	.354	KM20-400-8
4.5	20°	8	3-1/2	.399	KM20-450-8
5	20°	6	1-5/8	.443	KM20-500-6
5	20°	8	2-1/4	.443	KM20-500-8
6	20°	6	3-1/2	.532	KM20-600-6

Module	PA	No. Teeth	Approx. Stroke	WD	Series
1	20°	8	1-5/8	.048	KMJA-100-8
1.25	20°	8	2	.059	KMJA-125-8L
1.25	20°	12	2	.060	KMJA-125-12
1.5	20°	10	2-3/8	.070	KMJA-150-10
1.5	20°	16	2-7/8	.070	KMJA-150-16
1.667	20°	8	2	.077	KMJA-167-8
1.667	20°	11	1-7/8	.077	KMJA-167-11
1.667	20°	11	3-1/8	.079	KMJA-167-11L
2	20°	11	2	.090	KMJA-200-11
2.5	20°	6	2-3/4	.113	KMJA-250-6
2.5	20°	10	2-3/4	.113	KMJA-250-10
3	20°	6	2-3/4	.138	KMJA-300-6
3	20°	10	2-3/4	.138	KMJA-300-10
3.75	20°	11	3-1/8	.172	KMJA-375-11
3.75	20°	12	3	.172	KMJA-375-12

KMJA Series

Module 20° PA JIS Spline

Finishing
Non-Topping
Shank Type



KM30 & KMA30 Series

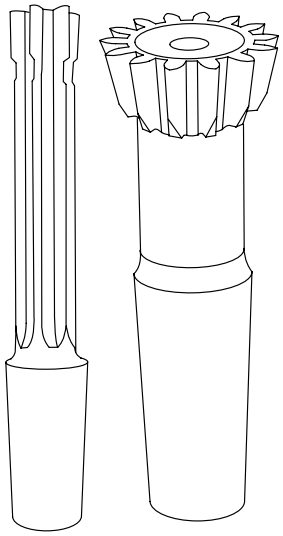
Module 30° PA

DIN and ANSI Spline

Finishing

Non-Topping

Shank Type



Module Pitch	PA	No. Teeth	Approx. Stroke	DIN 5480		ANSI B92.M-1980	
				WD	Series	WD	Series
.3	30°	18	3/4	.0129	KM30-030-18	-	-
.4	30°	16	1-1/4	.0173	KM30-040-16	-	-
.5	30°	9	1	.0216	KM30-050-9	-	-
.5	30°	10	1	-	-	.025	KMA30-050-10
.5	30°	12	1-1/8	.0216	KM30-050-12	.025	KMA30-050-12
.5	30°	18	1-1/4	.0216	KM30-050-18	.025	KMA30-050-18
.5	30°	26	1-5/8	-	-	.025	KMA30-050-26
.6	30°	14	1-1/4	.0259	KM30-060-14	-	-
.7	30°	10	1-1/8	.0303	KM30-070-10	-	-
.7	30°	12	1-1/4	.0303	KM30-070-12	-	-
.7	30°	18	1-1/2	.0303	KM30-070-18	-	-
.75	30°	6	1	.0324	KM30-075-6	.037	KMA30-075-6
.75	30°	8	1-1/4	.0324	KM30-075-8	.037	KMA30-075-8
.75	30°	12	1-1/2	.0324	KM30-075-12	.037	KMA30-075-12
.75	30°	22	1-3/4	.0324	KM30-075-22	.037	KMA30-075-22
.8	30°	6	1	.0346	KM30-080-6	-	-
.8	30°	8	1	-	-	.039	KMA30-080-8
.8	30°	12	1-1/2	.0346	KM30-080-12	-	-
.8	30°	18	1-3/4	.0346	KM30-080-18	-	-
.9	30°	8	1-1/4	.0389	KM30-090-8	-	-
1.0	30°	4	1	.0433	KM30-100-4	.049	KMA30-100-4
1.0	30°	5	1	-	-	.049	KMA30-100-5
1.0	30°	6	1-1/4	.0433	KM30-100-6	.049	KMA30-100-6
1.0	30°	8	1-3/8	.0433	KM30-100-8	.049	KMA30-100-8
1.0	30°	10	1-5/8	.0433	KM30-100-10	.049	KMA30-100-10
1.0	30°	14	1-3/4	.0433	KM30-100-14	.049	KMA30-100-14
1.0	30°	16	1-7/8	.0433	KM30-100-16	-	-
1.0	30°	20	2-3/4	.0433	KM30-100-20	.049	KMA30-100-20
1.25	30°	5	5/8	.0541	KM30-125-5	.062	KMA30-125-5
1.25	30°	6	3/4	.0541	KM30-125-6	.062	KMA30-125-6
1.25	30°	8	1-1/2	.0541	KM30-125-8	.062	KMA30-125-8
1.25	30°	10	1-1/2	.0541	KM30-125-10	.062	KMA30-125-10
1.25	30°	12	2	.0541	KM30-125-12	.062	KMA30-125-12
1.25	30°	18	2-1/4	.0541	KM30-125-18	.062	KMA30-125-18
1.5	30°	4	1	.0649	KM30-150-4	.074	KMA30-150-4
1.5	30°	6	1-1/4	.0649	KM30-150-6	.074	KMA30-150-6
1.5	30°	10	2-1/8	.0649	KM30-150-10	.074	KMA30-150-10
1.5	30°	16	1-1/4	.0649	KM30-150-16S	.074	KMA30-150-16S
1.5	30°	16	2	.0649	KM30-150-16	.074	KMA30-150-16
1.5	30°	16	3-1/2	.0649	KM30-150-16L	.074	KMA30-150-16L
1.5	30°	20	3	.0649	KM30-150-20	.074	KMA30-150-20
1.75	30°	4	1-1/4	.0757	KM30-175-4	.086	KMA30-175-4
1.75	30°	6	1-1/2	.0757	KM30-175-6	.086	KMA30-175-6
1.75	30°	8	1-7/8	.0757	KM30-175-8	.086	KMA30-175-8
1.75	30°	12	2-1/2	.0757	KM30-175-12	.086	KMA30-175-12
1.75	30°	12	3-1/2	.0757	KM30-175-12L	.086	KMA30-175-12L
2.0	30°	5	1-3/8	.0866	KM30-200-5	.098	KMA30-200-5
2.0	30°	6	1-1/4	.0866	KM30-200-6	.098	KMA30-200-6
2.0	30°	8	1-5/8	.0866	KM30-200-8	.098	KMA30-200-8
2.0	30°	10	1-5/8	.0866	KM30-200-10	.098	KMA30-200-10

Maximum Tooth Chart 30˚ PA

Teeth in Part	Max in Cutter	Teeth in Part	Max in Cutter
10	4	27	21
11	5	28	22
12	6	29	23
13	7	30	24
14	8	31	25
15	9	32	26
16	10	33	27
17	11	34	28
18	12	35	29
19	13	36	30
20	14	37	31
21	15	38	32
22	16	39	33
23	17	40	34
24	18	41	35
25	19	42	36
26	20		

SERIES CONTINUED
ON NEXT PAGE ->

KM30 & KMA30 Series

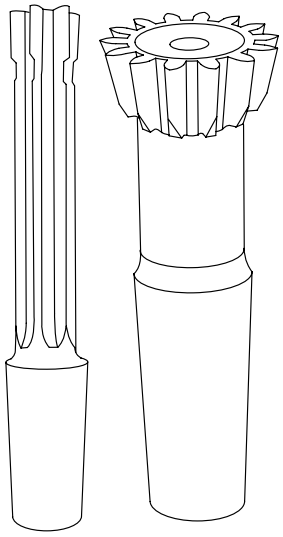
Module 30° PA

DIN and ANSI Spline

Finishing

Non-Topping

Shank Type



Module Pitch	PA	No. Teeth	Approx. Stroke	DIN 5480		ANSI B92.M-1980	
				WD	Series	WD	Series
2.0	30°	10	2-5/8	.0866	KM30-200-10L	.098	KMA30-200-10L
2.0	30°	11	2-1/2	.0866	KM30-200-11	.098	KMA30-200-11
2.0	30°	12	3-1/2	.0866	KM30-200-12	.098	KMA30-200-12
2.0	30°	15	1-1/2	.0866	KM30-200-15S	.098	KMA30-200-15S
2.0	30°	15	3-1/2	.0866	KM30-200-15	.098	KMA30-200-15
2.25	30°	10	2-1/4	.0974	KM30-225-10	-	-
2.5	30°	6	2-1/2	.1082	KM30-250-6	.123	KMA30-250-6
2.5	30°	8	1-5/8	.1082	KM30-250-8S	.123	KMA30-250-8S
2.5	30°	8	3-1/4	.1082	KM30-250-8	.123	KMA30-250-8
2.5	30°	10	2-1/4	.1082	KM30-250-10	.123	KMA30-250-10
2.5	30°	10	3-1/2	.1082	KM30-250-10L	.123	KMA30-250-10L
2.5	30°	12	2-7/8	.1082	KM30-250-12	.123	KMA30-250-12
2.5	30°	14	3-1/8	.1082	KM30-250-14	.123	KMA30-250-14
2.75	30°	10	2-5/8	.1190	KM30-275-10	-	-
3.0	30°	6	2-1/2	.1299	KM30-300-6	.148	KMA30-300-6
3.0	30°	8	2-1/4	.1299	KM30-300-8	.148	KMA30-300-8
3.0	30°	10	2-1/4	.1299	KM30-300-10	.148	KMA30-300-10
3.0	30°	10	3-1/2	.1299	KM30-300-10L	.148	KMA30-300-10L
3.5	30°	10	3	.1515	KM30-350-10	.172	KMA30-350-10
4.0	30°	8	3	.1732	KM30-400-8	.197	KMA30-400-8
4.0	30°	10	3-1/4	.1732	KM30-400-10	.197	KMA30-400-10
5.0	30°	7	3-1/2	.2165	KM30-500-7	.246	KMA30-500-7
6.0	30°	6	3-1/2	.2568	KM30-600-6	.295	KMA30-600-6

K2M30 Series

Module 30° PA

DIN 5482 Spline

Finishing

Semi-Topping

Shank Type

Module	PA	No. Cutter	Internal Splines in Part	Approx. Stroke	Approx. WD	Series
1.6	30°	4	8-10	1	.065	K2M30-160-4
1.6	30°	5	9-10	1-1/8	.065	K2M30-160-5
1.6	30°	6	12-13	1-5/8	.062	K2M30-160-6
1.6	30°	8	13-14	1-1/2	.065	K2M30-160-8
1.6	30°	9	14	1-3/4	.061	K2M30-160-9
1.75	30°	10	15-16	1-1/2	.079	K2M30-175-10
1.75	30°	10	15-16	2	.079	K2M30-175-10L
1.75	30°	12	17-18	1-3/4	.079	K2M30-175-12
1.75	30°	12	17-18	2-1/4	.080	K2M30-175-12L
1.9	30°	14	19-21	2-1/8	.079	K2M30-190-14
2.0	30°	16	22-23	2-1/2	.081	K2M30-200-16
2.0	30°	12	24	1-3/4	.102	K2M30-200-12
2.0	30°	17	26-28	2-1/2	.108	K2M30-200-17
2.0	30°	18	26-28	2-1/2	.099	K2M30-200-18
2.0	30°	20	26-28	3	.108	K2M30-200-20
2.1	30°	10	30	2-1/4	.110	K2M30-210-10
2.1	30°	22	31-36	1-1/2	.121	K2M30-210-22
2.1	30°	22	31-36	2-1/2	.121	K2M30-210-22L
2.25	30°	18	37-44	2-1/2	.122	K2M30-225-18

KMF30 Series

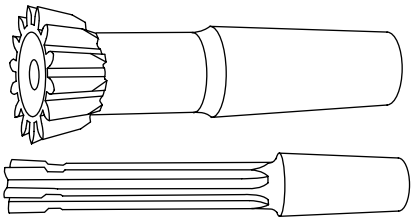
Module 30° PA

ANSI Full Fillet Spline

Finishing

Non-Topping

Shank Type



Module	PA	No. Teeth	Approx. Stroke	WD	Series
.3	30°	18	7/8	.017	KMF30-030-18
.4	30°	16	1-1/4	.022	KMF30-040-16
.5	30°	10	1	.028	KMF30-050-10
.5	30°	18	1-1/8	.028	KMF30-050-18E
.5	30°	18	1-1/4	.028	KMF30-050-18
.5	30°	26	1-1/2	.028	KMF30-050-26
.5	30°	50	1-1/4	.028	KMF30-050-50
.6	30°	14	1-3/8	.033	KMF30-060-14
.7	30°	10	1-1/8	.039	KMF30-070-10
.75	30°	6	1	.041	KMF30-075-6
.75	30°	8	3/4	.041	KMF30-075-8
.75	30°	10	1-1/4	.041	KMF30-075-10
.75	30°	12	1-1/2	.041	KMF30-075-12
.75	30°	16	2	.041	KMF30-075-16
.75	30°	22	1-7/8	.041	KMF30-075-22
.75	30°	24	2-3/4	.041	KMF30-075-24
.8	30°	6	1	.044	KMF30-080-6
1.00	30°	4	1	.055	KMF30-100-4
1.00	30°	5	3/4	.055	KMF30-100-5
1.00	30°	6	1-1/4	.055	KMF30-100-6
1.00	30°	8	1-1/4	.055	KMF30-100-8
1.00	30°	10	1-3/4	.055	KMF30-100-10
1.00	30°	14	1-7/8	.055	KMF30-100-14
1.00	30°	20	2-1/2	.055	KMF30-100-20
1.25	30°	6	1-1/4	.069	KMF30-125-6
1.25	30°	8	1-1/2	.069	KMF30-125-8
1.25	30°	10	1-1/2	.069	KMF30-125-10
1.25	30°	12	2	.069	KMF30-125-12S
1.25	30°	12	2-1/2	.069	KMF30-125-12
1.25	30°	18	2-1/4	.069	KMF30-125-18

Module	PA	No. Teeth	Approx. Stroke	WD	Series
1.50	30°	4	1	.083	KMF30-150-4
1.50	30°	6	1-1/4	.083	KMF30-150-6
1.50	30°	8	1-3/8	.083	KMF30-150-8
1.50	30°	10	1-7/8	.083	KMF30-150-10
1.50	30°	16	2	.083	KMF30-150-16
1.75	30°	4	1	.097	KMF30-175-4
1.75	30°	6	1-1/4	.097	KMF30-175-6
1.75	30°	8	1-3/4	.097	KMF30-175-8
1.75	30°	12	2-1/2	.097	KMF30-175-12
2.00	30°	5	1-1/4	.110	KMF30-200-5
2.00	30°	6	1-1/2	.110	KMF30-200-6
2.00	30°	8	1-1/2	.110	KMF30-200-8S
2.00	30°	8	2-1/2	.110	KMF30-200-8
2.00	30°	11	2-3/4	.110	KMF30-200-11
2.25	30°	10	2-1/4	.124	KMF30-225-10
2.50	30°	6	2-1/2	.138	KMF30-250-6
2.50	30°	14	3-1/8	.138	KMF30-250-14
3.00	30°	8	2	.165	KMF30-300-8
3.00	30°	10	2-1/4	.165	KMF30-300-10
3.50	30°	10	3	.193	KMF30-350-10
4.00	30°	8	3	.221	KMF30-400-8
5.00	30°	7	3-1/2	.276	KMF30-500-7
6.00	30°	6	3-1/2	.331	KMF30-600-6

Maximum Tooth Chart

30˚ PA Full Fillet

Teeth in Part	Max in Cutter
12	4
13	5
14	6
15	6
16	7
17	8
18	9
19	10
20	11
21	12
22	13
23	14
24	15
25	16
26	17
27	18

Teeth in Part	Max in Cutter
28	19
29	20
30	21
31	22
32	23
33	24
34	25
35	26
36	27
37	28
38	29
39	30
40	31
41	32
42	33

Module	PA	No. Teeth	Approx. Stroke	WD	Series
.5	37.5°	32	1-5/8	.023	KM37-050-32
.7	37.5°	20	1-1/2	.032	KM37-070-20
.75	37.5°	10	1-1/8	.034	KM37-075-10
.75	37.5°	18	1-1/2	.034	KM37-075-18
1.0	37.5°	8	1-1/4	.045	KM37-100-8
1.0	37.5°	14	1-1/2	.045	KM37-100-14
1.0	37.5°	24	3	.045	KM37-100-24
1.25	37.5°	12	1-1/4	.057	KM37-125-12
1.25	37.5°	12	2-1/2	.057	KM37-125-12L
1.5	37.5°	12	1-1/4	.068	KM37-150-12
1.75	37.5°	8	1-1/4	.079	KM37-175-8
2.0	37.5°	8	1-7/8	.091	KM37-200-8

KM37 Series

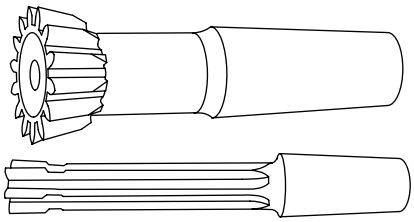
Module 37.5° PA

ANSI Full Fillet Spline

Finishing

Non-Topping

Shank Type



Module	PA	No. Teeth	Approx. Stroke	WD	Series
.5	45°	20	1-1/4	.020	KM45-050-20
.75	45°	10	3/4	.030	KM45-075-10
.75	45°	18	1-1/2	.030	KM45-075-18
1.0	45°	8	1	.039	KM45-100-8
1.0	45°	14	1-1/2	.039	KM45-100-14
1.0	45°	20	1-5/8	.039	KM45-100-20
1.0	45°	20	2-1/2	.039	KM45-100-20L
1.0	45°	32	1-3/8	.039	KM45-100-32
1.25	45°	8	1-3/8	.049	KM45-125-8
1.25	45°	14	2-3/8	.049	KM45-125-14L
1.25	45°	18	2-1/2	.049	KM45-125-18L
1.50	45°	12	1-1/4	.059	KM45-150-12S
1.50	45°	12	2-1/2	.059	KM45-150-12
1.75	45°	8	1-1/4	.069	KM45-175-8
1.75	45°	10	1-1/4	.069	KM45-175-10S
1.75	45°	10	1-1/2	.069	KM45-175-10
2.0	45°	8	1-3/4	.079	KM45-200-8

KM45 Series

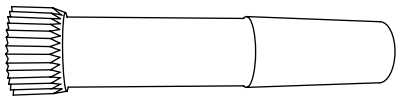
Module 45° PA

ANSI Full Fillet Spline

Finishing

Non-Topping

Shank Type



Maximum Tooth Chart
45˚ PA

Teeth in Part	Max in Cutter
10	6
11	7
12	8
13	9
14	10
15	11
16	12
17	13
18	14
19	15

Teeth in Part	Max in Cutter
20	16
21	17
22	18
23	19
24	20
25	21
26	22
27	23
28	24
29	25

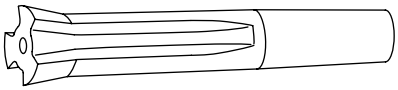
Teeth in Part	Max in Cutter
30	26
31	27
32	28
33	29
34	30
35	31
36	32
37	33
38	34

K6 Series

6 Spline Internal Parallel Sides

3 Tooth Generating

Shank Shaper Cutters



Generating Cutter

Major Diam.	Key Width	Approx. Stroke	Series
.750	.187	1-1/2	K6-075CBA
.875	.219	1-3/8	K6-875 CBA
1.000	.250	2	K6-100 CBA
1.000	.250	4	K6-100 CBAL
1.125	.281	1-5/8	K6-112 CBA-S
1.125	.281	2	K6-112 CBA
1.250	.313	2	K6-125 CBA
1.375	.344	2	K6-137 CBA
1.500	.375	2	K6-150 CBA
1.625	.406	1-3/4	K6-162 CBA
1.750	.438	2-1/2	K6-175 CBA
2.000	.500	2-1/2	K6-200 CBA
2.250	.563	2-7/8	K6-225CBA

K10 Series

10 Spline Internal Parallel Sides

Shaper Cutters

Slotting Cutter

Major Diam.	Key Width	Approx. Stroke	Fit To Cut	Cutter Type	Series
.750	.117	1-5/8	A,B,or C	2 Tooth Slotting	K10-750CBA
.875	.137	1-5/8	A,B,or C	2 Tooth Slotting	K10-875CBA
1.000	.156	1-3/4	A,B,or C	2 Tooth Slotting	K10-100CBA
1.125	.176	1-1/2	A,B,or C	2 Tooth Slotting	K10-112CBA
1.250	.195	1-1/2	A,B,or C	2 Tooth Slotting	K10-125CBA
1.375	.215	3	A,B,or C	2 Tooth Slotting	K10-137CBA
1.500	.234	1-1/4	B	5 Tooth Generating	K10-150B
1.500	.234	1-5/8	B	5 Tooth Generating	K10-150BL
1.500	.234	1-1/2	A,B,or C	2 Tooth Slotting	K10-150CBA
1.625	.254	1-1/2	A,B,or C	2 Tooth Slotting	K10-162CBA
1.750	.273	2-1/2	A,B,or C	2 Tooth Slotting	K10-175CBA
2.000	.312	2-1/2	A,B,or C	2 Tooth Slotting	K10-200CBA
2.250	.351	2-1/2	A,B,or C	2 Tooth Slotting	K10-225CBA
2.500	.390	2-1/2	A,B,or C	2 Tooth Slotting	K10-250CBA
3.000	.467	6-1/2	B	5 Tooth Generating	K10-300BL

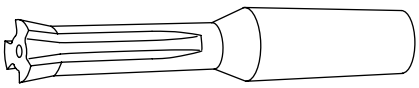
KSM6 Series

6 Spline Metric

Internal Parallel Sides

DIN5462/5463

Shank Shaper Cutters



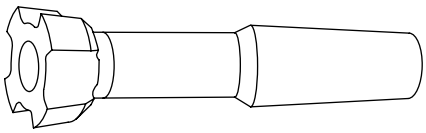
Will Produce			Cutter Data		Series
Major Diam. (mm)	Minor Diam.* (mm)	Key (mm)	Approx. Stroke	Style	
14	11	3	1	Slotting	KSM6-14-11
16	13	3.5	1-1/4	Slotting	KSM6-16-13
20	16	4	1-1/4	Slotting	KSM6-20-16
22	18	5	1-1/8	Generating	KSM6-22-18
25	21	5	1-1/2	Generating	KSM6-25-21
26	23	6	1-3/8	Generating	KSM6-26-23
28	23	6	1-1/4	Generating	KSM6-28-23
30	26	6	1-3/4	Generating	KSM6-30-26
32	26	6	1-3/4	Generating	KSM6-32-26
32	28	7	1-1/4	Generating	KSM6-32-28
34	28	7	1-3/4	Generating	KSM6-34-28

Will Produce			Cutter Data	Series
Major Diam. (mm)	Minor Diam.* (mm)	Key (mm)	Approx. Stroke	
36	32	6	2	KSM8-36-32L
38	32	6	1-1/2	KSM8-38-32
40	36	7	1-5/8	KSM8-40-36
42	36	7	1-3/4	KSM8-42-36
42	36	7	3	KSM8-42-36L
46	42	8	1-5/8	KSM8-46-42
48	42	8	1-3/4	KSM8-48-42
50	46	9	1-1/2	KSM8-50-46
50	46	9	1-5/8	KSM8-50-46A
50	46	9	3	KSM8-50-46L
54	46	9	1-3/4	KSM8-54-46
58	52	10	2	KSM8-58-52
60	52	10	1-5/8	KSM8-60-52
62	56	10	1-5/8	KSM8-62-56
65	56	10	2-1/8	KSM8-65-56
72	62	12	1-7/8	KSM8-72-62

KSM8 Series

8 Spline Metric
Internal Parallel Sides

DIN 5462/5463
4 Tooth Generating
Shank Shaper Cutters

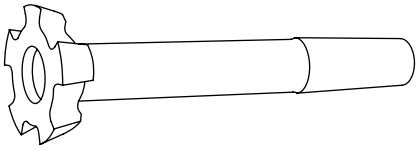


Will Produce			Cutter Data	Series
Major Diam. (mm)	Minor Diam.* (mm)	Key (mm)	Approx. Length	
78	72	12	3-1/8	KSM10-78-72
82	72	12	3-1/8	KSM10-82-72
92	82	12	3-1/8	KSM10-92-82
98	92	14	4	KSM10-98-92
102	92	14	4	KSM10-102-92
112	102	16	4-3/8	KSM10-112-102
125	112	18	4-1/2	KSM10-125-112

KSM10 Series

10 Spline Metric
Internal Parallel Sides

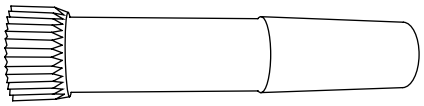
DIN 5462/5463
5 Tooth Generating
Shank Shaper Cutters



Nominal Diam. (mm)	No. Teeth in Part	No. Teeth	Approx. Stroke	WD	Series
8 X 7	28	15	3/4	.020	KM81-8-7
10 X 8	28	18	1	.030	KM81-10-8
12 X 10	30	18	7/8	.032	KM81-12-10
14 X 12	31	18	1	.037	KM81-14-12
17 X 15	32	18	3/4	.041	KM81-17-15
20 X 17	33	20	7/8	.047	KM81-20-17L
24 X 21	34	21	1-1/8	.054	KM81-24-21
30 X 26	35	22	1-1/4	.064	KM81-30-26
34 X 30	36	24	1-3/8	.066	KM81-34-30
40 X 36	37	26	1-1/2	.076	KM81-40-36

KM81 Series

DIN 5481
60° Included Angle Serrations
Internal Shank Type



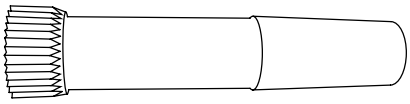
Nominal Diam.	Cutter		WD	Series
	No. Teeth	Stroke		
1/4	27	1/2	.009	K36-250-27
5/16	28	1	.011	K36-312-28
3/8	28	1-1/4	.012	K36-375-28
7/16	30	5/8	.014	K36-437-30
1/2	24	7/8	.018	K36-500-24S
1/2	28	1-3/8	.018	K36-500-28
5/8	27	1-1/2	.023	K36-625-27
3/4	25	1-1/2	.021	K36-750-25
1	27	1-1/2	.027	K36-100-27

K36 Series

36 SAE

45° Serrations

Internal Shank Type



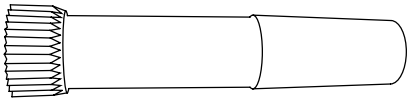
Nominal Diam.	Cutter		WD	Series
	No. Teeth	Stroke		
1/2	32	1-1/3	.016	K48-500-32
3/4	36	1-1/2	.020	K48-750-36
7/8	36	1-3/8	.023	K48-875-36
1	36	2-1/2	.025	K48-010-36
1-1/8	36	1-3/4	.030	K48-011-36
1-1/4	38	2	.034	K48-012-38
1-1/2	32	1-3/4	.041	K48-015-32
2	36	1-3/4	.054	K48-020-36

K48 Series

48 SAE

45° Serrations

Internal Shank Type



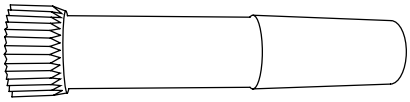
Part		Cutter		WD	Series
Nominal Diam.	No. Serr.	No. Teeth	Stroke		
1/2	16	11	7/8	.037	KBS16-500-11
5/8	20	14	1-1/2	.040	KBS20-625-14
3/4	20	14	1-5/8	.048	KBS20-750-14
7/8	20	15	1-5/8	.056	KBS20-875-15
1	24	18	1-5/8	.057	KBS24-010-18
1-1/8	24	18	1-5/8	.060	KBS24-011-18
1-1/4	24	18	1-3/4	.066	KBS24-012-18
1-3/8	24	18	1-7/8	.074	KBS24-013-18
1-1/2	24	16	2-1/8	.081	KBS24-015-16
2	36	24	2-1/4	.070	KSB36-020-24

KBS Series

British (BS 2059-1953)

Straight Sided Internal Serration

Shank Type



INTERNAL TRIMMING CHART

Maximum number of teeth recommended in gear shaper cutter for internal gears/splines - to avoid trimming of teeth

# of Teeth in gear	14½° P.A.	17½° P.A.	20° P.A.	22½° P.A.	20° Stub & 25° P.A.	27°½ P.A.	30° Full Fillet	30° Flat Root	45° P.A.
8									4
9									5
10								4	6
11							4	5	7
12					4	4	4	6	8
13			4	4	4	4	5	7	9
14			4	4	5	5	6	8	10
15			5	5	6	6	6	9	11
16			5	5	6	6	7	10	12
17		4	6	6	7	7	8	11	13
18	4	4	6	6	7	8	9	12	14
19	4	4	7	7	8	9	10	13	15
20	5	5	7	7	8	10	11	14	16
21	5	5	8	8	9	11	12	15	17
22	6	6	8	8	10	12	13	16	18
23	6	6	9	9	11	13	14	17	19
24	7	7	10	10	12	14	15	18	20
25	7	7	10	11	13	15	16	19	21
26	8	8	11	12	14	16	17	20	22
27	8	8	12	13	15	17	18	21	23
28	9	9	12	14	16	18	19	22	24
29	9	9	13	15	17	19	20	23	25
30	10	10	13	16	18	20	21	24	26
31	10	10	14	17	19	21	22	25	27
32	11	11	14	18	20	22	23	26	28
33	11	11	15	19	21	23	24	27	29
34	12	12	16	20	22	24	25	28	30
35	12	12	17	21	23	25	26	29	31
36	13	13	18	22	24	26	27	30	32
37	13	14	19	23	25	27	28	31	33
38	14	15	20	24	26	28	29	32	34
39	15	16	21	25	27	29	30	33	35
40	15	17	22	26	28	30	31	34	36
41	16	18	23	27	29	31	32	35	37
42	16	19	24	28	30	32	33	36	38
43	17	20	25	29	31	33	34	37	39
44	18	21	26	30	32	34	35	38	40
45	18	22	27	31	33	35	36	39	41
46	19	23	28	32	34	36	37	40	42
47	20	24	29	33	35	37	38	41	43
48	20	25	30	34	36	38	39	42	44
49	21	26	31	35	37	39	40	43	45
50	22	27	32	36	38	40	41	44	46
51	22	28	33	37	39	41	42	45	47
52	23	29	34	38	40	42	43	46	48
53	23	30	35	39	41	43	44	47	49
54	24	31	36	40	42	44	45	48	50
55	25	32	37	41	43	45	46	49	51

# of Teeth in gear	14½° P.A.	17½° P.A.	20° P.A.	22½° P.A.	20° Stub &25° P.A.	27½° P.A.	30° Full Fillet	30° Flat Root	45° P.A.
56	25	33	38	42	44	46	47	50	52
57	26	34	39	43	45	47	48	51	53
58	27	35	40	44	46	48	49	52	54
59	28	36	41	45	47	49	50	53	55
60	28	37	42	46	48	50	51	54	56
61	29	38	43	47	49	51	52	55	57
62	30	39	44	48	50	52	53	56	58
63	31	40	45	49	51	53	54	57	59
64	32	41	46	50	52	54	55	58	60
65	33	42	47	51	53	55	56	59	61
66	34	43	48	52	54	56	57	60	62
67	35	44	49	53	55	57	58	61	63
68	36	45	50	54	56	58	59	62	64
69	37	46	51	55	57	59	60	63	65
70	38	47	52	56	58	60	61	64	66
71	39	48	53	57	59	61	62	65	67
72	40	49	54	58	60	62	63	66	68
73	41	50	55	59	61	63	64	67	69
74	42	51	56	60	62	64	65	68	70
75	43	52	57	61	693	65	66	69	71
76	44	53	58	62	64	66	67	70	72
77	45	54	59	63	65	67	68	71	73
78	46	55	60	64	66	68	69	72	74
79	47	56	61	65	67	69	70	73	75
80	48	57	62	66	68	70	71	74	76
81	49	58	63	67	69	71	72	75	77
82	50	59	64	68	70	72	73	76	78
83	51	60	65	69	71	73	74	77	79
84	52	61	66	70	72	74	75	78	80
85	53	62	67	71	73	75	76	79	81
86	54	63	68	72	74	76	77	80	82
87	55	64	69	73	75	77	78	81	83
88	56	65	70	74	76	78	79	82	84
89	57	66	71	75	77	79	80	83	85
90	58	67	72	76	78	80	81	84	86
91	59	68	73	77	79	81	82	85	87
92	60	69	74	78	80	82	83	86	88
93	61	70	75	79	81	83	84	87	89
94	62	71	76	80	82	84	85	88	90
95	63	72	77	81	83	85	86	89	91
96	64	73	78	82	84	86	87	90	92
97	65	74	79	83	85	87	88	91	93
98	66	75	80	84	86	88	89	92	94
99	67	76	81	85	87	89	90	93	95
100	68	77	82	86	88	90	91	94	96
101	69	78	83	87	89	91	92	95	97
102	70	79	84	88	90	92	93	96	98
103	71	80	85	89	91	93	94	97	99

Since each job may have its own unique characteristics always cut a sample to prove acceptability.
Shallow depth gears will generally allow using a shaper cutter with more teeth.

Single Cutters Sort Index

Standard Gear 166

Stub Gear 168

Roughing 169

Module 170-173

30° ANSI Milling Cutter 171-172

Rack & Worm 173

ACME Thread 179

Multi-Rack Cutter 179

Roller Chain 181

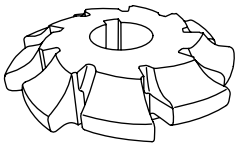
Parallel Spline Milling Cutter

- 6 Spline 181-182
- 10 Spline 183

F14 Series

DP 14.5° PA

Single Milling Cutter



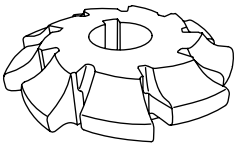
Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
1	8-1/2	2	F14-100-1	F14-100-2	F14-100-3	F14-100-4	F14-100-5	F14-100-6	F14-100-7	F14-100-8
1-1/4	7-3/4	2	F14-125-1	F14-125-2	F14-125-3	F14-125-4	F14-125-5	F14-125-6	F14-125-7	F14-125-8
1-1/2	7	1-3/4	F14-150-1	F14-150-2	F14-150-3	F14-150-4	F14-150-5	F14-150-6	F14-150-7	F14-150-8
1-3/4	6-1/2	1-3/4	F14-175-1	F14-175-2	F14-175-3	F14-175-4	F14-175-5	F14-175-6	F14-175-7	F14-175-8
2	5-3/4	1-1/2	F14-200-1	F14-200-2	F14-200-3	F14-200-4	F14-200-5	F14-200-6	F14-200-7	F14-200-8
2-1/4	5-3/4	1-1/2	F14-225-1	F14-225-2	F14-225-3	F14-225-4	F14-225-5	F14-225-6	F14-225-7	F14-225-8
2-1/2	5-3/4	1-1/2	F14-250-1	F14-250-2	F14-250-3	F14-250-4	F14-250-5	F14-250-6	F14-250-7	F14-250-8
2-3/4	4-3/4	1-1/4	F14-275-1	F14-275-2	F14-275-3	F14-275-4	F14-275-5	F14-275-6	F14-275-7	F14-275-8
3	4-3/4	1-1/4	F14-300-1	F14-300-2	F14-300-3	F14-300-4	F14-300-5	F14-300-6	F14-300-7	F14-300-8
4	4-1/4	1-1/4	F14-400-1	F14-400-2	F14-400-3	F14-400-4	F14-400-5	F14-400-6	F14-400-7	F14-400-8
4	3-1/2	1	F14-401-1	F14-401-2	F14-401-3	F14-401-4	F14-401-5	F14-401-6	F14-401-7	F14-401-8
5	3-3/4	1-1/4	F14-500-1	F14-500-2	F14-500-3	F14-500-4	F14-500-5	F14-500-6	F14-500-7	F14-500-8
5	3-3/8	1	F14-501-1	F14-501-2	F14-501-3	F14-501-4	F14-501-5	F14-501-6	F14-501-7	F14-501-8
6	3-1/2	1-1/4	F14-600-1	F14-600-2	F14-600-3	F14-600-4	F14-600-5	F14-600-6	F14-600-7	F14-600-8
6	3-1/8	1	F14-601-1	F14-601-2	F14-601-3	F14-601-4	F14-601-5	F14-601-6	F14-601-7	F14-601-8
7	2-7/8	1	F14-701-1	F14-701-2	F14-701-3	F14-701-4	F14-701-5	F14-701-6	F14-701-7	F14-701-8
8	3-1/4	1-1/4	F14-800-1	F14-800-2	F14-800-3	F14-800-4	F14-800-5	F14-800-6	F14-800-7	F14-800-8
8	2-7/8	1	F14-801-1	F14-801-2	F14-801-3	F14-801-4	F14-801-5	F14-801-6	F14-801-7	F14-801-8
10	2-3/4	1	F14-0101-1	F14-0101-2	F14-0101-3	F14-0101-4	F14-0101-5	F14-0101-6	F14-0101-7	F14-0101-8
10	2-3/8	7/8	F14-0107-1	F14-0107-2	F14-0107-3	F14-0107-4	F14-0107-5	F14-0107-6	F14-0107-7	F14-0107-8
12	2-5/8	1	F14-0121-1	F14-0121-2	F14-0121-3	F14-0121-4	F14-0121-5	F14-0121-6	F14-0121-7	F14-0121-8
12	2-1/4	7/8	F14-0127-1	F14-0127-2	F14-0127-3	F14-0127-4	F14-0127-5	F14-0127-6	F14-0127-7	F14-0127-8
14	2-1/2	1	F14-0141-1	F14-0141-2	F14-0141-3	F14-0141-4	F14-0141-5	F14-0141-6	F14-0141-7	F14-0141-8
16	2-3/8	1	F14-0161-1	F14-0161-2	F14-0161-3	F14-0161-4	F14-0161-5	F14-0161-6	F14-0161-7	F14-0161-8
18	2-3/8	1	F14-0181-1	F14-0181-2	F14-0181-3	F14-0181-4	F14-0181-5	F14-0181-6	F14-0181-7	F14-0181-8
20	2-3/8	1	F14-0201-1	F14-0201-2	F14-0201-3	F14-0201-4	F14-0201-5	F14-0201-6	F14-0201-7	F14-0201-8
20	1-7/8	7/8	F14-0207-1	F14-0207-2	F14-0207-3	F14-0207-4	F14-0207-5	F14-0207-6	F14-0207-7	F14-0207-8
22	2-1/2	1	F14-0221-1	F14-0221-2	F14-0221-3	F14-0221-4	F14-0221-5	F14-0221-6	F14-0221-7	F14-0221-8
24	2-1/4	1	F14-0241-1	F14-0241-2	F14-0241-3	F14-0241-4	F14-0241-5	F14-0241-6	F14-0241-7	F14-0241-8
24	1-3/4	7/8	F14-0247-1	F14-0247-2	F14-0247-3	F14-0247-4	F14-0247-5	F14-0247-6	F14-0247-7	F14-0247-8
26	2-1/4	1	F14-0261-1	F14-0261-2	F14-0261-3	F14-0261-4	F14-0261-5	F14-0261-6	F14-0261-7	F14-0261-8
26	1-3/4	7/8	F14-0267-1	F14-0267-2	F14-0267-3	F14-0267-4	F14-0267-5	F14-0267-6	F14-0267-7	F14-0267-8
28	2-1/4	1	F14-0281-1	F14-0281-2	F14-0281-3	F14-0281-4	F14-0281-5	F14-0281-6	F14-0281-7	F14-0281-8
28	1-3/4	7/8	F14-0287-1	F14-0287-2	F14-0287-3	F14-0287-4	F14-0287-5	F14-0287-6	F14-0287-7	F14-0287-8
30	2-1/4	1	F14-0301-1	F14-0301-2	F14-0301-3	F14-0301-4	F14-0301-5	F14-0301-6	F14-0301-7	F14-0301-8
30	1-3/4	7/8	F14-0307-1	F14-0307-2	F14-0307-3	F14-0307-4	F14-0307-5	F14-0307-6	F14-0307-7	F14-0307-8
32	2-1/4	1	F14-0321-1	F14-0321-2	F14-0321-3	F14-0321-4	F14-0321-5	F14-0321-6	F14-0321-7	F14-0321-8
32	1-3/4	7/8	F14-0327-1	F14-0327-2	F14-0327-3	F14-0327-4	F14-0327-5	F14-0327-6	F14-0327-7	F14-0327-8
40	1-3/4	7/8	F14-0407-1	F14-0407-2	F14-0407-3	F14-0407-4	F14-0407-5	F14-0407-6	F14-0407-7	F14-0407-8
48	2-1/4	1	F14-0481-1	F14-0481-2	F14-0481-3	F14-0481-4	F14-0481-5	F14-0481-6	F14-0481-7	F14-0481-8
48	1-3/4	7/8	F14-0487-1	F14-0487-2	F14-0487-3	F14-0487-4	F14-0487-5	F14-0487-6	F14-0487-7	F14-0487-8

F20 Series

DP 20° PA

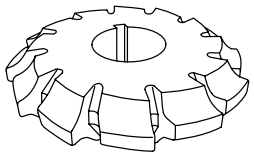
Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
1	8-1/2	2	F20-100-1	F20-100-2	F20-100-3	F20-100-4	F20-100-5	F20-100-6	F20-100-7	F20-100-8
1-1/4	7-3/4	2	F20-125-1	F20-125-2	F20-125-3	F20-125-4	F20-125-5	F20-125-6	F20-125-7	F20-125-8
1-1/2	7	1-3/4	F20-150-1	F20-150-2	F20-150-3	F20-150-4	F20-150-5	F20-150-6	F20-150-7	F20-150-8
1-3/4	6-1/2	1-3/4	F20-175-1	F20-175-2	F20-175-3	F20-175-4	F20-175-5	F20-175-6	F20-175-7	F20-175-8
2	5-3/4	1-1/2	F20-200-1	F20-200-2	F20-200-3	F20-200-4	F20-200-5	F20-200-6	F20-200-7	F20-200-8
2-1/4	5-3/4	1-1/2	F20-225-1	F20-225-2	F20-225-3	F20-225-4	F20-225-5	F20-225-6	F20-225-7	F20-225-8
2-1/2	5-3/4	1-1/2	F20-250-1	F20-250-2	F20-250-3	F20-250-4	F20-250-5	F20-250-6	F20-250-7	F20-250-8
2-3/4	4-3/4	1-1/4	F20-275-1	F20-275-2	F20-275-3	F20-275-4	F20-275-5	F20-275-6	F20-275-7	F20-275-8
3	4-3/4	1-1/4	F20-300-1	F20-300-2	F20-300-3	F20-300-4	F20-300-5	F20-300-6	F20-300-7	F20-300-8
3-1/2	4-1/2	1-1/4	F20-350-1	F20-350-2	F20-350-3	F20-350-4	F20-350-5	F20-350-6	F20-350-7	F20-350-8
4	4-1/4	1-1/4	F20-400-1	F20-400-2	F20-400-3	F20-400-4	F20-400-5	F20-400-6	F20-400-7	F20-400-8
4	3-1/2	1	F20-401-1	F20-401-2	F20-401-3	F20-401-4	F20-401-5	F20-401-6	F20-401-7	F20-401-8
4-1/2	3-1/2	1	F20-451-1	F20-451-2	F20-451-3	F20-451-4	F20-451-5	F20-451-6	F20-451-7	F20-451-8
5	3-3/4	1-1/4	F20-500-1	F20-500-2	F20-500-3	F20-500-4	F20-500-5	F20-500-6	F20-500-7	F20-500-8
5	3-3/8	1	F20-501-1	F20-501-2	F20-501-3	F20-501-4	F20-501-5	F20-501-6	F20-501-7	F20-501-8
5-1/2	3-3/8	1	F20-551-1	F20-551-2	F20-551-3	F20-551-4	F20-551-5	F20-551-6	F20-551-7	F20-551-8
6	3-1/2	1-1/4	F20-600-1	F20-600-2	F20-600-3	F20-600-4	F20-600-5	F20-600-6	F20-600-7	F20-600-8
6	3-1/8	1	F20-601-1	F20-601-2	F20-601-3	F20-601-4	F20-601-5	F20-601-6	F20-601-7	F20-601-8
7	2-7/8	1	F20-701-1	F20-701-2	F20-701-3	F20-701-4	F20-701-5	F20-701-6	F20-701-7	F20-701-8
8	3-1/4	1-1/4	F20-800-1	F20-800-2	F20-800-3	F20-800-4	F20-800-5	F20-800-6	F20-800-7	F20-800-8
8	2-7/8	1	F20-801-1	F20-801-2	F20-801-3	F20-801-4	F20-801-5	F20-801-6	F20-801-7	F20-801-8
9	2-3/4	1	F20-901-1	F20-901-2	F20-901-3	F20-901-4	F20-901-5	F20-901-6	F20-901-7	F20-901-8
10	2-3/4	1	F20-0101-1	F20-0101-2	F20-0101-3	F20-0101-4	F20-0101-5	F20-0101-6	F20-0101-7	F20-0101-8
10	2-3/8	7/8	F20-0107-1	F20-0107-2	F20-0107-3	F20-0107-4	F20-0107-5	F20-0107-6	F20-0107-7	F20-0107-8
11	2-5/8	1	F20-0111-1	F20-0111-2	F20-0111-3	F20-0111-4	F20-0111-5	F20-0111-6	F20-0111-7	F20-0111-8
12	2-5/8	1	F20-0121-1	F20-0121-2	F20-0121-3	F20-0121-4	F20-0121-5	F20-0121-6	F20-0121-7	F20-0121-8
12	2-1/4	7/8	F20-0127-1	F20-0127-2	F20-0127-3	F20-0127-4	F20-0127-5	F20-0127-6	F20-0127-7	F20-0127-8
14	2-1/2	1	F20-0141-1	F20-0141-2	F20-0141-3	F20-0141-4	F20-0141-5	F20-0141-6	F20-0141-7	F20-0141-8
14	2-1/8	7/8	F20-0147-1	F20-0147-2	F20-0147-3	F20-0147-4	F20-0147-5	F20-0147-6	F20-0147-7	F20-0147-8
16	2-3/8	1	F20-0161-1	F20-0161-2	F20-0161-3	F20-0161-4	F20-0161-5	F20-0161-6	F20-0161-7	F20-0161-8
16	2-1/8	7/8	F20-0167-1	F20-0167-2	F20-0167-3	F20-0167-4	F20-0167-5	F20-0167-6	F20-0167-7	F20-0167-8
18	2-3/8	1	F20-0181-1	F20-0181-2	F20-0181-3	F20-0181-4	F20-0181-5	F20-0181-6	F20-0181-7	F20-0181-8
18	2	7/8	F20-0187-1	F20-0187-2	F20-0187-3	F20-0187-4	F20-0187-5	F20-0187-6	F20-0187-7	F20-0187-8
20	2-3/8	1	F20-0201-1	F20-0201-2	F20-0201-3	F20-0201-4	F20-0201-5	F20-0201-6	F20-0201-7	F20-0201-8
20	2	7/8	F20-0207-1	F20-0207-2	F20-0207-3	F20-0207-4	F20-0207-5	F20-0207-6	F20-0207-7	F20-0207-8
22	1 7/8	7/8	F20-0227-1	F20-0227-2	F20-0227-3	F20-0227-4	F20-0227-5	F20-0227-6	F20-0227-7	F20-0227-8
24	2-1/4	1	F20-0241-1	F20-0241-2	F20-0241-3	F20-0241-4	F20-0241-5	F20-0241-6	F20-0241-7	F20-0241-8
24	1-3/4	7/8	F20-0247-1	F20-0247-2	F20-0247-3	F20-0247-4	F20-0247-5	F20-0247-6	F20-0247-7	F20-0247-8
26	1-7/8	7/8	F20-0267-1	F20-0267-2	F20-0267-3	F20-0267-4	F20-0267-5	F20-0267-6	F20-0267-7	F20-0267-8
28	2-1/4	1	F20-0281-1	F20-0281-2	F20-0281-3	F20-0281-4	F20-0281-5	F20-0281-6	F20-0281-7	F20-0281-8
32	2-1/4	1	F20-0321-1	F20-0321-2	F20-0321-3	F20-0321-4	F20-0321-5	F20-0321-6	F20-0321-7	F20-0321-8
32	1-3/4	7/8	F20-0327-1	F20-0327-2	F20-0327-3	F20-0327-4	F20-0327-5	F20-0327-6	F20-0327-7	F20-0327-8
36	2-1/4	1	F20-0361-1	F20-0361-2	F20-0361-3	F20-0361-4	F20-0361-5	F20-0361-6	F20-0361-7	F20-0361-8
40	1-3/4	7/8	F20-0407-1	F20-0407-2	F20-0407-3	F20-0407-4	F20-0407-5	F20-0407-6	F20-0407-7	F20-0407-8
48	2-1/4	1	F20-0481-1	F20-0481-2	F20-0481-3	F20-0481-4	F20-0481-5	F20-0481-6	F20-0481-7	F20-0481-8
48	1-3/4	7/8	F20-0487-1	F20-0487-2	F20-0487-3	F20-0487-4	F20-0487-5	F20-0487-6	F20-0487-7	F20-0487-8
64	1-3/4	7/8	F20-0647-1	F20-0647-2	F20-0647-3	F20-0647-4	F20-0647-5	F20-0647-6	F20-0647-7	F20-0647-8

Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth



FST20 Series

DP 20° PA

AGMA Stub

Single Milling Cutter

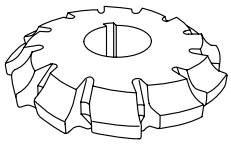
Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
1	8-1/2	2	FST20-100-1	FST20-100-2	FST20-100-3	FST20-100-4	FST20-100-5	FST20-100-6	FST20-100-7	FST20-100-8
1-1/4	7-3/4	2	FST20-125-1	FST20-125-2	FST20-125-3	FST20-125-4	FST20-125-5	FST20-125-6	FST20-125-7	FST20-125-8
1-1/2	7	1-3/4	FST20-150-1	FST20-150-2	FST20-150-3	FST20-150-4	FST20-150-5	FST20-150-6	FST20-150-7	FST20-150-8
1-3/4	6-1/2	1-3/4	FST20-175-1	FST20-175-2	FST20-175-3	FST20-175-4	FST20-175-5	FST20-175-6	FST20-175-7	FST20-175-8
2	5-3/4	1-1/2	FST20-200-1	FST20-200-2	FST20-200-3	FST20-200-4	FST20-200-5	FST20-200-6	FST20-200-7	FST20-200-8
2-1/2	5-1/2	1-1/2	FST20-250-1	FST20-250-2	FST20-250-3	FST20-250-4	FST20-250-5	FST20-250-6	FST20-250-7	FST20-250-8
3	4-3/4	1-1/4	FST20-300-1	FST20-300-2	FST20-300-3	FST20-300-4	FST20-300-5	FST20-300-6	FST20-300-7	FST20-300-8
4	4-1/4	1-1/4	FST20-400-1	FST20-400-2	FST20-400-3	FST20-400-4	FST20-400-5	FST20-400-6	FST20-400-7	FST20-400-8
5	3-3/4	1-1/4	FST20-500-1	FST20-500-2	FST20-500-3	FST20-500-4	FST20-500-5	FST20-500-6	FST20-500-7	FST20-500-8
6	3-1/2	1-1/4	FST20-600-1	FST20-600-2	FST20-600-3	FST20-600-4	FST20-600-5	FST20-600-6	FST20-600-7	FST20-600-8
8	2-7/8	1	FST20-801-1	FST20-801-2	FST20-801-3	FST20-801-4	FST20-801-5	FST20-801-6	FST20-801-7	FST20-801-8
10	2-3/4	1	FST20-0101-1	FST20-0101-2	FST20-0101-3	FST20-0101-4	FST20-0101-5	FST20-0101-6	FST20-0101-7	FST20-0101-8

FFS20 Series

DP 20° PA

Combination Pitch Stub

Single Milling Cutter

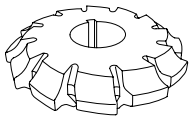


Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
4/5	4	1-1/4	FFS20-400-1	FFS20-400-2	FFS20-400-3	FFS20-400-4	FFS20-400-5	FFS20-400-6	FFS20-400-7	FFS20-400-8
5/7	3-1/4	1	FFS20-501-1	FFS20-501-2	FFS20-501-3	FFS20-501-4	FFS20-501-5	FFS20-501-6	FFS20-501-7	FFS20-501-8
6/8	2-7/8	1	FFS20-601-1	FFS20-601-2	FFS20-601-3	FFS20-601-4	FFS20-601-5	FFS20-601-6	FFS20-601-7	FFS20-601-8
8/10	2-3/4	1	FFS20-801-1	FFS20-801-2	FFS20-801-3	FFS20-801-4	FFS20-801-5	FFS20-801-6	FFS20-801-7	FFS20-801-8
10/12	2-1/4	7/8	FFS20-0107-1	FFS20-0107-2	FFS20-0107-3	FFS20-0107-4	FFS20-0107-5	FFS20-0107-6	FFS20-0107-7	FFS20-0107-8
12/14	2-1/4	7/8	FFS20-0127-1	FFS20-0127-2	FFS20-0127-3	FFS20-0127-4	FFS20-0127-5	FFS20-0127-6	FFS20-0127-7	FFS20-0127-8
16/21	2 1/4	7/8	FFS20-0167-1	FFS20-0167-2	FFS20-0167-3	FFS20-0167-4	FFS20-0167-5	FFS20-0167-6	FFS20-0167-7	FFS20-0167-8

FM14 Series

Module DP 14.5° PA

Single Milling Cutter



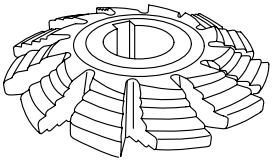
Module Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
1	2	7/8	FM14-100-1	FM14-100-2	FM14-100-3	FM14-100-4	FM14-100-5	FM14-100-6	FM14-100-7	FM14-100-8
1-1/2	2-1/4	1	FM14-150-1	FM14-150-2	FM14-150-3	FM14-150-4	FM14-150-5	FM14-150-6	FM14-150-7	FM14-150-8
1-3/4	2-1/4	1	FM14-175-1	FM14-175-2	FM14-175-3	FM14-175-4	FM14-175-5	FM14-175-6	FM14-175-7	FM14-175-8
2	2-1/2	1	FM14-200-1	FM14-200-2	FM14-200-3	FM14-200-4	FM14-200-5	FM14-200-6	FM14-200-7	FM14-200-8
2-1/4	2-5/8	1	FM14-225-1	FM14-225-2	FM14-225-3	FM14-225-4	FM14-225-5	FM14-225-6	FM14-225-7	FM14-225-8
2-1/2	2-3/4	1	FM14-250-1	FM14-250-2	FM14-250-3	FM14-250-4	FM14-250-5	FM14-250-6	FM14-250-7	FM14-250-8
3	2-7/8	1	FM14-300-1	FM14-300-2	FM14-300-3	FM14-300-4	FM14-300-5	FM14-300-6	FM14-300-7	FM14-300-8
3-1/2	3	1	FM14-350-1	FM14-350-2	FM14-350-3	FM14-350-4	FM14-350-5	FM14-350-6	FM14-350-7	FM14-350-8
4	3-1/4	1	FM14-400-1	FM14-400-2	FM14-400-3	FM14-400-4	FM14-400-5	FM14-400-6	FM14-400-7	FM14-400-8
5	4	1	FM14-500-1	FM14-500-2	FM14-500-3	FM14-500-4	FM14-500-5	FM14-500-6	FM14-500-7	FM14-500-8
5-1/2	4	1	FM14-550-1	FM14-550-2	FM14-550-3	FM14-550-4	FM14-550-5	FM14-550-6	FM14-550-7	FM14-550-8
6	4	1	FM14-600-1	FM14-600-2	FM14-600-3	FM14-600-4	FM14-600-5	FM14-600-6	FM14-600-7	FM14-600-8

FRG20 Series

DP 20° PA

Roughing

Single Milling Cutter

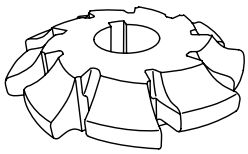


Diam. Pitch	Cutter Dia.	Size Hole	Type	Series
1	8-1/2	2	D	FRG20-100D
1	9	2	B	FRG20-100B
1-1/4	8	2	D	FRG20-125D
1-1/4	8-1/4	2	B	FRG20-125B
1-1/2	7	1-3/4	D	FRG20-150D
1-1/2	7	1-3/4	B	FRG20-150B
1-1/2	7	50mm	B	FRG20-150B5
1-3/4	6-1/4	1-3/4	B	FRG20-175B
2	5-3/4	1-1/2	D	FRG20-200D
2	5-3/4	1-1/2	B	FRG20-200B
2	5-3/4	1-1/2	A	FRG20-200A
2	6-1/2	1-3/4	A	FRG20-200AE
2-1/2	5-1/2	1-1/2	B	FRG20-250B
2-1/2	5-3/4	1-1/2	A	FRG20-250AE
3	4-3/4	1-1/4	B	FRG20-301B
4	4-1/4	1-1/4	B	FRG20-401B
5	3-3/4	1-1/4	B	FRG20-501B

FM20 Series

Module DP 20° PA

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

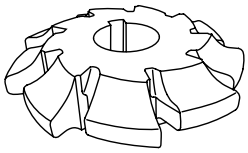
Module Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
0.5	1-3/4	7/8	FM20-050-1	FM20-050-2	FM20-050-3	FM20-050-4	FM20-050-5	FM20-050-6	FM20-050-7	FM20-050-8
0.75	1-3/4	7/8	FM20-075-1	FM20-075-2	FM20-075-3	FM20-075-4	FM20-075-5	FM20-075-6	FM20-075-7	FM20-075-8
0.8	1-3/4	7/8	FM20-080-1	FM20-080-2	FM20-080-3	FM20-080-4	FM20-080-5	FM20-080-6	FM20-080-7	FM20-080-8
1	2	7/8	FM20-100-1	FM20-100-2	FM20-100-3	FM20-100-4	FM20-100-5	FM20-100-6	FM20-100-7	FM20-100-8
1-1/4	2	7/8	FM20-125-1	FM20-125-2	FM20-125-3	FM20-125-4	FM20-125-5	FM20-125-6	FM20-125-7	FM20-125-8
1-1/2	2-1/4	1	FM20-150-1	FM20-150-2	FM20-150-3	FM20-150-4	FM20-150-5	FM20-150-6	FM20-150-7	FM20-150-8
1-1/2	2-1/4	7/8	FM20-1507-1	FM20-1507-2	FM20-1507-3	FM20-1507-4	FM20-1507-5	FM20-1507-6	FM20-1507-7	FM20-1507-8
1-3/4	2-1/4	1	FM20-175-1	FM20-175-2	FM20-175-3	FM20-175-4	FM20-175-5	FM20-175-6	FM20-175-7	FM20-175-8
2	2-1/4	7/8	FM20-2007-1	FM20-2007-2	FM20-2007-3	FM20-2007-4	FM20-2007-5	FM20-2007-6	FM20-2007-7	FM20-2007-8
2	2-1/2	1	FM20-200-1	FM20-200-2	FM20-200-3	FM20-200-4	FM20-200-5	FM20-200-6	FM20-200-7	FM20-200-8
2-1/2	2-1/4	7/8	FM20-2507-1	FM20-2507-2	FM20-2507-3	FM20-2507-4	FM20-2507-5	FM20-2507-6	FM20-2507-7	FM20-2507-8
2-1/4	2-5/8	1	FM20-225-1	FM20-225-2	FM20-225-3	FM20-225-4	FM20-225-5	FM20-225-6	FM20-225-7	FM20-225-8
2-1/2	2-3/4	1	FM20-250-1	FM20-250-2	FM20-250-3	FM20-250-4	FM20-250-5	FM20-250-6	FM20-250-7	FM20-250-8
2-1/2	2 1/2	7/8	FM20-2507-1	FM20-2507-2	FM20-2507-3	FM20-2507-4	FM20-2507-5	FM20-2507-6	FM20-2507-7	FM20-2507-8
2-3/4	2-7/8	1	FM20-275-1	FM20-275-2	FM20-275-3	FM20-275-4	FM20-275-5	FM20-275-6	FM20-275-7	FM20-275-8
3	2-7/8	1	FM20-300-1	FM20-300-2	FM20-300-3	FM20-300-4	FM20-300-5	FM20-300-6	FM20-300-7	FM20-300-8

SERIES CONTINUED ON NEXT PAGE ->

FM20 Series

Module DP 20° PA

Single Milling Cutter



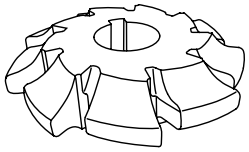
Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

Module Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
3-1/4	3	1	FM20-325-1	FM20-325-2	FM20-325-3	FM20-325-4	FM20-325-5	FM20-325-6	FM20-325-7	FM20-325-8
3-1/2	3	1	FM20-350-1	FM20-350-2	FM20-350-3	FM20-350-4	FM20-350-5	FM20-350-6	FM20-350-7	FM20-350-8
4	3-1/4	1	FM20-400-1	FM20-400-2	FM20-400-3	FM20-400-4	FM20-400-5	FM20-400-6	FM20-400-7	FM20-400-8
4-1/4	4	1	FM20-425-1	FM20-425-2	FM20-425-3	FM20-425-4	FM20-425-5	FM20-425-6	FM20-425-7	FM20-425-8
4-1/2	4	1	FM20-450-1	FM20-450-2	FM20-450-3	FM20-450-4	FM20-450-5	FM20-450-6	FM20-450-7	FM20-450-8
5	4	1	FM20-500-1	FM20-500-2	FM20-500-3	FM20-500-4	FM20-500-5	FM20-500-6	FM20-500-7	FM20-500-8
5-1/2	4	1	FM20-550-1	FM20-550-2	FM20-550-3	FM20-550-4	FM20-550-5	FM20-550-6	FM20-550-7	FM20-550-8
6	4	1	FM20-600-1	FM20-600-2	FM20-600-3	FM20-600-4	FM20-600-5	FM20-600-6	FM20-600-7	FM20-600-8
7	4-3/4	1-1/4	FM20-700-1	FM20-700-2	FM20-700-3	FM20-700-4	FM20-700-5	FM20-700-6	FM20-700-7	FM20-700-8
8	4-3/4	1-1/4	FM20-800-1	FM20-800-2	FM20-800-3	FM20-800-4	FM20-800-5	FM20-800-6	FM20-800-7	FM20-800-8
9	5-1/4	1-1/2	FM20-900-1	FM20-900-2	FM20-900-3	FM20-900-4	FM20-900-5	FM20-900-6	FM20-900-7	FM20-900-8
10	5-1/2	1-1/2	FM20-010-1	FM20-010-2	FM20-010-3	FM20-010-4	FM20-010-5	FM20-010-6	FM20-010-7	FM20-010-8
12	5-3/4	1-1/2	FM20-012-1	FM20-012-2	FM20-012-3	FM20-012-4	FM20-012-5	FM20-012-6	FM20-012-7	FM20-012-8
13	6	1-1/2	FM20-013-1	FM20-013-2	FM20-013-3	FM20-013-4	FM20-013-5	FM20-013-6	FM20-013-7	FM20-013-8
14	6-1/2	1-3/4	FM20-014-1	FM20-014-2	FM20-014-3	FM20-014-4	FM20-014-5	FM20-014-6	FM20-014-7	FM20-014-8
16	7	1-3/4	FM20-016-1	FM20-016-2	FM20-016-3	FM20-016-4	FM20-016-5	FM20-016-6	FM20-016-7	FM20-016-8
18	7-1/4	1-3/4	FM20-018-1	FM20-018-2	FM20-018-3	FM20-018-4	FM20-018-5	FM20-018-6	FM20-018-7	FM20-018-8
20	7-3/4	2	FM20-020-1	FM20-020-2	FM20-020-3	FM20-020-4	FM20-020-5	FM20-020-6	FM20-020-7	FM20-020-8

FCP14 Series

Circular Pitch 14.5° PA

Single Milling Cutter



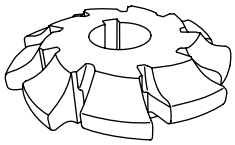
Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

Circular Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
4	11	2	FCP14-400-1	FCP14-400-2	FCP14-400-3	FCP14-400-4	FCP14-400-5	FCP14-400-6	FCP14-400-7	FCP14-400-8
3-1/2	9-1/2	2	FCP14-350-1	FCP14-350-2	FCP14-350-3	FCP14-350-4	FCP14-350-5	FCP14-350-6	FCP14-350-7	FCP14-350-8
3	8-1/2	1-3/4	FCP14-300-1	FCP14-300-2	FCP14-300-3	FCP14-300-4	FCP14-300-5	FCP14-300-6	FCP14-300-7	FCP14-300-8
2-1/2	7-1/4	1-3/4	FCP14-250-1	FCP14-250-2	FCP14-250-3	FCP14-250-4	FCP14-250-5	FCP14-250-6	FCP14-250-7	FCP14-250-8
2	7	1-3/4	FCP14-200-1	FCP14-200-2	FCP14-200-3	FCP14-200-4	FCP14-200-5	FCP14-200-6	FCP14-200-7	FCP14-200-8
1-3/4	6-1/2	1-3/4	FCP14-175-1	FCP14-175-2	FCP14-175-3	FCP14-175-4	FCP14-175-5	FCP14-175-6	FCP14-175-7	FCP14-175-8
1-1/2	5-3/4	1-1/2	FCP14-150-1	FCP14-150-2	FCP14-150-3	FCP14-150-4	FCP14-150-5	FCP14-150-6	FCP14-150-7	FCP14-150-8
1 1/4	5-3/4	1-1/2	FCP14-125-1	FCP14-125-2	FCP14-125-3	FCP14-125-4	FCP14-125-5	FCP14-125-6	FCP14-125-7	FCP14-125-8
1	4-3/4	1-1/4	FCP14-100-1	FCP14-100-2	FCP14-100-3	FCP14-100-4	FCP14-100-5	FCP14-100-6	FCP14-100-7	FCP14-100-8
3/4	3-3/4	1	FCP14-075-1	FCP14-075-2	FCP14-075-3	FCP14-075-4	FCP14-075-5	FCP14-075-6	FCP14-075-7	FCP14-075-8
1/2	3-1/8	1	FCP14-050-1	FCP14-050-2	FCP14-050-3	FCP14-050-4	FCP14-050-5	FCP14-050-6	FCP14-050-7	FCP14-050-8
1/4	2-3/4	1	FCP14-025-1	FCP14-025-2	FCP14-025-3	FCP14-025-4	FCP14-025-5	FCP14-025-6	FCP14-025-7	FCP14-025-8
1/8	2-1/4	1	FCP14-012-1	FCP14-012-2	FCP14-012-3	FCP14-012-4	FCP14-012-5	FCP14-012-6	FCP14-012-7	FCP14-012-8

FCP20 Series

Circular Pitch 20° PA

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

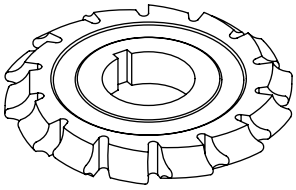
Circular Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
4	11	2	FCP20-400-1	FCP20-400-2	FCP20-400-3	FCP20-400-4	FCP20-400-5	FCP20-400-6	FCP20-400-7	FCP20-400-8
3-1/2	9-1/2	2	FCP20-350-1	FCP20-350-2	FCP20-350-3	FCP20-350-4	FCP20-350-5	FCP20-350-6	FCP20-350-7	FCP20-350-8
3	8-1/2	1-3/4	FCP20-300-1	FCP20-300-2	FCP20-300-3	FCP20-300-4	FCP20-300-5	FCP20-300-6	FCP20-300-7	FCP20-300-8
2-1/2	7-1/4	1-3/4	FCP20-250-1	FCP20-250-2	FCP20-250-3	FCP20-250-4	FCP20-250-5	FCP20-250-6	FCP20-250-7	FCP20-250-8
2 1/4	7-1/4	1-3/4	FCP20-225-1	FCP20-225-2	FCP20-225-3	FCP20-225-4	FCP20-225-5	FCP20-225-6	FCP20-225-7	FCP20-225-8
2	7	1-3/4	FCP20-200-1	FCP20-200-2	FCP20-200-3	FCP20-200-4	FCP20-200-5	FCP20-200-6	FCP20-200-7	FCP20-200-8
1-3/4	6-1/2	1-3/4	FCP20-175-1	FCP20-175-2	FCP20-175-3	FCP20-175-4	FCP20-175-5	FCP20-175-6	FCP20-175-7	FCP20-175-8
1-1/2	5-3/4	1-1/4	FCP20-150-1	FCP20-150-2	FCP20-150-3	FCP20-150-4	FCP20-150-5	FCP20-150-6	FCP20-150-7	FCP20-150-8
1-1/4	5-3/4	1-1/2	FCP20-125-1	FCP20-125-2	FCP20-125-3	FCP20-125-4	FCP20-125-5	FCP20-125-6	FCP20-125-7	FCP20-125-8
1	4-3/4	1-1/4	FCP20-100-1	FCP20-100-2	FCP20-100-3	FCP20-100-4	FCP20-100-5	FCP20-100-6	FCP20-100-7	FCP20-100-8
3/4	3-3/4	1	FCP20-075-1	FCP20-075-2	FCP20-075-3	FCP20-075-4	FCP20-075-5	FCP20-075-6	FCP20-075-7	FCP20-075-8
1/2	3-1/8	1	FCP20-050-1	FCP20-050-2	FCP20-050-3	FCP20-050-4	FCP20-050-5	FCP20-050-6	FCP20-050-7	FCP20-050-8
1/4	2-3/4	1	FCP20-025-1	FCP20-025-2	FCP20-025-3	FCP20-025-4	FCP20-025-5	FCP20-025-6	FCP20-025-7	FCP20-025-8
1/8	2-1/4	1	FCP20-012-1	FCP20-012-2	FCP20-012-3	FCP20-012-4	FCP20-012-5	FCP20-012-6	FCP20-012-7	FCP20-012-8

FF30 Series

DP 20° PA

ANSI Fillet Root

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

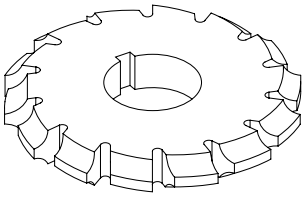
Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
4/8	3-3/4	1-1/4	FF30-400-1	FF30-400-2	FF30-400-3	FF30-400-4	FF30-400-5	FF30-400-6	FF30-400-7	FF30-400-8
5/10	3-1/2	1-1/4	FF30-500-1	FF30-500-2	FF30-500-3	FF30-500-4	FF30-500-5	FF30-500-6	FF30-500-7	FF30-500-8
6/12	3-1/2	1-1/4	FF30-600-1	FF30-600-2	FF30-600-3	FF30-600-4	FF30-600-5	FF30-600-6	FF30-600-7	FF30-600-8
8/16	3-1/2	1	FF30-800-1	FF30-800-2	FF30-800-3	FF30-800-4	FF30-800-5	FF30-800-6	FF30-800-7	FF30-800-8
10/20	3	1	FF30-010-1	FF30-010-2	FF30-010-3	FF30-010-4	FF30-010-5	FF30-010-6	FF30-010-7	FF30-010-8
12/24	3	1	FF30-012-1	FF30-012-2	FF30-012-3	FF30-012-4	FF30-012-5	FF30-012-6	FF30-012-7	FF30-012-8
16/32	3	1	FF30-016-1	FF30-016-2	FF30-016-3	FF30-016-4	FF30-016-5	FF30-016-6	FF30-016-7	FF30-016-8
20/40	3	1	FF30-020-1	FF30-020-2	FF30-020-3	FF30-020-4	FF30-020-5	FF30-020-6	FF30-020-7	FF30-020-8
24/48	3	1	FF30-024-1	FF30-024-2	FF30-024-3	FF30-024-4	FF30-024-5	FF30-024-6	FF30-024-7	FF30-024-8
32/64	2-3/4	1	FF30-032-1	FF30-032-2	FF30-032-3	FF30-032-4	FF30-032-5	FF30-032-6	FF30-032-7	FF30-032-8
48/96	2-1/2	1	FF30-048-1	FF30-048-2	FF30-048-3	FF30-048-4	FF30-048-5	FF30-048-6	FF30-048-7	FF30-048-8

FL30 Series

DP 30° PA

ANSI Flat Root

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

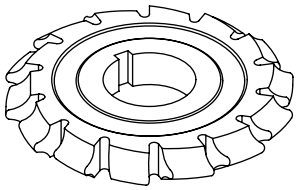
Diam. Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
2.5/5	4	1-1/4	FL30-250-1	FL30-250-2	FL30-250-3	FL30-250-4	FL30-250-5	FL30-250-6	FL30-250-7	FL30-250-8
3/6	3-3/4	1-1/2	FL30-300-1	FL30-300-2	FL30-300-3	FL30-300-4	FL30-300-5	FL30-300-6	FL30-300-7	FL30-300-8
4/8	3-3/4	1-1/4	FL30-400-1	FL30-400-2	FL30-400-3	FL30-400-4	FL30-400-5	FL30-400-6	FL30-400-7	FL30-400-8
5/10	3-1/2	1-1/4	FL30-500-1	FL30-500-2	FL30-500-3	FL30-500-4	FL30-500-5	FL30-500-6	FL30-500-7	FL30-500-8
6/12	3-1/2	1-1/4	FL30-600-1	FL30-600-2	FL30-600-3	FL30-600-4	FL30-600-5	FL30-600-6	FL30-600-7	FL30-600-8
8/16	3-1/2	1	FL30-800-1	FL30-800-2	FL30-800-3	FL30-800-4	FL30-800-5	FL30-800-6	FL30-800-7	FL30-800-8
10/20	3	1	FL30-010-1	FL30-010-2	FL30-010-3	FL30-010-4	FL30-010-5	FL30-010-6	FL30-010-7	FL30-010-8
12/24	3	1	FL30-012-1	FL30-012-2	FL30-012-3	FL30-012-4	FL30-012-5	FL30-012-6	FL30-012-7	FL30-012-8
16/32	3	1	FL30-016-1	FL30-016-2	FL30-016-3	FL30-016-4	FL30-016-5	FL30-016-6	FL30-016-7	FL30-016-8
20/40	3	1	FL30-020-1	FL30-020-2	FL30-020-3	FL30-020-4	FL30-020-5	FL30-020-6	FL30-020-7	FL30-020-8
24/48	3	1	FL30-024-1	FL30-024-2	FL30-024-3	FL30-024-4	FL30-024-5	FL30-024-6	FL30-024-7	FL30-024-8
32/64	2-3/4	1	FL30-032-1	FL30-032-2	FL30-032-3	FL30-032-4	FL30-032-5	FL30-032-6	FL30-032-7	FL30-032-8

FMF30 Series

Module 30° PA

ANSI Fillet Root

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

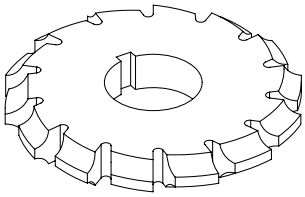
Module Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
3/4	2-3/4	1	FMF30-075-1	FMF30-075-2	FMF30-075-3	FMF30-075-4	FMF30-075-5	FMF30-075-6	FMF30-075-7	FMF30-075-8
1	3	1	FMF30-100-1	FMF30-100-2	FMF30-100-3	FMF30-100-4	FMF30-100-5	FMF30-100-6	FMF30-100-7	FMF30-100-8
1-1/4	3	1	FMF30-125-1	FMF30-125-2	FMF30-125-3	FMF30-125-4	FMF30-125-5	FMF30-125-6	FMF30-125-7	FMF30-125-8
1-1/2	3	1	FMF30-150-1	FMF30-150-2	FMF30-150-3	FMF30-150-4	FMF30-150-5	FMF30-150-6	FMF30-150-7	FMF30-150-8
1-3/4	3	1	FMF30-175-1	FMF30-175-2	FMF30-175-3	FMF30-175-4	FMF30-175-5	FMF30-175-6	FMF30-175-7	FMF30-175-8
2	3	1	FMF30-200-1	FMF30-200-2	FMF30-200-3	FMF30-200-4	FMF30-200-5	FMF30-200-6	FMF30-200-7	FMF30-200-8
2-1/2	3	1	FMF30-250-1	FMF30-250-2	FMF30-250-3	FMF30-250-4	FMF30-250-5	FMF30-250-6	FMF30-250-7	FMF30-250-8
3	3-1/2	1	FMF30-300-1	FMF30-300-2	FMF30-300-3	FMF30-300-4	FMF30-300-5	FMF30-300-6	FMF30-300-7	FMF30-300-8
4	3-1/2	1	FMF30-400-1	FMF30-400-2	FMF30-400-3	FMF30-400-4	FMF30-400-5	FMF30-400-6	FMF30-400-7	FMF30-400-8
5	3-1/2	1	FMF30-500-1	FMF30-500-2	FMF30-500-3	FMF30-500-4	FMF30-500-5	FMF30-500-6	FMF30-500-7	FMF30-500-8
6	3-3/4	1-1/4	FMF30-600-1	FMF30-600-2	FMF30-600-3	FMF30-600-4	FMF30-600-5	FMF30-600-6	FMF30-600-7	FMF30-600-8

FML30 Series

Module 30° PA

ANSI Flat Root

Single Milling Cutter



Cutter #	Range	Cutter #	Range
1	135 to a rack	5	21 to 25 teeth
2	55 to 134 teeth	6	17 to 20 teeth
3	35 to 54 teeth	7	14 to 16 teeth
4	26 to 34 teeth	8	12 to 13 teeth

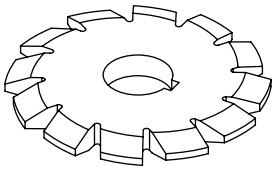
Module Pitch	Cutter Dia.	Size Hole	#1	#2	#3	#4	#5	#6	#7	#8
1	3	1	FMF30-100-1	FMF30-100-2	FMF30-100-3	FMF30-100-4	FMF30-100-5	FMF30-100-6	FMF30-100-7	FMF30-100-8
1-1/4	3	1	FMF30-125-1	FMF30-125-2	FMF30-125-3	FMF30-125-4	FMF30-125-5	FMF30-125-6	FMF30-125-7	FMF30-125-8
1-1/2	3	1	FMF30-150-1	FMF30-150-2	FMF30-150-3	FMF30-150-4	FMF30-150-5	FMF30-150-6	FMF30-150-7	FMF30-150-8
2	3	1	FMF30-200-1	FMF30-200-2	FMF30-200-3	FMF30-200-4	FMF30-200-5	FMF30-200-6	FMF30-200-7	FMF30-200-8
2-1/2	3	1	FMF30-250-1	FMF30-250-2	FMF30-250-3	FMF30-250-4	FMF30-250-5	FMF30-250-6	FMF30-250-7	FMF30-250-8
3	3-1/2	1	FMF30-300-1	FMF30-300-2	FMF30-300-3	FMF30-300-4	FMF30-300-5	FMF30-300-6	FMF30-300-7	FMF30-300-8
4	3-1/2	1	FMF30-400-1	FMF30-400-2	FMF30-400-3	FMF30-400-4	FMF30-400-5	FMF30-400-6	FMF30-400-7	FMF30-400-8
5	3-1/2	1	FMF30-500-1	FMF30-500-2	FMF30-500-3	FMF30-500-4	FMF30-500-5	FMF30-500-6	FMF30-500-7	FMF30-500-8
6	3-3/4	1-1/4	FMF30-600-1	FMF30-600-2	FMF30-600-3	FMF30-600-4	FMF30-600-5	FMF30-600-6	FMF30-600-7	FMF30-600-8
8	4	1-1/4	FMF30-800-1	FMF30-800-2	FMF30-800-3	FMF30-800-4	FMF30-800-5	FMF30-800-6	FMF30-800-7	FMF30-800-8

FRW14 Series

14.5° PA

Rack & Worm

Single Milling Cutter



Axial DP	Cutter Dia.	Size Hole	Point Width	Series
1-1/4	8	2	.778	FRW14-125-8
1-1/2	7	1-3/4	.648	FRW14-150-7
1-3/4	7	1-3/4	.556	FRW14-175-7
2	5-1/4	1-1/2	.486	FRW14-200-5
2	6	1-3/4	.486	FRW14-200-6
2	7	1-3/4	.486	FRW14-200-7
2-1/2	6	1-3/4	.389	FRW14-250-6
3	4	1-1/4	.324	FRW14-300-4
3	4-1/2	1-1/4	.324	FRW14-300-4L
3	5	1-1/2	.324	FRW14-300-5
3	6	1-3/4	.324	FRW14-300-6
3	7	1-3/4	.324	FRW14-300-7
3-1/2	4	1-1/4	.278	FRW14-350-4
4	3-3/4	1-1/4	.243	FRW14-400-3L
4	4	1-1/4	.243	FRW14-400-4
4	5	1-1/2	.243	FRW14-400-5
4	5-1/2	1-1/2	.243	FRW14-400-5L
4	6	1-3/4	.243	FRW14-400-6
4-1/2	4	1-1/4	.216	FRW14-450-4
5	3-3/4	1-1/4	.194	FRW14-500-3L
5	4	1-1/4	.194	FRW14-500-4
5	5	1-1/2	.194	FRW14-500-5
5	5-1/2	1-1/2	.194	FRW14-500-5L

Axial DP	Cutter Dia.	Size Hole	Point Width	Series
6	3-1/4	1	.162	FRW14-600-3A
6	3-1/2	1	.162	FRW14-600-3AE
6	4	1-1/4	.162	FRW14-600-4
6	4	1	.162	FRW14-600-4A
6	5	1-1/2	.162	FRW14-600-5
6	6	1-1/4	.162	FRW14-600-6S
6	6	1-3/4	.162	FRW14-600-6
7	4	1-1/4	.139	FRW14-700-4
7	4	1	.139	FRW14-700-4A
7	5	1-1/2	.139	FRW14-700-5
8	3	1	.122	FRW14-800-3A
8	3-1/4	1	.122	FRW14-800-3AE2
8	3-3/8	1	.122	FRW14-800-3AE
8	4	1-1/4	.122	FRW14-800-4
8	4	1	.122	FRW14-800-4A
8	4-1/2	1	.125	FRW14-800-4AL
8	5	1-1/2	.122	FRW14-800-5
8	6	1-1/14	.122	FRW14-800-6S
8	6	1-3/4	.122	FRW14-800-6
9	4	1-1/4	.108	FRW14-900-4
10	3-1/4	1-1/4	.097	FRW14-010-3L
10	4-1/2	1-1/4	.097	FRW14-010-4L
10	3	1	.097	FRW14-010-3A

SERIES CONTINUED ON NEXT PAGE ->

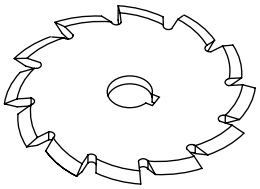
FRW14 Series

DP 14.5° PA , Rack & Worm Single Milling Cutter

Axial DP	Cutter Dia.	Size Hole	Point Width	Series
10	3-1/4	1	.097	FRW14-010-3L
10	3-1/2	1	.097	FRW14-010-3AE
10	4	1-1/4	.097	FRW14-010-4
10	4-1/2	1	.097	FRW14-010-4L
10	5	1-1/2	.097	FRW14-010-5
10	6	1-1/4	.097	FRW14-010-6S
10	6	1-3/4	.097	FRW14-010-6
10	4	1-1/4	.088	FRW14-010-4F-PG
12	2-1/2	1-1/4	.081	FRW14-012-2
12	3	1	.081	FRW14-012-3A
12	4	1	.081	FRW14-012-4A
12	4-1/2	1-1/4	.081	FRW14-012-4L
12	4	1-1/4	.081	FRW14-012-4
12	4	1	.081	FRW14-012-4A
12	5	1-1/2	.081	FRW14-012-5
12	6	1-3/4	.081	FRW14-012-6
14	2-1/2	1-1/4	.069	FRW14-014-2
14	3	1	.069	FRW14-014-3A
14	4	1-1/4	.069	FRW14-014-4
16	4-1/2	1	.063	FRW14-016-4AF
16	2-1/2	1-1/4	.061	FRW14-016-2
16	3	1	.061	FRW14-016-3A
16	3-1/2	1	.061	FRW14-016-3AE
16	4	1-1/4	.061	FRW14-016-4
16	4	1	.061	FRW14-016-4A
16	5	1-1/4	.061	FRW14-016-5E
16	5	1-1/2	.061	FRW14-016-5
16	6	1-3/4	.061	FRW14-016-6
18	3	1	.054	FRW14-018-3A
18	4	1-1/4	.054	FRW14-018-4
20	4	1	.050	FRW14-020-4AE
20	3	1	.049	FRW14-020-3A
20	4	1-1/4	.049	FRW14-020-4
20	4	1	.049	FRW14-020-4A
20	3-1/2	1	.046	FRW14-020-3AE
20	6-1/2	1-3/4	.049	FRW14-020-6
22	3	1	.044	FRW14-022-3A
24	2	1/2	.041	FRW14-024-2H
24	2-1/2	1-1/4	.041	FRW14-024-2
24	3	1	.041	FRW14-024-3A
24	4	1-1/4	.041	FRW14-024-4
32	2-1/2	1-1/4	.030	FRW14-032-2
48	2-1/2	1-1/4	.020	FRW14-048-2
64	4	1-1/4	.015	FRW14-064-4
96	2-1/2	1-1/4	.010	FRW14-096-2

FX14 Series

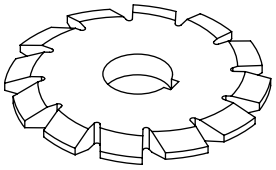
Blank 14.5° PA
Rack & Worm
Single Milling Cutter



Cutter Dia.	Size Hole	Point Width	DP Range	Series
4-1/4	1	.015	12-64	FX14-425-0152
5-1/4	1-1/4	.015	12-64	FX14-525-0152
6-1/4	1-1/2	.015	3-64	FX14-625-0152
7-1/4	1-3/4	.243	2-4	FX14-725-2431

FRW20 Series

DP 20° PA
Rack & Worm
Single Milling Cutter



Axial DP	Cutter Dia.	Size Hole	Point Width	Series
1	10	2	.728	FRW20-100-10
1-1/4	8	2	.583	FRW20-125-8
1-1/2	7	1-3/4	.486	FRW20-150-7
1-3/4	7	1-3/4	.416	FRW20-175-7
2	5-3/4	1-1/2	.364	FRW20-200-5
2	6	1-3/4	.364	FRW20-200-6
2	7	1-3/4	.364	FRW20-200-7
2-1/2	6	1-3/4	.291	FRW20-250-6
3	4	1-1/4	.243	FRW20-300-4
3	4-1/2	1-1/4	.243	FRW20-300-4E
3	5	1-1/2	.243	FRW20-300-5
3	6	1-3/4	.243	FRW20-300-6
3	4-1/2	1-1/4	.228	FRW20-300-4F
3-1/2	4	1-1/4	.208	FRW20-350-4
4	3-3/4	1-1/4	.182	FRW20-400-3L
4	4	1-1/4	.182	FRW20-400-4
4	5	1-1/2	.182	FRW20-400-5
4	6	1-3/4	.182	FRW20-400-6
4	6	1-1/2	.182	FRW20-400-6E
4	7	1-3/4	.182	FRW20-400-7
4-1/2	4	1-1/4	.162	FRW20-450-4
5	3-3/4	1-1/4	.146	FRW20-500-4E
5	4	1-1/4	.146	FRW20-500-4
5	4	1	.146	FRW20-500-4A
5	5	1-1/2	.146	FRW20-500-5
5	6	1-3/4	.146	FRW20-500-6
5	6	1-1/2	.146	FRW20-500-6E
6	3-1/4	1	.121	FRW20-600-3A
6	3-1/2	1	.121	FRW20-600-3AE

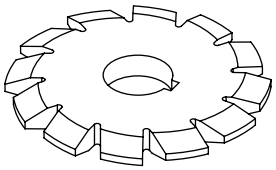
SERIES CONTINUED ON NEXT PAGE ->

FRW20 Series

DP 20° PA

Rack & Worm

Single Milling Cutter



Axial DP	Cutter Dia.	Size Hole	Point Width	Series
6	4	1-1/4	.121	FRW20-600-4
6	4	1	.121	FRW20-600-4A
6	5	1-1/2	.121	FRW20-600-5
6	6	1-3/4	.121	FRW20-600-6
6	6-1/2	1-1/2	.121	FRW20-600-6E
6	7	1-3/4	.121	FRW20-600-7
6	4	1-1/4	.106	FRW20-600-4F
7	4	1-1/4	.104	FRW20-700-4
7	4	1	.104	FRW20-700-4A
7	5	1-1/2	.104	FRW20-700-5
7	6	1-3/4	.104	FRW20-700-6
8	3-1/4	1	.091	FRW20-800-3A
8	3-1/4	1-1/4	.091	FRW20-800-3L
8	4	1-1/4	.091	FRW20-800-4
8	4	1	.091	FRW20-800-4A
8	5	1-1/2	.091	FRW20-800-5
8	5	1-1/4	.091	FRW20-800-5E
8	6	1-3/4	.091	FRW20-800-6
9	4	1-1/4	.081	FRW20-900-4
10	3	1	.073	FRW20-010-3A
10	3-1/4	1-1/4	.073	FRW20-010-3L
10	4	1-1/4	.073	FRW20-010-4
10	4	1	.073	FRW20-010-4A
10	4-1/2	1-1/4	.073	FRW20-010-4L
10	5	1-1/2	.073	FRW20-010-5
10	5	1-1/4	.073	FRW20-010-5E
10	6	1-3/4	.073	FRW20-010-6
10	6	1-1/4	.073	FRW20-010-6E
12	2-1/2	1-1/4	.061	FRW20-012-2
12	3	1	.061	FRW20-012-3A
12	4	1-1/4	.061	FRW20-012-4
12	4	1	.061	FRW20-012-4A
12	4-1/2	1-1/4	.061	FRW20-012-4L
12	5	1-1/2	.061	FRW20-012-5

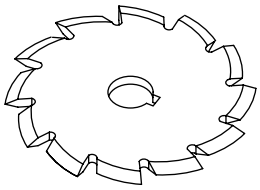
Axial DP	Cutter Dia.	Size Hole	Point Width	Series
12	5	1-1/4	.061	FRW20-012-5E
12	6	1-3/4	.061	FRW20-012-6
14	4	1-1/4	.052	FRW20-014-4
14	4	1	.052	FRW20-014-4A
14	5	1-1/2	.052	FRW20-014-5
16	2-1/2	1-1/4	.046	FRW20-016-2
16	3	1	.046	FRW20-016-3A
16	3-1/2	1	.046	FRW20-016-3AE
16	4	1-1/4	.046	FRW20-016-4
16	4	1	.046	FRW20-016-4A
16	4-1/2	1-1/4	.046	FRW20-016-4L
16	5	1-1/2	.046	FRW20-016-5
16	5	1-1/4	.046	FRW20-016-5E
16	6	1-3/4	.046	FRW20-016-6
18	3	1	.041	FRW20-018-3A
18	4	1-1/4	.041	FRW20-018-4
18	4-1/2	1-1/4	.041	FRW20-018-4L
20	4	1-1/4	.033	FRW20-020-4E
20	3	1	.036	FRW20-020-3A
20	4	1-1/4	.036	FRW20-020-4
20	4	1	.036	FRW20-020-4A
22	3	1	.033	FRW20-022-3A
22	4	1-1/4	.033	FRW20-022-4
24	2-1/2	1-1/4	.030	FRW20-024-2
24	3	1	.030	FRW20-024-3A
24	4	1-1/4	.030	FRW20-024-4
32	2-1/2	1-1/4	.023	FRW20-032-2
32	3-1/2	1	.023	FRW20-032-3A
48	2-1/2	1-1/4	.015	FRW20-048-2
48	3-1/4	1	.013	FRW20-048-3AE
64	2-1/2	1-1/4	.011	FRW20-064-2
72	2-1/2	1-1/4	.010	FRW20-072-2
96	2-1/2	3/4	.005	FRW20-096-3E

FX20 Series

Blank 20° PA

Rack & Worm

Single Milling Cutter



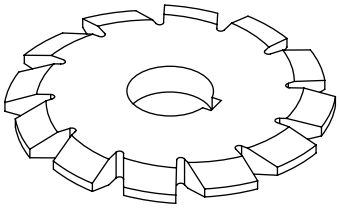
Cutter Dia.	Size Hole	Point Width	DP Range	Series
2-1/2	1-1/4	.006	16-126	FX20-250-0057
3-1/2	1	.020	13-32	FX20-350-0200
4	1-1/4	.020	10-32	FX20-400-0200
3-1/4	1	.040	8-18	FX20-325-0400
4-1/4	1	.015	16-48	FX20-425-0152
4-3/4	1-1/4	.015	3-48	FX20-475L-0152
5-1/4	1-1/4	.011	13-64	FX20-525-0114
6-1/4	1-1/2	.015	3-48	FX20-625-0152
7-3/4	1-3/4	.091	2-8	FX20-775-0911

FRW25 Series

DP 25° PA

Rack & Worm

Single Milling Cutter



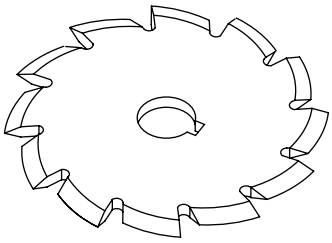
Axial DP	Cutter Dia.	Size Hole	Point Width	Series
2	6	1-1/2	.246	FRW25-200-6
2-1/2	6	1-3/4	.197	FRW25-250-6
3	4	1-1/4	.164	FRW25-300-4
3	5	1-1/2	.164	FRW25-300-5
3	6	1-3/4	.164	FRW25-300-6
3-1/2	4	1-1/4	.141	FRW25-350-4
4	4	1-1/4	.123	FRW25-400-4
4	6	1-3/4	.123	FRW25-400-6
5	4	1-1/4	.098	FRW25-500-4
5	4	1	.098	FRW25-500-4A
5	5	1-1/2	.098	FRW25-500-5
5	6	1-3/4	.098	FRW25-500-6
6	3-1/4	1-1/4	.082	FRW25-600-3L
6	4	1	.082	FRW25-600-4A
6	5	1-1/2	.082	FRW25-600-5
6	6	1-3/4	.082	FRW25-600-6
7	4	1-1/4	.070	FRW25-700-4
7	5	1-1/2	.070	FRW25-700-5
8	3	1	.062	FRW25-800-3A
8	3-1/4	1-1/4	.062	FRW25-800-3L
8	3-3/8	1	.062	FRW25-800-3AE
8	4	1-1/4	.062	FRW25-800-4
8	5	1-1/2	.062	FRW25-800-5
8	6	1-3/4	.062	FRW25-800-6
10	3	1	.049	FRW25-010-3A
10	4	1-1/4	.049	FRW25-010-4
12	3	1	.041	FRW25-012-3A
12	4	1-1/4	.041	FRW25-012-4
12	3-1/2	1	.039	FRW25-012-3AE
14	3	1	.035	FRW25-014-3A
16	3	1	.031	FRW25-016-3A
20	3	1	.025	FRW25-020-3A
24	3	1	.021	FRW25-024-3A
24	2-1/2	1-1/4	.017	FRW25-024-2E
48	2-1/2	1-1/4	.008	FRW25-048-2

FWC14 Series

CP 14.5° PA

Rack & Worm

Single Milling Cutter



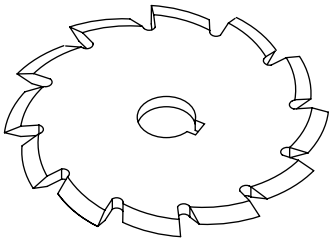
Circular Pitch		Cutter Dia.	Size Hole	Point Width	Series
1/10	.100	2-1/2	1	.023	FWC14-010
1/8	.125	2-3/4	1	.039	FWC14-012
3/16	.188	2-3/4	1	.058	FWC14-018
1/5	.200	2-3/4	1	.062	FWC14-020
1/4	.250	2-3/4	1	.078	FWC14-025
1/4	.250	2-1/2	1-1/4	.077	FWC14-025E
5/16	.313	3-1/4	1	.097	FWC14-031
1/3	.333	3-1/4	1	.103	FWC14-033
3/8	.375	3-1/4	1	.116	FWC14-037
2/5	.400	3-1/4	1	.124	FWC14-040
7/16	.438	3-1/4	1	.135	FWC14-043
1/2	.500	3-1/4	1	.155	FWC14-050
9/16	.563	3-3/4	1-1/4	.174	FWC14-056
5/8	.625	3-3/4	1-1/4	.193	FWC14-062
2/3	.666	3-3/4	1-1/4	.206	FWC14-066
3/4	.750	3-3/4	1-1/4	.232	FWC14-075
7/8	.875	4-3/4	1-1/4	.271	FWC14-087
1	1.000	4-3/4	1-1/4	.310	FWC14-100
1-1/8	1.125	4-3/4	1-1/4	.261	FWC14-112
1-1/4	1.250	5-3/4	1-1/2	.386	FWC14-125
1-1/4	1.250	5	1-1/4	.382	FWC14-125E
1-1/2	1.500	5-3/4	1-1/2	.464	FWC14-150
1-1/2	1.500	6	1-3/4	.464	FWC14-150E

FWC20 Series

CP 20° PA

Rack & Worm

Single Milling Cutter



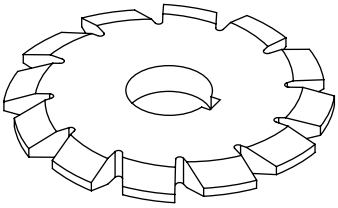
Circular Pitch		Cutter Dia.	Size Hole	Point Width	Series
1/10	.100	2-1/2	1	.023	FWC20-010
1/8	.125	2-3/4	1	.029	FWC20-012
1/6	.166	2-3/4	1	.039	FWC20-016
3/16	.188	2-3/4	1	.044	FWC20-018
1/5	.200	2-3/4	1	.046	FWC20-020
1/4	.250	2-3/4	1	.058	FWC20-025
5/16	.313	3-1/4	1	.073	FWC20-031
1/3	.333	3-1/4	1	.077	FWC20-033
3/8	.375	3-1/4	1	.087	FWC20-037
2/5	.400	3-1/4	1	.093	FWC20-040
7/16	.438	3-1/4	1	.102	FWC20-043
1/2	.500	3-1/4	1	.116	FWC20-050
9/16	.563	3-3/4	1-1/4	.130	FWC20-056
5/8	.625	3-3/4	1-1/4	.145	FWC20-062
3/4	.750	3-3/4	1-1/4	.174	FWC20-075
7/8	.875	4-3/4	1-1/4	.203	FWC20-087
1	1.000	4-3/4	1-1/4	.232	FWC20-100
1-1/4	1.250	5-3/4	1-1/2	.290	FWC20-125
1-1/2	1.500	5-3/4	1-1/2	.348	FWC20-150

FMR20 & FMW20 Series

MOD 20° PA

Rack & Worm

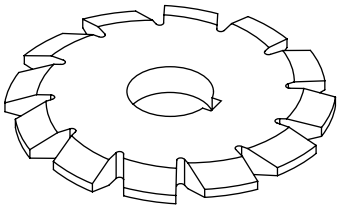
Single Milling Cutter



Module	Cutter Dia.	Size Hole	Point Width	Series
0.50	3	1	.013	FMR20-050-3
0.75	3	1	.022	FMR20-075-3
1	3	1	.029	FMR20-100-3
1-1/4	3	1	.036	FMR20-125-3
1-1/4	4	1	.036	FMR20-125-4
1-1/2	3	1	.043	FMR20-150-3
1-1/2	4	1	.043	FMR20-150-4A
1-1/2	4	1-1/4	.043	FMR20-150-4
1-3/4	3	1	.050	FMR20-175-3
1-3/4	4	1	.050	FMR20-175-4A
1-3/4	4	1-1/4	.050	FMR20-175-4
1-3/4	5	1-1/4	.050	FMR20-175-5
2	3	1	.057	FMR20-200-3A
2	3-1/2	1	.057	FMR20-200-3E
2	4	1	.057	FMR20-200-4A
2	4	1-1/4	.057	FMR20-200-4
2	5	1-1/4	.057	FMR20-200-5
2	5	1-1/2	.057	FMR20-200-5L
2-1/4	3	1	.065	FMR20-225-3A
2-1/4	4	1	.065	FMR20-225-4A
2-1/2	3-1/2	1	.072	FMR20-250-4A
2-1/2	4	1-1/4	.072	FMR20-250-4
2-1/2	5	1-1/2	.072	FMR20-250-5
2-1/2	5	1-1/4	.072	FMR20-250-5A
3	4-1/8	1-1/4	.086	FMR20-300-4
3	5	1-1/4	.086	FMR20-300-5
3	5	1-1/2	.086	FMR20-300-5L
3-1/2	4	1-1/4	.100	FMR20-350-4
3-1/2	5	1-1/2	.100	FMR20-350-5
4	3-1/2	1	.104	FMW20-400-4AE
4	4	1-1/4	.104	FWM20-400-4
4	6	1-1/4	.104	FMW20-400-6E
4	4	1-1/4	.115	FMR20-400-4
4	5	1-1/4	.115	FMR20-400-5
4	5	1-1/2	.115	FMR20-400-5L
4-1/2	4	1-1/4	.129	FMR20-450-4
5	4	1-1/4	.143	FMR20-500-4
5	5	1-1/4	.143	FMR20-500-5A
5	5	1-1/2	.143	FMR20-500-5L
6	4-1/2	1-1/4	.172	FMR20-600-4
6	5	1-1/2	.172	FMR20-600-5
6	6	1-3/4	.172	FMR20-600-6
7	5	1-1/2	.201	FMR20- 700-5
7	5	1-1/2	.230	FMR20-800-5
8	6	1-3/4	.230	FMR20-800-6
10	6	1-3/4	.287	FMR20-010-6
12	6-3/4	1-3/4	.344	FMR20-012-7
14	7	1-3/4	.402	FMR20-014-7
16	7	1-3/4	.459	FMR20-016-7

FCM Series

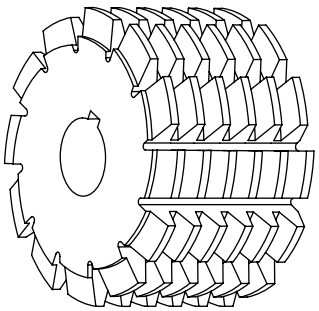
29 Included Angle
Acme Thread
Single Milling Cutter



TPI	Cutter Dia.	Bore	Point Width	Series
1-1/3	4	1	.273	FCM-133-4A
2	4	1	.180	FCM-200-4A
2	4	1-1/4	.180	FCM-200-4L
3	3-1/2	1	.118	FCM-300-3
3	4	1	.118	FCM-300-4
3	5	1-1/4	.118	FCM-300-5
3-1/2	3-1/2	1	.101	FCM-350-4
4	2-5/8	3/4	.088	FCM-400-3
4	3-1/2	1	.088	FCM-400-3E
4	4	1	.088	FCM-400-4A
4	4	1-1/4	.088	FCM-400-4L
4	5	1-1/4	.088	FCM-400-5
4	6	1-1/4	.088	FCM-400-6
5	2-5/8	3/4	.069	FCM-500-3
5	4	1	.069	FCM-500-4A
5	5	1-1/4	.069	FCM-500-5
6	2-5/8	3/4	.057	FCM-600-3
6	4	1	.057	FCM-600-4A
6	4	1-1/4	.057	FCM-600-4L
6	5	1-1/4	.057	FCM-600-5L
8	4	1	.041	FCM-800-4A
8	4	1-1/4	.041	FCM-800-4L
10	2-5/8	3/4	.032	FCM-010-3
12	2-5/8	3/4	.026	FCM-012-3
12	4	1	.026	FCM-012-4A

RAK14 Series

DP 14.5° PA
Multiple Rack Milling Cutter

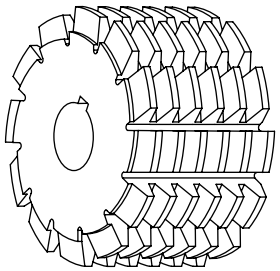


DP	OD	Approx. Length	Bore	No. Teeth (in cutter)	D+F	Series
4	4-1/2	4	1-1/4	5	.539	RAK14-04-5
5	4	3-3/4	1-1/4	6	.431	RAK14-05-6
6	3-3/4	3-7/8	1-1/4	7	.360	RAK14-06-7E
6	4	4-1/4	1-1/4	8	.360	RAK14-06-8
8	2-1/2	2-3/8	1	6	.270	RAK14-08-6
8	4	3-1/8	1-1/4	8	.270	RAK14-08-8
8	4	4-3/8	1-1/4	11	.270	RAK14-08-11
10	2-3/8	1-7/8	1	6	.216	RAK14-10-6
10	4	3-1/8	1-1/4	10	.216	RAK14-10-10
12	2-5/8	1-5/8	1	6	.180	RAK14-12-6
12	4-1/2	1-1/2	1-1/4	6	.180	RAK14-12-6E
12	3-1/2	2-5/8	1-1/4	10	.180	RAK14-12-10
12	3	3-1/8	1-1/4	13	.180	RAK14-12-13E
12	3-1/2	3-1/2	1-1/4	13	.180	RAK14-12-13
16	2-3/8	1-3/8	1	7	.135	RAK14-16-7
16	3	2	1-1/4	10	.135	RAK14-16-10
16	3-1/2	2-1/2	1-1/4	13	.135	RAK14-16-13
18	2-1/2	1-1/2	1	9	.120	RAK14-18-9
20	2-1/2	1-1/2	1	10	.112	RAK14-20-10
20	2-1/2	1-7/8	1	12	.112	RAK14-20-12
24	2-1/2	1-1/2	1	12	.094	RAK14-24-12
32	2-1/2	1-5/8	1	17	.071	RAK14-32-17
32	2-1/2	2	1	21	.071	RAK14-32-21
36	2-1/4	1-1/4	1	14	.063	RAK14-36-14

RAK20 Series

DP 20° PA

Multiple Rack Milling Cutter

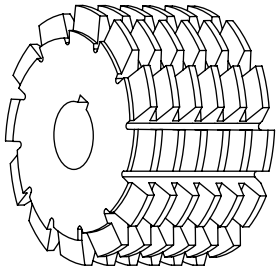


DP	OD	Approx. Length	Bore	No. Teeth (cutter)	D+F	Series
4	4-1/2	4	1-1/4	5	.539	RAK20-04-5
5	4	3-3/4	1-1/4	6	.431	RAK20-05-6
6	4	3-3/4	1-1/4	7	.360	RAK20-06-7
8	2-1/2	2-3/8	1	6	.270	RAK20-08-6
8	4	3-1/8	1-1/4	8	.270	RAK20-08-8
8	3-1/2	4-3/8	1-1/4	11	.270	RAK20-08-11
10	2-3/8	1-7/8	1	6	.216	RAK20-10-6
10	4	3-1/8	1-1/4	10	.216	RAK20-10-10
10	3-1/4	4	1-1/4	13	.216	RAK20-10-13
12	2-3/8	1-5/8	1	6	.180	RAK20-12-6
12	3-1/2	2-5/8	1-1/4	10	.180	RAK20-12-10
12	3-1/4	3-1/2	1-1/4	13	.180	RAK20-12-13
16	2-3/8	1-3/8	1	7	.135	RAK20-16-7
16	3	2	1-1/4	10	.135	RAK20-16-10
16	3-1/2	2-3/16	1-1/4	11	.135	RAK20-16-11
16	3	3-1/8	1-1/4	15	.135	RAK20-16-15
18	2-1/2	1-1/2	1	9	.120	RAK20-18-9
20	2-1/2	1-1/2	1	10	.112	RAK20-20-10
20	2-1/2	1-7/8	1	12	.112	RAK20-20-12
20	3	3-1/4	1-1/4	21	.112	RAK20-20-21E
24	2-1/2	1-1/2	1	12	.094	RAK20-24-12
28	3	2	1-1/4	26	.081	RAK20-28-26
32	2-1/2	1-5/8	1	17	.071	RAK20-32-17
36	2-1/4	1-3/8	1	14	.063	RAK20-36-14
48	2-1/4	2-1/8	1	30	.048	RAK20-48-30

RMK20 Series

Module 20° Included Angle

Multiple Rack Milling Cutter



Mod	OD	Approx. Length	Bore	No. Teeth (in cutter)	D+F	Series
1	2-1/2	1-1/2	1	12	.089	RMK20-100-12
1	3	2-1/4	1-1/4	18	.089	RMK20-100-18
1-1/4	2-1/2	1-7/8	1	12	.111	RMK20-125-12
1-1/4	2-1/2	1-1/2	1	8	.133	RMK20-125-8
1-1/2	3	2-1/4	1-1/4	12	.133	RMK20-150-12
1-3/4	2-3/8	1-1/2	1	7	.155	RMK20-175-7
2	2-3/8	1-1/2	1	6	.177	RMK20-200-6
2	3-1/2	2-1/2	1-1/4	10	.177	RMK20-200-10
2-1/2	2-3/8	1-7/8	1	6	.222	RMK20-250-6
2-1/2	3-1/2	3-1/8	1-1/4	10	.222	RMK20-250-10
3	3-1/2	3	1-1/4	8	.266	RMK20-300-8
3-1/2	4	3	1-1/4	7	.310	RMK20-350-7
4	4	3-1/2	1-1/4	7	.354	RMK20-400-7
5	4	4 /12	1-1/4	7	.443	RMK20-500-7
12	8-1/4	3-3/8	50mm	2	1.063	RMK20-012-2F

RMK60 Series

Metric 60° Included Angle

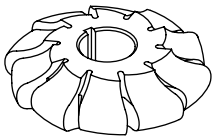
Multiple Rack Milling Cutter

MM	OD	Approx. Length	Bore	No. Teeth (cutter)	Series
1.5	3	1-1/2	1-1/4	28	RMK60-150-28

FRC Series

Roller Chain Sprocket

American Standard

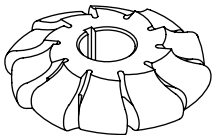


Chain No.	Pitch	Roller	OD	Bore	Tooth Range					
					6	7-8	9-11	12-17	18-34	35 & Up
35	3/8	.200	2-3/4	1	FRC-35-6	FRC-35-7	FRC-35-9	FRC-35-12	FRC-35-18	FRC-35-35
40	1/2	.313	3-1/8	1	FRC-40-6	FRC-40-7	FRC-40-9	FRC-40-12	FRC-40-18	FRC-40-35
41	1/2	.306	3-1/8	1	FRC-41-6	FRC-41-7	FRC-41-9	FRC-41-12	FRC-41-18	FRC-41-35
50	5/8	.400	3-1/8	1	FRC-50-6	FRC-50-7	FRC-50-9	FRC-50-12	FRC-50-18	FRC-50-35
60	3/4	.469	3-3/8	1	FRC-60-6	FRC-60-7	FRC-60-9	FRC-60-12	FRC-60-18	FRC-60-35
80	1	.625	4-1/4	1-1/4	FRC-80-6	FRC-80-7	FRC-80-9	FRC-80-12	FRC-80-18	FRC-80-35
(Spec.)	1	.563	4-1/4	1-1/4	FRC-81-6	FRC-81-7	FRC-81-9	FRC-81-12	FRC-81-18	FRC-81-35
100	1-1/4	.750	4-5/8	1-1/4	FRC-100-6	FRC-100-7	FRC-100-9	FRC-100-12	FRC-100-18	FRC-100-35
120	1-1/2	.875	4-3/4	1-1/4	FRC-120-6	FRC-120-7	FRC-120-9	FRC-120-12	FRC-120-18	FRC-120-35
140	1-3/4	1.000	5-3/8	1-1/2	FRC-140-6	FRC-140-7	FRC-140-9	FRC-140-12	FRC-140-18	FRC-140-35
160	2	1.125	5-3/4	1-1/2	FRC-160-6	FRC-160-7	FRC-160-9	FRC-160-12	FRC-160-18	FRC-160-35
180	2-1/4	1.406	6-1/2	1-1/2	FRC-180-6	FRC-180-7	FRC-180-9	FRC-180-12	FRC-180-18	FRC-180-35
200	2-1/2	1.563	6-7/8	1-3/4	FRC-200-6	FRC-200-7	FRC-200-9	FRC-200-12	FRC-200-18	FRC-200-35
240	3	1.875	8	2	FRC-240-6	FRC-240-7	FRC-240-9	FRC-240-12	FRC-240-18	FRC-240-35

FRB Series

Roller Chain Sprocket

British Standard



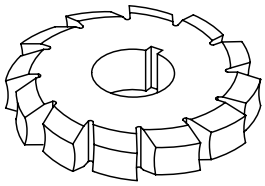
Chain No.	Pitch	Roller	OD	Bore	Tooth Range				
					6	7-8	9-11	13-19	20 & Up
36	3/8	.250	2-3/4	1	FRB-36-6	FRB-36-7	FRB-36-9	FRB-36-13	FRB-36-20
42	1/2	.335	3-1/8	1	FRB-42-6	FRB-42-7	FRB-42-9	FRB-42-13	FRB-42-20
51	5/8	.400	3-1/8	1	FRB-51-6	FRB-51-7	FRB-51-9	FRB-51-13	FRB-51-20
61	3/4	.475	3-3/8	1	FRB-61-6	FRB-61-7	FRB-61-9	FRB-61-13	FRB-61-20

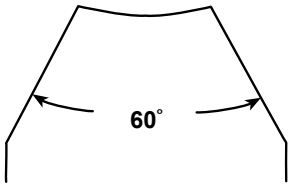
F6 Series

6 Parallel Spline Milling Cutters

No Lugs, Non-Chamfering

Will Produce			OD	Bore	Cutter Point Width	Series
Major Dia.	Minor Dia.	Key				
0.750	0.675	.188	3	1	.161	F6-075A
0.750	0.635	.185	3	1	.144	F6-075B
0.750	0.597	.185	3	1	.125	F6-075C
0.875	0.788	.219	3	1	.189	F6-087A
0.875	0.741	.215	3	1	.168	F6-087B
0.875	0.696	.215	3	1	.145	F6-087C
1.000	0.900	.250	3	1	.216	F6-100A
1.000	0.847	.246	3	1	.192	F6-100B
1.000	0.796	.246	3	1	.165	F6-100C
1.125	1.014	.281	3	1	.244	F6-112A
1.125	0.953	.277	3	1	.216	F6-112B
1.125	0.894	.277	3	1	.185	F6-112C



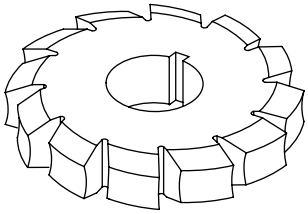


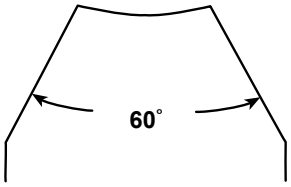
SERIES CONTINUED ON NEXT PAGE ->

F6 Series

6 Parallel Spline Milling Cutters

No Lugs, Non-Chamfering



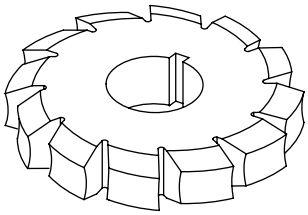


Will Produce			OD	Bore	Cutter Point Width	Series
Major Dia.	Minor Dia.	Key				
1.250	1.126	.313	3	1	.270	F6-125A
1.250	1.060	.309	3	1	.239	F6-125B
1.250	0.996	.309	3	1	.206	F6-125C
1.375	1.239	.345	3	1	.296	F6-137A
1.375	1.165	.340	3	1	.263	F6-137B
1.375	1.096	.340	3	1	.227	F6-137C
1.500	1.350	.375	3	1	.324	F6-150A
1.500	1.271	.371	3	1	.287	F6-150B
1.500	1.196	.371	3	1	.247	F6-150C
1.625	1.465	.406	3	1	.352	F6-162A
1.625	1.378	.402	3	1	.311	F6-162B
1.625	1.296	.402	3	1	.268	F6-162C
1.750	1.577	.438	3	1	.378	F6-175A
1.750	1.485	.434	3	1	.334	F6-175B
1.750	1.396	.434	3	1	.288	F6-175C
2.000	1.802	.500	3	1	.433	F6-200A
2.000	1.696	.495	3	1	.382	F6-200B
2.000	1.595	.495	3	1	.329	F6-200C
2.250	2.027	.563	3	1	.486	F6-225A
2.250	1.908	.558	3	1	.429	F6-225B
2.250	1.795	.558	3	1	.370	F6-225C
2.500	2.252	.625	3	1	.541	F6-250A
2.500	2.120	.620	3	1	.477	F6-250B
2.500	1.996	.620	3	1	.412	F6-250C
3.000	2.702	.750	3	1	.648	F6-300A
3.000	2.545	.745	3	1	.572	F6-300B
3.000	2.394	.745	3	1	.492	F6-300C
3.500	3.152	.875	3	1	.756	F6-350A
3.500	2.970	.870	3	1	.666	F6-350B
3.500	2.794	.870	3	1	.574	F6-350C

F10 Series

10 Parallel Spline Milling Cutters

No Lugs, Non-Chamfering



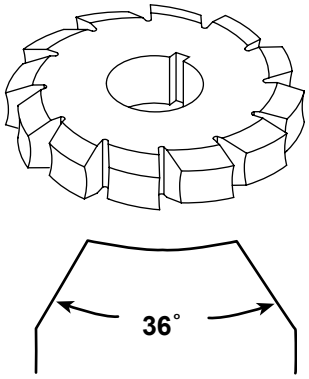
Will Produce			OD	Bore	Cutter Point Width	Series
Major Dia.	Minor Dia.	Key				
0.750	.642	.114	3	1	.087	F10-075B
0.750	.605	.114	3	1	.075	F10-075C
0.875	.794	.137	3	1	.111	F10-087A
0.875	.751	.134	3	1	.101	F10-087B
0.875	.706	.134	3	1	.087	F10-087C
1.000	.907	.156	3	1	.128	F10-100A
1.000	.857	.153	3	1	.115	F10-100B
1.000	.857	.153	2	1	.115	F10-100BE

SERIES CONTINUED ON NEXT PAGE ->

F10 Series

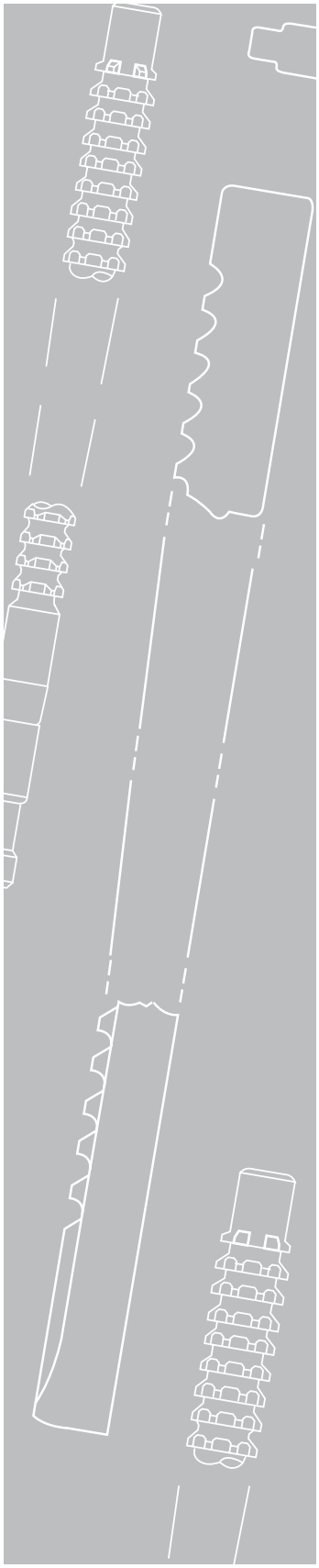
10 Parallel Spline Milling Cutters

No Lugs, Non-Chamfering



Will Produce			OD	Bore	Cutter Point Width	Series
Major Dia.	Minor Dia.	Key				
1.000	.807	.153	3	1	.099	F10-100C
1.125	1.020	.176	3	1	.143	F10-112A
1.125	0.965	.173	3	1	.129	F10-112B
1.125	0.908	.173	3	1	.111	F10-112C
1.250	1.134	.195	3	1	.160	F10-125A
1.250	1.072	.192	3	1	.143	F10-125B
1.250	1.010	.192	3	1	.124	F10-125C
1.375	1.248	.215	3	1	.175	F10-137A
1.375	1.180	.212	3	1	.157	F10-137B
1.375	1.111	.212	3	1	.135	F10-137C
1.500	1.362	.235	3	1	.192	F10-150A
1.500	1.286	.231	3	1	.172	F10-150B
1.500	1.211	.231	3	1	.148	F10-150C
1.625	1.394	.251	3	1	.186	F10-162B
1.625	1.311	.251	3	1	.159	F10-162C
1.750	1.590	.274	3	1	.224	F10-175A
1.750	1.501	.270	3	1	.200	F10-175B
1.750	1.414	.270	3	1	.173	F10-175C
2.000	1.817	.313	3	1	.256	F10-200A
2.000	1.715	.307	3	1	.229	F10-200B
2.000	1.615	.307	3	1	.198	F10-200C
2.250	2.045	.352	3	1	.288	F10-225A
2.250	1.930	.346	3	1	.258	F10-225B
2.250	1.818	.346	3	1	.222	F10-225C
2.500	2.272	.391	3	1	.320	F10-250A
2.500	2.145	.385	3	1	.286	F10-250B
2.500	2.020	.385	3	1	.247	F10-250C
3.000	2.727	.469	3	1	.385	F10-300A
3.000	2.574	.463	3	1	.342	F10-300B
3.000	2.424	.463	3	1	.295	F10-300C
3.500	3.182	.547	3	1	.449	F10-350A
3.500	3.004	.541	3	1	.399	F10-350B
3.500	2.829	.541	3	1	.344	F10-350C

Broach Sort Index



30° Involute Spline 185

Parallel Spline

- 6 Spline 190
- 10 Spline 192

Parallel Spline Metric

- 4 Spline 191
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- Inch 196-197
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Key Seating Broaches 199

Hex Broaches 194-195

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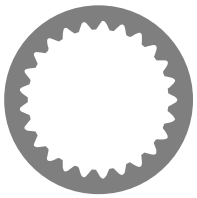
BF30 Series

DP Fillet Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1

Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
12/24	30	14	1.335	1.084	52	3/4	2 1/2	1	BF30-12-014
12/24	30	19	1.752	1.500	52	3/4	2 3/4	1	BF30-12-019
16/32	30	8	.628	.448	34	1/2	1-1/2	3/8	BF30-008
16/32	30	9	.690	.505	39	5/8	1-5/8	1/2	BF30-009
16/32	30	10	.753	.565	39	5/8	1-5/8	1/2	BF30-010
16/32	30	11	.815	.625	34	5/8	1-7/8	5/8	BF30-011
16/32	30	12	.878	.688	38	5/8	2	5/8	BF30-012
16/32	30	13	.940	.750	32	5/8	1-7/8	5/8	BF30-013
16/32	30	14	1.003	.813	43	3/4	2-7/8	3/4	BF30-014
16/32	30	15	1.066	.875	43	3/4	2 1/2	3/4	BF30-015
16/32	30	16	1.128	.938	43	3/4	2-7/8	3/4	BF30-016
16/32	30	17	1.191	1.000	43	3/4	2-7/8	3/4	BF30-017
16/32	30	18	1.253	1.063	43	3/4	2 1/2	3/4	BF30-018
16/32	30	19	1.316	1.125	43	3/4	2-7/8	1	BF30-019
16/32	30	20	1.378	1.188	43	3/4	2-7/8	1	BF30-020
16/32	30	21	1.441	1.249	43	3/4	2-7/8	1	BF30-021
16/32	30	22	1.504	1.313	43	3/4	2-7/8	1	BF30-022
16/32	30	23	1.566	1.375	43	3/4	2-7/8	1	BF30-023
16/32	30	24	1.627	1.438	43	3/4	2-7/8	1	BF30-024
16/32	30	26	1.753	1.562	47	3/4	3	1 1/2	BF30-026
20/40	30	9	.550	.405	33	1/2	1-1/2	3/8	BF30-20-009
20/40	30	12	.704	.550	28	1/2	1-1/2	1/2	BF30-20-012
20/40	30	13	.758	.602	31	5/8	1-5/8	1/2	BF30-20-013F
20/40	30	14	.804	.650	41	3/4	2 1/2	5/8	BF30-20-014
20/40	30	15	.854	.698	36	3/4	2 1/4	5/8	BF30-20-015
20/40	30	16	.908	.751	38	3/4	2 1/2	5/8	BF30-20-016F
20/40	30	17	.958	.802	30	3/4	2 1/4	5/8	BF30-20-017Y
20/40	30	18	1.004	.850	40	3/4	2 1/2	5/8	BF30-20-018
20/40	30	19	1.055	.900	40	1	3 1/4	3/4	BF30-20-019
20/40	30	20	1.105	.952	35	3/4	2-7/8	3/4	BF30-20-020
20/40	30	21	1.155	1.000	38	3/4	2	3/4	BF30-20-021
20/40	30	22	1.205	1.050	39	3/4	2 1/2	1	BF30-20-022
20/40	30	24	1.302	1.150	38	3/4	2 1/2	1	BF30-20-024
20/40	30	28	1.502	1.350	38	3/4	2 1/2	1 1/4	BF30-20-028
20/40	30	30	1.592	1.452	28	1/2	1-1/2	1	BF30-20-030
24/48	30	8	.418	.300	25	1/2	1 1/4	3/8	BF30-24-008E
24/48	30	11	.546	.418	28	5/8	1-5/8	3/8	BF30-24-011
24/48	30	14	.671	.541	31	3/4	2 1/4	1/2	BF30-24-014
24/48	30	15	.713	.584	35	5/8	1-5/8	1/2	BF30-24-015
24/48	30	16	.758	.627	27	1/2	1 3/8	1/2	BF30-24-016F
24/48	30	17	.796	.667	36	3/4	2 1/2	5/8	BF30-24-017
24/48	30	18	.842	.711	28	1/2	1 3/4	5/8	BF30-24-018F
24/48	30	19	.884	.752	36	1/2	1 3/4	3/4	BF30-24-019F
24/48	30	20	.921	.792	23	1/2	1 1/8	3/4	BF30-24-020
24/48	30	22	1.005	.875	34	3/4	2 1/2	3/4	BF30-24-022



*Approximate overall length of broach listed

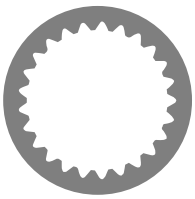
BF30 Series

DP Fillet Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1

Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
24/48	30	23	1.050	.917	32	3/4	2 1/2	3/4	BF30-24-023
24/48	30	24	1.083	.961	32	3/4	2 1/2	3/4	BF30-24-024
24/48	30	26	1.078	.967	31	3/4	2 1/2	1	BF30-24-026
24/48	30	27	1.215	1.084	42	3/4	3	1	BF30-24-027
24/48	30	28	1.255	1.125	36	3/4	3	1	BF30-24-028
24/48	30	30	1.339	1.209	31	1/2	1 3/4	1	BF30-24-030
24/48	30	35	1.550	1.416	32	3/4	2 1/2	1 1/4	BF30-24-035
24/48	30	36	1.578	1.407	32	3/4	2 1/2	1 1/4	BF30-24-036
32/64	30	9	.349	.255	27	1/2	1 3/8	1/4	BF30-32-009
32/64	30	10	.380	.283	24	1/2	1 1/4	Pin Type	BF30-32-010Y
32/64	30	11	.411	.315	25	1/2	1 1/2	5/16	BF30-32-011
32/64	30	12	.447	.346	27	1/2	1 5/8	5/16	BF30-32-012F
32/64	30	13	.469	.375	26	1/2	1 5/8	3/8	BF30-32-013
32/64	30	15	.537	.438	30	1/2	1 3/4	3/8	BF30-32-015
32/64	30	16	.572	.470	29	1/2	2	7/16	BF30-32-016
32/64	30	17	.595	.502	25	1/2	1 5/8	3/8	BF30-32-017
32/64	30	18	.634	.530	26	1/2	1 5/8	7/16	BF30-32-018Y
32/64	30	19	.662	.563	27	1/2	2	1/2	BF30-32-019
32/64	30	20	.695	.594	32	1/2	2	1/2	BF30-32-020
32/64	30	22	.760	.657	35	3/4	2 1/2	5/8	BF30-32-022
32/64	30	23	.792	.689	29	1/2	2	5/8	BF30-32-023S
32/64	30	24	.821	.719	32	3/4	2 1/2	5/8	BF30-32-024
32/64	30	25	.848	.750	26	1/2	1 5/8	3/4	BF30-32-025
32/64	30	28	.950	.844	24	1/2	1 3/4	3/4	BF30-32-028
40/80	30	19	.525	.449	18	1/2	1 3/4	7/16	BF30-40-019
40/80	30	24	.657	.576	21	1/4	3/4	1/2	BF30-40-024
40/80	30	32	.856	.774	22	1/2	2	3/4	BF30-40-032
40/80	30	39	1.030	.950	21	1/2	2	3/4	BF30-40-039
48/96	30	11	.274	.212	23	1/2	1 5/8	Pin Type	BF30-48-011Z
48/96	30	12	.298	.232	17	1/2	1 1/2	3/16	BF30-48-012
48/96	30	13	.323	.253	19	1/4	1 1/4	1/2	BF30-48-013E
48/96	30	18	.420	.349	25	1/2	1 1/2	5/16	BF30-48-018

*Approximate overall length of broach listed

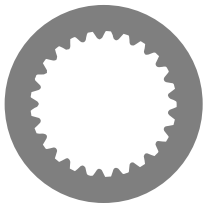


BR30 Series

DP Flat Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1

Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
8/16	30	8	1.169	.875	49	3/4	2	3/4	BR30-8-008E
8/16	30	9	1.294	1.000	45	3/4	2	1	BR30-8-009
8/16	30	10	1.423	1.138	60	3/4	2 3/4	1	BR30-8-010
8/16	30	12	1.673	1.383	57	3/4	2 1/2	1	BR30-8-012
8/16	30	13	1.793	1.506	57	3/4	2 1/2	1 1/2	BR30-8-013
8/16	30	14	1.981	1.628	57	3/4	2 1/2	1 1/2	BR30-8-014
8/16	30	15	2.048	1.753	54	3/4	2 1/2	1 1/2	BR30-8-015
8/16	30	16	2.169	1.876	55	3/4	2 1/2	1 3/4	BR30-8-016
10/20	30	10	1.138	.913	52	3/4	2	7/8	BR30-10-010G
10/20	30	11	1.238	1.008	40	3/4	2	7/8	BR30-10-011E
10/20	30	12	1.339	1.105	50	3/4	2-1/2	1	BR30-10-012
10/20	30	13	1.435	1.205	43	3/4	2-1/2	1	BR30-10-013
10/20	30	14	1.536	1.300	49	3/4	2-1/2	1	BR30-10-014
10/20	30	18	1.937	1.699	42	3/4	2-1/2	1 1/2	BR30-10-018
12/24	30	7	.700	.520	34	3/4	2	1/2	BR30-12-007
12/24	30	10	.947	.759	34	5/8	1 3/4	5/8	BR30-12-010
12/24	30	11	1.033	.841	34	3/4	2	3/4	BR30-12-011
12/24	30	12	1.116	.922	38	3/4	2 1/4	3/4	BR30-12-012
12/24	30	13	1.200	1.006	51	3/4	2 1/4	7/8	BR30-12-013F
12/24	30	14	1.283	1.087	50	3/4	2 3/4	1	BR30-12-014
12/24	30	14	1.283	1.087	36	5/8	1 3/8	1	BR30-12-014S
12/24	30	15	1.366	1.170	50	3/4	3	1	BR30-12-015
12/24	30	16	1.450	1.250	40	3/4	3	1 1/4	BR30-12-016S
12/24	30	17	1.533	1.334	54	3/4	3	1 1/4	BR30-12-017
12/24	30	18	1.617	1.417	44	3/4	2 1/2	1 3/8	BR30-12-018
12/24	30	19	1.696	1.500	34	3/4	2 1/4	1 1/4	BR30-12-019
12/24	30	20	1.782	1.584	46	3/4	2 1/4	1 1/2	BR30-12-020
12/24	30	21	1.866	1.668	48	3/4	2 1/2	1 1/2	BR30-12-021E
12/24	30	22	1.950	1.750	38	3/4	2	1 1/2	BR30-12-022
12/24	30	23	2.032	1.834	40	3/4	2 5/8	1 1/2	BR30-12-023
12/24	30	24	2.117	1.917	51	1	3 1/4	1 1/2	BR30-12-024
12/24	30	25	2.200	2.000	37	5/8	1 3/4	1 3/4	BR30-12-025
12/24	30	29	2.533	2.334	46	3/4	2	2	BR30-12-029
16/32	30	7	.526	.393	28	1/2	1-1/2	3/8	BR30-007
16/32	30	8	.588	.449	32	1/2	1-1/2	3/8	BR30-008
16/32	30	9	.651	.509	36	5/8	1-5/8	1/2	BR30-009
16/32	30	9	.650	.509	36	3/4	2	1/2	BR30-009L
16/32	30	10	.713	.569	39	5/8	1-5/8	1/2	BR30-010
16/32	30	10	.712	.572	36	5/8	1-7/8	Key Type	BR30-010E
16/32	30	11	.776	.631	36	5/8	1-7/8	1/2	BR30-011
16/32	30	12	.838	.692	39	1/2	1-1/2	5/8	BR30-012
16/32	30	13	.901	.754	39	5/8	1-5/8	3/4	BR30-013
16/32	30	14	.963	.814	43	3/4	2 7/8	3/4	BR30-014
16/32	30	14	.963	.815	35	1/2	2	3/4	BR30-014S
16/32	30	15	1.026	.877	33	3/4	2	3/4	BR30-015
16/32	30	15	1.026	.877	35	3/4	2-1/2	3/4	BR30-015S
16/32	30	16	1.088	.939	43	3/4	2 1/2	3/4	BR30-016
16/32	30	16	1.087	.941	47	3/4	3	3/4	BR30-016L
16/32	30	16	1.088	.939	30	1/2	2	3/4	BR30-016S
16/32	30	17	1.151	1.001	43	3/4	2	7/8	BR30-017



*Approximate overall length of broach listed

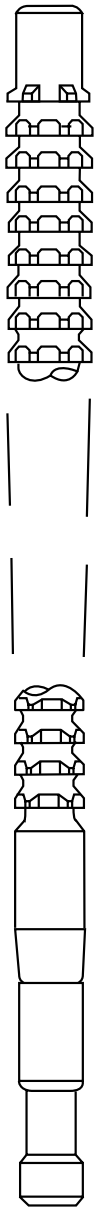
SERIES CONTINUED ON NEXT PAGE ->

BR30 Series

DP Flat Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1

Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
16/32	30	17	1.151	1.001	35	1/2	2	3/4	BR30-017S
16/32	30	18	1.213	1.063	43	3/4	2 1/2	3/4	BR30-018
16/32	30	18	1.213	1.063	35	1/2	2-1/2	3/4	BR30-018S
16/32	30	19	1.276	1.125	43	3/4	3	1	BR30-019
16/32	30	19	1.276	1.125	36	1/2	2-1/2	1	BR30-019S
16/32	30	20	1.338	1.188	43	3/4	3	1	BR30-020
16/32	30	20	1.338	1.188	35	1/2	2-1/2	1	BR30-020S
16/32	30	21	1.401	1.250	43	3/4	2 3/4	1	BR30-021
16/32	30	21	1.401	1.250	35	1/2	2	1	BR30-021S
16/32	30	22	1.463	1.313	43	3/4	3	1	BR30-022
16/32	30	22	1.463	1.313	35	1/2	2	1	BR30-022S
16/32	30	23	1.525	1.375	34	3/4	3	1 1/4	BR30-023L
16/32	30	23	1.526	1.375	35	1/2	2-1/2	1	BR30-023S
16/32	30	24	1.588	1.438	43	3/4	2 3/4	1	BR30-024
16/32	30	25	1.651	1.500	45	3/4	2 3/4	1-1/4	BR30-025
16/32	30	25	1.651	1.500	35	1/2	2	1-1/4	BR30-025S
16/32	30	26	1.713	1.563	45	3/4	3	1-1/4	BR30-026
16/32	30	27	1.772	1.625	36	1/2	2 1/4	1 1/2	BR30-027S
16/32	30	28	1.838	1.688	33	5/8	2 1/2	1 1/2	BR30-028
16/32	30	29	1.900	1.750	39	5/8	2 1/2	1 3/8	BR30-029S
16/32	30	30	1.963	1.813	33	5/8	2 1/2	1 1/2	BR30-030
16/32	30	31	2.026	1.875	33	5/8	2 1/2	1 1/2	BR30-031
20/40	30	7	.417	.318	25	1/2	1-1/2	5/16	BR30-20-007
20/40	30	9	.522	.408	26	1/2	1-1/2	3/8	BR30-20-009
20/40	30	9	.522	.408	38	5/8	2 1/2	3/8	BR30-20-009L
20/40	30	10	.572	.457	28	5/8	2 1/2	7/16	BR30-20-010
20/40	30	11	.622	.506	25	1/2	1-1/2	1/2	BR30-20-011E
20/40	30	12	.672	.554	32	1/2	2 1/2	1/2	BR30-20-012
20/40	30	13	.721	.602	31	5/8	2	1/2	BR30-20-013F
20/40	30	14	.770	.651	26	5/8	2	5/8	BR30-20-014
20/40	30	15	.821	.701	26	1/2	1 1/2	Key Type	BR30-20-015S
20/40	30	16	.872	.752	30	1/2	1 1/2	3/4	BR30-20-016
20/40	30	17	.918	.800	31	1/2	1 1/2	3/4	BR30-20-017
20/40	30	18	.972	.853	38	3/4	2 7/8	3/4	BR30-20-018
20/40	30	19	1.022	.902	32	3/4	2 7/8	3/4	BR30-20-019
20/40	30	20	1.072	.950	31	3/4	2 1/2	3/4	BR30-20-020
20/40	30	22	1.172	1.049	36	3/4	2 1/2	1	BR30-20-022S
20/40	30	24	1.271	1.149	30	5/8	2	7/8	BR30-20-024
20/40	30	25	1.321	1.200	30	3/4	2 1/2	1	BR30-20-025
20/40	30	26	1.372	1.251	35	3/4	2 1/2	1	BR30-20-026
24/48	30	10	.477	.380	29	5/8	2	3/8	BR30-24-010
24/48	30	11	.515	.421	28	5/8	2	3/8	BR30-24-011
24/48	30	12	.559	.462	23	5/8	2	3/8	BR30-24-012E
24/48	30	13	.601	.504	26	1/2	1 1/2	1/2	BR30-24-013F
24/48	30	14	.639	.544	29	5/8	2	1/2	BR30-24-014
24/48	30	15	.684	.582	25	5/8	1 3/4	1/2	BR30-24-015F
24/48	30	17	.769	.668	23	5/8	1 3/4	5/8	BR30-24-017
24/48	30	18	.810	.709	20	5/8	1 3/4	5/8	BR30-24-018
24/48	30	19	.852	.751	23	5/8	1-7/8	5/8	BR30-24-019S
24/48	30	20	.894	.790	23	5/8	1-7/8	5/8	BR30-24-020



*Approximate overall length of broach listed

BR30 Series

DP Flat Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1

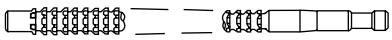
Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
24/48	30	21	.934	.834	30	3/4	2 3/8	5/8	BR30-24-021E
24/48	30	23	1.019	.916	27	5/8	1 3/4	3/4	BR30-24-023
24/48	30	24	1.060	.959	30	5/8	2	7/8	BR30-24-024
24/48	30	25	1.101	1.001	23	5/8	1 5/8	3/4	BR30-24-025S
24/48	30	26	1.143	1.041	28	3/4	2 3/8	3/4	BR30-24-026
24/48	30	27	1.185	1.084	35	3/4	2 1/2	1	BR30-24-027
32/64	30	11	.386	.313	24	1/2	1 1/2	5/16	BR30-32-011
32/64	30	12	.420	.346	24	1/2	1 1/2	5/16	BR30-32-012
32/64	30	13	.451	.377	21	5/8	1 3/8	3/8	BR30-32-013F
32/64	30	14	.480	.400	27	5/8	2	3/8	BR30-32-014
32/64	30	15	.515	.439	27	5/8	2	7/16	BR30-32-015
32/64	30	16	.546	.467	21	1/2	1 1/4	7/16	BR30-32-016
32/64	30	17	.577	.501	26	5/8	1 3/4	1/2	BR30-32-017
32/64	30	18	.609	.532	28	5/8	2	1/2	BR30-32-018
32/64	30	19	.633	.563	26	5/8	1 1/2	1/2	BR30-32-019E
32/64	30	20	.667	.594	25	5/8	1 1/2	5/8	BR30-32-019E
32/64	30	24	.796	.719	28	5/8	1 3/4	5/8	BR30-32-024
32/64	30	32	1.039	.969	25	5/8	1 3/4	3/4	BR30-32-032S

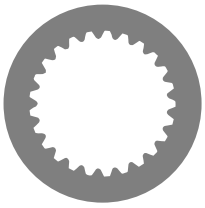
*Approximate overall length of broach listed

BJ30 Series

DP Flat Root

Involute Spline
Pull Broach
Class 5 Fit
ANSI B92.1





Pitch	PA°	No. Teeth	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
						Min.	Max.		
8/16	30	9	1.250	1.017	45	3/4	2	1	BJ30-8-009
8/16	30	14	1.876	1.625	48	3/4	3	1 1/2	BJ30-8-014
10/20	30	13	1.405	1.200	39	3/4	2-1/2	1	BJ30-10-013
12/24	30	17	1.500	1.335	44	3/4	2-1/2	1 1/4	BJ30-12-017
12/24	30	27	2.338	1.335	36	1/2	1	2	BJ30-12-027
16/32	30	8	.563	.449	23	1/2	1-1/2	3/8	BJ30-008
16/32	30	9	.625	.509	32	5/8	1-5/8	1/2	BJ30-009
16/32	30	10	.689	.570	34	5/8	1-5/8	1/2	BJ30-010
16/32	30	11	.751	.632	36	5/8	1-7/8	1/2	BJ30-011
16/32	30	12	.813	.692	36	5/8	1-7/8	5/8	BJ30-012
16/32	30	12	.813	.692	28	1/2	1 3/4	5/8	BJ30-012S
16/32	30	13	.876	.754	35	3/4	2-1/2	3/4	BJ30-013
16/32	30	14	.938	.815	31	3/4	2-1/2	3/4	BJ30-014
16/32	30	15	1.001	.877	35	3/4	2 1/4	3/4	BJ30-015
16/32	30	17	1.126	1.001	42	3/4	3	3/4	BJ30-017
16/32	30	18	1.188	1.063	42	3/4	3	3/4	BJ30-018
16/32	30	19	1.251	1.125	42	3/4	2 3/4	1	BJ30-019
16/32	30	19	1.251	1.130	50	3/4	3	1	BJ30-019E
16/32	30	21	1.377	1.250	43	3/4	2 3/4	1	BJ30-021
16/32	30	21	1.377	1.250	34	5/8	2-1/2	1	BJ30-021S
16/32	30	23	1.501	1.375	31	1/2	2-1/2	1	BJ30-023S
16/32	30	24	1.563	1.438	43	3/4	2-1/2	1	BJ30-024
16/32	30	25	1.636	1.500	33	3/4	2 5/8	1	BJ30-025E

*Approximate overall length of broach listed

BDN82 & BDN80 Series

Module DIN
Involute Spline
Pull Broach

Module	PA°	No. Teeth	Standard	Major	Minor	Overall Length	Length of Cut		Auto Puller	Series
							Min.	Max.		
1.60	30	9	5482	17	14	24	5/8	1 1/8	1/2	BDN82-17-14
1.75	30	18	5482	35	31	42	3/4	2 1/2	1	BDN82-35-31
1.90	30	20	5482	40	36	48	1	3	1 3/8	BDN82-40-36
2.00	30	28	5480	80	60	40	5/8	2 3/4	1 1/2	BDN80-60-56

*Approximate overall length of broach listed

BSS6 Series

6 Parallel Spline

Pull Broach

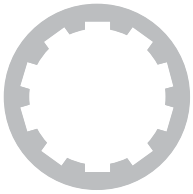
Part				Broach			
Outside Dia.	Fit	Root Dia.	Key	Approx. Pitch	Overall Length	Auto Puller	Series
.501	C	.397	.125	3/8	24	3/8	BSS6-050C
.625	A	.563	.156	3/8	24	1/2	BSS6-062A
.625	B	.531	.156	3/8	26	1/2	BSS6-062B
.625	C	.500	.156	3/8	26	1/2	BSS6-062C
.750	A	.675	.188	7/16	26	5/8	BSS6-075A
.750	B	.638	.188	7/16	29	5/8	BSS6-075B
.750	C	.600	.188	7/16	31	1/2	BSS6-075C
.875	A	.788	.219	7/16	29	1/2	BSS6-087A
.875	B	.744	.219	7/16	32	1/2	BSS6-087B
.875	C	.700	.219	7/16	32	1/2	BSS6-087C
1.000	A	.900	.250	1/2	34	3/4	BSS6-100A
1.000	B	.850	.250	1/2	38	3/4	BSS6-100B
1.000	C	.800	.250	1/2	38	3/4	BSS6-100C
1.125	A	1.013	.281	1/2	34	3/4	BSS6-112A
1.125	B	.956	.281	1/2	38	3/4	BSS6-112B
1.125	C	.900	.281	1/2	38	3/4	BSS6-112C
1.250	B	1.063	.313	5/8	48	7/8	BSS6-125B
1.250	C	1.000	.313	5/8	48	Key Type	BSS6-125C
1.375	A	1.238	.344	5/8	43	1	BSS6-137A
1.375	B	1.169	.344	5/8	48	1	BSS6-137B
1.375	C	1.000	.344	5/8	48	3/4	BSS6-137C
1.500	A	1.350	.375	3/4	50	1	BSS6-150A
1.500	B	1.275	.375	3/4	56	1	BSS6-150B
1.500	C	1.200	.375	3/4	56	Key Type	BSS6-150C
1.625	B	1.381	.406	3/4	56	1 1/4	BSS6-162B
1.625	C	1.300	.406	3/4	56	1 1/4	BSS6-162C
1.750	A	1.575	.438	3/4	51	1-3/8	BSS6-175A
1.750	B	1.488	.438	3/4	58	1-3/8	BSS6-175B
1.750	C	1.400	.438	9/16	58	1 1/4	BSS6-175C
2.000	A	1.800	.500	3/4	52	1-1/2	BSS6-200A
2.000	B	1.700	.500	3/4	60	1-1/2	BSS6-200B
2.000	C	1.600	.500	9/16	60	1-1/2	BSS6-200C

*Approximate overall length of broach listed

BSS10 Series

10 Parallel Spline

Pull Broach



Part				Broach			Series
Outside Dia.	Fit	Root Dia.	Key	Approx. Pitch	Overall Length	Auto Puller	
.750	B	.639	.117	7/16	31	1/2	BSS10-075B
.750	C	.608	.117	7/16	29	1/2	BSS10-075C
.875	A	.796	.137	3/8	30	3/4	BSS10-087A
.875	B	.753	.137	1/2	28	3/4	BSS10-087B
.875	C	.709	.137	7/16	32	5/8	BSS10-087C
1.000	A	.910	.156	1/2	34	3/4	BSS10-100A
1.000	B	.860	.156	1/2	34	3/4	BSS10-100B
1.000	C	.810	.156	1/2	38	5/8	BSS10-100C
1.125	A	1.024	.176	1/2	34	1	BSS10-112A
1.125	B	.968	.176	1/2	38	Key Type	BSS10-112B
1.125	C	.911	.176	1/2	38	Key Type	BSS10-112C
1.250	B	1.075	.195	1/2	43	3/4	BSS10-125B
1.250	C	1.013	.195	5/8	48	Key Type	BSS10-125C
1.375	A	1.251	.215	5/8	43	1	BSS10-137A
1.375	B	1.183	.215	5/8	48	1	BSS10-137B
1.375	C	1.114	.215	5/8	48	Key Type	BSS10-137C
1.500	A	1.365	.234	3/4	49	1	BSS10-150A
1.500	B	1.290	.234	3/4	56	1 1/4	BSS10-150B
1.500	C	1.215	.234	5/8	56	1	BSS10-150C
1.625	A	1.479	.254	3/4	50	1	BSS10-162A
1.625	B	1.398	.254	3/4	56	1 1/4	BSS10-162B
1.625	C	1.316	.254	3/4	67	1 1/4	BSS10-162CE
1.750	A	1.593	.273	3/4	52	1-3/8	BSS10-175A
1.750	B	1.505	.273	3/4	58	1-3/8	BSS10-175B
1.750	C	1.418	.273	9/16	58	1-3/8	BSS10-175C
1.875	B	1.613	.273	3/4	60	1 1/2	BSS10-187B
2.000	A	1.819	.309	5/8	52	1-5/8	BSS10-200A
2.000	B	1.719	.312	1/2	60	1-5/8	BSS10-200B
2.000	C	1.620	.312	9/16	60	1-1/2	BSS10-200C
2.250	B	1.935	.351	5/8	64	1 3/4	BSS10-225B
2.500	B	2.150	.390	5/8	68	1-1/2	BSS10-250B
2.500	C	2.025	.390	9/16	72	1-1/2	BSS10-250C

*Approximate overall length of broach listed

BSM4 Series

4 Parallel Spline

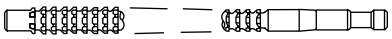
Metric Pull Broach

DIN 5463/ UNI 221

Cuts splines only

Part			Broach			Series
Outside Dia. (mm)	Root Dia. (mm)	Key (mm)	Approx. Pitch	Overall Length	Auto Puller	
14	11	4	.500	36	3/8	BSM4-14-11
16	13	5	.500	36	1/2	BSM4-16-13
20	16	6	.500	36	1/2	BSM4-20-16

*Approximate overall length of broach listed



Part			Broach			
Major Dia. (mm)	Minor Dia. (mm)	Key (mm)	Pitch	Overall Length	Auto Puller	Series
DIN5462/UNI 220						
26	23	6	.500	36	3/4	BSM6-26-23
30	26	6	.500	44	3/4	BSM6-30-26
32	28	7	.500	44	1-1/4	BSM6-32-28
DIN5463/UNI 221						
14	11	3	.500	36	3/8	BSM6-14-11
16	13	3.5	.500	36	1/2	BSM6-16-13
20	16	4	.500	36	5/8	BSM6-20-16
22	18	5	.500	36	5/8	BSM6-22-18
25	21	5	.500	36	3/4	BSM6-25-21
28	23	6	.500	44	3/4	BSM6-28-23
32	26	6	.500	44	3/4	BSM6-32-26
34	28	7	.500	44	1	BSM6-34-28
42	36	8	.420	44	1	BSM6-42-36

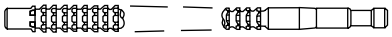
*Approximate overall length of broach listed

BSM6 Series

6 Parallel Spline

Metric Pull Broach

Cuts splines only



Part			Broach			Series
Major Dia. (mm)	Minor Dia. (mm)	Key (mm)	Pitch	Overall Length	Auto Puller	
DIN5462/UNI 220						
36	32	6	.625	44	1	BSM8-36-32
40	36	7	.625	44	1-1/4	BSM8-40-36
46	42	8	.625	53	1-1/2	BSM8-46-42
50	46	9	.625	53	1-1/2	BSM8-50-46
58	52	10	.625	54	1-3/4	BSM8-58-52
62	56	10	.625	54	1-3/4	BSM8-62-56
DIN5463/UNI 221						
38	32	6	.625	53	1-1/4	BSM8-38-32
42	36	7	.625	53	1-1/4	BSM8-42-36
48	42	8	.625	53	1-1/2	BSM8-48-42
54	46	9	.625	53	1-3/4	BSM8-54-46
60	52	10	.625	60	1-3/4	BSM8-60-52
65	56	10	.625	60	2	BSM8-65-56

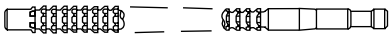
*Approximate overall length of broach listed

BSM8 Series

8 Parallel Spline

Metric Pull Broach

Cuts splines only



BSA36 Series

36 SAE 45° Serrations

Pull Broach

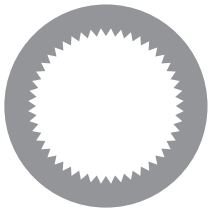
Outside Dia.	# Of Serrations	Max. Length of Cut	Overall Length	Auto Puller	Series
1/4	36	7/8	13	Pin Type	BSA36-250
5/16	36	7/8	16	1/4	BSA36-312
3/8	36	1	18	5/16	BSA36-375
1/2	36	1.5	22	3/8	BSA36-500
5/8	36	1.5	22	1/2	BSA36-625
3/4	36	1	22	5/8	BSA36-750
1	36	1 7/8	26	3/4	BSA36-100

*Approximate overall length of broach listed

BSA48 Series

48 SAE 45° Serrations

Pull Broach



Outside Dia.	# Of Serrations	Max. Length of Cut	Overall Length	Auto Puller	Series
3/4	48	1-3/8	19	5/8	BSA48-750
7/8	48	1-1/4	19	3/4	BSA48-875S
1	48	1.5	26	7/8	BSA48-100
1-1/8	48	1.5	26	1	BSA48-112
1-1/4	48	1	24	1	BSA48-125S
1-3/8	48	1	18	1-1/4	BSA48-137S
1-1/2	48	2	32	1-1/4	BSA48-150

*Approximate overall length of broach listed

BDN81 Series

DIN 5481

Serration Pull Broach

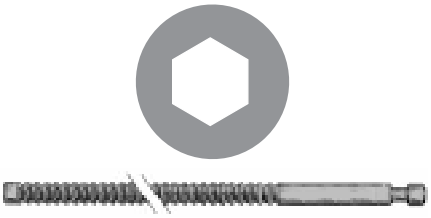
Major (mm)	Minor (mm)	# Of Serrations	Max. Length of Cut	Overall Length	Auto Puller Dia.	Series
10	8	28	1-3/8	20	3/8	BDN81-10-8
20	17	33	1-1/4	22	3/4	BDN81-20-17

Length of cut is predicated on mild steel, Broach cuts splines only

*Approximate overall length of broach listed

BHX Series

Hexagon Inch
Pull Broach

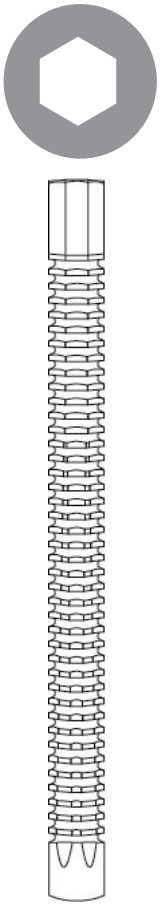


Hex	Dec. Dim	Pitch	Overall Length	Length of Cut		Auto Puller Dia.	Series
				Min.	Max.		
1/4	.251	1/4	16	.28	1.00	1/4	BHX-250
5/16	.314	1/4	17	.28	1.00	1/4	BHX-312
3/8	.376	1/4	18	.28	1.00	5/16	BHX-375
7/16	.439	9/32	19	.32	1.00	3/8	BHX-437
1/2	.502	5/16	21	.40	1.50	3/8	BHX-500
9/16	.564	11/32	22	.38	1.37	1/2	BHX-562
5/8	.627	3/8	25	.40	1.50	1/2	BHX-625
3/4	.752	7/16	28	.45	1.75	5/8	BHX-750
7/8	.877	1/2	34	.54	2.00	3/4	BHX-875
1	1.002	9/16	37	.58	3.00	7/8	BHX-100
1-1/8	1.127	9/16	40	.58	3.00	1	BHX-112
1-1/4	1.252	5/8	47	.68	4.00	1	BHX-125
1-3/8	1.378	1/2	47	.54	2.75	1	BHX-137
1-1/2	1.503	9/16	54	.60	3.00	1-1/4	BHX-150

*Approximate overall length of broach listed

PHX Series

Hexagon Inch
Push Broach



Hex	Dec. Dim. (max)	Pilot Size	Overall Length	Length of Cut		Series
				Min.	Max.	
1/8	.126	.125	4-5/8	3/16	3/8	PHX-125
5/32	.157	.156	5-1/2	1/4	1/2	PHX-156
3/16	.189	.187	5-9/16	1/4	5/8	PHX-187
7/32	.220	.218	6	1/4	3/4	PHX-218
1/4	.252	.250	6-1/2	1/4	3/4	PHX-250
9/32	.283	.281	7-3/4	3/8	1	PHX-281
5/16	.314	.312	8-1/4	3/8	1	PHX-312
11/32	.345	.343	8-1/2	3/8	1	PHX-343
3/8	.377	.375	9	3/8	1-1/4	PHX-375
13/32	.408	.406	10	1/2	1-3/8	PHX-406
7/16	.440	.437	10-3/4	1/2	1-3/8	PHX-437
15/32	.470	.468	11-1/4	1/2	1-3/8	PHX-468
1/2	.502	.500	12-1/2	1/2	1-3/8	PHX-500
9/16	.564	.562	14-1/4	1/2	1-1/2	PHX-562
5/8	.627	.625	16-7/8	5/8	1-5/8	PHX-625
11/16	.689	.687	17	5/8	1-5/8	PHX-687
3/4	.752	.750	17-7/8	5/8	1-5/8	PHX-750
7/8	.877	.875	18-7/8	5/8	1-5/8	PHX-875
1	1.003	1.000	19-7/8	5/8	1-5/8	PHX-100

Length of cut is predicated on mild steel, Broach cuts splines only

*Approximate overall length of broach listed

BHXM Series

Hexagon Metric
Pull Broach

Hex (mm)	Dec. Dim.	Pitch	Overall Length	Length of Cut		Auto Puller Dia.	Series
				Min.	Max.		
6	.238	1/4	17	1/3	1	3/16	BHXM-600
7	.277	1/4	17	1/3	1	3/16	BXHM-700
8	.317	1/4	17	1/3	1	1/4	BXHM-800
10	.395	1/4	19	1/3	1	3/8	BXHM-010
12	.474	1/4	20	1/3	1-1/4	3/8	BXHM-012
14	.554	11/32	22	3/8	1-3/8	1/2	BXHM-014
16	.633	3/8	25	1/2	1-5/8	5/8	BXHM-016
18	.711	7/16	27	1/2	1-3/4	5/8	BXHM-018
20	.790	7/16	31	1/2	1-3/4	3/4	BXHM-020
22	.870	1/2	34	5/8	2	3/4	BXHM-022
24	.947	9/16	37	5/8	2-1/2	3/4	BXHM-024
25	.987	5/8	38	2/3	3	7/8	BXHM-025

*Approximate overall length of broach listed

PHXM Series

Hexagon Metric
Push Broach

Hex (mm)	Dec. Dim. (Max.)	Diag. Dim. (Max.)	Pilot Dia.	Overall Length	Length of Cut		Series
					Min.	Max.	
4	.159	.183	.158	5-1/2	1/4	1/2	PHXM-400
5	.198	.228	.197	6	1/4	3/4	PHXM-500
6	.238	.274	.236	6-1/2	1/4	3/4	PHXM-600
7	.277	.319	.276	7-3/4	3/8	1	PHXM-700
8	.317	.364	.315	8-1/4	3/8	1	PHXM-800
10	.395	.455	.394	10	3/8	1-3/8	PHXM-010
12	.474	.546	.472	12-3/8	5/8	1-5/8	PHXM-012
14	.553	.634	.551	14-1/4	1/2	1-1/2	PHXM-014
16	.631	.726	.629	16-7/8	1/2	1-1/2	PHXM-016
20	.789	.906	.787	17-7/8	5/8	1-5/8	PHXM-020
24	.946	1.087	.944	19-7/8	5/8	1-5/8	PHXM-024

*Approximate overall length of broach listed

PSQQ Series

Full Square
Push Broach

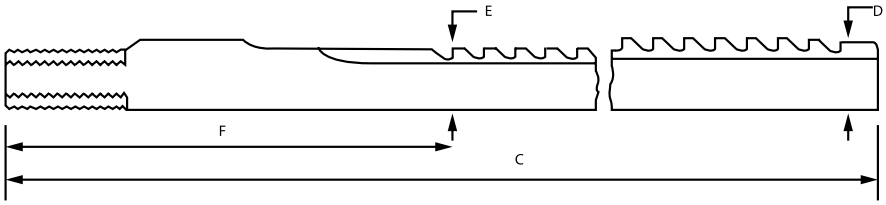
Size Sq.	Dec. Dim. (max)	Diag. Dim. (min)	Pilot Size	Overall Length	Length of Cut		Series
					Min.	Max.	
3/16	.189	.263	.187	6-1/4	3/16	1/2	PSQQ-187
1/4	.252	.351	.249	8-5/8	1/4	3/4	PSQQ-250
5/16	.314	.438	.312	10-1/4	1/4	3/4	PSQQ-312
3/8	.377	.525	.375	12-1/4	3/8	1	PSQQ-375
1/2	.502	.699	.500	14-7/16	3/8	1	PSQQ-500

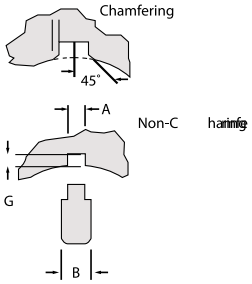
*Approximate overall length of broach listed

BRK, BRKC & BRKN Series

Keyway Pull Broach

Threaded Puller

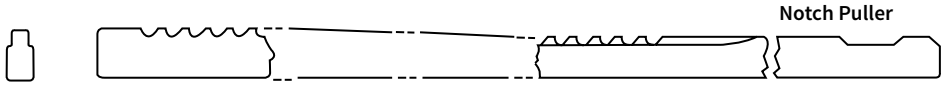




A		Min. Hole Size	Length of Cut		Body B	Overall Length C	Last Tooth D	First Tooth E	Tang F	Depth G	# of Cuts	Puller Thread Size	Non Chamfering Series	Chamfering Series	Notch Puller Non-Chamfering
Nom. Key	Dec. Key		Min.	Max.											
1/16	.064	3/8	3/8	1-1/4	.155	20	.313	.271	7-3/16	.042	1	1/4-20	BRK-501	BRKC-501	-
3/32	.095	7/16	1/2	1-1/2	.187	24	.367	.309	8-1/4	.058	1	5/16-18	BRK-502	BRKC-502	-
3/32	.095	5/8	5/8	2-1/2	.249	33	.491	.433	10	.058	1	3/8-16	BRK-503	BRKC-503	BRKN-503
1/8	.126	1/2	1/2	1-1/2	.249	30	.438	.364	9	.074	1	3/8-16	BRK-504	BRKC-504	BRKN-504
1/8	.126	11/16	5/8	2-1/2	.312	36	.594	.520	10	.074	1	1/2-13	BRK-505	BRKC-505	-
5/32	.157	19/32	1/2	1-1/2	.249	30	.525	.436	9	.089	1	3/8-16	BRK-506	BRKC-506	BRKN-506
5/32	.157	23/32	5/8	2-1/2	.312	33	.625	.536	10	.089	1	1/2-13	BRK-507	BRKC-507	-
3/16	.189	11/16	5/8	2-1/2	.374	36	.581	.476	10	.105	1	1/2-13	BRK-508	BRKC-508	BRKN-508
3/16	.189	15/16	11/16	3-1/2	.374	36	.796	.691	10-11/16	.105	1	1/2-13	BRK-509	BRKC-509	-
7/32	.220	11/16	5/8	2-1/2	.374	33	.557	.437	10	.120	1	1/2-13	BRK-510	BRKC-510	-
7/32	.220	15/16	11/16	3-1/2	.374	42	.813	.693	11-1/16	.120	1	1/2-13	BRK-511	BRKC-511	-
1/4	.251	3/4	5/8	2-1/2	.374	36	.612	.476	10	.136	1	1/2-13	BRK-512	BRKC-512	BRKN-512
1/4	.251	1	11/16	4	.499	45	.877	.741	11-13/16	.136	1	5/8-11	BRK-513	BRKC-513	BRKN-513
1/4	.251	1-3/8	7/8	6	.624	51	1.250	1.114	13-1/2	.136	1	3/4-10	BRK-514	BRKC-514	-
9/32	.283	7/8	11/16	4	.499	42	.716	.564	11-5/8	.152	1	5/8-11	BRK-515	BRKC-515	-
9/32	.283	1-1/4	7/8	6	.499	51	1.093	.941	13-1/2	.152	1	5/8-11	BRK-516	BRKC-516	-
5/16	.314	1-1/16	11/16	4	.499	45	.908	.741	11-13/16	.167	1	5/8-11	BRK-517	BRKC-517	BRKN-517
5/16	.314	1-5/16	7/8	6	.499	51	1.158	.991	13-1/2	.167	1	5/8-11	BRK-518	BRKC-518	-
3/8	.377	1-1/16	11/16	4	.499	45	.938	.739	11-13/16	.199	1	5/8-11	BRK-519	BRKC-519	BRKN-519
3/8	.377	1-5/17	7/8	6	.499	54	1.189	.990	13-1/2	.199	1	5/8-11	BRK-520	BRKC-520	-
7/16	.439	1-9/16	11/16	4	.624	48	1.390	1.160	12	.230	1	3/4-10	BRK-521	BRKC-521	-
7/16	.439	1-3/4	1	8	.624	48	1.611	1.496	15-5/8	.230	2	3/4-10	BRK-522	BRKC-522	-
1/2	.502	1-1/2	11/16	4	.624	48	1.312	1.051	12	.261	1	3/4-10	BRK-523	BRKC-523	BRKN-523
1/2	.502	1-9/16	1	8	.624	48	1.377	1.246	16-1/2	.261	2	3/4-10	BRK-524	BRKC-524	-
9/16	.565	1-11/16	11/16	4	.687	54	1.438	1.146	11-13/16	.292	1	1-8	BRK-525	BRKC-525	-
9/16	.565	1-5/8	1	8	.687	51	1.391	1.245	16	.292	2	1-8	BRK-526	BRKC-526	-
9/16	.565	1-15/16	1-1/8	12	.874	60	1.641	1.495	20	.292	2	1-8	BRK-527	BRKC-527	-
5/8	.627	1-7/8	11/16	4	.749	60	1.625	1.301	12-3/16	.324	1	1-8	BRK-528	BRKC-528	BRKN-528
5/8	.627	1-15/16	1	8	.874	54	1.657	1.495	16-3/8	.324	2	1-8	BRK-529	BRKC-529	-
5/8	.627	1-15/16	1-1/8	12	.874	57	1.657	1.495	20	.324	2	1-8	BRK-530	BRKC-530	-
3/4	.752	1-15/16	11/16	4	.874	60	1.625	1.239	12-3/16	.386	1	1-8	BRK-531	BRKC-531	-
3/4	.752	2-1/16	1	8	.999	60	1.688	1.495	16-1/4	.386	2	1 1/4-7	BRK-532	BRKC-532	-
3/4	.752	2-1/16	1-1/8	12	.999	57	1.688	1.560	20	.386	3	1 1/4-7	BRK-533	BRKC-533	-
7/8	.877	2-1/4	11/16	4	1.124	63	1.875	1.426	12-3/8	.449	1	1 1/4-7	BRK-534	BRKC-534	-
7/8	.877	2-1/8	1	8	1.124	63	1.719	1.494	15-3/4	.499	2	1 1/4-7	BRK-535	BRKC-535	-
7/8	.877	2-1/8	1-1/8	12	1.124	63	1.719	1.569	20	.499	3	1 1/4-7	BRK-536	BRKC-536	-
1	1.002	2-1/4	5/8	2-1/2	1.249	63	1.750	1.239	10-1/2	.511	1	1 1/2-6	BRK-537	BRKC-537	-
1	1.002	2-1/4	7/8	6	1.249	63	1.750	1.494	14-1/4	.511	2	1 1/2-6	BRK-538	BRKC-538	-
1	1.002	2-1/4	1-1/8	12	1.249	60	1.750	1.580	20	.511	3	1 1/2-6	BRK-539	BRKC-539	-
1-1/4	1.254	2-3/4	1-1/4	6	1.374	69	2.375	2.166	14-1/4	.627	3	1 1/2-6	BRK-541	BRKC-541	-

*Approximate overall length of broach listed

Notch Puller



BRB Series

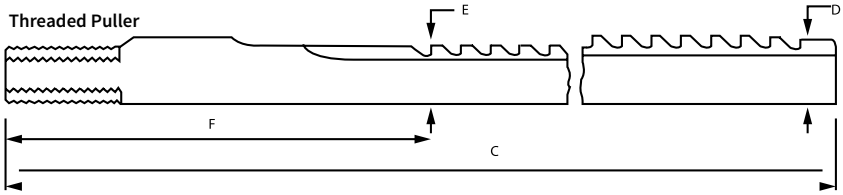
Round Body Key
Pull Type

A		Bore Size	Body B	Overall Length C	Last Tooth D	Auto Puller	Series
Nom. Key	Decimal Key						
1/8	.127	1/2	.499	21	.562	1/2	BRB-125-1
1/8	.127	9/16	.561	21	.626	1/2	BRB-125-2
3/16	.189	5/8	.623	26	.712	1/2	BRB-187-1
3/16	.189	11/16	.686	26	.775	1/2	BRB-187-2
3/16	.189	3/4	.748	26	.839	3/4	BRB-187-3
3/16	.189	13/16	.811	26	.901	3/4	BRB-187-4
3/16	.189	7/8	.873	26	.965	3/4	BRB-187-5
1/4	.251	1	.998	31	1.117	3/4	BRB-250-2
1/4	.251	1-1/16	1.061	31	1.179	3/4	BRB-250-3
1/4	.251	1-1/8	1.123	31	1.243	1	BRB-250-4
1/4	.251	1-3/16	1.185	31	1.306	1	BRB-250-5
1/4	.251	1-1/4	1.248	31	1.370	1	BRB-250-6

*Approximate overall length of broach listed

BMK Series

Keyway Metric
Pull Broach



A Key mm (Dec.)	Key Tol. mm	Min. Hole Size	Length of Cut		Body B	OAL C	Last Tooth D	First Tooth E	Tang F	Depth G	No. of Cuts	Thread Size Series	Series
			Min.	Max.									
2	-0.0002	0.354	3/8	1 1/4	.155	20	.313	.260	7-3/4	.053	1	1/4-20	BMK-200-20
3	-0.0002	0.433	1/2	1 1/2	.187	24	.367	.295	7-3/4	.072	1	5/16-18	BMK-300-24
4	-0.0003	0.512	1/2	1 1/2	.249	33	.438	.347	9	.091	1	3/8-16	BMK-400-33
4	-0.0003	0.512	3/8	2 1/2	.249	36	.436	.345	10	.091	1	3/8-16	BMK-400-36
5	-0.0003	0.551	9/16	1 3/4	.312	36	.436	.322	9-3/4	.114	1	1/2-13	BMK-500-36
5	-0.0003	0.551	3/8	3 1/2	.374	36	.797	.691	9-3/4	.106	1	1/2-13	BMK-500-36-91A
5	-0.0003	0.906	3/8	3	.374	42	.813	.699	11	.114	1	1/2-13	BMK-500-42
6	-0.0003	0.709	5/8	2 1/2	.374	36	.612	.471	10	.141	1	1/2-13	BMK-600-36
6	-0.0003	1.024	11/16	4	.499	45	.877	.736	12	.141	1	5/8-11	BMK-600-45
7	-0.0004	0.709	3/8	3	.374	36	.612	.476	10	.136	1	5/8-11	BMK-700-36
7	-0.0004	1.025	11/16	4	.499	45	.742	.742	12	.134	1	5/8-11	BMK-700-45
8	-0.0004	1.063	11/16	4	.499	45	.908	.739	12	.169	1	5/8-11	BMK-800-45
8	-0.0004	1.299	7/8	6	.499	51	1.158	.989	13-7/8	.169	1	5/8-11	BMK-800-51
10	-0.0004	1.063	11/16	4	.499	45	.916	.739	12	.177	1	5/8-11	BMK-010-45
10	-0.0004	1.417	7/8	6	.624	51	1.250	1.073	13-7/8	.177	1	3/4-10	BMK-010-51
10	-0.0004	1.417	7/8	6	.499	54	1.189	.990	13-7/8	.199	1	3/4-10	BMK-010-54-91
12	-0.0004	1.535	11/16	4	.624	48	1.341	1.160	11-7/8	.181	1	3/4-10	BMK-012-48
12	-0.0004	1.535	1	8	.624	48	1.611	1.496	11-7/8	.115	1	3/4-10	BMK-012-48-91
12	-0.0004	1.535	1	8	.624	60	1.341	1.160	16	.181	1	3/4-10	BMK-012-60
14	-0.0004	1.575	1	4	.686	51	1.391	1.245	11-5/8	.146	1	1-8	BMK-014-51-91

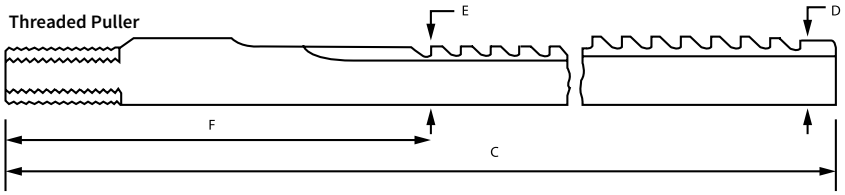
Length of cut is predicated on mild steel, Broach cuts splines only

*Approximate overall length of broach listed

SERIES CONTINUED ON NEXT PAGE ->

BMK Series

Keyway Metric
Pull Broach

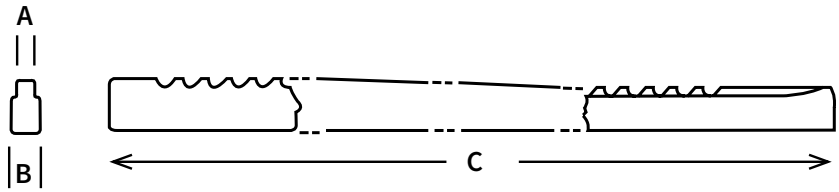


A Key mm (Dec.)	Key Tol. mm	Min. Hole Size	Length of Cut		Body B	OAL C	Last Tooth D	First Tooth E	Tang F	Depth G	No. of Cuts	Thread Size Series	Series
			Min.	Max.									
14	-0.0004	1.575	11/16	4	.687	54	1.354	1.146	11-5/8	.208	1	1-8	BMK-014-54
14	-0.0004	1.732	1	8	.749	60	1.509	1.301	15-3/4	.208	1	1-8	BMK-014-60
14	-0.0004	1.850	1	8	.874	60	1.641	1.495	15-3/4	.146	1	1-8	BMK-014-60-91
16	-0.0004	1.850	11/16	4	.749	60	1.625	1.396	12	.229	1	1-8	BMK-016-60
16	-0.0004	1.890	1-1/8	12	.874	60	1.625	1.510	20	.229	2	1-8	BMK-016-61
18	-0.0004	1.890	11/16	4	.874	60	1.625	1.388	12	.237	1	1-8	BMK-018-60
18	-0.0004	2.008	1-1/8	12	.999	60	1.688	1.569	20-3/16	.237	2	1-1/4-7	BMK-018-61
20	-0.0005	2.205	11/16	4	1.124	63	1.875	1.612	11-7/8	.263	1	1-1/4-7	BMK-020-63
20	-0.0005	2.087	1-1/8	12	1.124	63	1.719	1.587	19-13/16	.263	2	1-1/4-7	BMK-020-64
22	-0.0005	2.244	11/16	4	1.124	63	1.875	1.590	11-7/8	.285	1	1-1/4-7	BMK-022-63
25	-0.0005	2.205	11/16	4	1.249	63	1.750	1.456	10-5/8	.294	1	1-1/2-6	BMK-025-63

*Approximate overall length of broach listed

PMK Series

Keyway Metric
Push Broach

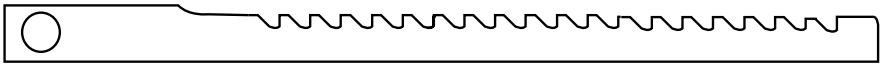


A		Max. Length of Cut	Body B	Overall Length C	# of Passes	Series
Key Nominal (mm)	Decimal Key					
2	.079	1	.129	5	1	PMK-AA02
3	.120	1-1/8	.129	5	1	PMK-AA03
4	.158	1-1/8	.250	6-3/4	1	PMK-BB04
5	.197	1-5/16	.250	6-3/4	2	PMK-BB05
6	.237	2-1/2	.385	12	2	PMK-C006
7	.276	2-1/2	.385	11-7/8	2	PMK-CC07
8	.315	2-1/2	.390	11-3/4	1	PMK-CC08
10	.395	6	.566	13-7/8	2	PMK-DD10
12	.473	6	.566	13-7/8	2	PMK-DD12
14	.552	6	.566	13-7/8	2	PMK-DD14
16	.631	6	.760	15-1/2	2	PMK-EE16
18	.710	6	.760	15-1/2	2	PMK-EE18
20	.788	6	1.015	19-1/2	2	PMK-FF20
22	.867	6	1.015	20-1/4	2	PMK-FF22
24	.945	6	1.015	20-1/4	2	PMK-FF24
25	.985	6	1.015	20-1/4	2	PMK-FF25

Length of cut is predicated on mild steel, Broach cuts splines only
*Approximate overall length of broach listed

BKY Series

Keyseating Inch Broach

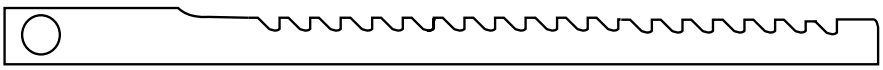


Broach Size	Keyway Width Tolerances	Width x Body	Length	Length of Cut		Series
				Min.	Max.	
3/32	.0937-.0947	3/16 X 3/8	16	5/8	1-7/8	BKY-702
1/8	.1252-.1262	3/16 X 7/8	16	5/8	1-7/8	BKY-703
5/32	.1564-.1574	3/16 X 1/2	16	5/8	1-7/8	BKY-704
3/16	.1877-.1887	3/16 X 9/16	16	5/8	1-7/8	BKY-705
3/16	.1877-.1887	3/16 X 3/4	20	5/8	3-1/8	BKY-706
1/4	.2502-.2512	1/4 X 3/4	16	5/8	1-5/8	BKY-707
1/4	.2502-.2512	1/4 X 3/4	20	5/8	3-1/8	BKY-708
5/16	.3127-.3137	5/16 X 7/8	16	1-1/16	3-3/16	BKY-709
5/16	.3127-.3137	5/16 X 7/8	20	1-1/16	5-3/16	BKY-710
3/8	.3755-.3765	3/8 X 7/8	16	1-1/16	3-3/16	BKY-711
3/8	.3755-.3765	3/8 X 7/8	20	1-1/16	5-5/16	BKY-712
7/16	.4380-.4390	7/16 X 1	16	1-1/16	3-3/16	BKY-713
7/16	.4380-.4390	7/16 X 1	20	1-1/16	5-3/16	BKY-714
1/2	.5006-.5016	1/2 X 1	20	1-1/16	5-3/16	BKY-715
9/16	.5630-.5640	9/16 X 1	20	1-1/16	5-3/16	BKY-716
5/8	.6260-.6270	5/8 X 1	20	1-1/16	5-3/16	BKY-717
3/4	.7515-.7525	3/4 X 1	20	1-1/16	5-3/16	BKY-718
7/8	.8765-.8775	7/8 X 1	20	1-1/16	5-3/16	BKY-719
1	1.0015-1.0025	1 X 1	20	1-1/16	5-3/16	BKY-720

*Approximate overall length of broach listed

BKYM Series

Keyseating Metric Broach



Broach Size (mm)	Keyway Width Tolerances	Width x Body	Overall Length	Length of Cut		Series
				Min.	Max.	
4	.1575-.1580	3/16”x1/2”	16	5/8	1-7/8	BKYM-416
5	.1968-.1973	5mm X 9/16”	16	5/8	1-7/8	BKYM-516
5	.1968-.1973	5mm X 3/4”	20	5/8	3-1/8	BKYM-520
6	.2362-.2367	6mm X 3/4”	16	5/8	1-7/8	BKYM-616
6	.2362-.2367	6mm X 3/4”	20	5/8	3-1/8	BKYM-620
8	.3150-.3155	8mm X 7/8”	16	1-1/16	3-3/16	BKYM-816
10	.3937-.3942	10mm X 7/8”	16	1-1/16	5-5/16	BKYM-116
10	.3927-.3942	10mm X 7/8”	20	1-1/16	5-5/16	BKYM-120
12	.4724-.4730	12mm X 1”	20	1-1/16	5-5/16	BKYM-012
14	.5512-.5519	14mm X 1”	20	1-1/16	5-5/16	BKYM-014
16	.6299-.6306	16mm X 1”	20	1-1/16	5-5/16	BKYM-016
18	.7087-.7093	18mm X 1”	20	1-1/16	5-5/16	BKYM-018
20	.7874-.7883	20mm X 1”	20	1-1/16	5-5/16	BKYM-020
22	.8661-.8669	22mm X 1”	20	1-1/16	5-5/16	BKYM-022
24	.9449-.9458	24mm X 1”	20	1-1/16	5-5/16	BKYM-024
25	.9843-.9853	25mm X 1”	20	1-1/16	5-5/16	BKYM-025

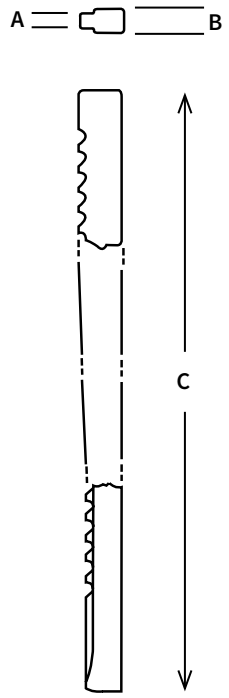
Length of cut is predicated on mild steel, Broach cuts splines only

*Approximate overall length of broach listed

PRK Series

Keyway Push Broach

A		Max. Length of Cut	Body	Length	# of Passes	Series
Nom. Key	Decimal Key					
1/16	.063	1-1/8	1/8	5	1	PRK-401
3/32	.094	1-1/8	1/8	5	1	PRK-402
3/32	.094	1-11/16	3/16	6-3/4	1	PRK-403
1/8	.126	1-1/8	1/8	5	1	PRK-404
1/8	.126	1-11/16	3/16	6-3/4	1	PRK-405
5/32	.157	1-11/16	3/16	6-3/4	1	PRK-406
3/16	.188	1-11/16	3/16	6-3/4	2	PRK-408
3/16	.188	2-1/2	3/8	11-3/4	2	PRK-409
1/4	.251	2-1/2	3/8	11-3/4	2	PRK-412
5/16	.313	2-1/2	3/8	11-3/4	2	PRK-417
5/16	.313	6	9/16	13-7/8	2	PRK-418
3/8	.376	2-1/2	3/8	11-3/4	2	PRK-419
3/8	.376	6	9/16	13-7/8	2	PRK-420
7/16	.439	6	9/16	13-7/8	1	PRK-421
1/2	.501	6	9/16	13-7/8	2	PRK-423
5/8	.627	6	3/4	15-1/2	2	PRK-428
3/4	.752	6	3/4	15-1/2	2	PRK-431
7/8	.877	6	1	20-1/4	2	PRK-434
1	1.002	6	1	20-1/4	2	PRK-437



Length of cut is predicated on mild steel, Broach cuts splines only
*Approximate overall length of broach listed

Broaching is a machining method in which a series of cutting teeth each remove a small portion of stock as they move past or through the work. It combines both roughing and finishing in one operation. The finished work can be held to very precise limits.

Broaching can be done on an internal or the surface of work. Internal broaching is used to finish holes, cut internal splines, or odd shaped holes. Surface broaching is used to produce finished surfaces to almost any contour and to cut external serrations, or slots.

Broaching is an economical finishing method for both high and low production jobs.
For finishing odd shaped holes there is often no economical alternative to broaching.

RECOMMENDED PITCH CHART
Based on Broach Tooth Data

PART WIDTH	PITCH	LAND	DEPTH	RADIUS
7/32	1/8	3/64	3/64	0.02
1/4	5/32	3/64	1/16	0.02
3/8	3/16	1/16	1/16	1/32
1/2	7/32	1/16	5/64	3/64
5/8	1/4	1/16	3/32	1/16
3/4	9/32	3/32	7/64	1/16
1	5/16	3/32	1/8	5/64
1-1/8	11/32	3/32	1/8	5/64
1-1/2	3/8	7/64	9/64	3/32
1-3/4 to 2	7/16	1/8	5/32	7/64
2-1/2	1/2	1/8	3/16	1/18
3	9/16	9/64	7/32	9/64
3-1/2	5/8	5/32	15/64	5/32
4-1/2	11/16	11/64	9/32	3/16
5	3/4	3/16	19/64	3/16
6	13/16	3/16	5/16	13/64
7	7/8	7/32	11/32	7/32
8	15/16	7/32	23/64	7/32
9	1	1/4	3/8	1/4

PSQ Series

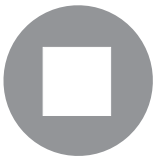
Square
Push Broach

Square	Dec. Dim. (max)	Diag. Dim. (min)	Pilot Size	Overall Length	Length of Cut		Series
					Min.	Max.	
1/8	.126	.177	.129	4-1/8	3/16	1/2	PSQ-125
3/16	.189	.264	.193	5-9/16	1/4	5/8	PSQ-187
1/4	.252	.352	.266	7	1/4	3/4	PSQ-250
9/32	.283	.395	.297	7-3/4	3/8	1	PSQ-281
5/16	.314	.439	.328	8-1/8	3/8	1	PSQ-312
11/32	.345	.483	.359	9-3/8	3/8	1-1/4	PSQ-343
3/8	.377	.525	.391	9-3/8	3/8	1-1/4	PSQ-375
13/32	.408	.570	.422	10-5/8	1/2	1-3/8	PSQ-406
7/16	.440	.613	.453	10-7/8	1/2	1-3/8	PSQ-437
15/32	.470	.658	.500	12	1/2	1-3/8	PSQ-468
1/2	.502	.699	.531	12	1/2	1-3/8	PSQ-500
9/16	.564	.788	.594	14-3/4	1/2	1-1/2	PSQ-562
5/8	.627	.873	.656	16-5/16	5/8	1-5/8	PSQ-625
11/16	.690	.963	.750	17-3/4	5/8	1-5/8	PSQ-687
3/4	.752	1.047	.813	19	5/8	1-3/4	PSQ-750
7/8	.878	1.030	.938	22-3/4	1/2	2	PSQ-875
1	1.003	1.405	1.094	24-1/8	1/2	2	PSQ-100

*Approximate overall length of broach listed

BSQ Series

Square
Pull Broach



Square Size	Dec. Dim.	Pitch	Pilot	Overall Length	Length of Cut		Auto Puller Dia.	Series
					Min.	Max.		
5/32	.158	.156	.154	14	1/5	1/2	pin	BSQ-156S
3/16	.188	.187	.185	16	1/4	5/8	pin	BSQ-187S
1/4	.251	.187	.247	21	1/4	7/8	1/4	BSQ-250
1/4	.251	.187	.247	16	1/4	5/8	1/4	BSQ-250S
5/16	.314	.250	.312	26	1/3	1	1/4	BSQ-312
5/16	.314	.187	.312	17	1/4	3/4	1/4	BSQ-312S
3/8	.376	.250	.374	28	3/8	1-1/4	5/16	BSQ-375
3/8	.376	.187	.374	18	1/4	4/5	1/4	BSQ-375S
7/16	.439	.375	.435	38	1/2	1-3/8	3/8	BSQ-437
7/16	.439	.250	.435	30	1/3	1-1/8	3/8	BSQ-437S
1/2	.502	.375	.497	41	1/2	1-5/8	7/16	BSQ-500
1/2	.502	.250	.497	32	1/3	1-1/4	3/8	BSQ-500S
9/16	.565	.375	.562	45	1/2	1-3/4	1/2	BSQ-562
9/16	.565	.250	.562	34	1/3	1-1/4	1/2	BSQ-562S
5/8	.627	.375	.623	45	1/2	1-3/4	9/16	BSQ-625
5/8	.627	.312	.623	34	3/8	1-3/8	1/2	BSQ-625S
3/4	.752	.438	.748	53	1/2	2-1/2	5/8	BSQ-750
3/4	.752	.375	.748	38	4/9	1-5/8	5/8	BSQ-750S
7/8	.877	.438	.872	56	1/2	2-1/2	3/4	BSQ-875
7/8	.877	.375	.873	42	4/9	1-5/8	3/4	BSQ-875S
1	1.002	.500	.998	66	5/9	3	7/8	BSQ-100
1	1.002	.437	.998	50	1/2	2-1/4	7/8	BSQ-100S
1-1/4	1.252	.438	1.250	48	1/2	2-1/4	1	BSQ-125

Length of cut is predicated on mild steel, Broach cuts splines only

*Approximate overall length of broach listed

BSQM Series

Square Metric
Pull Broach

Square (mm)	Dec Dim.	Approx. Pitch	Pilot	Overall Length	Length of Cut		Auto Puller Dia	Series
					Min.	Max.		
4	.159	.156	.154	14	1/5	1/2	pin	BSQM-400
5	.198	.187	.794	16	1/4	5/8	pin	BSQM-500
6	.238	.187	.233	20	1/4	7/8	3/16	BSQM-600
6	.238	.187	.233	15	1/4	5/8	3/16	BSQM-600S
8	.317	.250	.313	26	1/3	1	1/4	BSQM-800
8	.317	.187	.313	17	1/4	3/4	1/4	BSQM-800S
10	.396	.250	.392	28	1/2	1-1/2	3/8	BSQM-010
10	.396	.188	.392	19	1/4	4/5	3/8	BSQM-010S
12	.474	.375	.470	40	1/2	1-1/2	3/8	BSQM-012
12	.474	.250	.469	32	1/3	1-1/8	3/8	BSQM-012S
14	.557	.375	.547	44	1/2	1-5/8	1/2	BSQM-014
14	.557	.250	.547	33	1/3	1-3/8	1/2	BSQM-014S
16	.632	.375	.627	45	1/2	1-3/4	5/8	BSQM-016
16	.632	.312	.625	34	3/8	1-1/4	5/8	BSQM-016S
18	.710	.375	.706	35	4/9	1-3/8	5/8	BSQM-018S
20	.790	.438	.782	54	5/8	2-1/2	3/4	BSQM-020
20	.790	.375	.784	40	1/2	1-5/8	3/4	BSQM-020S
24	.946	.500	.941	62	5/9	2-1/2	3/4	BSQM-024
24	.946	.437	.944	47	1/2	1-5/8	3/4	BSQM-024S

*Approximate overall length of broach listed

PSQM Series

Square Metric
Push Broach

Square (mm)	Dec. Dim. (Max.)	Pilot Dia.	Broach Length	Length of Cut		Series
				Min.	Max.	
5	.198	.205	6-7/8	3/8	3/4	PSQM-500
6	.238	.250	7	3/8	3/4	PSQM-600
8	.317	.327	8-3/16	7/16	7/8	PSQM-800
10	.395	.406	10-7/8	1/2	1	PSQM-010
12	.474	.492	12-7/8	5/8	1-1/4	PSQM-012
14	.553	.591	14-7/8	3/4	1-1/2	PSQM-014
16	.632	.669	16-13/16	7/8	1-5/8	PSQM-016
18	.710	.787	18-1/2	7/8	1-3/4	PSQM-018
20	.788	.866	19	7/8	1-3/4	PSQM-020
22	.868	.945	23-1/4	7/8	1-3/4	PSQM-022
24	.946	1.024	24-9/16	7/8	1-3/4	PSQM-024
25	.986	1.063	24-1/2	7/8	1-3/4	PSQM-025

*Approximate overall length of broach listed

BTR Series

Fellows Tri-Lobe
Pull Broach

Maj. Dia.	Pilot	Min. Length of Cut	Max. Length of Cut	Length	Auto Puller Dia.	Series
.848	.750	3/8	1	40	3/4	BTR-875
1.185	1.069	9/16	1-3/8	33	1	BTR-118

*Approximate overall length of broach listed

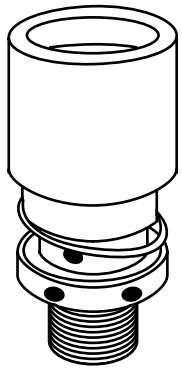
Length of cut is predicated on mild steel, Broach cuts splines only

PHH & PHV Series

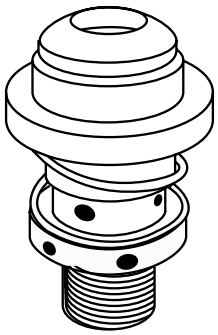
Automatic Broach Pull Head

Size	Horizonal R		Verticle RD	
	No Locator	with Locator	No Locator	with Locator
3/16	PHH-018	PHH-018L	PHV-018	PHV-018L
1/4	PHH-025	PHH-025L	PHV-025	PHV-025L
9/32	PHH-028	-	-	-
5/16	PHH-031	PHH-031L	PHV-031	-
11/32	PHH-034	-	-	-
3/8	PHH-037	PHH-037L	PHV-037	PHV-037L
13/32	PHH-040	-	-	-
7/16	PHH-043	PHH-043L	PHV-043	PHV-043L
1/2	PHH-050	PHH-050L	PHV-050	PHV-050L
9/16	PHH-056	PHH-056L	PHV-056	-
5/8	PHH-062	PHH-062L	PHV-062	PHV-062L
11/16	PHH-068	-	PHV-068	-
3/4	PHH-075	PHH-075L	PHV-075	PHV-075L
13/16	PHH-081	-	PHV-081	-
7/8	PHH-087	PHH-087L	PHV-087	PHV-087L
15/16	PHH-093	-	PHV-093	-
1	PHH-100	PHH-100L	PHV-100	PHV-100L
1-1/8	PHH-112	PHH-112L	PHV-112	-
1-1/4	PHH-125	PHH-125L	PHV-125	PHV-125L
1-3/8	PHH-137	PHH-137L	PHV-137	-
1 7/16	PHH-143	-	PHV-143	-
1-1/2	PHH-150	PHH-150L	PHV-150	PHV-150L
1 5/8	PHH-162	-	-	-
1-3/4	PHH-175	PHH-175L	PHV-175	-
1-7/8	PHH-187	PHH-187L	-	-
2	PHH-200	PHH-200L	PHV-200	PHV-200L
2 1/4	PHH-225	PHH-225L	-	-
2 1/2	PHH-250	PHH-250L	-	-

Replacement Parts Available



Horizontal
2" x 8 Threads

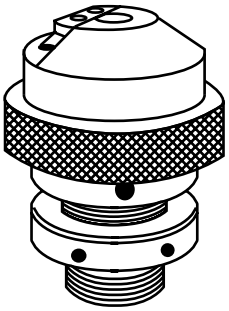


Vertical
2" x 8 Threads

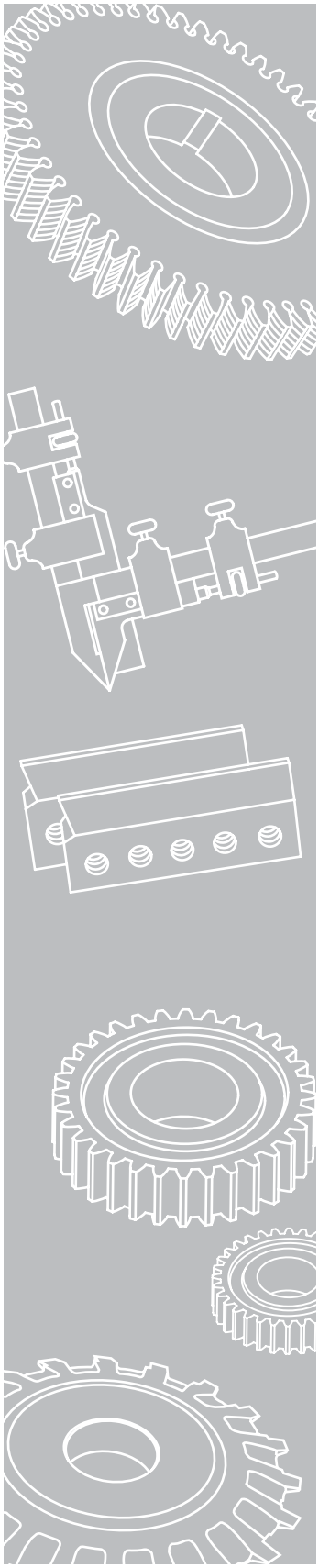
PHS-8 & PHS-12 Series

Semi-Automatic Broach Pull Head

Size	2" x 8 Thread	1 3/8" x 12 Thread	
	No Locator	No Locator	With Locator
3/16	-	PHS-12-018	-
7/32	-	PHS-12-021	PHS-12-021L
1/4	-	PHS-12-025	-
5/16	-	PHS-12-031	-
3/8	-	PHS-12-037	-
1/2	-	-	PHS-12-050L
5/8	PHS-8-062	-	-
3/4	PHS-8-075	-	-
7/8	PHS-8-087	-	-
1	PHS-8-100	-	-



Misc. Tool Sort Index



#104 Bevel Cutters 205

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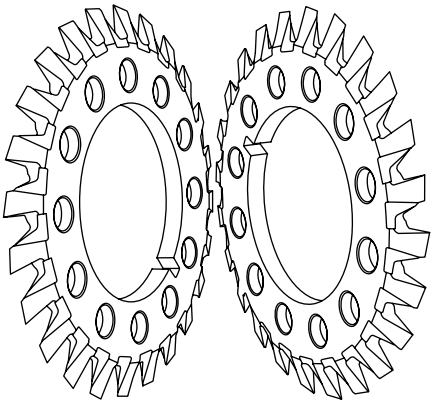
G104E Series

Straight Bevel

Coniflex® Cutters #104

9”x4.5” Set includes both right and left hand



Point Width	PA	WD	Corner Breaks	Series
.011	14.5	.550	Break Corner	G104E-11T-F
.015	20	.550	Break Corner	G104E-15T-D
.015	17.5	.550	Break Corner	G104E-15T-E
.015	14.5	.550	Break Corner	G104E-15T-F
.020	22.2	.550	Break Corner	G104E-20T-B
.020	21.5	.550	Break Corner	G104E-20T-C
.020	20	.550	Break Corner	G104E-20T-D
.020	17.5	.550	Break Corner	G104E-20T-E
.020	14.5	.550	Break Corner	G104E-20T-F
.021	14.5	.550	Break Corner	G104E-21T-F
.025	21.5	.550	Break Corner	G104E-25T-C
.025	20	.550	Break Corner	G104E-25T-D
.025	17.5	.550	Break Corner	G104E-25T-E
.025	14.5	.550	Break Corner	G104E-25T-F
.027	14.5	.550	Break Corner	G104E-27T-F
.028	21.5	.550	Break Corner	G104E-28T-C
.028	17.5	.550	Break Corner	G104E-28T-E
.031	21.5	.550	Break Corner	G104E-31T-C
.031	20	.550	Break Corner	G104E-31T-D
.031	17.5	.550	Break Corner	G104E-31T-E
.031	14.5	.550	Break Corner	G104E-31T-F
.033	21.5	.550	Break Corner	G104E-33T-C
.033	20	.550	Break Corner	G104E-33T-D
.033	17.5	.550	Break Corner	G104E-33T-E
.035	21.5	.550	Break Corner	G104E-35T-C
.035	14.5	.550	Break Corner	G104E-35T-F
.038	22.2	.550	.010	G104E-38T-B
.038	21.5	.550	.010	G104E-38T-C
.038	20	.550	.010	G104E-38T-D
.038	17.5	.550	.010	G104E-38T-E
.038	14.5	.550	.010	G104E-38T-F
.040	17.5	.550	.010	G104E-40T-E
.040	14.5	.550	.010	G104E-40T-F
.043	21.5	.550	.010	G104E-43T-C
.045	21.5	.550	.010	G104E-45T-C
.045	20	.550	.010	G104E-45T-D
.048	22.2	.550	.010	G104E-48T-B
.048	21.5	.550	.010	G104E-48T-C
.048	20	.550	.010	G104E-48T-D
.048	17.5	.550	.010	G104E-48T-E
.048	14.5	.550	.010	G104E-48T-F
.060	22.6	.550	.010	G104E-60T-A
.060	22.2	.550	.010	G104E-60T-B
.060	21.5	.550	.010	G104E-60T-C
.060	20	.550	.010	G104E-60T-D

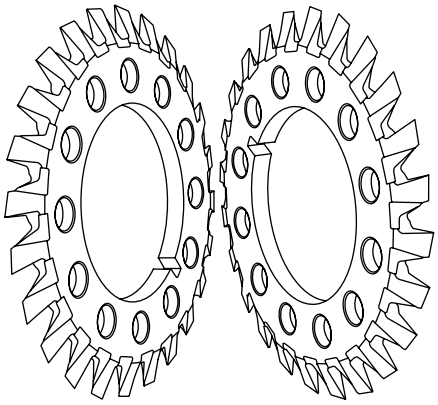
SERIES CONTINUED ON NEXT PAGE ->

Point Width	PA	WD	Corner Breaks	Series
.060	17.5	.550	.010	G104E-60T-E
.060	14.5	.550	.010	G104E-60T-F
.060	22.2	.750	.010	G104E-60U-B
.065	21.5	.550	.010	G104E-65T-C
.065	20	.550	.010	G104E-65T-D
.065	22.2	.750	.010	G104E-65U-B
.067	22.6	.550	.010	G104E-67T-A
.071	17.5	.550	.010	G104E-71T-E
.075	22.2	.550	.010	G104E-75T-B
.075	21.5	.550	.010	G104E-75T-C
.075	20	.550	.010	G104E-75T-D
.075	17.5	.550	.010	G104E-75T-E
.075	14.5	.550	.010	G104E-75T-F
.075	21.5	.750	.010	G104E-75U-C
.078	22.6	.550	.010	G104E-78T-A
.080	22.6	.550	.010	G104E-80T-A
.080	20	.550	.010	G104E-80T-D
.085	22.6	.750	.010	G104E-85U-A
.085	22.2	.750	.010	G104E-85U-B
.090	22.6	.550	.015	G104E-90T-A
.090	22.2	.550	.015	G104E-90T-B
.090	21.5	.550	.015	G104E-90T-C
.090	20	.550	.015	G104E-90T-D
.090	17.5	.550	.015	G104E-90T-E
.090	22.6	.750	.015	G104E-90U-A
.090	21.5	.750	.015	G104E-90U-C
.092	21.5	.550	.015	G104E-92T-C
.100	22.6	.550	.015	G104E-100T-A
.100	22.2	.550	.015	G104E-100T-B
.100	17.5	.550	.015	G104E-100T-E
.110	22.6	.550	.020	G104E-110T-A
.110	22.2	.550	.020	G104E-110T-B
.110	21.5	.550	.020	G104E-110T-C
.110	20	.550	.020	G104E-110T-D
.110	22.6	.750	.020	G104E-110U-A
.110	22.2	.750	.020	G104E-110U-B
.110	21.5	.750	.020	G104E-110U-C
.130	22.6	.550	.020	G104E-130T-A
.130	22.2	.550	.020	G104E-130T-B
.130	21.5	.550	.020	G104E-130T-C
.130	20	.550	.020	G104E-130T-D
.130	22.6	.750	.030	G104E-130U-A
.130	22.2	.750	.030	G104E-130U-B
.160	22.6	.750	.040	G104E-160U-A
.160	22.2	.750	.040	G104E-160U-B
.160	21.5	.750	.040	G104E-160U-C

G104E Series

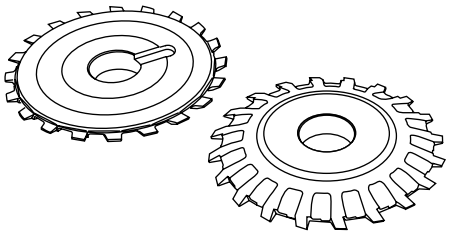
Straight Bevel Coniflex® Cutters #104

9”x4.5” Set includes both right and left hand



G102 Series

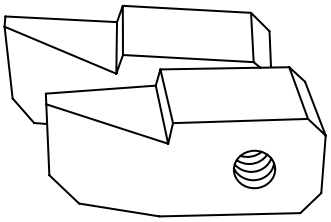
Straight Bevel
Coniflex® Cutters #102
4.25”x1”
Set includes both
right and left hand



Point Width	WD	Series
.003	.225	G102E-3T-20
.004	.225	G102E-3.5T-20
.005	.225	G102E-5T-20
.006	.225	G102E-6T-20
.005	.225	G102E-5T-20
.008	.225	G102E-8T-20
.011	.225	G102E-11T-20
.015	.225	G102E-15T-20
.020	.225	G102E-20T-20
.026	.225	G102E-26T-20

BV24 Series

Straight Bevel Gear Cutters
for 24” Machine
DP 14.5° , 20° & 25° PA

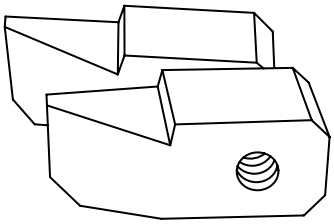


	14.5°			20°			25°		
Diam. Pitch	Roughing	Finishing	Slotting	Roughing	Finishing	Slotting	Roughing	Finishing	Slotting
1	-	-	-	BV24-100R	BV24-100F	BV24-100SL	-	-	-
1-1/4	BV24F-125R	BV24F-125F	-	BV24-125R	BV24-125F	BV24-125SL	BV24-125R	BV24-125F	-
1-1/2	BV24F-150R	BV24F-150F	-	BV24-150R	BV24-150F	BV24-150SL	BV24-150R	BV24-150F	-
1-3/4	BV24F-175R	BV24F-175F	-	BV24-175R	BV24-175F	BV24-175SL	BV24-175R	BV24-175F	-
2	BV24F-200R	BV24F-200F	-	BV24-200R	BV24-200F	BV24-200SL	BV24-200R	BV24-200F	-
2-1/2	BV24F-250R	BV24F-250F	BV24F-250SL	BV24-250R	BV24-250F	BV24-250SL	BV24-250R	BV24-250F	BV24-250SL
3	BV24F-300R	BV24F-300F	-	BV24-300R	BV24-300F	BV24-300SL	-	-	-
3-1/2	-	-	-	BV24-350R	BV24-350F	-	-	-	-
4	BV24F-400R	-	-	BV24-400R	BV24-400F	-	BV24-25	BV24-25	BV24-25

BVM24 Series

Straight Bevel Gear Cutters for 24" Machine

Module 20° PA

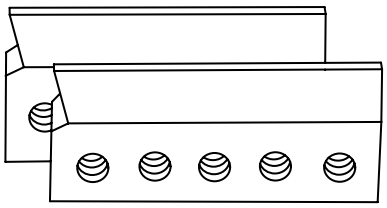


Module Pitch	Roughing	Finishing
16	BVM24-016R	BVM24-016F
20	BVM24-020R	BVM24-020F
22	BVM24-022R	BVM24-022F
24	BVM24-024R	BVM24-024F

BV14 , BV17, BV20, BV22 & BV25 Series

Straight Bevel Gear Cutters for 24" Machine

DP 14.5°, 17.5° , 20° , 22.5°, 25° PA



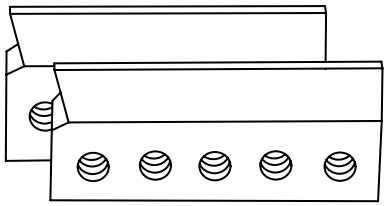
Diametral Pitch	14-1/2°		17 1/2°		20°		22 1/2°	25°	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Finishing	Roughing	Finishing
2-1/2	---	---	-	-	BV20-250R	BV20-250F	-	---	---
3	BV14-300R	BV14-300F	-	-	BV20-300R	BV20-300F	-	BV25-300R	BV25-300F
3-1/2	BV14-350R	BV14-350F	-	BV17-350F	BV20-350R	BV20-350F	-	BV25-350R	BV25-350F
4	BV14-400R	BV14-400F	-	-	BV20-400R	BV20-400F	BV22-400F	BV25-400R	BV25-400F
4-1/2	---	---	-	-	BV20-450R	BV20-450F	-	BV25-450R	BV25-450F
5	BV14-500R	BV14-500F	-	BV17-500F	BV20-500R	BV20-500F	-	BV25-500R	BV25-500F
6	BV14-600R	BV14-600F	-	-	BV20-600R	BV20-600F	-	BV25-600R	BV25-600F
7	BV14-700R	BV14-700F	-	BV17-700F	BV20-700R	BV20-700F	-	---	---
8	BV14-800R	BV14-800F	BV17-800R	BV17-800F	BV20-800R	BV20-800F	BV22-800F	BV25-800R	BV25-800F
9	BV14-900R	BV14-900F	-	-	BV20-900R	BV20-900F	-	---	---
10	BV14-010R	BV14-010F	-	-	BV20-010R	BV20-010F	-	BV25-010R	BV25-010F
11	-	-	-	-	BV20-011R	BV20-011F	-	-	-
12	BV14-012R	BV14-012F	-	-	BV20-012R	BV20-012F	-	BV25-012R	BV25-012F
14	BV14-014R	BV14-014F	-	-	BV20-014R	BV20-014F	-	---	---
16	BV14-016R	BV14-016F	-	-	BV20-016R	BV20-016F	-	BV25-016R	BV25-016F
17	-	-	-	-	BV20-017R	BV20-017F	-	-	-
18	BV14-018R	BV14-018F	-	-	BV20-018R	BV20-018F	-	---	---
20	BV14-020R	BV14-020F	-	-	BV20-020R	BV20-020F	-	---	---
24	BV14-024R	BV14-024F			BV20-024R	BV20-024F		-	-
28	BV14-028R	BV14-028F	-	-	BV20-028R	BV20-028F	-	---	---
32	BV14-032R	BV14-032F	-	-	BV20-032R	BV20-032F	-	---	---
40	-	-	-	-	BV20-040R	BV20-040F	-	-	-
48	BV14-048R	BV14-048F	-	-	BV20-048R	BV20-048F	-	-	-
64	BV14-064R	BV14-064F	-	-	-	-	-	-	-

Completing and TanRuf styles available

BVM20 & BVM25 Series

Straight Bevel Gear Cutters for 24" Machine

Module 20° & 25° PA

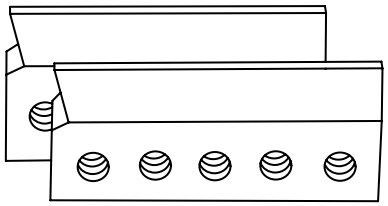


Module	20°		25°	
	Roughing	Finishing	Roughing	Finishing
3/4	BVM20-075R	BVM20-075F	---	---
1	BVM20-100R	BVM20-100F	BVM25-100R	BVM25-100F
1-1/4	BVM20-125R	BVM20-125F	---	---
1-1/2	BVM20-150R	BVM20-150F	---	---
1-3/4	BVM20-175R	BVM20-175F	---	---
2	BVM20-200R	BVM20-200F	BVM25-200R	BVM25-200F
2-1/4	BVM20-225R	BVM20-225F	---	---
2-1/2	BVM20-250R	BVM20-250F	---	---
2-3/4	BVM20-275R	BVM20-275F	---	---
3	BVM20-300R	BVM20-300F	BVM25-300R	BVM25-300F
3-1/2	BVM20-350R	BVM20-350F	---	---
4	BVM20-400R	BVM20-400R	BVM25-400R	BVM25-400F
4-1/2	BVM20-450R	BVM20-450F	---	---
5	BVM20-500R	BVM20-500F	BVM25-500R	BVM25-500F
6	BVM20-600R	BVM20-600F	BVM25-600R	BVM25-600F
7	BVM20-700R	BVM20-700F	---	---
8	BVM20-800R	BVM20-800F	BVM25-800R	BVM25-800F
10	BVM20-010R	BVM20-010F	---	---

BVS14 & BVS20 Series

Straight Bevel Gear Cutters for 3" Machine

DP 14.5° & 20° PA



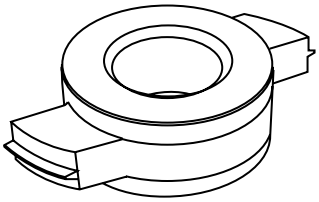
Diam. Pitch	14-1/2°		20°	
	Roughing	Finishing	Roughing	Finishing
8	BVS14-800R	BVS14-800F	BVS20-800R	BVS20-800F
10	BVS14-010R	BVS14-010F	BVS20-010R	BVS20-010F
12	BVS14-012R	BVS14-012F	BVS20-012R	BVS20-012F
14	BVS14-014R	BVS14-014F	BVS20-014R	BVS20-014F
16	BVS14-016R	BVS14-016F	BVS20-016R	BVS20-016F
18	-	-	BVS20-018R	BVS20-018F
20	-	BVS14-020F	BVS20-020R	BVS20-020F
24	-	-	BVS20-024R	BVS20-024F
32	-	BVS14-032F	BVS20-032R	BVS20-032F
36	-	-	-	BVS20-036F
40	-	BVS14-040F	BVS20-040R	BVS20-040F
48	-	BVS14-048F	BVS20-048R	BVS20-048F
64	-	BVS14-064F	-	BVS20-064F

F8V 20 Series

DP 20° PA

8 mm Bore

Bevel Gear Cutter



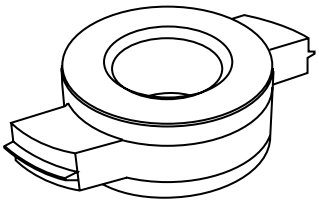
Diam. Pitch	PA	Cutter Diam.	Size Hole	Series
16	20°	1-1/8	8mm	F8V20-016
20	20°	1-1/8	8mm	F8V20-020
32	20°	1-1/8	8mm	F8V20-032
40	20°	1-1/8	8mm	F8V20-040
48	20°	1-1/8	8mm	F8V20-048
64	20°	1-1/8	8mm	F8V20-064
72	20°	1-1/8	8mm	F8V20-072
80	20°	1-1/8	8mm	F8V20-080
96	20°	1-1/8	8mm	F8V20-096
120	20°	1-1/8	8mm	F8V20-120
127	20°	1-1/8	8mm	F8V20-127

F10V 20 Series

DP 20° PA

8 mm Bore

Bevel Gear Cutter



Diam. Pitch	PA	Cutter Diam.	Size Hole	Series
16	20°	1-1/8	10mm	F10V20-016
20	20°	1-1/8	10mm	F10V20-020
32	20°	1-1/8	10mm	F10V20-032
40	20°	1-1/8	10mm	F10V20-040
48	20°	1-1/8	10mm	F10V20-048
64	20°	1-1/8	10mm	F10V20-064
72	20°	1-1/8	10mm	F10V20-072
80	20°	1-1/8	10mm	F10V20-080
96	20°	1-1/8	10mm	F10V20-096
120	20°	1-1/8	10mm	F10V20-120
127	20°	1-1/8	10mm	F10V20-127

Module	PA	Roughing	Finishing
1.5	20	BVSM20-150R	BVSM20-150F

BVSM 20 Series

Straight Bevel Gear Cutters for 3" Machine

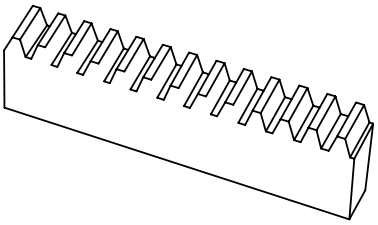
Module 20°

Diam. Pitch	Maag 14.5°	Maag 20°	Sunderland 14.5°	Sunderland 20°
1	GD14-100	GD20-100	-	-
1-1/4	GD14-125	GD20-125	-	-
1-1/2	GD14-150	GD20-150	-	DD20-150
1-3/4	GD14-175	GD20-175	-	DD20-175
2	GD14-200	GD20-200	DD14-200	DD20-200
2-1/4	GD14-225	GD20-225	DD14-225	DD20-225
2-1/2	GD14-250	GD20-250	DD14-250	DD20-250
3	GD14-300	GD20-300	DD14-300	DD20-300
4	GD14-400	GD20-400	DD14-400	DD20-400
5	GD14-500	GD20-500	DD14-500	DD20-500
6	GD14-600	GD20-600	DD14-600	DD20-600
7	GD14-700	GD20-700	DD14-700	DD20-700
8	GD14-800	GD20-800	DD14-800	DD20-800
9	GD14-900	GD20-900	DD14-900	DD20-900
10	GD14-010	GD20-010	DD14-010	DD20-010
12	GD14-012	GD20-012	DD14-012	DD20-012
16	GD14-016	GD20-016	DD14-016	DD20-016
18	-	GD20-018	DD14-018	DD20-018
20	-	GD20-020	DD14-020	DD20-020
24	–	GD20-024	DD14-024	DD20-024
32	–	GD20-032	DD14-032	DD20-032
48	–	GD20-048	DD14-048	DD20-048
64	–	-	DD14-064	DD20-064
72	–	-	-	DD20-072

Backing Plates Also Available

GD14, GD20 & DD14,DD20 Series

Maag & Sunderland Cutters

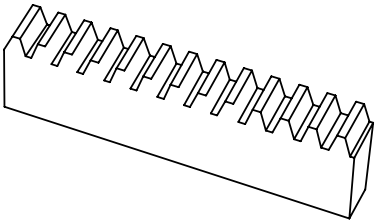


Diam. Pitch	Maag	Sunderland
4/5	GFD20-400	-
5/7	GFD20-500	DFD20-500
6/8	GFD20-600	DFD20-600
8/10	GFD20-800	DFD20-800
10/12	-	DFD20-010

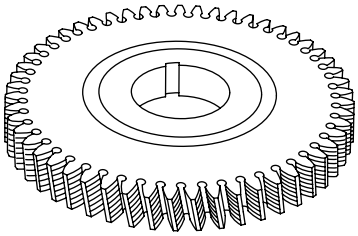
GFD20, & DFD20 Series

Maag & Sunderland Cutters

Combination Stub 20°PA



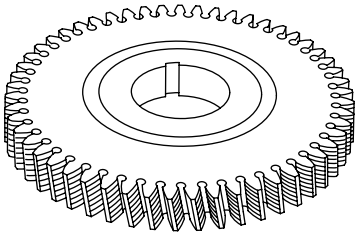
V20 Series
Shaving Cutters
DP 20° PA 2.5" Bore



Diam. Pitch	Teeth	OD	Specify Left or Right Hand				
			0° Helix	5° Helix	10° Helix	12° Helix	15° Helix
4	36	9	V20-04-S	V20-04-5	V20-04-10	V20-04-12	V20-04-15
5	45	9	V20-05-S	V20-05-5	V20-05-10	V20-05-12	V20-05-15
6	53	9	V20-06-S	V20-06-5	V20-06-10	V20-06-12	V20-06-15
8	57	7-1/2	V20-08-S	V20-08-5	V20-08-10	V20-08-12	V20-08-15
10	71	7-3/8	V20-10-S	V20-10-5	V20-10-10	V20-10-12	V20-10-15
12	83	7-1/4	V20-12-S	V20-12-5	V20-12-10	V20-12-12	V20-12-15
16	113	7-1/4	V20-16-S	V20-16-5	V20-16-10	V20-16-12	V20-16-15

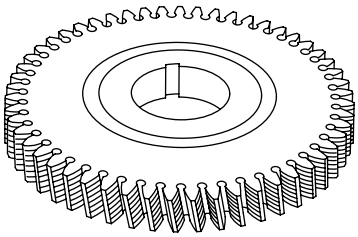
14½°PA also available

VM20 Series
Shaving Cutters
Module 20° PA 2.5" Bore



Module Pitch	Teeth	OD	Specify Left or Right Hand				
			0° Helix	5° Helix	10° Helix	12° Helix	15° Helix
1.25	120	7-1/4	VM20-125-S	VM20-125-5	VM20-125-10	VM20-125-12	VM20-125-15
1.50	120	7-1/4	VM20-150-S	VM20-150-5	VM20-150-10	VM20-150-12	VM20-150-15
2	90	7-1/4	VM20-200-S	VM20-200-5	VM20-200-10	VM20-200-12	VM20-200-15
3	61	7-1/2	VM20-300-S	VM20-300-5	VM20-300-10	VM20-300-12	VM20-300-15
4	53	9	VM20-400-S	VM20-400-5	VM20-400-10	VM20-400-12	VM20-400-15
5	45	9	VM20-500-S	VM20-500-5	VM20-500-10	VM20-500-12	VM20-500-15
6	36	9	VM20-600-S	VM20-600-5	VM20-600-10	VM20-600-12	VM20-600-15
8	26	9	VM20-800-S	VM20-800-5	VM20-800-10	VM20-800-12	VM20-800-15
10	21	9	VM20-010-S	VM20-010-5	VM20-010-10	VM20-010-12	VM20-010-15

VM25 Series
Shaving Cutters
Module 25° PA 2.5" Bore

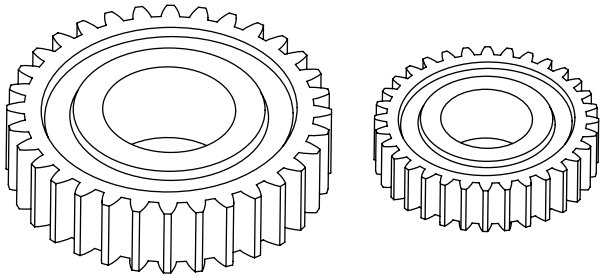


Module Pitch	Specify Left or Right Hand			
	0° Helix	5° Helix	10° Helix	12° Helix
2.75	VM25-275-S	VM25-275-5	VM25-275-10	VM25-275-12
3	VM25-300-S	VM25-300-5	VM25-300-10	VM25-300-12
4	VM25-400-S	VM25-400-5	VM25-400-10	VM25-400-12
5	VM25-500-S	VM25-500-5	VM25-500-10	VM25-500-12

MDP14, MDP20, MDP25 & MDP30 Series

Master Gear

DP 14.5°, 20°, 25° & 30° PA



Diam. Pitch	PD	Face	Bore	No. Teeth	14.5°PA	20°PA	25°PA	30°PA
4	6	1-1/4	1-1/4	24	-	MDP20-004-6	-	-
5	4	1-1/4	1-1/4	20	-	-	MDP25-500-4	-
5	5	1-1/4	1-1/4	25	-	MDP20-005-5	-	-
5	7	1-1/4	1-1/4	35	-	MDP20-005-7	-	-
6	3	1	1-1/4	18	-	MDP20-006-3	-	-
6	4	1-1/4	1-1/4	24	-	MDP20-006-4	MDP25-006-4	-
6	6	1-1/4	1-1/4	36	-	MDP20-006-6	-	-
8	3	1	1-1/4	24	-	-	MDP25-008-3	-
8	4	1	1-1/4	32	MDP14-008-4	MDP20-008-4	MDP25-008-4	-
10	3	3/4	1-1/4	30	-	MDP20-010-3	MDP25-010-3	MDP30-010-3
10	4	3/4	1-1/4	40	MDP14-010-4	MDP20-010-4	MDP25-010-4	-
11	2	1/2	1/2	22	-	MDP20-011-2	-	-
12	3	3/4	1-1/4	36	MDP14-012-3	MDP20-012-3	MDP25-012-3	-
12	4	1	1-1/4	48	-	MDP20-012-4	-	-
13	3	3/4	1-1/4	39	-	MDP20-013-3	-	-
14	3	3/4	1-1/4	42	-	MDP20-014-3	-	-
15	3	3/4	1-1/4	45	-	MDP20-015-3	-	-
16	2	1/2	1/2	32	-	MDP20-016-2	-	MDP30-016-2
16	3	3/4	1-1/4	48	MDP14-016-3	MDP20-016-3	MDP25-016-3	-
18	2	1/2	1/2	36	-	MDP20-018-2	-	-
20	1-1/2	1/2	1/2	30	-	MDP20-020-1	MDP25-020-1	-
20	2	1/2	1/2	40	MDP14-020-2	MDP20-020-2	-	-
20	3	3/4	1-1/4	60	MDP14-020-3	MDP20-020-3	-	-
21	3	1/2	1-1/4	63	-	MDP20-021-3	-	-
24	1-1/2	1/2	1/2	36	MDP14-024-1	MDP20-024-1	MDP25-024-1	-
24	2	1/2	1/2	48	-	MDP20-024-2	-	-
24	3	1/2	1/2	72	-	MDP20-024-3	-	-
27	2	1/2	1/2	54	-	MDP20-027-2	-	-
28	1-1/2	1/2	1/2	42	-	MDP20-028-1	-	-

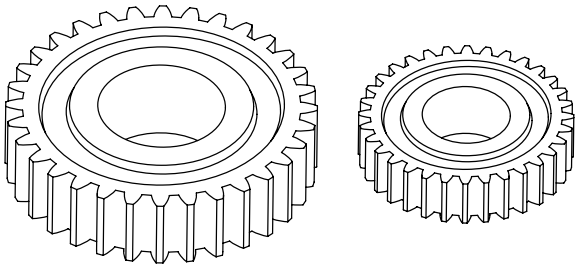
All master gears are made of hardened tool steel & finish ground to exacting standards. Each gear will be marked with the class, the exact test diameter and the actual tooth thickness. The accuracy of each gear will be certified from the manufacturer for assurance of the highest quality. Stock master gears are made to class 3B. Master gears are used to determine the accuracy of work gears. When work gears and master gears are rolled together on rolling fixtures with either fixed or adjustable centers, dimensional variations may be determined through the use of indicators, charts, or other suitable indicating devices.

SERIES CONTINUED ON NEXT PAGE ->

MDP14, MDP20, MDP25 & MDP30 Series

Master Gear

DP 14.5°, 20°, 25° & 30° PA



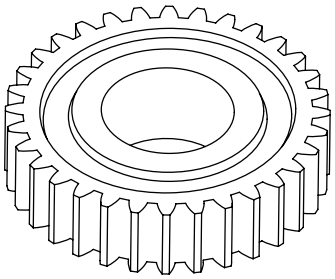
Diam. Pitch	PD	Face	Bore	No. Teeth	14.5°PA	20°PA	25°PA	30°PA
28	2	1/2	1/2	56	-	MDP20-028-2	-	-
28	2	1/2	1/2	56	-	MDP20-028-2	-	-
30	1-1/2	1/2	1/2	45	-	MDP20-030-1	-	-
30	2	1/2	1/2	60	-	MDP20-030-2	-	-
32	1-1/2	1/2	1/2	48	MDP14-032-1	MDP20-032-1	MDP25-032-1	-
32	2	1/2	1/2	64	MDP14-032-2	MDP20-032-2	-	MDP30-032-2
34	2	1/2	1/2	68	-	MDP20-034-2	-	-
36	1-1/2	1/2	1/2	54	-	MDP20-036-1	-	-
36	2	1/2	1/2	72	MDP14-036-2	-	MDP25-036-2	-
40	1-1/2	1/2	1/2	60	-	MDP20-040-1	-	-
40	2	1/2	1/2	80	MDP14-040-2	MDP20-040-2	-	MDP30-040-2
42	1-1/2	1/2	1/2	63	-	MDP20-042-1	-	-
44	1-1/2	1/2	1/2	66	-	MDP20-044-1	-	-
48	1-1/2	1/2	1/2	72	MDP14-048-1	MDP20-048-1	MDP25-048-1	MDP30-048-1
48	2	1/2	1/2	96	MDP14-048-2	MDP20-048-2	-	-
48	4	1/2	1 1/4	192	-	MDP20-048-4	-	-
56	1-1/2	1/2	1/2	84	-	MDP20-056-1	-	-
60	1-1/2	1/2	1/2	90	-	MDP20-060-1	-	-
64	1-1/2	1/2	1/2	96	-	MDP20-064-1	-	-
64	2	1/2	1/2	128	MDP14-064-2	MDP20-064-2	-	MDP30-064-2
64	2	1/2	1/2	130	-	-	MDP25-064-2	-
72	1-1/2	1/2	1/2	108	-	MDP20-072-1	-	-
72	2	1/2	1/2	144	MDP14-072-2	-	MDP25-072-2	-
80	1-1/2	1/2	1/2	120	-	MDP20-080-1	-	MDP30-080-1
90	1-1/2	1/2	1/2	135	MDP14-090-1	-	-	-
96	1-1/2	1/2	1/2	144	MDP14-096-1	MDP20-096-1	-	-
96	2	1/2	1/2	192	-	MDP20-096-2	-	-
100	2	1/2	1/2	200	-	MDP20-100-2	-	-
120	1-1/2	1/2	1/2	180	-	MDP20-120-1	-	-
120	2	1/2	1/2	240	-	MDP20-120-2	-	-

Circular Pitch	PD	Face	Bore	No. Teeth	14-1/2° PA	20° PA
1/8	2	1/2	1/2	50	-	MCP20-012-2
1/4	3	3/4	1-1/4	38	MCP14-025-3	MCP20-025-3
1/4	5	1-1/4	1-1/4	60	-	MCP20-025-5
1/3	3	3/4	1-1/4	28	-	MCP20-033-3
1/2	4	1-1/4	1-1/4	24	MCP14-050-4	MCP20-050-4

MCP14 & MCP20 Series

Master Gear

CP 14.5° & 20° PA

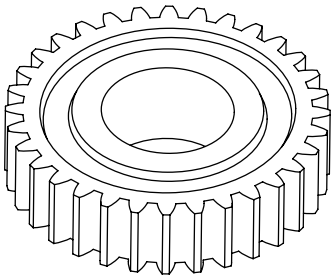


Module Pitch	PD	Face	Bore	No. Teeth	Series
.20	1-1/2	1/2	1/2	190	MM20-020-2
.25	1-1/2	1/2	1/2	152	MM20-025-1
.30	1-1/2	1/2	1/2	126	MM20-030-1
.40	1-1/2	1/2	1/2	95	MM20-040-1
.50	1-1/2	1/2	1/2	76	MM20-050-1
.60	1-1/2	1/2	1/2	64	MM20-060-1
.60	2	1/2	1/2	84	MM20-060-2
.70	1-1/2	1/2	1/2	54	MM20-070-1
.70	2	1/2	1/2	72	MM20-070-2
.75	1-1/2	1/2	1/2	50	MM20-075-1
.80	1-1/2	1/2	1/2	48	MM20-080-1
1	1-1/2	1/2	1/2	38	MM20-100-1
1.25	1-1/2	1/2	1/2	30	MM20-125-1
1.5	2	1/2	1/2	34	MM20-150-2
1.5	3	1/2	1-1/4	50	MM20-150-3
1.75	1-1/2	1/2	1/2	22	MM20-175-1
1.75	2 1/4	1/2	1/2	32	MM20-175-2
2	3	3/4	1-1/4	38	MM20-200-3
2.5	3	3/4	1-1/4	32	MM20-250-3
3	3	1	1-1/4	26	MM20-300-3
3.5	3	1	1-1/4	22	MM20-350-3
4	4	1-1/4	1-1/4	26	MM20-400-4

MM20 Series

Master Gear

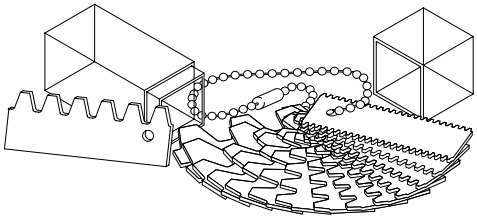
Module 20° PA



All master gears are made of hardened tool steel & finish ground to exacting standards. Each gear will be marked with the class, the exact test diameter and the actual tooth thickness. The accuracy of each gear will be certified from the manufacturer for assurance of the highest quality. Stock master gears are made to class 3B. Master gears are used to determine the accuracy of work gears. When work gears and master gears are rolled together on rolling fixtures with either fixed or adjustable centers, dimensional variations may be determined through the use of indicators, charts, or other suitable indicating devices.

Pitch Templates

Series	Pitch Gauge
PG-D2SS	**Super Set Diametral Pitch Super Set** 14-1/2° & 20° PA includes: 3, 3-1/2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 28, 30, 32 DP
PG-D2	**Diametral Pitch Common** 14-1/2° & 20° PA includes: 3, 4, 5, 6, 8, 10, 12, 16, 20, 24, 32, 48 DP
PG-D3	**Diametral Pitch Uncommon** 14-1/2° & 20° PA includes: 3-1/2, 6-1/2, 7, 9, 11, 13, 14, 15, 18, 22, 26, 28, 30 DP
PG-DD1	**Diametral Pitch Coarse Single Tooth** 14-1/2° & 20° PA includes: 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2 DP
PG-D5	**Combination Stub Diametral Pitch** 20° PA includes: 3/4, 4/5, 5/7, 6/8, 7/9, 8/10, 9/11, 10/12, 12/14, 14/18, 16/21, 20/24, 24/32, 32/42 DP
PG-D6	**Diametral Pitch Common** 25° PA includes: 3, 3-1/2, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 32 DP
PG-M1	**Module Pitch** 14-1/2° & 20° PA includes: 8, 7, 6, 5-1/2, 5, 4-1/2, 4, 3-1/2, 3, 2-1/2, 2, 1-1/2, 1 MOD
PG-S1	**Involute Spline** 30° PA includes: 3/6, 4/8, 5/10, 6/12, 7/16, 8/16, 10/20, 12/24, 16/32, 20/40, 24/48, 32/64, 40/80, 48/96 DP
PG-C1	**Circular Pitch** 14-1/2° & 20° PA includes: 1”, 3/4”, 5/8”, 1/2”, 7/16”, 3/8”, 1/3”, 1/4”, 1/5”, 3/16”, 1/8” CP



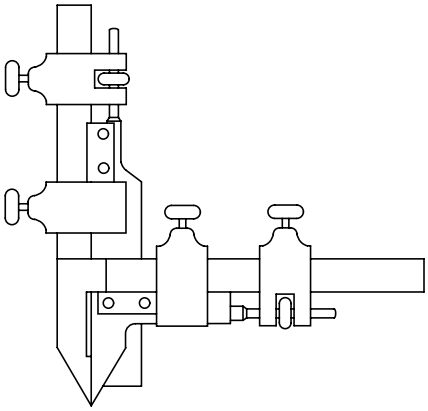
Use to correctly identify your gear. Each rack template has generated machine cut accuracy and is made from anodized aluminum for long life. Sold in complete sets only, with carrying case.

GV & GVM Series

Gear Tooth Vernier Caliper

Pitch Range	Graduation	Series
24 to 1-1/2 DP	-.001"	GV-A2-C1*
20 to 2 DP	-.001”	GV-A2
10 to 1 DP	-.001”	GV-B2
1 to 16 MOD	-.001”	GVM-A2-C1
1-1/4 to 12 MOD	-.001”	GVM-A2
2-1/2 to 25 MOD	-.001”	GVM-B2

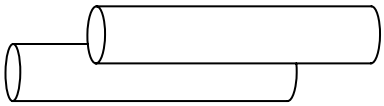
*Carbide Tipped



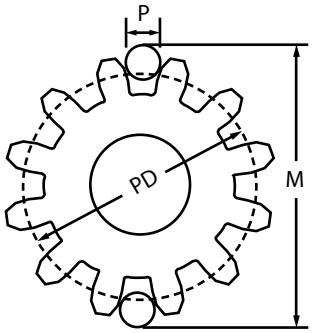
GW Series

Gear Measuring Wires
Diametral Pitch Gears

XX Tolerance
- Two wires per set



Wires sold is pairs only.



Normal Diametral Pitch	Enlarged Pinions 1.92/DP		External Gears 1.728/DP		Alternate Gears 1.68/DP		Internal Gears 1.44/DP	
	P	Series	P	Series	P	Series	P	Series
1	1.9200	GW-1.9200	1.7280	-	1.680	-	1.440	-
1 1/2	1.2800	GW-1.2800	1.1520	-	1.120	GW-1.12000	.9600	GW-96000
2	.9600	GW-96000	.8640	GW-86400	.8400	GW-84000	.7200	GW-72000
2 1/2	.7680	GW-76800	.6910	GW-69120	.6720	GW-67200	.5760	GW-57600
3	.6400	GW-64000	.5760	GW-57600	.5600	GW-56000	.4800	GW-48000
3 1/2	.5490	-	.4940	GW-49371	.4800	GW-48000	.4110	GW-41143
4	.4800	GW-48000	.4320	GW-43200	.4200	GW-42000	.3600	GW-36000
4 1/2	.4270	-	.3840	GW-38400	.3730	-	.3200	GW-32000
5	.3840	GW-38400	.3460	GW-34560	.3360	GW-33600	.2880	GW-28800
6	.3200	GW-32000	.2880	GW-28800	.2800	GW-28000	.2400	GW-24000
7	.2740	GW-27429	.2470	GW-24686	.2400	GW-24000	.2060	GW-20571
8	.2400	GW-24000	.2160	GW-21600	.2100	GW-21000	.1800	GW-1800
9	.2130	GW-21333	.1920	GW-19200	.1870	-	.1600	GW-16000
10	.1920	GW-19200	.1730	GW-17280	.1680	GW-16800	.1440	GW-14400
11	.1750	GW-17455	.1570	GW-15709	.1530	GW-15273	.1310	GW-13091
12	.1600	GW-16000	.1440	GW-14400	.1400	GW-14400	.1200	GW-12000
14	.1370	GW-13714	.1230	GW-12343	.1200	GW-12000	.1030	GW-10286
16	.1200	GW-12000	.1080	GW-10800	.1050	GW-10500	.0900	GW-09000
18	.1070	-	.0960	GW-09600	.0930	GW-09333	.0800	GW-08000
20	.0960	GW-09600	.0860	GW-08640	.0840	GW-08400	.0720	GW-07200
22	.0870	GW-08727	.0790	GW-07855	.0760	GW-07636	.0650	GW-06545
24	.0800	GW-08000	.0720	GW-07200	.0700	GW-07000	.0600	GW-06000
28	.0690	GW-06857	.0620	GW-06171	.0600	GW-06000	.0510	GW-05143
32	.0600	GW-06000	.0540	GW-05400	.0530	GW-05250	.0450	GW-04500
36	.0530	GW-05333	.0480	GW-04800	.0470	GW-04667	.0400	GW-0400
40	.0480	GW-04800	.0430	GW-04320	.0420	-	.0360	GW-03600
48	.0400	GW-0400	.0360	GW-03600	.0350	GW-03500	.0300	GW-03000
56	.0340	GW-03429	.0310	GW-03086	.0300	GW-03000	.0260	-
64	.0300	GW-03000	.027	GW-02700	.0260	GW-02625	.0230	GW-02250
72	.0270	-	.0240	GW-02400	.0230	-	.0200	GW-02000
80	.0240	GW-02400	.0220	GW-02160	.0210	-	.0180	GW-01800
96	.0200	GW-02000	.0180	GW-01800	.0180	-	.0150	GW-01400
100	.0190	-	.0170	-	.0170	-	.0140	GW-01440
120	.0160	-	.0140	GW-01400	.0140	GW-01400	.0120	-

All wires shown in inch sizes

Series	Gear Measuring Wire Sets
GWS-1728-18	**Set includes 1 pair each of 18 sizes from 1.728/DP Series:** 3, 4, 5, 6, 8, 9, 10, 12, 14, 16, 18, 20, 24, 32, 36, 40, 48 & 64 DP
GWS-144-18	**Set includes 1 pair each of 18 sizes from 1.44/DP Series:** 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 24, 32, 36, 40, 48 & 64 DP
GWS-168-15	**Set includes 1 pair each of 15 sizes from 1.68/DP Alternate Series:** 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 28, 32, 48 & 56 DP
GWS-192-15	**Set includes 1 pair each of 15 sizes from 1.92/DP Series:** 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 20, 24 & 32 DP

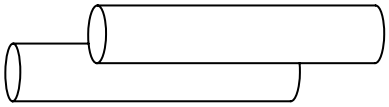
Spline Pitch	1.92 / DP		1.728 / DP	
	P	Series	P	Series
3/6	.6400	GW-64000	.5760	GW-57600
4/8	.4800	GW-48000	.4320	GW-43200
5/10	.3840	GW-38400	.3460	GW-34560
6/12	.3200	GW-32000	.2880	GW-28800
8/16	.2400	GW-24000	.2160	GW-21600
10/20	.1920	GW-19200	.1730	GW-17280
12/24	.1600	GW-16000	.1440	GW-14400
16/32	.1200	GW-12000	.1080	GW-10800
20/40	.0960	GW-09600	.0860	GW-08640
24/48	.0800	GW-08000	.0720	GW-07200
32/64	.0600	GW-06000	.0540	GW-05400
40/80	.0480	GW-04800	.0430	GW-04320
48/96	.0400	GW-04000	.0360	GW-03600
64/128	.0300	GW-03000	.0270	GW-02700

All wires shown in inch sizes

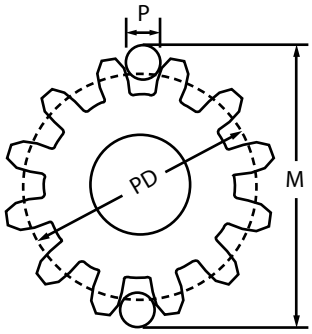
GW Series

Gear Measuring Wires
Involute Spline

XX Tolerance - Two wires per set



Wires sold is pairs only.

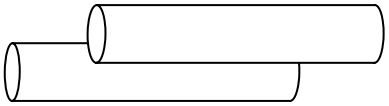


GW Series

Gear Measuring Wires
For 36 & 48 Serrations

XX Tolerance - Two wires per set

36 SERRATION					48 SERRATION				
Nominal Dia.	Internal P	Series	External P	Series	Nominal Dia.	Internal P	Series	External P	Series
1/8	.00650	-	.00796	-	3/4	.03025	-	.03558	-
3/16	.00967	-	.01194	-	7/8	.03529	-	.04150	-
1/4	.01290	-	.01592	-	1	.04033	-	.04743	-
5/16	.01613	-	.01990	-	1-1/8	.04538	-	.05336	-
3/8	.01935	GW-01935	.02388	GW-02388	1-1/4	.05042	GW-05042	.05929	GW-05929
1/2	.02580	GW-02580	.03184	-	1-3/8	.05546	-	.06522	GW-06522
5/8	.03225	GW-03225	.03980	GW-03980	1-1/2	.06050	-	.07115	-
					1-3/4	.07058	-	.08301	-
					2	.08067	-	.09487	-
					2-1/4	.09075	-	.10673	-
					2-1/2	.10083	-	.11858	-
					2-3/4	.11092	-	.13044	-
					3	.12100	-	.14230	-



Wires sold is pairs only.

All wires shown in inch sizes

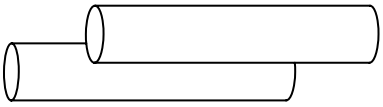
GW Series

Gear Measuring Wires
Module Pitch Gears

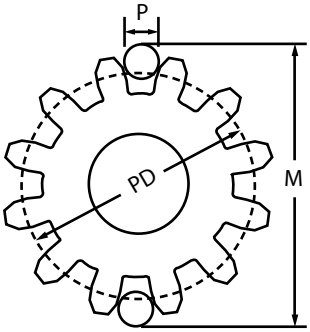
XX Tolerance
- Two wires per set

Normal Module Pitch	Enlarged Pinions 1.92/DP		External Gears 1.728/DP		Alternate Series 1.68/DP		Internal Gears 1.44/DP	
	P	Series	P	Series	P	Series	P	Series
0.5	.9600	GW-03780	.8640	GW-03402	.8400	-	.7200	GW-02835
0.6	1.1520	GW-04535	1.0370	-	1.0080	GW-03969	.8640	GW-03402
0.7	1.3440	-	1.2100	-	1.1760	-	1.0080	GW-03969
0.750	1.4400	GW-05669	1.2960	GW-05102	1.2600	-	1.0800	GW-04252
0.8	1.5360	-	1.3820	-	1.3440	-	1.1520	GW-04535
1.0	1.9200	GW-07559	1.7280	-	1.6800	-	1.4400	GW-05669
1.25	2.4000	-	2.1600	-	2.1000	-	1.8000	GW-07087
1.50	2.8800	GW-11339	2.5920	GW-10205	2.5200	GW-09921	2.1600	GW-08500
1.75	3.3600	-	3.0240	-	2.9400	-	2.5200	GW-09921
2.0	3.8400	-	3.4560	-	3.3600	-	2.8800	GW-11339
2.25	4.3200	-	3.8880	GW-15307	3.7800	-	3.2400	GW-12756
2.5	4.8000	-	4.3200	-	4.2000	-	3.6000	GW-14173
3.0	5.7600	-	5.1840	-	5.0400	-	4.3200	-
3.5	6.7200	-	6.0480	-	5.8800	-	5.0400	-
4.0	7.6800	-	6.9120	GW-27213	6.7200	-	5.7600	-
4.5	8.6400	GW-34016	7.7760	-	7.5600	-	6.4800	-
5	9.6000	-	8.6400	-	8.4000	-	7.2000	-
6	11.5200	-	10.3680	-	10.0800	-	8.6400	GW-34016
7	13.4400	-	12.0960	-	11.7600	-	10.0800	-
8	15.3600	-	13.8240	GW-54425	13.4400	-	11.5200	-
9	17.2800	-	15.5520	-	15.1200	-	12.9600	GW-51024
10	19.2000	-	17.2800	-	16.8000	-	14.4000	-
11	21.1200	-	19.0080	-	18.4800	-	15.8400	-
12	23.0400	-	20.7360	-	20.1600	-	17.2800	-
14	26.8800	-	24.1920	-	23.5200	-	20.1600	-
16	30.7200	-	27.6480	-	26.8800	-	23.0400	-
18	34.5600	-	31.1040	-	30.2400	-	25.9200	-
20	38.4000	-	34.5600	-	33.6000	-	28.8000	-

All wires shown in inch sizes



Wires sold is pairs only.



GW Series

Gear Measuring Wires
Circular Pitch Gears

XX Tolerance
- Two wires per set

Normal Circular Pitch	Enlarged Pinions 1.92/DP		External Gears 1.728/DP		Alternate Series 1.68/DP	
	P	Series	P	Series	P	Series
.125	.0760	GW-07639	.0690	GW-06875	.0670	-
.250	.1530	-	.1380	GW-13751	.1340	GW-13369
.375	.2290	-	.2060	GW-20626	.2010	-
.500	.3060	-	.2750	GW-27502	.2670	-
.625	.3820	-	.3440	-	.3340	-
.750	.4580	-	.4130	-	.4010	-
.875	.5350	-	.4810	-	.4680	-
1.00	.6110	-	.5500	-	.5350	-
1.25	.7640	-	.6880	-	.6680	-
1.50	.9170	-	.8250	-	.8020	-

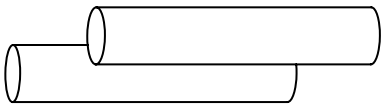
All wires shown in inch sizes

GW Series

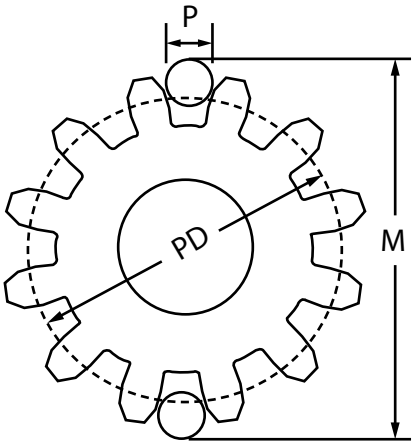
Miscellaneous Sizes

Gear Measuring Wires

XX Tolerance - Two wires per set



Wires sold is pairs only.



Misc.		
P (")	P (mm)	Series
1.7717	45.001	GW-1.7717
1.5748	40.000	GW-1.5748
1.5360	39.014	GW-1.5360
1.3780	35.000	GW-1.37795
1.3606	34.559	GW-1.3606
1.2246	31.105	GW-1.2246
1.1811	30.000	GW-1.18110
1.0897	27.678	GW-1.0897
.9873	25.078	GW-98733
.9630	24.460	GW-96300
.9524	24.191	GW-95240
.8750	22.225	GW-87500
.6190	15.723	GW-61900
.8750	22.225	GW-87500
.8250	20.955	GW-82500
.8164	20.737	GW-81640
.7480	19.000	GW-74803
.7086	18.000	GW-70866
.6299	16.000	GW-62992
.6283	15.960	GW-62836
.6190	15.723	GW-61900
.5511	14.000	GW-55118
.5443	13.825	GW-54430
.5317	13.505	GW-53170
.5170	13.132	GW-51700
.5000	12.700	GW-50000
.4930	12.522	GW-49300
.4724	12.000	GW-47244
.4330	11.000	GW-43307
.4150	10.541	GW-41500
.4133	10.500	GW-41338
.4082	10.368	GW-40820
.4082	10.366	GW-40812
.3937	10.000	GW-39370
.3930	9.982	GW-39300
.3800	9.652	GW-38000
.3780	9.601	GW-37800
.3750	9.525	GW-37500
.3543	9.000	GW-35433
.3500	8.890	GW-35000
.3438	8.733	GW-34380
.3231	8.208	GW-32315
.3149	8.000	GW-31496
.3125	7.938	GW-31250

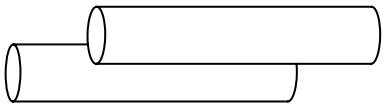
Misc.		
P (")	P (mm)	Series
.3061	7.775	GW-30610
.3024	7.681	GW-30240
.2969	7.541	GW-29690
.2952	7.500	GW-29528
.2864	7.276	GW-28646
.2835	7.201	GW-28350
.2812	7.142	GW-28120
.2786	7.076	GW-27860
.2755	7.000	GW-27559
.2721	6.912	GW-27213
.2721	6.911	GW-27210
.2667	6.774	GW-26670
.2646	6.721	GW-26460
.2637	6.700	GW-26378
.2616	6.645	GW-26160
.2600	6.604	GW-26000
.2559	6.500	GW-25590
.2551	6.480	GW-25510
.2500	6.350	GW-25000
.2480	6.300	GW-24803
.2469	6.271	GW-24690
.2464	6.261	GW-24648
.2420	6.147	GW-24200
.2381	6.048	GW-23810
.2362	6.000	GW-23622
.2362	5.999	GW-23620
.2344	5.954	GW-23440
.2300	5.842	GW-23000
.2268	5.761	GW-22680
.2211	5.616	GW-22110
.2187	5.556	GW-21875
.2187	5.555	GW-21870
.2185	5.550	GW-21850
.2165	5.500	GW-21653
.2150	5.461	GW-21500
.2130	5.410	GW-21300
.2080	5.283	GW-20800
.2066	5.250	GW-20669
.2041	5.184	GW-20410
.1984	5.039	GW-19840
.1968	5.000	GW-19685
.1875	4.763	GW-18750
.1866	4.741	GW-18666
.1851	4.702	GW-18510

GW Series

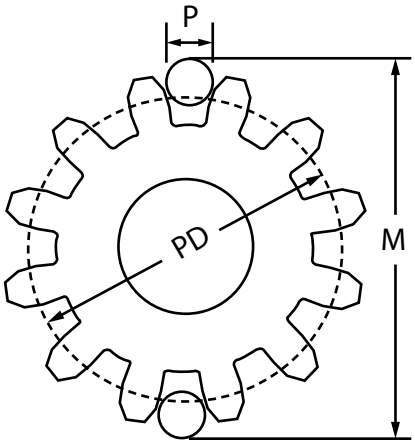
Miscellaneous Sizes

Gear Measuring Wires

XX Tolerance - Two wires per set



Wires sold is pairs only.

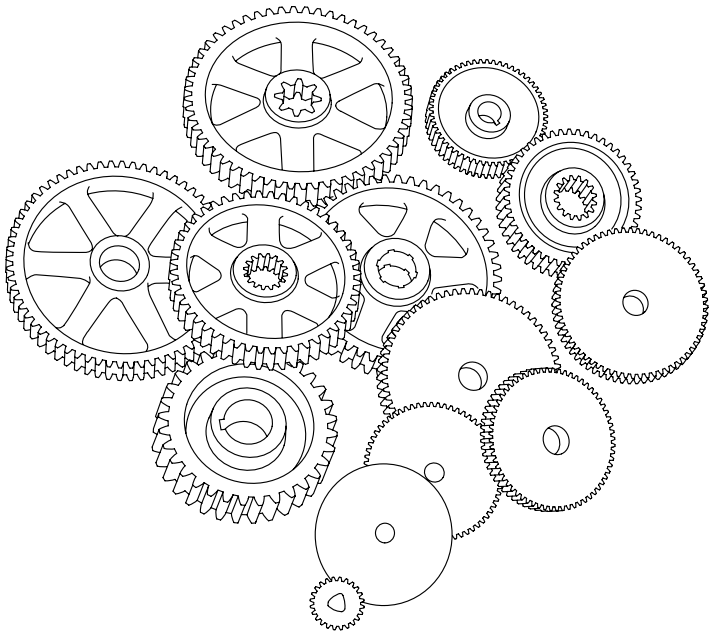


Misc.		
P (“)	P (mm)	Series
.0787	2.000	GW-07874
.0787	2.000	GW-07873
.0785	1.994	GW-07850
.0708	1.800	GW-07087
.0688	1.750	GW-06889
.0668	1.698	GW-06684
.0665	1.689	GW-06650
.0650	1.651	GW-06500
.0640	1.626	GW-06400
.0590	1.500	GW-05906
.0576	1.463	GW-05760
.0550	1.397	GW-05500
.0520	1.321	GW-05200
.0511	1.300	GW-05118
.0510	1.295	GW-05100
.0504	1.280	GW-05040
.0500	1.270	GW-05000
.0492	1.250	GW-04921
.0472	1.200	GW-04724
.0430	1.092	GW-04300
.0411	1.045	GW-04114
.0410	1.041	GW-04100
.0408	1.036	GW-04080
.0393	1.000	GW-03937
.0356	.904	GW-03560
.0343	.873	GW-03437
.0340	.864	GW-03400
.0320	.815	GW-03207
.0314	.800	GW-03148
.0303	.777	GW-03036
.0267	.678	GW-02670
.0240	.611	GW-02406
.0213	.543	GW-02138
.0161	.410	GW-01614
.0144	.367	GW-01443

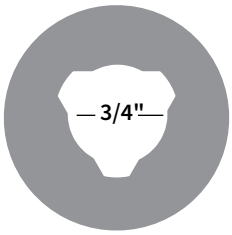
All wires shown in inch sizes

Misc.		
P (“)	P (mm)	Series
.1771	4.500	GW-17717
.1745	4.432	GW-17450
.1700	4.320	GW-17007
.1673	4.250	GW-16732
.1670	4.242	GW-16700
.1643	4.174	GW-16434
.1574	4.000	GW-15748
.1562	3.967	GW-15620
.1530	3.888	GW-15307
.1512	3.840	GW-15120
.1496	3.800	GW-14960
.1488	3.780	GW-14880
.1476	3.750	GW-14764
.1378	3.500	GW-13780
.1375	3.493	GW-13750
.1370	3.480	GW-13700
.1361	3.457	GW-13610
.1337	3.396	GW-13370
.1323	3.360	GW-13230
.1279	3.250	GW-12795
.1250	3.175	GW-12500
.1236	3.139	GW-12360
.1230	3.124	GW-12300
.1181	3.000	GW-11811
.1120	2.845	GW-11200
.1100	2.794	GW-11000
.1093	2.778	GW-10938
.1083	2.751	GW-10830
.1082	2.750	GW-10826
.1066	2.708	GW-10660
.1043	2.650	GW-10433
.1027	2.609	GW-10271
.1020	2.591	GW-10200
.1016	2.581	GW-10160
.0984	2.500	GW-09843
.0945	2.400	GW-09450
.0938	2.383	GW-09380
.0925	2.350	GW-09250
.0916	2.327	GW-09160
.0890	2.261	GW-08900
.0885	2.250	GW-08858
.0881	2.240	GW-08818
.0860	2.184	GW-08600
.0850	2.159	GW-08500

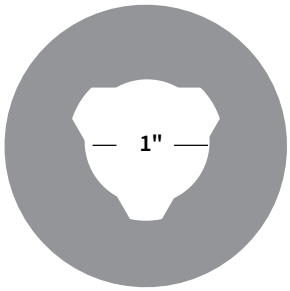
Change Gear Series Identification



Pitch	Bore	Series
20 DP	11/16" Bore	CG20
16 DP	3/4" Bore	CG16
12 DP	12 Spline	CG12
12 DP	1" Bore	CG12B
12 DP	1-1/4" Bore	CG12BL
12 DP	6 Spline	CG6
10 DP	1-1/4" Bore	CG10
8 DP	1-3/8" Bore	CG8



Standard Tri-lobe



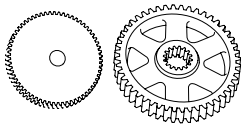
Large Tri-lobe

Pitch	Bore	Series
16 DP	Standard Tri-Lobe	CGT
16 DP	Large Tri-Lobe	CGBT

CG Series

8-12DP Sizes

Change Gears



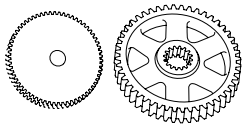
# of Teeth	8DP 14.5°PA 1.5"bore	10DP 14.5°PA 1.25"bore	10DP 14.5°PA .875"bore	10DP 20°PA 1.75"bore	10DP 20°PA 14 Spline bore	12DP 14.5°PA 12 Spline bore	12DP 14.5°PA 1"bore	12DP 14.5°PA 1.25"bore	12DP 14.5°PA .875"bore
18	-	-	CG10A-18	-	-	-	CG12B-18	-	CG12A-18
19	-	-	-	-	-	-	-	-	CG12A-19
20	-	CG10-20	CG10A-20	-	-	CG12-20	CG12B-20	-	CG12A-20
21	-	CG10-21	-	-	-	CG12-21	CG12B-21	-	CG12A-21
22	-	CG10-22	CG10A-22	-	-	CG12-22	CG12B-22	-	CG12A-22
23	-	CG10-23	-	-	-	CG12-23	CG12B-23	-	-
24	CG8-24	CG10-24	CG10A-24	-	-	CG12-24	CG12B-24	CG12BL-24	CG12A-24
25	-	CG10-25	CG10A-25	-	-	CG12-25	CG12B-25	CG12BL-25	CG12A-25
26	-	CG10-26	CG10A-26	-	-	CG12-26	CG12B-26	-	CG12A-26
27	-	CG10-27	CG10A-27	-	-	CG12-27	CG12B-27	CG12BL-27	-
28	-	CG10-28	CG10A-28	-	-	CG12-28	CG12B-28	CG12BL-28	CG12A-28
29	-	CG10-29	CG10A-29	-	-	CG12-29	CG12B-29	-	CG12A-29
30	-	CG10-30	-	-	CG14-30	CG12-30	CG12B-30	CG12BL-30	CG12A-30
31	-	CG10-31	-	-	-	CG12-31	CG12B-31	CG12BL-31	CG12A-31
32	CG8-32	CG10-32	CG10A-32	-	CG14-32	CG12-32	CG12B-32	CG12BL-32	CG12A-32
33	CG8-33	CG10-33	-	-	CG14-33	CG12-33	CG12B-33	CG12BL-33	CG12A-33
34	CG8-34	CG10-34	CG10A-34	-	-	CG12-34	CG12B-34	CG12BL-34	CG12A-34
35	CG8-35	CG10-35	-	-	CG14-35	CG12-35	CG12B-35	CG12BL-35	CG12A-35
36	-	CG10-36	CG10A-36	-	CG14-36	CG12-36	CG12B-36	CG12BL-36	CG12A-36
37	-	CG10-37	-	-	CG14-37	CG12-37	CG12B-37	CG12BL-37	CG12A-37
38	-	CG10-38	CG10A-38	-	CG14-38	CG12-38	CG12B-38	CG12BL-38	CG12A-38
39	-	CG10-39	-	-	CG14-39	CG12-39	CG12B-39	CG12BL-39	CG12A-39
40	CG8-40	CG10-40	-	-	CG14-40	CG12-40	CG12B-40	CG12BL-40	CG12A-40
41	CG8-41	CG10-41	-	-	CG14-41	CG12-41	CG12B-41	CG12BL-41	CG12A-41
42	CG8-42	CG10-42	-	-	CG14-42	CG12-42	CG12B-42	CG12BL-42	CG12A-42
43	CG8-43	CG10-43	-	-	CG14-43	CG12-43	CG12B-43	CG12BL-43	CG12A-43
44	CG8-44	CG10-44	-	-	CG14-44	CG12-44	CG12B-44	CG12BL-44	CG12A-44
45	CG8-45	CG10-45	-	-	CG14-45	CG12-45	CG12B-45	CG12BL-45	CG12A-45
46	CG8-46	CG10-46	-	-	CG14-46	CG12-46	CG12B-46	CG12BL-46	CG12A-46
47	CG8-47	CG10-47	-	-	CG14-47	CG12-47	CG12B-47	CG12BL-47	CG12A-47
48	CG8-48	CG10-48	-	-	CG14-48	CG12-48	CG12B-48	CG12BL-48	CG12A-48
49	CG8-49	CG10-49	-	-	CG14-49	CG12-49	CG12B-49	CG12BL-49	CG12A-49
50	CG8-50	CG10-50	-	CG10BL-50	CG14-50	CG12-50	CG12B-50	CG12BL-50	CG12A-50
51	CG8-51	CG10-51	-	CG10BL-51	CG14-51	CG12-51	CG12B-51	CG12BL-51	CG12A-51
52	CG8-52	CG10-52	-	-	CG14-52	CG12-52	CG12B-52	CG12BL-52	CG12A-52
53	CG8-53	CG10-53	-	-	CG14-53	CG12-53	CG12B-53	CG12BL-53	CG12A-53
54	CG8-54	CG10-54	-	-	CG14-54	CG12-54	CG12B-54	CG12BL-54	CG12A-54
55	CG8-55	CG10-55	-	-	CG14-55	CG12-55	CG12B-55	CG12BL-55	-
56	CG8-56	CG10-56	-	-	CG14-56	CG12-56	CG12B-56	CG12BL-56	-
57	CG8-57	CG10-57	-	-	CG14-57	CG12-57	CG12B-57	CG12BL-57	-
58	CG8-58	CG10-58	-	-	CG14-58	CG12-58	CG12B-58	CG12BL-58	CG12A-58
59	CG8-59	CG10-59	-	-	CG14-59	CG12-59	CG12B-59	CG12BL-59	-
60	CG8-60	CG10-60	-	-	CG14-60	CG12-60	CG12B-60	CG12BL-60	-
61	CG8-61	CG10-61	-	CG10BL-61	CG14-61	CG12-61	CG12B-61	CG12BL-61	-
62	CG8-62	CG10-62	-	-	CG14-62	CG12-62	CG12B-62	CG12BL-62	-
63	CG8-63	CG10-63	-	-	CG14-63	CG12-63	CG12B-63	CG12BL-63	-
64	CG8-64	CG10-64	-	-	CG14-64	CG12-64	CG12B-64	CG12BL-64	-
65	CG8-65	CG10-65	-	-	CG14-65	CG12-65	CG12B-65	CG12BL-65	-

SERIES CONTINUED ON NEXT PAGE ->

CG Series

8-12 DP Sizes

Change Gears



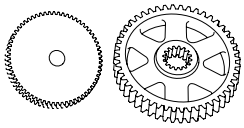
# of Teeth	8DP 14.5°PA 1.5”bore	10DP 14.5°PA 1.25”bore	10DP 14.5°PA .875”bore	10DP 20°PA 1.75”bore	10DP 20°PA 14 Spline bore	12DP 14.5°PA 12 Spline bore	12DP 14.5°PA 1”bore	12DP 14.5°PA 1.25”bore	12DP 14.5°PA .875”bore
66	CG8-66	CG10-66	-	CG10BL-66	CG14-66	CG12-66	CG12B-66	CG12BL-66	-
67	CG8-67	CG10-67	-	-	CG14-67	CG12-67	CG12B-67	CG12BL-67	-
68	CG8-68	CG10-68	-	-	CG14-68	CG12-68	CG12B-68	CG12BL-68	-
69	CG8-69	CG10-69	-	-	CG14-69	CG12-69	CG12B-69	CG12BL-69	-
70	CG8-70	CG10-70	-	-	CG14-70	CG12-70	CG12B-70	CG12BL-70	-
71	CG8-71	CG10-71	-	-	CG14-71	CG12-71	CG12B-71	CG12BL-71	-
72	CG8-72	CG10-72	-	CG10BL-72	CG14-72	CG12-72	CG12B-72	CG12BL-72	-
73	-	CG10-73	-	-	CG14-73	CG12-73	CG12B-73	CG12BL-73	-
74	-	CG10-74	-	-	CG14-74	CG12-74	CG12B-74	CG12BL-74	-
75	-	CG10-75	-	-	CG14-75	CG12-75	CG12B-75	CG12BL-75	-
76	CG8-76	CG10-76	-	-	-	CG12-76	CG12B-76	CG12BL-76	-
77	-	CG10-77	-	-	CG14-77	CG12-77	CG12B-77	CG12BL-77	-
78	CG8-78	CG10-78	-	-	-	CG12-78	CG12B-78	CG12BL-78	-
79	-	CG10-79	-	-	-	CG12-79	CG12B-79	CG12BL-79	-
80	CG8-80	CG10-80	-	-	-	CG12-80	CG12B-80	CG12BL-80	-
81	-	CG10-81	-	-	-	CG12-81	CG12B-81	CG12BL-81	-
82	-	CG10-82	-	-	-	CG12-82	CG12B-82	CG12BL-82	-
83	-	CG10-83	-	CG10BL-83	-	CG12-83	CG12B-83	CG12BL-83	-
84	-	CG10-84	-	CG10BL-84	-	CG12-84	CG12B-84	CG12BL-84	-
85	CG8-85	CG10-85	-	-	-	CG12-85	CG12B-85	CG12BL-85	-
86	CG8-86	CG10-86	-	-	-	CG12-86	CG12B-86	CG12BL-86	-
87	CG8-87	CG10-87	-	-	CG14-87	CG12-87	CG12B-87	CG12BL-87	-
88	CG8-88	CG10-88	-	-	-	CG12-88	CG12B-88	CG12BL-88	-
89	-	CG10-89	-	-	-	CG12-89	CG12B-89	CG12BL-89	-
90	-	CG10-90	-	-	-	CG12-90	CG12B-90	CG12BL-90	-
91	-	CG10-91	-	-	-	CG12-91	CG12B-91	CG12BL-91	-
92	CG8-92	CG10-92	-	-	-	CG12-92	CG12B-92	CG12BL-92	-
93	CG8-93	CG10-93	-	-	-	CG12-93	CG12B-93	CG12BL-93	-
94	CG8-94	CG10-94	-	-	-	CG12-94	CG12B-94	CG12BL-94	-
95	CG8-95	CG10-95	-	-	CG14-95	CG12-95	-	-	-
96	-	CG10-96	-	-	-	CG12-96	CG12B-96	CG12BL-96	-
97	-	CG10-97	-	-	-	CG12-97	CG12B-97	CG12BL-97	-
98	-	CG10-98	-	-	-	CG12-98	-	CG12BL-98	-
99	CG8-99	CG10-99	-	-	CG14-99	CG12-99	CG12B-99	-	-
100	CG8-100	CG10-100	-	-	-	CG12-100	-	-	-
101	-	CG10-101	-	-	-	CG12-101	-	CG12BL-101	-
102	-	CG10-102	-	-	-	CG12-102	-	CG12BL-102	-
103	-	CG10-103	-	-	-	CG12-103	-	CG12BL-103	-
104	-	CG10-104	-	-	-	CG12-104	-	CG12BL-104	-
105	-	CG10-105	-	-	-	CG12-105	-	CG12BL-105	-
106	-	CG10-106	-	-	-	CG12-106	-	CG12BL-106	-
107	-	CG10-107	-	-	-	CG12-107	-	CG12BL-107	-
108	-	CG10-108	-	-	-	CG12-108	-	CG12BL-108	-
109	-	-	-	-	-	CG12-109	-	CG12BL-109	-
110	-	-	-	-	-	CG12-110	-	CG12BL-110	-
111	-	-	-	-	-	CG12-111	-	CG12BL-111	-
112	-	CG10-112	-	-	-	CG12-112	-	CG12BL-112	-
113	-	CG10-113	-	-	-	CG12-113	-	CG12BL-113	-

SERIES CONTINUED ON NEXT PAGE ->

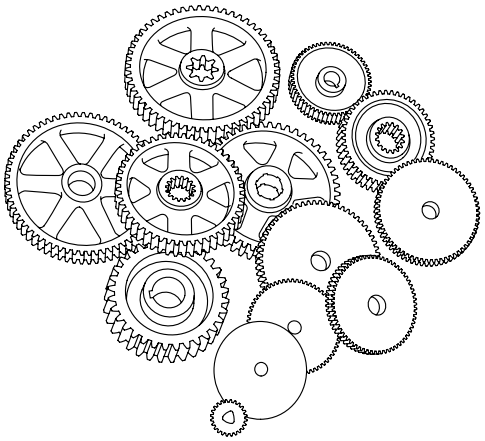
CG Series

8-12 DP Sizes

Change Gears



# of Teeth	8DP 14.5°PA 1.5”bore	10DP 14.5°PA 1.25”bore	10DP 14.5°PA .875”bore	10DP 20°PA 1.75”bore	10DP 20°PA 14 Spline bore	12DP 14.5°PA 12 Spline bore	12DP 14.5°PA 1”bore	12DP 14.5°PA 1.25”bore	12DP 14.5°PA .875”bore
114	-	-	-	-	-	CG12-114	-	-	-
115	-	-	-	-	-	CG12-115	-	-	-
116	-	-	-	-	-	-	-	-	-
117	-	-	-	-	-	CG12-117	-	-	-
118	-	-	-	-	-	-	-	-	-
119	-	CG10-119	-	-	-	CG12-119	-	-	-
120	-	CG10-120	-	-	-	-	-	CG12BL-120	-
121	-	-	-	-	-	-	-	-	-
122	-	-	-	-	-	-	-	-	-
123	-	-	-	-	-	-	-	-	-
124	-	-	-	-	-	-	-	CG12BL-124	-
125	-	-	-	-	-	-	-	-	-
126	-	-	-	-	-	-	-	-	-
127	-	-	-	-	-	CG12-127	-	-	-
128	-	-	-	-	-	-	-	-	-
129	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-
131	-	-	-	-	-	-	-	-	-
132	-	-	-	-	-	-	-	CG12BL-132	-
133	-	-	-	-	-	CG12-133	-	-	-

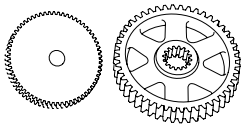


Pitch	Bore	Series
20 DP	11/16" Bore	CG20
16 DP	3/4" Bore	CG16
12 DP	12 Spline	CG12
12 DP	1" Bore	CG12B
12 DP	1-1/4" Bore	CG12BL
12 DP	6 Spline	CG6
10 DP	1-1/4" Bore	CG10
8 DP	1-3/8" Bore	CG8

CG Series

16-24 DP & Mod Sizes

Change Gears



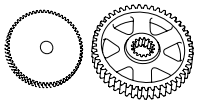
# of Teeth	16DP 14.5°PA .75"bore	16DP 14.5°PA .875"bore	18DP 20°PA .875"bore	20DP 14.5°PA .6875"Bore	20DP 14.5°PA 12 Spline bore	24DP 14.5°PA .625"bore	2Mod 20°PA 28mm D-bore	1.75Mod 20°PA 26mm D-bore
18	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-
20	CG16-020	-	-	-	-	-	CG2M-20	CG175M-20
21	CG16-021	-	-	CG20-21	-	-	-	CG175M-21
22	CG16-022	-	-	CG20-22	CG1220-22	-	-	-
23	CG16-023	-	-	CG20-23	-	-	-	CG175M-23
24	CG16-024	-	-	CG20-24	CG1220-24	CG24-24	CG2M-24	CG175M-24
25	CG16-025	-	-	CG20-25	-	CG24-25	-	CG175M-25
26	CG16-026	-	-	CG20-26	CG1220-26	CG24-26	-	CG175M-26
27	CG16-027	-	-	CG20-27	-	-	-	CG175M-27
28	CG16-028	-	-	CG20-28	-	CG24-28	-	CG175M-28
29	CG16-029	-	-	CG20-29	-	-	-	CG175M-29
30	CG16-030	-	-	CG20-30	CG1220-30	CG24-30	CG2M-30	CG175M-30
31	CG16-031	-	-	CG20-31	CG1220-31	CG24-31	-	CG175M-31
32	CG16-032	CG16B-32	-	CG20-32	CG1220-32	CG24-32	-	CG175M-32
33	CG16-033	-	-	CG20-33	CG1220-33	CG24-33	-	CG175M-33
34	CG16-034	CG16B-34	-	CG20-34	CG1220-34	CG24-34	-	CG175M-34
35	CG16-035	CG16B-35	-	CG20-35	CG1220-35	CG24-35	-	CG175M-35
36	CG16-036	CG16B-36	CG18-36	CG20-36	CG1220-36	CG24-36	-	CG175M-36
37	CG16-037	CG16B-37	-	CG20-37	CG1220-37	CG24-37	-	CG175M-37
38	CG16-038	CG16B-38	-	CG20-38	CG1220-38	CG24-38	-	CG175M-38
39	CG16-039	-	CG18-39	CG20-39	CG1220-39	CG24-39	-	CG175M-39
40	CG16-040	CG16B-40	-	CG20-40	CG1220-40	CG24-40	CG2M-40	CG175M-40
41	CG16-041	-	-	CG20-41	CG1220-41	CG24-41	CG2M-41	CG175M-41
42	CG16-042	CG16B-42	CG18-42	CG20-42	CG1220-42	CG24-42	CG2M-42	CG175M-42
43	CG16-043	-	-	CG20-43	CG1220-43	CG24-43	CG2M-43	CG175M-43
44	CG16-044	-	-	CG20-44	CG1220-44	CG24-44	CG2M-44	CG175M-44
45	CG16-045	-	-	CG20-45	CG1220-45	CG24-45	CG2M-45	CG175M-45
46	CG16-046	CG16B-46	-	CG20-46	CG1220-46	CG24-46	CG2M-46	CG175M-46
47	CG16-047	-	-	CG20-47	CG1220-47	CG24-47	CG2M-47	CG175M-47
48	CG16-048	CG16B-48	-	CG20-48	CG1220-48	CG24-48	CG2M-48	CG175M-48
49	CG16-049	-	-	CG20-49	CG1220-49	CG24-49	CG2M-49	CG175M-49
50	CG16-050	-	-	CG20-50	CG1220-50	CG24-50	CG2M-50	CG175M-50
51	CG16-051	-	-	CG20-51	CG1220-51	CG24-51	CG2M-51	CG175M-51
52	CG16-052	CG16B-52	-	CG20-52	CG1220-52	CG24-52	CG2M-52	CG175M-52
53	CG16-053	CG16B-53	-	CG20-53	CG1220-53	CG24-53	CG2M-53	CG175M-53
54	CG16-054	CG16B-54	-	CG20-54	CG1220-54	CG24-54	CG2M-54	CG175M-54
55	CG16-055	CG16B-55	-	CG20-55	CG1220-55	CG24-55	CG2M-55	CG175M-55
56	CG16-056	CG16B-56	-	CG20-56	CG1220-56	CG24-56	CG2M-56	CG175M-56
57	CG16-057	CG16B-57	-	CG20-57	CG1220-57	CG24-57	CG2M-57	CG175M-57

SERIES CONTINUED ON NEXT PAGE ->

CG Series

16-24 DP & Mod Sizes

Change Gears



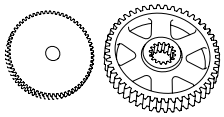
# of Teeth	16DP 14.5°PA .75"bore	16DP 14.5°PA .875"bore	18DP 20°PA .875"bore	20DP 14.5°PA .6875"Bore	20DP 14.5°PA 12 Spline bore	24DP 14.5°PA .625"bore	2Mod 20°PA 28mm D-bore	1.75Mod 20°PA 26mm D-bore
58	CG16-058	CG16B-58	-	CG20-58	CG1220-58	CG24-58	CG2M-58	CG175M-58
59	CG16-059	CG16B-59	-	CG20-59	CG1220-59	CG24-59	CG2M-59	CG175M-59
60	CG16-060	CG16B-60	-	CG20-60	CG1220-60	CG24-60	CG2M-60	CG175M-60
61	CG16-061	CG16B-61	-	CG20-61	CG1220-61	CG24-61	CG2M-61	CG175M-61
62	CG16-062	CG16B-62	-	CG20-62	CG1220-62	CG24-62	CG2M-62	CG175M-62
63	CG16-063	CG16B-63	-	CG20-63	CG1220-63	CG24-63	CG2M-63	CG175M-63
64	CG16-064	CG16B-64	-	CG20-64	CG1220-64	CG24-64	CG2M-64	CG175M-64
65	CG16-065	CG16B-65	CG18-65	CG20-65	CG1220-65	CG24-65	CG2M-65	CG175M-65
66	CG16-066	CG16B-66	-	CG20-66	CG1220-66	CG24-66	CG2M-66	CG175M-66
67	CG16-067	CG16B-67	-	CG20-67	CG1220-67	CG24-67	CG2M-67	CG175M-67
68	CG16-068	CG16B-68	-	CG20-68	CG1220-68	CG24-68	CG2M-68	CG175M-68
69	CG16-069	CG16B-69	-	CG20-69	CG1220-69	-	CG2M-69	CG175M-69
70	CG16-070	CG16B-70	CG18-70	CG20-70	CG1220-70	CG24-70	CG2M-70	CG175M-70
71	CG16-071	CG16B-71	CG18-71	CG20-71	CG1220-71	-	CG2M-71	CG175M-71
72	CG16-072	CG16B-72	CG18-72	CG20-72	CG1220-72	CG24-72	CG2M-72	CG175M-72
73	CG16-073	-	CG18-73	CG20-73	CG1220-73	-	CG2M-73	CG175M-73
74	CG16-074	-	CG18-74	CG20-74	CG1220-74	CG24-74	CG2M-74	CG175M-74
75	CG16-075	-	CG18-75	CG20-75	CG1220-75	-	CG2M-75	CG175M-75
76	CG16-076	-	CG18-76	CG20-76	CG1220-76	CG24-76	CG2M-76	CG175M-76
77	CG16-077	-	CG18-77	CG20-77	CG1220-77	-	CG2M-77	CG175M-77
78	CG16-078	CG16B-78	CG18-78	CG20-78	CG1220-78	-	CG2M-78	CG175M-78
79	CG16-079	-	CG18-79	CG20-79	CG1220-79	-	CG2M-79	-
80	CG16-080	-	CG18-80	CG20-80	CG1220-80	-	CG2M-80	-
81	CG16-081	-	CG18-81	CG20-81	CG1220-81	-	CG2M-81	-
82	CG16-082	-	CG18-82	CG20-82	CG1220-82	-	CG2M-82	-
83	CG16-083	-	CG18-83	CG20-83	CG1220-83	-	CG2M-83	-
84	CG16-084	CG16B-84	CG18-84	CG20-84	CG1220-84	-	CG2M-84	-
85	CG16-085	-	CG18-85	CG20-85	CG1220-85	-	CG2M-85	-
86	CG16-086	-	CG18-86	CG20-86	CG1220-86	-	CG2M-86	-
87	CG16-087	-	CG18-87	CG20-87	CG1220-87	-	-	-
88	CG16-088	-	CG18-88	CG20-88	CG1220-88	-	-	-
89	CG16-089	-	CG18-89	CG20-89	CG1220-89	-	CG2M-89	-
90	CG16-090	CG16B-90	CG18-90	CG20-90	CG1220-90	-	-	-
91	CG16-091	-	CG18-91	CG20-91	CG1220-91	-	-	-
92	CG16-092	-	CG18-92	CG20-92	CG1220-92	-	-	-
93	CG16-093	-	CG18-93	CG20-93	CG1220-93	-	-	-
94	CG16-094	-	CG18-94	CG20-94	CG1220-94	-	CG2M-94	-
95	CG16-095	-	CG18-95	CG20-95	CG1220-95	-	-	-
96	CG16-096	CG16B-96	CG18-96	CG20-96	CG1220-96	-	CG2M-96	CG175M-96
97	CG16-097	-	CG18-97	CG20-97	CG1220-97	-	CG2M-97	-
98	CG16-098	-	CG18-98	CG20-98	CG1220-98	-	-	-

SERIES CONTINUED ON NEXT PAGE ->

CG Series

16-24 DP & Mod Sizes

Change Gears



# of Teeth	16DP 14.5°PA .75"bore	16DP 14.5°PA .875"bore	18DP 20°PA .875"bore	20DP 14.5°PA .6875"Bore	20DP 14.5°PA 12 Spline bore	24DP 14.5°PA .625"bore	2Mod 20°PA 28mm D-bore	1.75Mod 20°PA 26mm D-bore
99	CG16-099	-	CG18-99	CG20-99	CG1220-99	-	-	-
100	CG16-100	-	CG18-100	CG20-100	CG1220-100	-	-	-
101	-	-	CG18-101	-	CG1220-101	-	-	-
102	CG16-102	-	CG18-102	-	CG1220-102	-	-	-
103	CG16-103	-	CG18-103	CG20-103	CG1220-103	-	-	-
104	CG16-104	-	CG18-104	-	CG1220-104	-	-	-
105	CG16-105	-	CG18-105	-	CG1220-105	-	-	-
106	CG16-106	-	-	-	CG1220-106	-	-	-
107	CG16-107	-	-	-	CG1220-107	-	-	-
108	-	-	-	-	CG1220-108	-	-	-
109	CG16-109	-	-	-	CG1220-109	-	-	-
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111	CG16-111	-	-	-	CG1220-111	-	-	-
112	CG16-112	-	-	-	CG1220-112	-	-	-
113	CG16-113	-	-	CG20-113	CG1220-113	-	-	-
114	CG16-114	-	-	-	CG1220-114	-	-	-
115	CG16-115	-	-	CG20-115	CG1220-115	-	-	-
116	CG16-116	-	-	-	CG1220-116	-	-	-
117	CG16-117	-	-	-	-	-	-	-
118	CG16-118	-	-	-	-	-	-	-
119	CG16-119	-	-	-	-	-	-	-
120	CG16-120	-	-	CG20-120	CG1220-120	-	-	-
121	-	-	-	-	-	-	-	-
122	CG16-122	-	-	-	-	-	-	-
123	CG16-123	-	-	-	-	-	-	-
124	CG16-124	-	-	-	-	-	-	-
125	CG16-125	-	-	-	-	-	-	-
126	-	-	-	-	-	-	-	-
127	-	-	-	-	-	-	-	-
128	-	-	-	-	CG1220-128	-	-	-
129	-	-	-	-	-	-	-	-
130	-	-	CG18-130	-	-	-	-	-
131	CG16-131	-	-	-	-	-	-	-
132	-	-	-	-	-	-	-	-
133	-	-	-	-	-	-	-	-
134	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-	-
136	-	-	-	-	-	-	-	-
137	-	-	-	-	-	-	-	-
138	-	-	-	-	-	-	-	-
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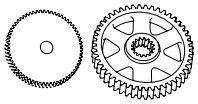
SERIES CONTINUED ON NEXT PAGE ->

CG Series

16-24 DP & Mod Sizes

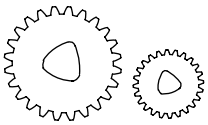
Change Gears



# of Teeth	16DP 14.5°PA .75”bore	16DP 14.5°PA .875”bore	18DP 20°PA .875”bore	20DP 14.5°PA .6875”Bore	20DP 14.5°PA 12 Spline bore	24DP 14.5°PA .625”bore	2Mod 20°PA 28mm D-bore	1.75Mod 20°PA 26mm D-bore
140	-	-	-	-	-	-	-	-
141	-	-	-	-	-	-	-	-
142	-	-	-	-	-	-	-	-
143	-	-	-	-	-	-	-	-
144	CG16-144	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-	-
146	-	-	-	CG20-146	-	-	-	-
147	-	-	-	-	-	-	-	-
148	-	-	-	-	-	-	-	-
149	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-
151	CG16-151	-	-	-	-	-	-	-
152	-	-	-	-	-	-	-	-
153	-	-	-	-	-	-	-	-
154	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-
156	-	-	-	-	-	-	-	-
157	CG16-157	-	-	-	-	-	-	-
158	-	-	-	-	-	-	-	-
159	-	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-	-
161	-	-	-	-	-	-	-	-
162	-	-	-	-	-	-	-	-
163	CG16-163	-	-	-	-	-	-	-

CGT CGB10 & CGBT Series

Fellows Tri-Lobe Change Gears

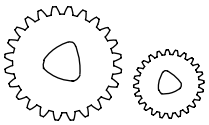


# of Teeth	16DP 15.3°PA Tri-Lobe	16DP 15.3°PA Large Tri-Lobe	10DP 20°PA Large Tri-Lobe
17	CGT-017	-	-
18	CGT-018	-	-
19	CGT-019	-	-
20	CGT-020	-	-
21	CGT-021	-	-
22	CGT-022	-	-
23	CGT-023	-	-
24	CGT-024	CGBT-024	-
25	CGT-025	CGBT-025	-
26	CGT-026	CGBT-026	-
27	CGT-027	CGBT-027	-
28	CGT-028	CGBT-028	-
29	CGT-029	CGBT-029	-
30	CGT-030	CGBT-030	-
31	CGT-031	CGBT-031	-
32	CGT-032	CGBT-032	-
33	CGT-033	CGBT-033	-
34	CGT-034	CGBT-034	-
35	CGT-035	CGBT-035	-
36	CGT-036	CGBT-036	-
37	CGT-037	CGBT-037	-
38	CGT-038	CGBT-038	-
39	CGT-039	CGBT-039	-
40	CGT-040	CGBT-040	-
41	CGT-041	CGBT-041	-
42	CGT-042	CGBT-042	-
43	CGT-043	CGBT-043	-
44	CGT-044	CGBT-044	CGB10-44
45	CGT-045	CGBT-045	CGB10-45
46	CGT-046	CGBT-046	-
47	CGT-047	CGBT-047	-
48	CGT-048	CGBT-048	CGB10-48
49	CGT-049	CGBT-049	-
50	CGT-050	CGBT-050	-
51	CGT-051	CGBT-051	-
52	CGT-052	CGBT-052	-
53	CGT-053	CGBT-053	-
54	CGT-054	CGBT-054	CGB10-54
55	CGT-055	CGBT-055	-
56	CGT-056	CGBT-056	-

# of Teeth	16DP 15.3°PA Tri-Lobe	16DP 15.3°PA Large Tri-Lobe	10DP 20°PA Large Tri-Lobe
57	CGT-057	CGBT-057	-
58	CGT-058	CGBT-058	-
59	CGT-059	CGBT-059	CGB10-59
60	CGT-060	CGBT-060	CGB10-60
61	CGT-061	CGBT-061	CGB10-61
62	CGT-062	CGBT-062	CGB10-62
63	CGT-063	CGBT-063	CGB10-63
64	CGT-064	CGBT-064	CGB10-64
65	CGT-065	CGBT-065	CGB10-65
66	CGT-066	CGBT-066	CGB10-66
67	CGT-067	CGBT-067	CGB10-67
68	CGT-068	CGBT-068	CGB10-68
69	CGT-069	CGBT-069	CGB10-69
70	CGT-070	CGBT-070	CGB10-70
71	CGT-071	CGBT-071	CGB10-71
72	CGT-072	CGBT-072	CGB10-72
73	CGT-073	CGBT-073	CGB10-73
74	CGT-074	CGBT-074	CGB10-74
75	CGT-075	CGBT-075	CGB10-75
76	CGT-076	CGBT-076	CGB10-76
77	CGT-077	CGBT-077	CGB10-77
78	CGT-078	CGBT-078	CGB10-78
79	CGT-079	CGBT-079	CGB10-79
80	CGT-080	CGBT-080	CGB10-80
81	CGT-081	CGBT-081	CGB10-81
82	CGT-082	CGBT-082	CGB10-82
83	CGT-083	CGBT-083	CGB10-83
84	CGT-084	CGBT-084	-
85	CGT-085	CGBT-085	CGB10-85
86	CGT-086	CGBT-086	-
87	CGT-087	CGBT-087	-
88	CGT-088	CGBT-088	CGB10-88
89	CGT-089	CGBT-089	-
90	CGT-090	CGBT-090	-
91	CGT-091	CGBT-091	-
92	CGT-092	CGBT-092	-
93	CGT-093	CGBT-093	-
94	CGT-094	CGBT-094	-
95	CGT-095	CGBT-095	-
96	CGT-096	CGBT-096	-

CGT CGB10 & CGBT Series

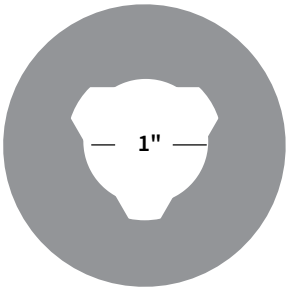
Fellows Tri-Lobe Change Gears



# of Teeth	16DP 15.3°PA Tri-Lobe	16DP 15.3°PA Large Tri-Lobe	10DP 20°PA Large Tri-Lobe
97	CGT-097	CGBT-097	-
98	CGT-098	CGBT-098	-
99	CGT-099	CGBT-099	-
100	CGT-100	CGBT-100	-
101	CGT-101	CGBT-101	-
102	CGT-102	CGBT-102	-
103	CGT-103	CGBT-103	-
104	CGT-104	CGBT-104	-
105	CGT-105	CGBT-105	-
106	CGT-106	CGBT-106	-
107	CGT-107	CGBT-107	-
108	CGT-108	CGBT-108	-
109	CGT-109	CGBT-109	-
110	CGT-110	CGBT-110	-
111	CGT-111	CGBT-111	-
112	CGT-112	CGBT-112	-
113	CGT-113	CGBT-113	-
114	CGT-114	CGBT-114	-
115	CGT-115	CGBT-115	-
116	CGT-116	CGBT-116	-
117	CGT-117	CGBT-117	-
118	CGT-118	CGBT-118	-
119	CGT-119	CGBT-119	-
120	CGT-120	CGBT-120	-
121	CGT-121	CGBT-121	-
122	CGT-122	CGBT-122	-
123	CGT-123	CGBT-123	-
124	CGT-124	CGBT-124	-
125	CGT-125	CGBT-125	-
126	CGT-126	CGBT-126	-
127	CGT-127	CGBT-127	-
128	CGT-128	CGBT-128	-
129	CGT-129	CGBT-129	-
130	CGT-130	CGBT-130	-
131	CGT-131	CGBT-131	-
132	CGT-132	CGBT-132	-
133	CGT-133	-	-
134	CGT-134	-	-
135	CGT-135	-	-
136	CGT-136	-	-

# of Teeth	16DP 15.3°PA Tri-Lobe	16DP 15.3°PA Large Tri-Lobe	10DP 20°PA Large Tri-Lobe
137	CGT-137	-	-
138	CGT-138	-	-
139	CGT-139	-	-
140	CGT-140	-	-
141	CGT-141	-	-
142	CGT-142	-	-
143	CGT-143	-	-
144	CGT-144	CGBT-144	-
145	-	-	-
146	-	-	-
147	CGT-147	-	-
148	-	-	-
149	CGT-149	-	-
150	-	-	-
151	CGT-151	-	-

Standard Tri-lobe

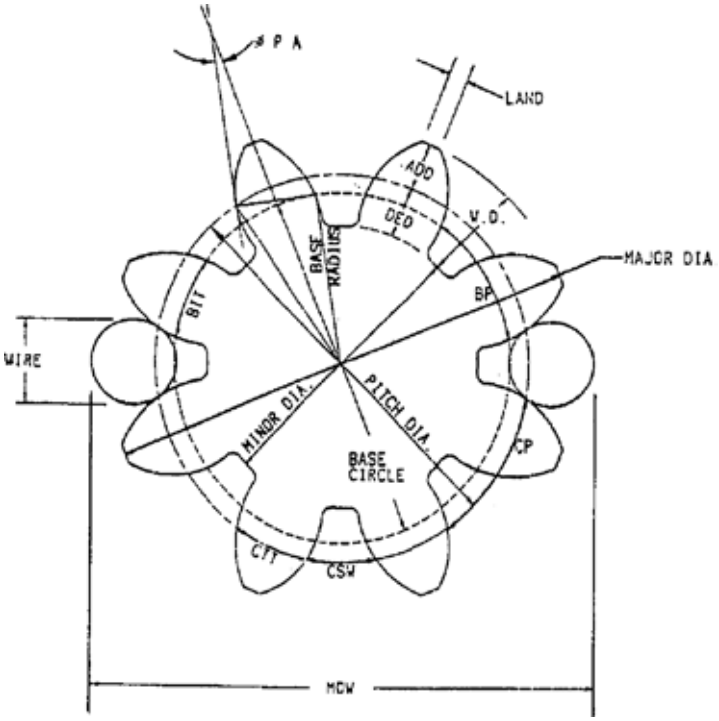


Large Tri-lobe

GCP4 – GEAR CALCULATION PROGRAM

Calculates your gear data even when you have a limited amount of information. GCP2 calculates all your gear data:

- Pitch- Module Module Circular
- Pressure angle at P.D.
- Base pitch
- Major
- Minor
- Addendum
- Dedendum
- Tooth thickness - Circular and Chordal
- MOW/MBW - for any wire diameter



GCP4 is a seven program package for use with:

Internal Spur
External Spur
Internal Helical
External Helical
Worm Gears
Rack & Worm threads
Straight sided splines
30°, 37.5°, 45°, Pressure angle, involute splines, DIN, ANSI, Standard & non standard, Long addendum, short addendum. Completely configurable.

GCP4 is pre-loaded with standard AGMA depth standards, 2.157/DP, 2.25/DP, 2.335/DP, 2.2/DP + .002, Comb. stub & AGMA stub.

All the GCP2 programs share a common trait, field integration. Data fields are updated when a related field is modified. For example, if on the external spur gear screen the P.D. is moved down the tooth from 3” to 2.95” the fields for pressure angle and tooth thickness are updated to the values for the new P.D., (other related fields are also updated).

The Seven programs are easy to use. As little data as Pitch, Pressure angle and number of teeth are all that’s needed to complete the gear data fields to standard values based on the depth system selected. Information can be output to a printer or a file, you can even display the gear tooth profile on the screen to review. Please call for quotation.

CPC-24 – BEVEL GENERATOR SETUP SOFTWARE

This setup program is for Gleason No’s. 12, 14, & 24 Machine. These machines use two planer-style cutters having specified rack form pressure angle and point width. Setup includes A & B dial settings for pattern control.

CPC-24 features:

- Accepts angular sets where shaft angle is not 90°.
- Suggests correct long (pinion) & short (gear) addendums to control undercut.
- Determines balanced tooth strength by suggesting best tooth thicknesses.
- Saves setup history to an internal database. Allows rerunning an old setup at any time.
- May be configured to keep track of change gears and cutters for each of your machines separately. Useful for tooling inventory control. Or may be used for a single machine.
- No graphs, tables, or calculator necessary to produce summary results.
- Complete dimension sheet and machine setup can be reviewed on screen and printed out for use at machine.
- Complete with on-line context sensitive help.

CPC-2A – CONIFLEX STRAIGHT BEVEL GENERATOR

This setup program is for a Gleason No. 2A Coniflex machine. The 2A machine uses rotary milling-style cutters and is typically used to cut 10NDP or finer gears. Very productive, fast floor-to-floor times.

CPC-2A Features:

- Calculates gear dimensions, angles, tooth proportions, and all machine setup data ready for the shop floor.
- Handles angular gear sets.
- Provides formate cutting option. Can be useful at large shaft angles.
- Suggests correct long (pinion) & short (gear) addendums to control undercut.
- Determines balanced tooth strength by suggesting best tooth thicknesses.
- Saves setup history to an internal database with one click. You can rerun an old setup at any time.
- Automatically directs you to extra-depth feed cam only when necessary.
- Does not require tables, graphs, or calculator. Fully self contained.
- Complete with on-line context sensitive help.

CPC-26 – SPIRAL BEVEL GENERATOR

This setup program is for Gleason No. 26 spiral bevel machine. The basic No. 26 may be used in several processes: roughing, finishing, grinding, production, and in “jobber” (Small Job Fixed Blade) mode. High production requires the fixed-blade setup method which requires special cutters/bodies specific to the job.

CPC-26 Features:

- Produces setups for the jobber (SJFB) method only. An SJFB setup requires each member to be machine mounted and cut twice. This is quite acceptable for small lots and is actually Gleason’s recommendation to control contact pattern and profile bearing. Because of it ability to use your tooling cutters to cover a range of pitches and ratios, the No. 26 machine is ideally suited for small job lots and the SJFB method.
- Suggests best tooth proportions. You alter to suit your design.
- Handles angular gear sets. You specify the shaft angle.
- Lets you make tooling choices from suggested optimum selections. Displays all possible choices based on your tooling inventory.
- Print out complete machine setup for roughing and finishing, including all machine settings and change gears.
- Any setup can be saved to and retrieved from database.
- Accurate first-time setups are produced quickly to help you make small lot sizes profitable.
- Warns you whenever a potential problem could occur. Permits you to continue if not critical, or allows you to alter your inputs.
- So far, field trials have demonstrated that bias settings and re-cutting have been unnecessary.
- Bias settings are provided, just in case. You control the work test roll bias amount. Complete with on-line

CPC-HOB - For all gear hobbing machines

CPC-HOB is a simple and painless way to set up all types of gear hobbers. You select a machine, enter gear specs and CPC-HOB creates a complete set of change gears - for differential or non-differential machines. You easily control table feed. Easily sets up machines without differentials to cut helical gears.

CPC-HOB features:

- Maintains a customized list of your hobbing machines. Enter machine constants once and only once. If you have difficulty finding out what your hob machine constants are, we can do it for you. This is the only time you need to consider what a machine constant is!
- Works for all gear hobbing machines: with differential, without differential, dial feed, or tangential feed. Helical or spur, prime or not.
- Change gear inventories may be customized for each machine.
  Enter a min. and max. size and enter missing sizes to be excluded from change gear sets.
- When you start a setup, simply select a machine from the machine list, enter your gear specs and suggest a table feed.
  CPC-HOB does the rest.
- Enter your gear data as NDP, NCP, or MODULE. Enter helix angle in Degrees/Minutes or Decimal Degrees.
- Don’t like the gear set chosen? You can remove a gear size from any change gear set (index, differential, or feed) and CPC-HOB finds the next best set. This ability to accept only the gear set you want assures you a working setup for your machine.
- Create a special hybrid setup for a differential machine to cut large prime number teeth on spur gears.
- Determines OD and over pin measurement. You specify Min/Max backlash allowance.
- Complete with on-line context sensitive help.

Contents:
Trigonometry Table • Natural Functions, Sines • Cosines • Tangents • Cotangents • Secants • Cosecants • Involute Functions - Tables and Formulas for Spur and Helical Gears, General Formulas, The Involute Functions, Rolling for Size with Master, Block (span) Measurement, Tooth Caliper Measurement, How to Measure over Pins or Ball, and much more.
• The old ever popular ITW Trig Tables

Trigonometry Tables & Involute Functions

ORDER NO.: BK-ASH

3" x 6" Pocket Size, 72 pgs.

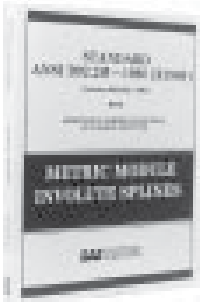
Contents:
This ANSI B92.1-1996 standard is the result of a joint effort by SAE Involute Splines, Serrations and Inspection Committee and ANSI Standards Committee B92, Involute Splines and Inspection, to update ASA B5.15-1960. ASA B5.15-1960 was essentially a revision and consolidation of ASA B5.15-1950, ASA B5.26-1950 and ASA B5.31-1953. Most of the features of the 1960 standard are retained; plus the addition of three tolerance classes, for a total of four. The standard includes involute splines with 30°, 37-1/2°, and 45° pressure angle and tables for these splines. Detailed inspection data is included. All dimensions, listed in this standard, are for the finished part. This publication is approved by the American National Standards Institute.

INVOLUTE SPLINES AND INSPECTION

ORDER NO.: BK-1970

Sponsored by The Society of Automotive Engineers Inc. and American Society of Mechanical Engineers, 154 pgs., ANSI B92.1-1996

Contents:
This B92.2M-1989 involute spline standard presented in hard metric form is the American National Standards Institute (ANSI) version of the International Standards Organization (ISO) involute spline standard ISO 4156. This is not a "soft metric" conversion of any previous inchbased spline standard. This publication is divided into three parts. Parts I and II cover spline generalities and dimensions. Part III covers spline inspection. The ISO 4156 standard, from which this document is derived, is the result of a cooperative effort between the ANSI B92 Committee and other members of the ISO/TC 14-2 Involute Spline Committee.



METRIC MODULE INVOLUTE SPLINES

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Standard ANSI B92.2M-1980 (R1989) Includes B92.2MA-1984, 257 pgs., SAE

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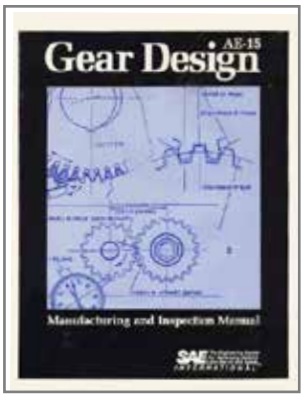
Throughout the last decade, significant technological advancements have virtually revolutionized the gear engineering industry. In one complete volume, this authoritative publication details technologies and applications in the design, manufacture and inspection of gears. Individual, comprehensive sections on design, manufacture and inspection are included, as well as an extensive appendix complete with a glossary of terms, listings of related standards, sources for educational and technical information, and much more. An essential reference for the mobility engineer needing a single source to current concepts and techniques for gear design and its applications.

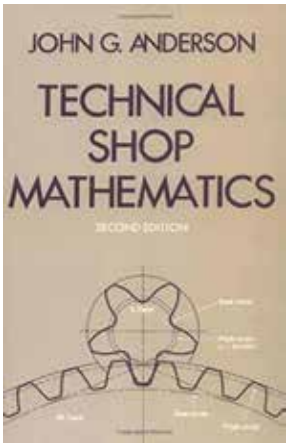


GEAR DESIGN, MANUFACTURING & INSPECTION MANUAL

ORDER NO.: BK-006

1990, Over 500 figures and graphs.
ISBN 1-56091-006-2, 656 pgs.,
4 Sections, 49 Papers, Hardbound

Contents:
Suitable for home study, classroom use or as a superior reference guide for the shop professional, this practical text presents a review and introduction to basic shop mathematics in a straightforward manner.
• Offers a slowly paced exposition of the basic principles of the subject necessary to machinist, toolmakers, patternmakers and other persons in the mechanical trades.
• Logically progresses from arithmetical operations through measurement systems to basic algebra for shop-formula solving skills, practical geometry with shop examples and applications, and trigonometry to emphasize its valuable use in the shop and trades.
• Provides numerous shop-related problems requiring practical application of principles, as well as worked-out examples reinforcing concepts.
• Uses actual part detail - gages, plugs, templates for each practical application of geometric and trigonometric principles.



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1983 , By John G. Anderson, 500 pgs.,
ISBN 0-8311-114

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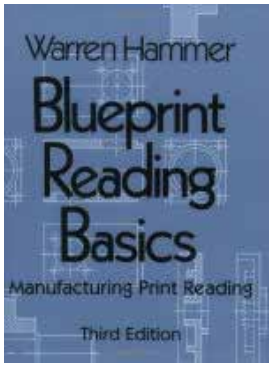
Written in a non-technical and easy-tounderstand manner, this practical guide combines blueprint reading theory with industry applications. Appropriate for anyone wanting to learn how to read blueprints or needing additional information on the subject. This includes machinists, mechanics, technicians, inspectors, personnel in maintenance and repair service industries as well as students taking blueprint reading, machine shop or tool and die courses.



BLUEPRINT READING BASICS

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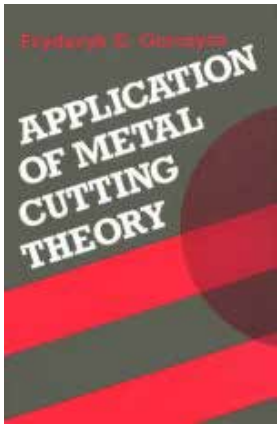
ISBN 0-8311-1186-0

Contents:
Explains how to intelligently select the most economical cutting tools and materials.
• Supplies all unknowns to consider before making cutting decisions.
• Increases analytical skill through application of the scientific method.
• Contains 106 illustrative example problems, 27 technical data tables, and 125 end-of-chapter problems.



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By Fryderyk E. Gorczya, 1987, 275 pgs.
ISBN 0-8311-1176-3

Contents:
These valuable combination texts and reference guides include everything from underlying principles, to standards, to calculations for every specific task in shop training.
• Presents an outstanding study on machine shop practice that includes fundamental principles and methods of adjusting and using different types of machine tools.
• Provides typical examples of work-measuring instruments and gauges, cutting screw threads by different processes, thread grinding, gear cutting, precision toolmaking methods, typical shop problems with solutions, miscellaneous facts relating to the art of machine construction, and much more.

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By Franklin D. Jones,
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Vol. II 1964, 566 pgs.,ISBN 0-8311-1040-6

Contents:
• Now offers sections on numerical control, grinding wheels, single point cutting tools and tool wear, basic drilling machine setups and formulas for estimating the power required for planning.
• Gives greater attention to methods of setting up the workpiece on milling machines, horizontal boring machines, planners and shapers.
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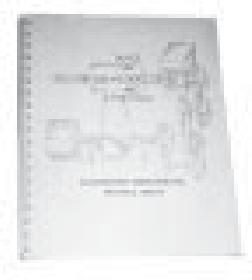
Contents:
Recess Action Gears may be used whenever one gear is a driver and the other a follower to provide better gear tooth action, longer life and less noise than standard form gears. Includes tables showing the necessary data for the design and manufacture of recess action gears for both 20° and 25° PA. All values in the tables are for 1 DP performing all basic gear calculation, for 1 DP generally results in simpler calculations, reduces chances for error and the interpretation of the numbers derived in terms of geometry of the gear form is more easily visualized.

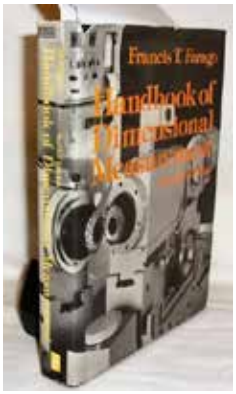


TABLES FOR RECESS ACTION GEARS

ORDER NO.: BK-B400

By E.K. Buckingham, 1964, 94 pgs., Plastic Comb Binding

Contents:
• Provides 19 chapters filled with authorized treatments of all aspects of dimensional measurement technology for industry. Contains four new chapters – Screw Thread Gaging and Measurement, Measurement of Gears, Process Control Gaging and Automated Dimensional Measurements.



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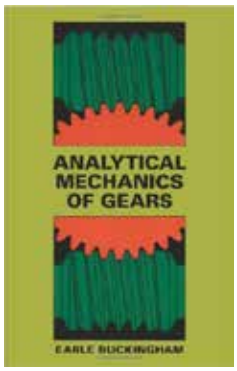

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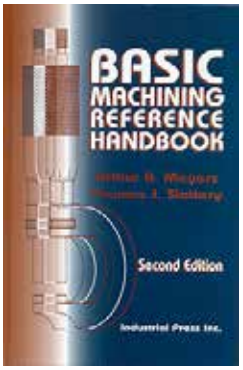

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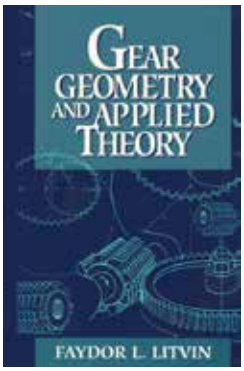

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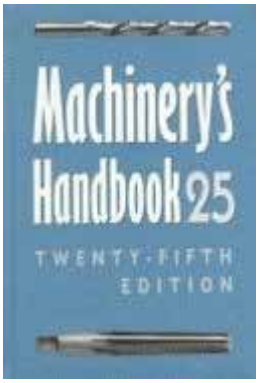

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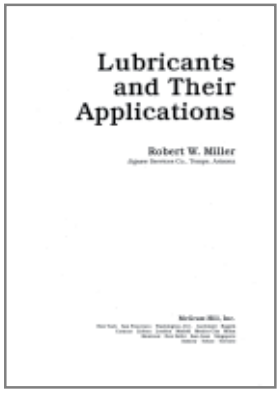

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By Robert W. Miller, 1993, 193 pgs., illus., ISBN 0-07-041992-2

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Dudley describes 5,000 years of gear history, from the earliest known gear relics through the great advances in 20th Century gearing. The text is profusely illustrated with historical examples, and is useful to anyone interested in the development of gear engineering. In Addition to providing a precise history of gears, Dudley also discuses the future of gears and highlights the most significant trends in modern gear engineering.

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By D. W. Dudley, 90 pgs.,

Contents:
Basic Theory of Gear-Tooth Action and Generation
*Functional Types of Gears *Gear Arrangements*Elements of Gears and Basic Formulas*Gear-Tooth Proportions
*Center-Distance*Special Calculations for Spur and Helical Gears*Calculation of Gear Reactions and Mountings*Load Ratings of Gears*Loaded Gears in Action*Lubrication of Gears*Gear Cutting*Gears Produced by Dies*Gear Finishing by Shaving, Honing and Lapping*Grinding Spur and Helical Gers*Bevel-and-Hypoid Gear Manufacturing*Worm and Wormgear Cutting and Grinding Process*Gear-Cutting Tools*Gear-Inspection Devices
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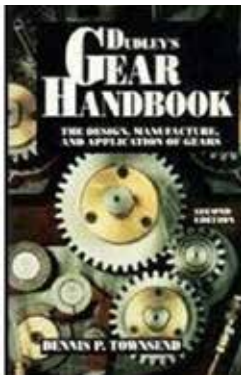

GEAR HANDBOOK: The Design, Manufacture and Application of Gears

ORDER NO.: BK-D902

***Hard to Find**

By D.W. Dudley
1962, 937 pgs., illus.
ISBN 0-07-017902-6

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Terms & Definitions - The following is a list of terms and definitions commonly used in the gear industry.

Active Profile -
The part of the gear tooth profile which actually comes in contact with the profile of its mating tooth along the line of action.

Addendum -
The height by which a tooth of a gear projects beyond (outside for external, or inside for internal) the standard pitch circle or pitch line; also, the radial distance between the pitch diameter and the outside diameter

Angular Bevel Gears -
Are bevel gears in which the axes are not at a right angle.

Arc of Action -
The arc of the pitch circle through which a tooth travels from the time it first makes contact with a mating tooth until contact with mating tooth ceases.

Arc of Approach -
The arc of the pitch circle through which a tooth travels from the time it first makes contact with a mating tooth until it is in contact at the pitch point.

Axial Pitch -
The distance in an axial plane surface between corresponding adjacent tooth profiles.

Axial Pitch of Worm -
The distance parallel to the axis of the worm between corresponding sides of adjacent teeth. The term axial pitch is preferred to the term linear pitch.

Axial Plane - (of a pair of gears)
The plane that contains the two axes. In a single gear, an axial plane may be any plane containing the axis and a point of its diameter.

Axial Pressure Angle of Worm -
The angle in a axial plane between the side of the thread and a line perpendicular to the axis.

Axial Thickness of Worms -
The distance parallel to the axis between two pitch line elements of the same tooth.

Back Angle -
In a bevel gear, the angle between an element of the back cone and a plane of rotation, usually equal to the pitch angle.

Back Cone -
In a bevel or hypoid gear, an imaginary cone tangent to the outer ends of the teeth, with its elements perpendicular to those of the pitch cone.

Back Cone Distance -
In a bevel gear, the distance along an element of the back cone from its apex to the pitch circle.

Backlash -
Is the amount by which the width of a tooth space exceeds the thickness of the engaging tooth on the pitch circles. In the context of gears, backlash is clearance between mating components, or the amount of lost motion due to clearance or slackness when movement is reversed and contact is re-established.

Backlash Variation -
The difference between the maximum and minimum backlash occurring in a whole revolution of the larger of a pair of mating gears.

Base Circular Thickness -
The length of arc on the base circle between two involute curves forming the profiles of a tooth.

Base Cylinder -
The cylinder of the same diameter as the base circle.

Base Lead Angle -
The lead angle on a base cylinder.

Base Diameter -
The diameter of the circle from which the involute is generated.

Base Helix Angle -
The helix angle on the base cylinder.

Base Pitch - (normal to involute)
The circular pitch taken in the circumference of the base circle, and is also the distance along the line of action between two successive and corresponding involute profiles.

Base Radius -
The radius of the circle from which the involute is generated.

Bevel Gears -
Gears of conical form designed to operate on intersecting axes.

Bottom Land -
The surface at the bottom of a gear tooth space adjoining the fillet.

Center Distance -
The shortest distance between non-intersecting axes of mating gears.

Central Plane of a Worm Gear -
The plane perpendicular to the gear axis and containing the common perpendicular of the gear and worm axes.

Chordal Addendum - (for tooth calipers)
The radial distance from the circular thickness chord to the top of the tooth.

Chordal Addendum - (normal)
The perpendicular distance from the normal thickness chord to the top of the tooth.

Chordal Thickness -
The length of the chord suspended by the circular thickness arc.

Circular Pitch -
The distance along the pitch circle or pitch line between corresponding profiles of adjacent teeth.

Circular Thickness -
The thickness of the tooth on the pitch circle.

Clearance -
The amount by which the dedendum in a given gear exceeds the addendum of its mating gear.

Composite Action -
The variation in center distance when two gears are rolled in tight mesh.

Cone Distance -
The distance along an element of the pitch cone from the apex to any given position along the length of a tooth.

Contact Ratio -
The ratio of the arc of action to the circular pitch.

Contact Ratio Face -
The ratio of the face advance to the circular pitch.

Contact Ratio Total -
The ratio of the sum of the arc of action and the face advance to the circular pitch.

Crossed Helical Gears -
Gears that operate on non-intersecting axes.

Crossing Point -
The point of intersection of bevel gear axes; also the apparent point of intersection of the axes in hypoid gears, crossed helical gears, worm-gears, and offset face gears, when projected to a plane parallel to both axes.

Crown Circle -
The circle of intersection of the back and face cones.

Crown Gear -
A bevel gear having a plane pitch surface.

Crowned Teeth -
Teeth having surfaces modified in the lengthwise direction to prevent contact at their ends.

Cylindrical Worm -
A gear having one or more teeth in the form of screw threads.

Dedendum -
The radial or perpendicular distance between the pitch circle and the bottom of the tooth space.

Diametral Pitch -
The ratio of the number of teeth to the number of inches in the pitch diameter. There is a fixed relation between diametral pitch (P) and circular pitch (p), namely p =n/P.

Double-Enveloping Wormgearing -
The worm-gearing comprising an enveloping worm designed to operate with line contact with a mating enveloping wormgear.

Double-Helical Gear -
A gear of cylindrical form with two sections of teeth, one right hand and the other left hand, that engage simultaneously with the teeth of a similarly designed mating gear.

Effective (or Active) Face Width -
The width of face which comes actually into contact with a mating gear.

Enveloping Worm -
(Hourglass Worm) is a worm that increases in diameter from its middle portion toward both ends, conforming in its axial plane to the curvature of the gear.

Equal-Addendum Teeth -
Teeth of two engaging gears having same addendum.

Equivalent Number of Teeth -
That number of teeth contained in the whole circumference of a pitch circle corresponding to an equivalent pitch radius.

Equivalent Pitch Radius -
The radius of the pitch circle in a cross section of gear teeth in any plane other than a plane of rotation. It is properly the radius of curvature of the pitch surface in the given cross section.

Equivalent Diameter - (in normal plane)
The diameter of curvature of the pitch surface in the plane normal to the pitch line element.

External Gear -
A gear with the teeth formed on the outer surface of a cylinder or cone.

Face Advance -
The distance on the pitch circle that a gear tooth travels from the time pitch point contact is made at one end of the tooth until pitch point contact is made at the other end.

Face Cone -
The cones tangent to the tops of the teeth.

Face Contact Ratio -
The contact ratio in an axial plane, or the ratio of the face width to the axial pitch. For bevel and hypoid gears it is the ratio of face advance to circular pitch.

Face Gears -
A gearset consisting of a spur or helical pinion in combination with a conjugate gear of disc form, the axes being usually at right angles, either intersecting or non-intersecting.

Face Width -
The width of the pitch surface. For herringbone gears, this includes the width of the surface containing both of the helices and the groove width.

Fillet Curve -
The concave portion of the tooth profile where it joins the bottom of the tooth space.

Fillet Radius -
The radius of a circular arc approximating the fillet curve.

Front Angle -
The angle between an element of the front cone and a plane of rotation, usually equal to the pitch angle.

Front Cone -
An imaginary cone tangent to the inner ends of the teeth, with its elements perpendicular to those of the pitch cone.

Full-Depth Teeth -
Teeth in which the working depth equals 2.000 divided by normal diametral pitch.

Gear Center -
The center of the pitch circle.

Gear Ratio -
The ratio of the numbers of teeth in mating members.

Groove Depth -
The depth of the clearance groove between helice's of herringbone gears.

Groove Width -
The width of clearance groove between helice's of herringbone gears.

Heel -
The portion of the tooth surface near its outer end.

Helical Gear -
A cylindrical gear with helical teeth.

Helical Rack -
A rack having teeth that are oblique to the direction of motion.

Helix Angle -
The angle between a tangent to the helix and an element of the cylinder. Unless otherwise specified, the pitch helix is referred to.

Hourglass Worm -
See enveloping worm.

Hub Diameter -
The diameter of the central part of the gear body surrounding the bore and extending beyond the web, spokes, or body.

Hub Extension -
The distance that the hub extends beyond the face of the gear body.

Hypoid Gears -
Gears similar in general form to bevel gears but designed to operate on non-intersecting axes.

Inner Cone Distance -
The distance from the apex of the pitch cone to the inner ends of the teeth.

Inner Spiral Angle -
The spiral angle of a bevel gear at the inner ends of the teeth.

Inside Cylinder -
The surfaces that coincides with the tops of the teeth of an internal cylindrical gear.

Interference -
The contact between mating teeth at some other point than along the line of action.

Internal Diameter -
The diameter of that circle which contains the tops of the teeth of an internal gear.

Internal Gear -
A gear with the teeth formed on the inner surface of a cylinder or cone.

Involute Polar Angle -
The angle between a radius vector to a point on an involute curve and a radial line to the point where the curve touches the base circle.

Involute Roll Angle -
An angle whose arc on the base circle of radius unity equals the tangent of the pressure angle at a selected point on the involute.

Involute Teeth of Gears - (helical gears, and worms)
Are those in which the active portion of the profile in the transverse plane is the involute of a circle.

Lead -
The axial advance of a helix for one complete turn, as in the threads of cylindrical worms and teeth of helical gears.

Lead Angle -
The angle between a tangent to the pitch helix and a plane of rotation.

Length of Action -
The distance on an involute line of action through which the point of contact moves during the action of the tooth profiles.

Line of Action -
That portion of the common tangent to the base circles along which contact between the mating involute teeth occurs.

Line of Centers -
The straight line through the center of tangent pitch circles.

Line of Contact -
The line or curve along which two tooth surfaces are tangent to each other.

Long-and-Short Addendum Teeth -
The teeth of engaging gears (on a standard designed center distance), one of which has a long addendum and the other has a short addendum.

Mean Cone Distance (in Bevel Gears) **-**
The distance from the apex of the pitch cone to the middle of the face width.

Mean Spiral Angle -
The specific designation for the spiral angle at the mean cone distance in a bevel gear.

Miter Gears -
Mating bevel gears with equal numbers of teeth and with axes at right angles.

Modified Addendum Teeth -
The teeth of engaging gears, one or both of which have nonstandard addendum.

Modified Contact Ratio -
The contact ratio of modified tooth surfaces

Module (m = D/N) - (metric)
The ratio of the pitch diameter in millimeters to the number of teeth.

Mounting Distance -
The distance, for assembling bevel gears or hypoid gears, from the crossing point of the axes to a location surface of a gear, which may be at either back or front.

Normal Base Pitch -
Distance on a normal base helix between corresponding involutes of adjacent teeth.

Normal Chordal Addendum -
Chordal addendum in a normal plane.

Normal Chordal Thickness -
The length of the normal thickness chord between pitch line elements of a tooth.

Normal Circular Thickness -
The circular thickness in the normal plane. In helical gears, it is an arc of the normal Helix.

Normal Circular Pitch - (normal to helix)
The shortest distance on the pitch surface between corresponding pitch line elements of adjacent teeth.

Normal Diametrical Pitch -
The diametrical pitch corresponding to the normal circular pitch and calculated in the normal plane.

Normal Helix -
The helix on a pitch cylinder normal to the pitch helix.

Normal Plane -
The plane perpendicular to a given straight line or to a tangent to a curved line.

Normal Pressure Angle -
The pressure angle in a plane normal to the pitch line element.

Normal Profile Angle -
The profile angle in a normal plane of a helical or spiral tooth.

Normal Tooth Profile -
The outline formed by the intersection of a tooth surface and a plane perpendicular to the pitch line element.

Number of Threads in Worm -
The number of starts, or separate threads on the worm.

Outside Diameter of Gear, Pinion or Worm -
The diameter of the circle which contains the tops of the teeth of an external gear.

Offset -
The perpendicular distance between the axes of hypoid gears or offset face gears.

Operating Pitch Diameters -
The pitch diameters determined from the numbers of teeth and the center distance at which gears operate.

Outer Cone Distance -
The distance from the apex of the pitch cone to the outer ends of the teeth.

Outer Spiral Angle -
The spiral angle of a bevel gear at the outer cone distance.

Outside Cylinder -
The surface that coincides with the tops of the teeth of an external cylindrical gear.

Outside Helix -
The helix formed by the intersection of a tooth surface and the outside cylinder.

Outside Helix Angle -
The helix angle on the outside cylinder.

Outside Lead Angle -
The lead angle on the outside cylinder.

Outside Radius of Gear or Pinion -
The radius of the circle which contains the tops of the teeth of external gears.

Path of Contact -
The curve on either tooth surface along which contact occurs in gears which normally engage with only single point contact.

Pinion -
A gear with a small number of teeth. Of two gears that run together the one with the smaller number of teeth is called the pinion.

Pitch Angle -
The angle between an element of a pitch cone and its axis.

Pitch Apex to Back - (Apex to Back)
In a bevel or hypoid gear, the distance in the direction of the axis from the apex of the pitch cone to a locating surface at back of the blank.

Pitch, Circular -
The distance on the circumference of the pitch circle between corresponding points of adjacent teeth.

Pitch Circle - (see pitch diameter and pitch radius)
The circle through the pitch point having its center of the axis of the gear.

Pitch Circle - (Circumference)
The circumference of the pitch circle.

Pitch Cone -
A cone whose apex is at the intersection of axes and whose base is a pitch circle.

Pitch Cylinder -
The imaginary cylinder in a gear that rolls without slipping on a pitch cylinder or pitch plane of another gear.

Pitch, Diametral - (in plane of rotation)
The ratio of the number of teeth to the number of inches in the pitch diameter. It indicates the number of teeth in the gear f or each inch of pitch diameter.

Pitch Diameter -
The diameter of the pitch circle. In parallel shaft gears, the pitch diameters can be determined directly from the center distance and the number of teeth by proportionality. Operating pitch diameter is the pitch diameter at which the gears operate.

Pitch Helix -
The helix formed by the intersection of the surface of a helical tooth or thread with the pitch cylinder.

Pitch Helix Angle -
The angle between any helix and an element of its cylinder.

Pitch Lead Angle -
The lead angle on a pitch cylinder.

Pitch Line Element -
A line curved or straight, formed by the intersection of the pitch surface and the tooth surface.

Pitch Plane -
The plane which is tangent to both the pitch cylinder of the worm and the pitch cylinder of the gear.

Pitch Radius of Gear or Pinion -
The radius of the pitch circle.

Pitch Point -
The intersection between the axes of the line of centers and the line of action.

Pitch Range -
The difference between the longest and the shortest pitches on a gear.

Pitch Surface -
The surface of the pitch cylinder, which rolls with the surface of the mating member.

Plane of Action -
A surface of action in involute parallel axis gears, tangent to their base cylinders.

Point of Contact -
The point at which two tooth profiles touch each other.

Plane of Rotation -
Is any plane perpendicular to a gear axis.

Pressure Angle -
The angle between a tooth profile and the radial line at its pitch point. In involute teeth, pressure angle is often described also as the angle between the line of action and the line of tangent to the pitch circle. Standard pressure angles are established in connection with standard gear-tooth proportions.

Profile Angle -
The angle between a tangent to a tooth profile and the radius from the gear axis to the tangent point. In gear cutting tools, the angle between a cutting edge and some principal direction in the tool.

Profile Control Diameter -
The diameter of the circle beyond which the tooth profile must conform to the specified involute curve.

Profile Radius of Curvature -
The radius of curvature of a tooth profile at a specified point.

Rack General -
A gear with teeth spaced along a straight line, and suitable for straight-line motion.

Revacycle Bevel Gears -
Straight bevel gears generated by a special process with a special tooth form.

Right-Hand Helical Gear -
A gear in which the teeth twist clockwise as they recede from an observer looking along the axis.

Right-Hand Spiral Bevel Gear -
A spiral bevel gear in which the other half of a tooth is inclined in the clockwise direction from the axial plane through the midpoint of a tooth as viewed by an observer looking at the face of the gear.

Root Angle -
The angle between an element of the root cone and its axis.

Root Circle -
The circle containing the bottom of the tooth spaces.

Root Cone -
The imaginary cone tangent to the bottoms of the tooth spaces.

Root Cylinder -
The imaginary cylinder tangent to the bottoms of the tooth spaces in a cylindrical gear.

Root Diameter of Gear, Worm or Pinion -
The diameter of the circle which contains the roots of the teeth.

Root Radius -
The radius of the root circle.

Shaft Angle -
The angle between the axes of oppositely rotating portions of nonparallel shafts of mating gears.

Single-Helical Gears -
Helical gears that have teeth of only one hand on each gear.

Skew Bevel Gear -
Bevel gears for which the corresponding crown gear has teeth that are straight and oblique.

Space Bottom -
A line joining two fillets of adjacent tooth profiles in the same plane.

Spiral Angle -
The angle between a tooth trace and an element of the pitch cone.

Spiral Bevel Gear -
Bevel gears whose teeth are curved and oblique.

Spur Gears -
Gears cylindrical in form, with teeth that are straight and parallel, and that operate on parallel axes.

Spur Rack -
A rack with straight teeth that are at right angles to the direction of motion.

Straight Bevel Gears -
Bevel gears with straight tooth elements which, if extended, would pass through the point of intersection of their axes.

Stub Teeth -
Are those in which the working depth is less than 2.000 divided by normal diametral pitch.

Surface of Action -
The imaginary surface in which contact occurs between two engaging tooth surfaces. It is the summation of the paths of action in all sections of the engaging teeth.

Tangent Plane -
The plane tangent to a tooth surface at a point or line of contact.

Throat Diameter - (of Worm Gear)
The outside diameter of worm gear in central plane.

Throat Form Radius -
The radius of the throat surface of an enveloping wormgear, or of an hourglass worm, in an axial plane.

Teeth, Left Hand -
Are the teeth which twist to the left, or in a counterclockwise direction, as they recede from the observer.

Teeth, Right Hand -
Are the teeth which twist to the right or in a clockwise direction, as they recede from the observer.

Tip Radius -
The radius of the surface joining the top land (end cutting edge) and its adjacent addendum surface (side cutting edge) of a gear-cutting tool.

Tip Relief -
An arbitrary modification of a tooth profile whereby a small amount of material is removed near the tip of the gear tooth.

Toe -
The portion of the tooth surface near its inner end.

Tooth Bearing -
The portion of the tooth surface which actually comes into contact.

Tooth Chamfer -
The bevel between the end of a tooth and the tooth surface, to break the sharp edge.

Tooth Face -
The surface between the pitch line element and the top of the tooth.

Tooth Fillet -
The curved surface of the tooth flank joining it to the bottom land.

Tooth Flank -
The surface between the pitch line element and the bottom land - it includes the fillet.

Tooth Profile -
The outline in a designated plane of a tooth between the addendum and root circles.

Tooth Surface -
The total area including the tooth face and the tooth flank.

Tooth Thickness on Base Circle -
The distance on the base circle between involutes of the same tooth.

Tooth-to-Tooth Composite Action -
The greatest amount of composite action within any single pitch or contact throughout an entire gear.

Tooth Top -
A line joining the outer ends of two adjacent tooth profiles in the same place, in internal gearing it is the inner ends of the teeth.

Top Land -
The (sometimes flat)surface of the top of the gear tooth.

Total Composite Action -
The total amount of composite action for an entire gear.

Total Contact Ratio -
The sum of the transverse contact ratio and the face contact ratio.

Total Face Width -
The actual dimension of a gear blank that exceeds the effective face width, or as in double-helical gears where the total face width includes any distance separating right-hand and left-hand helices.

Transverse Circular Thickness -
The circular tooth thickness in the transverse plane.

Transverse Contact Ratio -
The ratio of the arc of action to the transverse circular pitch.

Transverse Diametral Pitch -
The ratio of the number of teeth to the number of inches in the transverse pitch diameter. There is a fixed relation between transverse diametral pitch (TP), and transverse circular pitch (tp), namely tp = n/TP

Transverse Pitch -
The distance between corresponding pitch line elements of adjacent teeth in the plane of rotation.

Transverse Plane -
A plane that lies Perpendicular to the axial plane and to the pitch plane. In gears with parallel axes, the transverse plane and plane of rotation coincide.

Transverse Pressure Angle -
The pressure angle in the transverse plane.

Transverse Profile Angle -
The profile angle in a transverse plane.

Undercut -
A condition in generated gear teeth when any part of the fillet curve lies inside of a line drawn tangent to the true involute form at its lowest point. Undercut may be deliberately introduced to facilitate finishing operations.

Whole Depth - (total depth)
The radial distance between the outside circle and the root circle.

Worm -
A gear with one or more teeth in the form of screw threads, a worm is meshed with a worm wheel, which looks similar to a spur gear.

Worm Gear -
A device consisting of a threaded shaft (worm) that mates with a gearwheel (worm wheel) so that rotary motion can be transferred between two shafts at right angles to each other

Wormgearing -
A gearing comprising worms and their mating gears, with axes usually at right angles.

Working Depth -
The greatest depth to which a tooth of one gear extends into the tooth space of the mating gear.

Zone of Action -
The rectangular area in a plane of action limited by the length of action and the face width.

Symbols for Rules & Formulas

Addendum	a
Addendum Angle	α
Allowable Pitch Variation	V_{pA}
Allowable Variation	A
Angular Pitch	$\emptyset_N$
Arc of Action	Q_t
Arc of Approach	Q_a
Arc of Recess	Q_r
Axial Base Pitch	P_x
Axial Pitch	P_X
Axial Pressure Angle	Φ_X
Axial Thickness	t_x
Backlash	B
Base Circular Thickness	t_b
Base Diameter	D_b
Base Helix Angle	Ψ_b
Base Lead Angle	λ_b
Base Pitch	P_b
Center Distance	C
Chordal Addendum	a_c
Chordal Thickness	t_c
Circular Pitch	P
Circular Tooth Thickness	t
Clearance	c
Contact Ratio	m_c
Datum Circle	m_F
Dedendum	b
Diametral Pitch (transverse)	P_d
Effective or Active Face Width	F_e
Equivalent Number of teeth	N_e
Face Contact Ratio	m_F
Face Width	F
Features on a Gear	G
Features on a Pinion	P
Features on a Worm	W
Fillet Radius	r_f
Gear Ratio	m_G
Helix Angle, Spiral Angle	Ψ
Index Variation	V_x
Internal Diameter	D_i
Involute Polar Angle	$\emptyset$
Involute Roll Angle	ε
Lead	L
Lead Angle	λ
Length of Action	Z
Modified Contact Ratio	m_o
Module	m
Normal Base Pitch	P_N
Normal Chordal Addendum	a_{nc}
Normal Chordal Thickness	t_{nc}
Normal Circular Pitch	P_n
Normal Circular Thickness	t_n
Normal Diametral Pitch	P_{nd}
Normal Module	m_n
Normal Pitch Variation	V_{pn}
Normal Plane	n
Normal Pressure Angle	Φ_n
Number of teeth or threads	N
Operating Pitch Diameter	d_p
Outside Diameter	D_O
Outside Lead Angle	λ_o
Pitch Angle	$\acute{\Gamma}$
Pitch Lead Angle	λ_p
Pitch Variation	V_p
Pressure Angle	Φ
Profile Radius of Curvature	p
Profile Tolerance	$V_{\Phi T}$
Profile Variation	V_Φ
Quality Number	Q
Radial Runout	V_r
Radial Runout Tolerance	V_{rT}
Reference Standard Pitch Diameter	D $\acute{\Gamma}$ R
Root Angle	
Root Diameter	D_R
Shaft Angle	Σ
Spacing Variation	V_s
Test Radius	R_r
Throat Diameter	D_t
Throat Form Radius	r_t
Tip or Edge Radius of Tool	r_T
Tolerance	
Tooth Alignment Tolerance	$V_{\Psi T}$
Tooth Alignment Variation	V_Ψ
Tooth Thickness Tolerance	t_T
Tooth-to-Tooth Composite Tolerance(double flank)	V_{qT}
Tooth-to-Tooth Composite Variation (double flank)	V_q
Total Accumulated Pitch Variation	V_{ap}
Total Accumulated Pitch Variation within a sector of k Pitches	V_{apk}
Total Composite Tolerance (double flank)	V_{cqt}
Total Composite Variation (double flank)	V_{cq}
Total Contact Ratio	m_t
Total Face Width	F_t
Transverse Circular Pitch	P_t
Transverse Circular Thickness	t_t
Transverse Contact Ratio	m_p
Transverse Plane	t
Transverse Pressure Angle	Φ_t
True Position Pitch	P_m
Variable	k
Whole Depth(tooth depth)	h_t
Working Depth	h_k

Diametral Pitch
Spur Gear Formulas

TO GET	HAVING	RULE	FORMULA
Module	Diametral Pitch	Divide 25.4 by the diametral Pitch	m=25.4/Pd
Diametral Pitch	Module	Divide 25.4 by the module	Pd=25.4/m
	Circular Pitch	Divide π by the circular pitch	Pd=π/P
	Pitch Diameter and Number of Teeth	Divide the # of Teeth by Pitch Diameter	Pd=N/D
	Outside of Gear and Number of Teeth	Divide the # of Teeth plus 2 by the outside diameter	Pd=N+2/Do
	Base Pitch and Pressure Angle	Divide the base pitch by the cosine of the pressure angle then divide by π	Pd=(Pb/cosΦ)/π
Operating Diametral Pitch	Center Disance between 2 gears and # of teeth in both	Add the # of Teeth in both gears and divide by 2, then divide by center distance	dp=(n1+n2)/C
Pressure Angle	Base Diameter and Pitch Diameter	Divide the base diameter by pitch diameter	cosΦ=Db/D
	Base Pitch and Diametral Pitch	Divide π by diametral pitch, then divide by the base pitch	cosΦ=Pb(π/Pd)
	Base Pitch and Circular Pitch	Divide the Base Pitch by the circular pitch = cosine pressure angle	cosΦ=Pb/P
Pitch Diameter	# of Teeth & Diametral Pitch	Divide the # of Teeth by Diametral Pitch	D=N/Pd
	# of Teeth & Outer Diameter	Divide the product of the outer diameter and # of Teeth by # of Teeth plus two	D=N•Do/n+2
	Outside Diameter & Diametral Pitch	Subtract from the outside diameter. the quotient of 2, divided by diametral pitch	D=Do-2/Pd
	Addendum and # of Teeth	Multiply addendum by # of Teeth	D=a•n
	Base Diameter and Pressure Angle	Divide the Base Diameter by the cosine of the pressure angle	dp = Db / cosΦ
Outside Diameter	# of Teeth and Diametral Pitch	Divide the # of Teeth plus two by the diametral pitch	Do = N+2 / Pd
	Pitch Diameter and Diametral Pitch	Add the Pitch Diameter to the quotient of 2 divided by the diametral pitch	Do = D+2 / Pd
	Pitch Diameter and # of Teeth	Divide the # of Teeth plus 2 by the quotient of # of teeth divided by the pitch diameter	Do = N+2 / N / D
	# of Teeth and Addendum	Multiply the # of Teeth plus 2 by addendum	Do = (N+2) a
Number of Teeth	Pitch Diameter and Diametral Pitch	Multiply pitch diameter by the diametral pitch	N = D • Pd
	Outside Diameter and Diametral Pitch	Multiply outside diameter by the diametral pitch and subtract 2	N = Do • Pd-2
Std. Thickness of Tooth	Diametral Pitch	Divide 1.5708 by the diametral pitch	t = 1.5708 / Pd
Std. Addendum	Diametral Pitch	Divide 1 by the diametral pitch	a = 1/ Pd
Std. Dedendum	Diametral Pitch	Divide 1.157 (or 1.25) by the diametral pitch	b = 1.157 / Pd
Std. Whole Depth	Diametral Pitch	Divide 2.157 (or 2.25) by the diametral pitch	ht = 2.157 / Pd
Clearance	Diametral Pitch	Divide .157 (or .250) by the diametral pitch	c = .157 / Pd
	Thickness of Tooth	Divide thickness of tooth at pitch line by 10	c = t / 10
Center Distance	Normal Diametral Pitch and # of Teeth in both gears	Add # of teeth in both gears together and divide by 2, then divide result by the normal diametral pitch.	dp = ((n1+n)2 /2) / Pnd
Operating Center Distance	Operating Diametral Pitch and # of Teeth in both gears	Add # of teeth in both gears together and divide by 2, then divide result by operating diametral pitch.	dp = (n1+n2 /2) / Pod
Base Diameter	Pitch Diameter and Pressure Angle	Multiply the pitch diameter by cosine of the pressure angle	Db = D • cosΦ
Base Pitch	Diametral Pitch and Pressure Angle	Divide the diametral pitch by π, then multiply by cosine of pressure angle	Pb = cosΦ • π/Pd

Circular Pitch
Spur Gears

TO GET	HAVING	RULE	FORMULA
Module	Circular Pitch	Divide the Circular Pitch by .12368	m = P/0.12368
Circular Pitch	Diametral Pitch	Divide p by the diametral pitch	P = π/Pd
	Module	Multiply the modules by .12368	P = m • 0.12368
	Pitch Diameter and # of Teeth	Divide pitch diameter by the product of .3183 and # of Teeth	P = D/0.3183•N
	Outside diameter and # of Teeth	Divide outside diameter by the product of .3183 and number of teeth plus 2	P = D/0.3183(N+2)
Pitch Diameter	# of Teeth and Circular Pitch	The continued product of the number of teeth, the circular pitch and .3183	D = N•0.3183p
	Outside Diameter and Circular Pitch	Subtract from the outside diameter the product of the circular pitch and .6366	D = D-(0.6366p)
Outside Diameter	# of Teeth and Circular Pitch	Divide # of Teeth plus 2 by π divided by circular pitch	Do = (N+2) / (π/p)
	Pitch Diameter and Circular Pitch	Add to the pitch diameter the product of the circular pitch and .6336	Do = D+0.6336p
Number of Teeth	Pitch Diameter and Circular Pitch	Divide the product of pitch diameter and π by the circular pitch	N = π•D/p
Circular Tooth Thickness	Circular Pitch	One-half the circular pitch	t = p/2
Std. Addendum	Circular Pitch	Multiply the circular pitch by .3183	a = 0.3183•p
Std. Dedendum	Circular Pitch	Multiply the circular pitch by .3683	b = 0.3683 • p
Whole Depth (2.157/DP)	Circular Pitch	Multiply the circular pitch by .6866	h_t = 0.6366 • p

Worm Gears

TO GET	HAVING	RULE	FORMULA
Linear Pitch (circular axial)	Lead and # of threads in worm	Divide the lead by the # of threads in worm	Px = L/Nw
Normal Diametral Pitch	Axial diametral pitch & worm hear helix angle	Divide the axial diametral pitch by the cosine of the worm helix angle	Pnd = Pxd/Cos.Ψ
Axial Diametral Pitch	Normal diametral pitch & worm helix angle	Multiply normal diametral outch by the cosine of the worm helix angle	Pxd = Pnd • Cos.Ψ
	# of teeth in wormwheel & Pitch diameter of wormwheel	Divide the # of Teeth in the wormwheel by pitch diameter of the wormwheel	Pxd = NG/D
Helix Angle of Worm	Worm pitch diameter & lead	Multiply the worm pitch diameter by π, and divide the product by the lead. The quotient is the co-tangent of the helix angle of worm	CoTanΨ = π • Dw/L
	Normal diametral pitch & axial diametral pitch	Divide the axial diametral pitch by the normal diametral pitch	Cos.Ψ = Pxd/Pnd
Pitch Diameter of Worm	Pitch diameter of wormwheel & center distance	Subtract the pitch diameter of the wormwheel from twice the center distance	Dw = 2C-DG
	Outside diameter & addendum	Subtract twice the addendum from the outside diametre	Dw = D-2α
Pitch Diameter of Wormwheel	Linear pitch & number of teeth	Multiply the # of teeth in the wheel by the linear pitch of the worm, then divide by π	DG = NG•PG/π
	Pitch Diameter of worm & center distance	Divide the worm pitch diameter by 2 minus the center distance, multiplied by 2	DG = C•2-Dw
Center Distance between worm and wormwheel	Pitch Diameter of worm & wormwheel	Add pitch diameter of worm & wormwheel, then divide the sum by 2	C = Dwt•DG/2

WORM GEARS
Continued

TO GET	HAVING	RULE	FORMULA
Addendum of Worm Tooth	Linear Pitch	Multiply the pitch by 0.318	α = 0.3183•Px
Whole Depth of Worm Tooth	Linear Pitch	Multiply linear pitch by 0.6866	W = 0.68866•P
Bottom Diameter of Worm	Whole Depth and O.D	Subtract twice the whole depth of tooth from the outside diameter	B = 0-2(WD)
End Width of Thread Tool (14.5 PA)	Linear Pitch	Multiply the linear pitch by 0.31	T = 0.31•P
Throat Diameter of Worm Wheel	Wormwheel P.D and worm addendum	Add twice the addendum of the worm tooth	0″ = D•2S
Radius of Worm Wheel Throat	Worm OD and addendum	Subtract the addendum of the worm tooth from half the outside diameter of the worm	U = 0/2-2(ADD)
Outside Diameter of Worm	Pitch Diameter and addendum	Add together the pitch diameter and two times the addendum	$0 = D_1+2(ADD)$
Diameter of Worm Wheel to sharp corners	Radius of curvature face angle and throat diameter	Multiply the curvature of the worm wheel throat by the cosine of half the face angle. Subtract this quantity from the radius of curvature, multiply the remainder by 2. Then add the product to the wormwheel throat diameter.	0 = 2u - ux cos.A+0′
Worm Wheel Helix Angle	Worm lead and circumference of the pitch circle of worm	Divide the lead of the worm by the circumference of the pitch circle. The result will be the tangent of the angle.	$\tan(HA) = L/D_1$
Lead of Worm	Linear pitch and number of threads in worm	Multiply the linear pitch by the number of threads in the worm.	L = Px•Nw
Worm PD	Lead and Helix angle of worm	Divide the lead of worm by the tangent of the helix angle then divide by π	$D_w = (L/\tan\Psi)/\pi$
Lead of Worm	Worm PD and Helix angle of worm	Multiply the worm PD by π, then multiply by the tangent of the helix angle.	$L = D_w \cdot \pi \tan\Psi$
Number of Threads in Worm	Lead and Axial circular pitch No. of teeth in wormwheel and ratio	Divide the lead by the axial circular pitch Divide the no. of teeth in the wormwheel by the ratio	Nw = L / Px Nw = NG / mG
Number of Teeth in Worm Wheel	Ratio and No. of threads in wheel	Multiply the No. of Teeth in worm	$N_G = mG \cdot N_W$
Ratio	No. of teeth in wormwheel and number of threads in worm	Divide the No. of Teeth in the wormwheel by the no. of teeth in the worm	mG = NG/NW

HELICAL GEARS
Rules and Formulas

TO GET	HAVING	RULE	FORMULA
Normal D.P.	Transverse DP and Helix Angle	Divide the transverse DP 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	$P_{nd} = P_d / \cos \Psi$
Normal P.A.	Transverse P.A. and helix angle of gear	Multiply the tangent 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 tangent 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 Number of teeth plus transverse diameter pitch	Divide the number of teeth by the product of the normal pitch and the cosine of the tooth angle Divide the number of teeth in the gear by the transverse diametral pitch	$D = NG / P_{nd} \cos \Psi$ $D = N/Pd$
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 Normal CP, #of Teeth and Helix Angle	Divide the pitch circumference by the tangent of the helix pitch. Divide the product of the number of teeth times the normal CP by the sine of the helix angle.	$L = \pi \cdot D_w / \tan\Psi$ $L = N \cdot P_n / \sin\Psi$
Helix Angle	Normal CP and transverse circular pitch Pitch Diameter plus lead Normal and Trans P.A.	Divide the normal CP by the transverse circular pitch, the quotient will be the cosine of the helix angle. Multiply the pitch diameter by π, divide the results by the lead. Divide the tangent of the normal PA by the tangent of the transverse PA = cosHA	$\cos\Psi = P_n/P_t$ $\cos\Psi = D - \pi / L$ $\cos\Psi = \tan\Phi / \tan\Phi_t$
Outside Diameter	Pitch Diameter and Addendum	Add twice the addendum to the pitch diameter	$D_O = 2 \cdot \alpha + D$
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 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.	$Nc = N/(\cos\Psi)^3$
Lead Tooth Helix	Pitch Diameter and Helix Angle	Multiply the pitch diameter by π, times the cotangent of the tooth angle.	$L = \pi \cdot D\cot\Psi$
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	$h_t = 2.15/P_{nd}$
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.	$P_{od} = [(N1+N2)/ 2] / CO$
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 transverse diametral pitch.	$C_O = [(N1+N2)/ 2] / P_{od}$
Number of Teeth in Gear	Pitch Diameter plus transverse diametral pitch	Multiply the pitch diameter by the transverse diametral pitch	$N = D \cdot P_d$
Transverse D.P.	Pitch Diameter and Number of Teeth	Divide TPD by # of teeth	$P_d = N/D$
Base Diameter	Pitch Diameter and Transverse P.A.	Multiply the Pd by trans. PA	$D_b = D \cdot \cos\Phi_t$

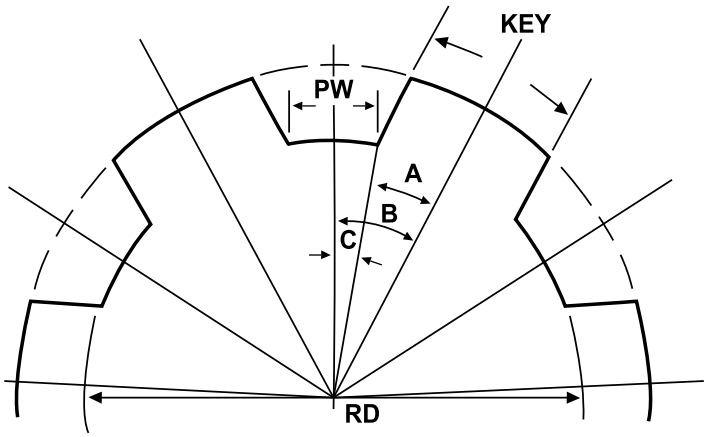
INVOLUTE SPLINES AND SERRATIONS 30° PA

TO GET	HAVING	RULE	FORMULA
Diametral Pitch	Outer diameter and number of teeth	Divide number of teeth plus 1 by the outer diameter	$P_d = N + 1 / D_O$
Pitch Diameter	Outer diameter and number of teeth	Divide the product of outer diameter and number of teeth by number of teeth plus 1	$D = N \cdot D_O / N + 1$
Outer Diameter	Diametral pitch and number of teeth	Divide the number of teeth plus 1 by the quotient of number of teeth divided by pitch diameter	$D_O = N + 1 / (N/D)$
Diametral Pitch	Internal diameter and number of teeth	Divide number of teeth minus 1 by the internal diameter	$P_d = N - 1 / D$
Internal Diameter	Diametral pitch and number of teeth	Divide number of teeth minus 1 by the diametral pitch	$D_i = N - 1 / P_d$

STANDARD S.A.E PARALLEL KEY SPLINE

NO. OF KEYS	SPACE WIDTH INTERNAL	**A FIT** Permanent Fit		**B FIT** To Slide Not Under Load		**C FIT** To Slide Under Load		NOMINAL MAJOR DIAMETER
		WD	Minor	WD	Minor	WD	Minor	
4	0.241D	0.075 D	0.850D	0.125D	0.750D			To 3"
6	0.250D	0.050D	0.900D	0.075D	0.850D	0.100D	0.800D	To 3"
10	0.156D	0.045D	0.910D	0.070D	0.860D	0.095D	0.810D	To 6"
16	0.098D	0.045D	0.910D	0.070D	0.860D	0.095D	0.810D	To 6"

POINT WIDTH CONVERSION FOR STRAIGHT SIDED SPLINE

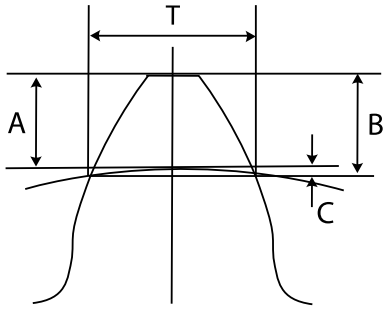


N = Number of Keys
B = 180°/N
SIN A = KW/RD
C = B-A
PW = RD X SIN"C"
N = 6
KW = .371
RD = 1.271

EXAMPLE:
B = 180/6 =30°
SIN "A" = .2919
A = 16.97151°
C = 13.02849
SIN "C"= .22543
W = 1.271•.22543
PW = .2865

GEAR TOOTH VERNIERS

The gear tooth vernier is made to measure the Chordal Thickness of the gear teeth at the pitch line. Allowance may be made for any error in blank size by adjusting the height vernier.

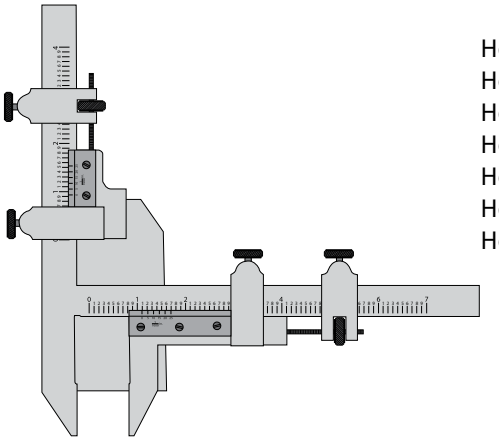


A = Addendum
B = Corrected Addendum
C = Correction
T = Chordal Thickness

Example:
To gauge a gear, 4 DP 21 Teeth

Height Setting = Addendum of gear + Correction (C)
= Addendum of gear + .0294/4
= Addendum of gear + .007

Thickness Setting = T/Diametral Pitch
= 1.5694/4 = .392



Height setting for internal gear (of low pressure angle) = addendum of gear:

Height setting for internal slotting cutter	= dedendum of gear
Height setting for rotary spur cutter	= dedendum of gear - correction
Height setting for end milling cutter	= dedendum of gear - correction
Height setting for hob and fly hob	= dedendum of gear + correction
Height setting for gear shaper cutter	= dedendum of gear + correction
Height setting for rack type generating cutter	= dedendum of gear

Chart for obtaining correct Addendum “B”, and Chordal Thickness “T”. This chart is based on 1 D.P. ; for any other D.P. divide these values by the desired D.P. (for circular pitch multiply by C.P. over π)

# Of Teeth	T.	C.
6	1.5330	0.1022
7	1.5568	0.0873
8	1.5607	0.0769
9	1.5628	0.0684
10	1.5643	0.0616
11	1.5654	0.0559
12	1.5654	0.0514
13	1.5670	0.0474
14	1.5670	0.0440
15	1.5679	0.0411
16	1.5683	0.0385
17	1.5686	0.0362
18	1.5688	0.0342
19	1.5690	0.0324
20	1.5692	0.0308
21	1.5694	0.0294
22	1.5695	0.0281
23	1.5696	0.0268
24	1.5697	0.0257
25	1.5698	0.0247
26	1.5698	0.0237
27	1.5699	0.0228

# Of Teeth	T.	C.
28	1.5700	0.0220
29	1.5700	0.0213
30	1.5701	.0208
32	1.5702	0.0193
34	1.5702	0.0181
36	1.5703	0.171
38	1.5704	0.0162
40	1.5704	0.0154
43	1.5702	0.0143
46	1.55705	0.0134
50	1.5706	0.0123
55	1.5706	0.0112
60	1.5707	0.0102
68	1.5707	0.0091
75	1.5707	0.0083
86	1.5707	0.0072
100	1.5707	0.0061
125	1.5707	0.0049
150	1.5708	0.0045
200	1.5708	0.0035
250	1.5708	0.0025
Rack	1.5708	0.0000

CHORDAL THICKNESS AND CHORDAL ADDENDUM OF GEAR TEETH

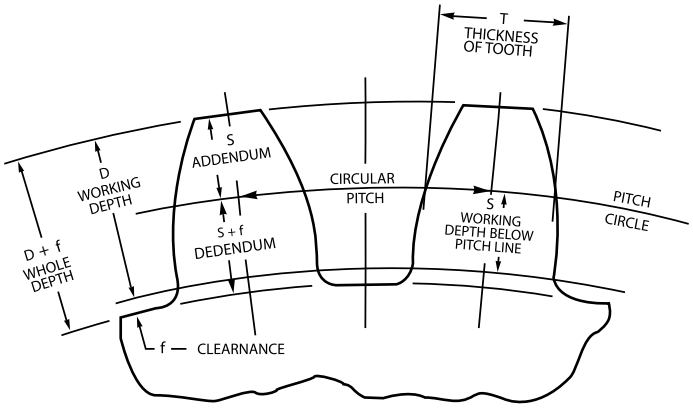
This table is for spur gears of one diametral pitch. For any other diametral pitch, divide the given value by the desired pitch.
The table lists the chordal thickness at the pitch circle when the addendum is standard for full-depth teeth or equal to 1 divided by the diametral pitch.

# of Teeth	Chordal Thickness	Chordal Addendum	# of Teeth	Chordal Thickness	Chordal Addendum	# of Teeth	Chordal Thickness	Chordal Addendum
10	1.56434	1.06156	59	1.57051	1.01046	108	1.57074	1.00570
11	1.56546	1.05598	60	1.57062	1.01029	109	1.57075	1.00565
12	1.56631	1.05133	61	1.57062	1.01011	110	1.57075	1.0056
13	1.56698	1.04739	62	1.57063	1.00994	111	1.57075	1.00556
14	1.56750	1.0441	63	1.57063	1.00978	112	1.57075	1.00551
15	1.56794	1.04109	64	1.57064	1.00963	113	1.57075	1.00546
16	1.56827	1.03852	65	1.57064	1.00947	114	1.57075	1.00541
17	1.56856	1.03625	66	1.57065	1.00933	115	1.57075	1.00537
18	1.56880	1.03425	67	1.57065	1.00920	116	1.57075	1.00533
19	1.56901	1.03244	68	1.57066	1.00907	117	1.57075	1.00529
20	1.56918	1.03083	69	1.57066	1.00893	118	1.57075	1.00524
21	1.56933	1.02936	70	1.57067	1.00880	119	1.57075	1.00519
22	1.56946	1.02803	71	1.57067	1.00867	120	1.57075	1.00515
23	1.56958	1.02681	72	1.57067	1.00855	121	1.57075	1.00511
24	1.56967	1.02569	73	1.57068	1.00843	122	1.57075	1.00507
25	1.56977	1.02466	74	1.57068	1.00832	123	1.57076	1.00503
26	1.5684	1.02371	75	1.57068	1.00821	124	1.57076	1.00499
27	1.56991	1.02284	76	1.57069	1.00810	125	1.57076	1.00495
28	1.56998	1.02202	77	1.57069	1.00799	126	1.57076	1.00491
29	1.57003	1.02127	78	1.57069	1.00789	127	1.57076	1.00487
30	1.57008	1.0205	79	1.57069	1.00780	128	1.57076	1.00483
31	1.57012	1.01990	80	1.57070	1.00772	129	1.57076	1.00479
32	1.57016	1.01926	81	1.57070	1.00762	130	1.57076	1.00475
33	1.57019	1.01869	82	1.57070	1.00752	131	1.57076	1.00472
34	1.57024	1.01813	83	1.57070	1.00743	132	1.57076	1.00469
35	1.57027	1.01762	84	1.57071	1.00734	133	1.57076	1.00466
36	1.57030	1.01714	85	1.57071	1.0725	134	1.57076	1.00462
37	1.57032	1.01667	86	1.57071	1.00716	135	1.57076	1.00457
38	1.57035	1.01623	87	1.57071	1.00708	136	1.57076	1.00454
39	1.57037	1.01582	88	1.57071	1.00700	137	1.57076	1.00451
40	1.57039	1.01542	89	1.57072	1.00693	138	1.57076	1.00447
41	1.57041	1.01504	90	1.57072	1.00689	139	1.57076	1.00444
42	1.57043	1.01469	91	1.57072	1.00679	140	1.57076	1.00441
43	1.57045	1.01434	92	1.57072	1.00672	141	1.57076	1.00439
44	1.57047	1.01402	93	1.57072	1.00665	142	1.57076	1.00435
45	1.57048	1.01370	94	1.57072	1.00658	143	1.57076	1.00432
46	1.57050	1.01341	95	1.57073	1.00651	144	1.57076	1.00429
47	1.57051	1.01311	96	1.57073	1.00644	145	1.57077	1.00425
48	1.57052	1.01285	97	1.57073	1.00637	146	1.57077	1.00422
49	1.57053	1.01258	98	1.57073	1.00630	147	1.57077	1.00419
50	1.57054	1.01233	99	1.57073	1.00623	148	1.57077	1.00416
51	1.57055	1.01209	100	1.57073	1.00617	149	1.57077	1.00413
52	1.57056	1.0187	101	1.57074	1.00611	150	1.57077	1.00411
53	1.57057	1.01165	102	1.57074	1.00605	151	1.57077	1.00409
54	1.57058	1.01143	103	1.57074	1.0059	152	1.57077	1.00407
55	1.57058	1.01121	104	1.57074	1.00593	153	1.57077	1.00405
56	1.57059	1.01102	105	1.57074	1.00587	154	1.57077	1.00402
57	1.57060	1.01083	106	1.57074	1.00581	155	1.57077	1.00400
58	1.57061\	1.01064	107	1.57074	1.00575	156	1.57077	1.00397

METHOD OF PRODUCING STUB DEPTH GEAR AND SPLINES

To produce a sub tooth gear, standard or non standard, certain information is required. Diametral pitch, pressure angle, major diameter, minor diameter, number of teeth and circular tooth thickness,(space width of internals).

FOR EXAMPLE
10 D.P., 20° P.A., 30 Teeth, 3.1" O.D., 2.768" R.D., .15708" Tooth thickness, .1657" D & F. At first glance the gear tooth appears stubby, but a standard cutter can produce this part. The O.D. of this gear has been reduced, (standard O.D. is 3.2"). The difference between the standard O.D. and our O.D. is .10" or .05 on one side. That difference plus the D&F of the gear, (.1657") is .2157". Therefore a standard finishing cutter would work. In cases when the tooth thickness is nonstandard, a standard cutter can be modified by top-grinding to produce the correct stub tooth.



FOR EXAMPLE
Same part as above, except the tooth thickness is .1520".
The most accurate way to determine the amount to remove from the tool is to first cut a sample to measurement over pins. This will give us the tooth thickness we need. Remove the difference of root diameter produced and root diameter desired from the O.D. of the tool. This can also be determined with nearly the same accuracy without cutting a sample by dividing the difference of desired tooth thickness and standard tooth thickness by the tangent of the pressure angle.
Reduce the O.D. of the tool by this amount.

FOR EXAMPLE
.15708" – .1520" = .0051/TAN P.A. = .0140". .0140"
= Amount of Reduction

THE INVERSE OF THE INVOLUTE FUNCTION

θ IN DEGREES	INV. θ
0	0
5	0.00022
10	0.00179
14.5	0.00554
17.5	0.00987
20	0.01490
22.5	0.02151
25	0.02998
30	0.05375
35	0.05934
40	0.014097
45	0.21460
50	0.31909
55	0.46821
60	0.68485

Given the involute of an angle, there is no simple formula for finding that angle. If you have involute tables, the inverse of the involute can be found by interpolating between known values, if needed. Without the benefit of tables, the pursuit of the angle can be achieved with a calculator, the most practical solution is to guess based on this brief table.
Remember you have involute

(Inv θ) you want θ.
θ is the Greek letter Theta often used for a given angle.

1) Inv (θ) = Tangent θ - (θ•p/180)

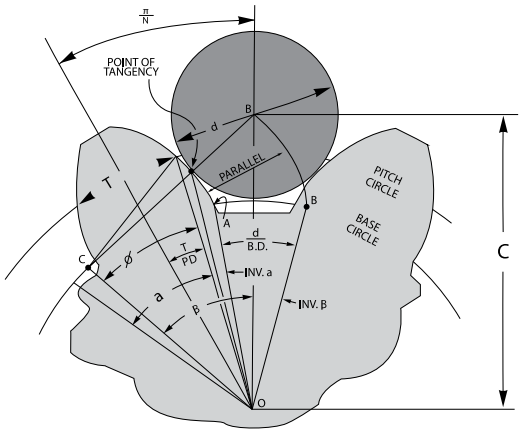
2) The function makes sense only from a range of 0° up to 89°. You should arrive at θ = 140° for example.

3) The involute is a steadily increasing function; that is, the higher the angle, the higher the involute and vice versa. Tables can be purchased, see Section F.

EXTERNAL SPUR GEARS WIRE MEASUREMENTS

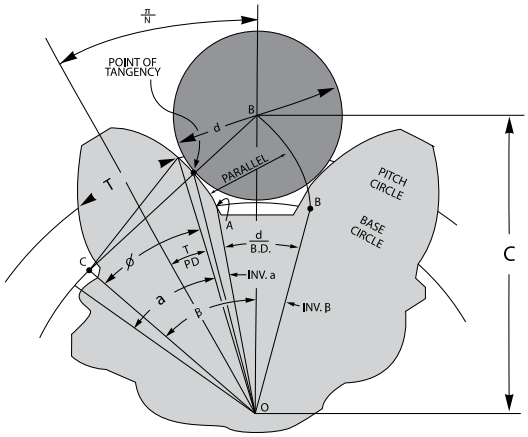
Determining Dimension over Pins

TO GET	HAVING	RULE	FORMULA
N	Number of Teeth	Given	35
DP	Diametral Pitch	Given	10
α	Pressure Angle	Given	20
t	Arc tooth thickness	Given	0.15500
d	Pin Diameter	Given	0.17280
PD	Pitch Diameter	N/DP	3.50000
BD	Base Diameter	PD • COS(α)	3.28892
A	-	t/PD	0.04429
D	-	d/BD	0.05254
E	-	π/N	0.08976
INVα	Involute function of α	TAN(α)-[α(π/180)]	0.01490
INV β	Involute function of β	A+D+INVα-E	0.02197
β	Pressure angle to pin center	See tables (page G14)	22.65108
CC	Twice the center distance of pin and gear	BD/COS(β)	3.56381
DE	Dimension over pins even # of teeth	CC+d	*******
DO	Dimension over pins odd # of teeth	COS(90/N) • CC+d	3.73302
Φ	Pressure angle to point of tangency	TAN(Φ)=TAN(β)-D	20.04026
RT	Radius to point of tangency	BD/[2 • COS(Φ)]	1.75045



Determining Arc Tooth Thickness Given Dimension over Pins

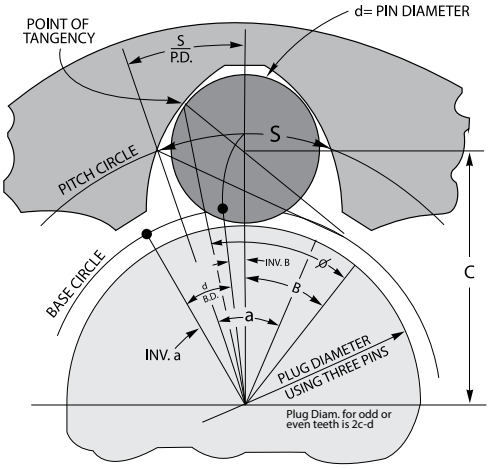
TO GET	HAVING	RULE	FORMULA
N	Number of Teeth	Given	50
DP	Diametral Pitch	Given	8
α	Pressure angle	Given	20
d	Pin Diameter	Given	0.21144
DE	Dimension over pins even # of teeth	Given	6.53345
DO	-	Given	******
PD	-	N/PD	6.25000
BD	-	PD•COS(α)	5.87308
CE	-	DE-d	6.32201
CO	-	(DO-d)/COS(90/N)	*******
β	Pressure angle to pin center	COS(β)=BD/CE or CO	21.72221
INVβ	Involute function of β	TAN(β)-[β(π/180)]	0.01927
E	-	π/N	0.06283
D	-	d/BD	0.03600
INVα	Involute function of α	TAN(α-[α(π/180)]	0.01490
t	Arc tooth thickness	PD(E+INVβ-INVα-D)	0.19500



INTERNAL SPUR GEARS
WIRE MEASUREMENTS

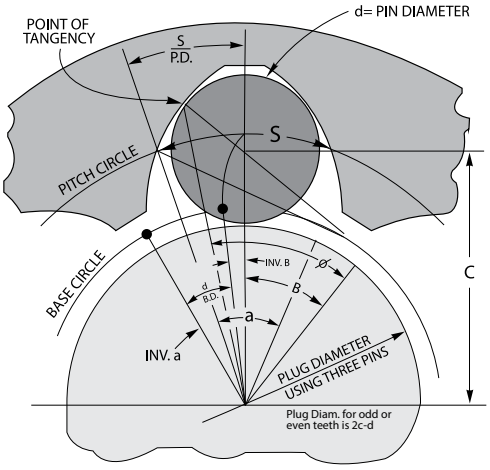
Determining Dimension under Pins

TO GET	HAVING	RULE	FORMULA
N	Number of Teeth	Given	12
DP	Diametral Pitch	Given	24
α	Pressure Angle	Given	14.5
s	Arc Space Width	Given	0.06800
d	Pin Diameter	Given	0.06701
PD	Pitch Diameter	N/PD	0.50000
BD	Base Diameter	PD • COS(α)	0.48407
A	-	s/PD	0.13600
D	-	d/BD	0.13843
INVα	Involute function of α	TAN(α)-[α(π/180)]	0.00554
INVβ	Involute function of β	A+INVα-D	0.00312
β	Pressure angle to pin center	See tables (page G14)	11.99809
CC	Twice the center distance of pin and gear	BD/COS(β)	0.49488
DE	Dimension under pins even# of teeth	CC-d	0.42787
DO	Dimension under pins odd# of teeth	CC•COS(90/N)-d	******
Φ	Pressure angle to point of tangency	TAN(Φ)=TAN(β)+D	19.33857
RT	Radius to point of tangency	BD/[2•COS(Φ)]	0.25651



Determining Arc Space Width Given Dimensions under Pins

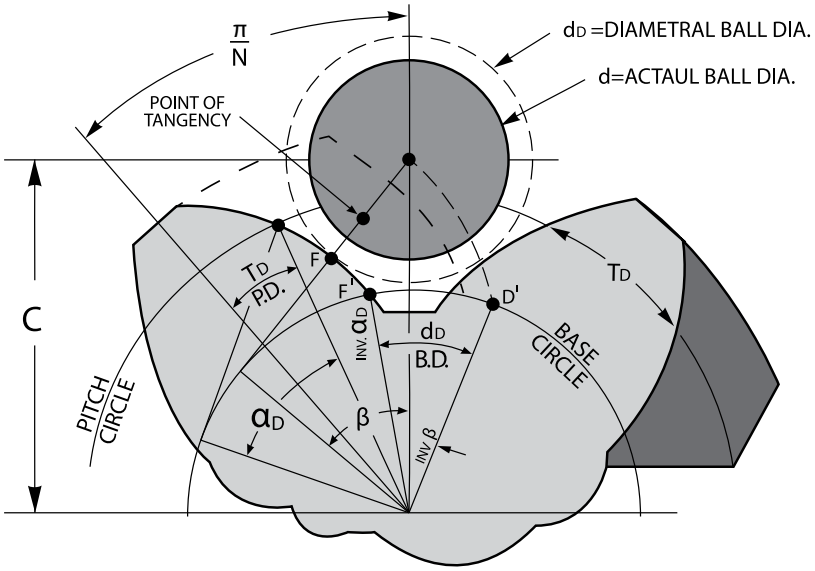
TO GET	HAVING	RULE	FORMULA
N	Number of Teeth	Given	44
DP	Diametral Pitch	Given	24
α	Pressure Angle	Given	14.5
d	Pin Diameter	Given	0.06701
DE	Dimension under pins even # of teeth	Given	1.76152
DO	Dimension under pins odd # of teeth	Given	******
PD	Pitch Diameter	N/PD	1.83333
BD	Base Diameter	PD•COS(α)	1.77494
CE	Twice the center distance of pin and gear even # of teeth	DE+d	1.82853
CO	Twice the center distance of pin and gear odd # of teeth	(DO+d)/COS(90/N)	******
β	Pressure angle to pin center	COS(β)=BD/CE or CO	13.90611
INVα	Involute function of α	TAN(α)-[α(π/180)]	0.00554
INVβ	Involute function of β	TAN(β)-[β(π/180)]	0.00488
D		d/BD	0.03775
s	Arc space width	PD(INVb+D-INVa)	0.06800



EXTERNAL HELICAL GEARS
WIRE MEASUREMENTS

Determining Dimensions over Pins or Balls

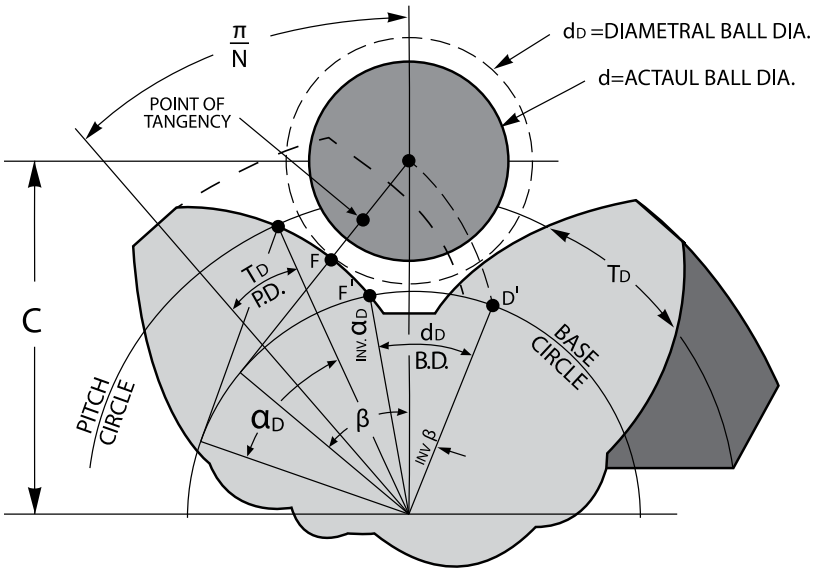
TO GET	HAVING	RULE	FORMULA
N	Number of teeth	Given	50
DP	Diametral Pitch	Given	10
h	Pitch Helix Angle	Given	31.50000
αn	Normal pressure angle	Given	30
tn	Normal arc tooth thickness	Given	0.15440
d	Pin diameter	Given	0.17280
αd	Transverse pressure angle	TAN(an)=TAN(an)/COS(h)	34.10320
td	Transverse arc tooth thickness	tn/COS(h)	0.18108
H	Base Helix Angle	TAN(H)=TAN(h)•COSad	26.90400
dD	Transverse pin diameter	d/COS(H	0.19377
PD	Pitch Diameter	N/[DP•COS(h)]	5.86414
BD	Base Diameter	PD•COS(ad)	4.85568
INVαd	Involute function of αβ	TAN(ad)-[ad(p/180)]	0.08192
A	-	td/PD	0.03088
D	-	dD/BD	0.03991
E	-	π/N	0.06283
INVβ	Involute function of β	A+D+INVαd-E	0.08987
β	Pressure angle to pin center	See Tables (page G14)	35.06197
CC	Twice the center distance	BD/COS(β)	5.93218
DE	Dimension over pins even # of teeth	CC+d	6.10498
DO	Dimension over pins odd # of teeth	COS(90/N)•CC+d	******
Φ	Pressure angle to point of tangency	TAN(Φ)=TAN(β)-[d•COS(H)/BD]	33.82546
RT	Radius to point of tangency	BD/[2•COS(Φ)]	2.92251



EXTERNAL HELICAL GEARS
WIRE MEASUREMENTS

Determining Tooth Thickness with Dimension over Pins or Balls

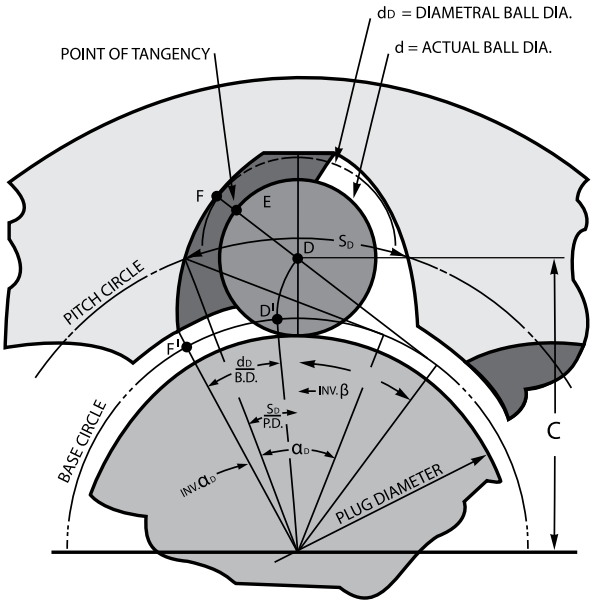
To Get	Having	Rule	Formula
N	Number of teeth	Given	31
DP	Normal Diametral pitch	Given	11
αn	Normal pressure angle	Given	25
h	Pitch helix angle	Given	45
d	Pin diameter	Given	0.15709
DE	Dimension over pins even # of teeth	Given	
DO	Dimension over pins odd # of teeth	Given	4.07900
αd	Transverse pressure angle	TAN(αn)=TAN(αn)/COS(h)	33.40320
H	Base Helix angle	TAN(H)=TAN(h)•COSαd	39.85571
dD	Transverse pin diameter	d/COS(H)	0.20463
PD	Pitch Diameter	N/[DP•COS(h)]	3.98551
BD	Base Diameter	PD•COS(αd)	3.32717
CE	Twice the center distance of pin and gear even # of teeth	DE-d	******
CO	Twice the center distance of pin and gear odd # of teeth	(DO-d)/COS(90/N)	3.92695
β	Pressure angle to pin center	COS(β)=BD/CE or CO	32.08442
INVβ	Involute function of β	TAN(β)-[β(π/180)]	0.06694
INVαβ	Involute function of αβ	TAN(αd)-[αd(π/180)]	0.07646
E		π/N	0.10134
D		dD/BD	0.06150
td	Transverse arc tooth thickness	PD•(E+INVβ-INVαd-D)	0.12082
tn	Normal arc tooth thickness	td/COS(h)	0.08544



INTERNAL HELICAL GEARS
WIRE MEASUREMENTS

Determining Dimensions under Pins or Balls

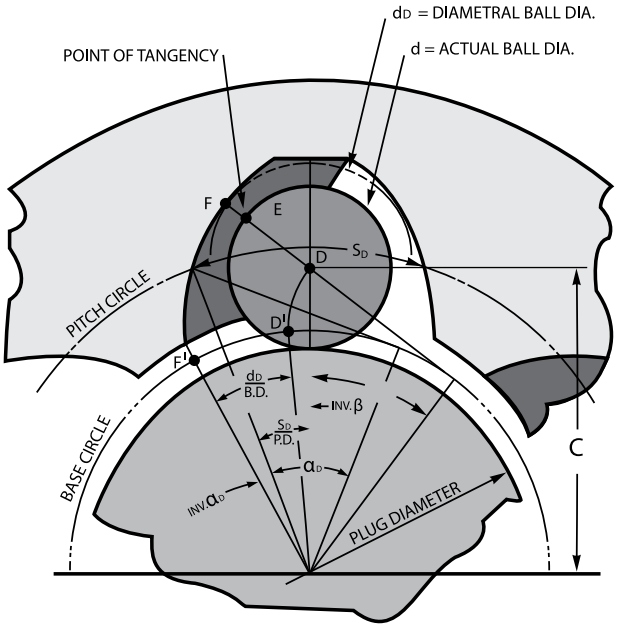
To Get	Having	Rule	Formula
N	Number of Teeth	Given	16
DP	Normal Diametral Pitch	Given	6
h	Pitch Helix Angle	Given	12.16370
αn	Normal pressure angle	Given	25
sn	Normal arc space width	Given	0.26220
d	Ball Diameter	Given	0.24000
αd	Transverse pressure angle	TAN(αd)=TAN(αn)/COS(h)	25.50193
sd	Transverse arc space width	sn/COS(h)	0.26822
H	Base helix angle	TAN(H)=TAN(h) • COSαd	11.00905
dD	Transverse ball diameter	d/COS(H)	0.24450
PD	Pitch diameter	N/[DP•COS(h)]	2.72791
BD	Base diameter	PD•COS(αd)	2.46213
INVαd	Involute function of αd	TAN(αd)-[αd(π/180)]	0.03192
A	-	sd/PD	0.09833
D	-	dD/BD	0.09930
INVβ	Involute function of β	A+INVαd-D	0.03095
β	Pressure angle to ball center	See tables (page G14)	25.25264
CC	Twice the center distance of ball and gear	BD/COS(β)	2.72229
DE	Dimension under balls even # of teeth.	CC-d	2.48229
DO	Dimension under balls odd # of teeth	CC • COS(90/N)-d	******
Φ	Pressure angle to point of tangency	TAN(Φ)=TAN(β)+[d•COS(H)/BD]	29.56926
RT	Radius to point of tangency.	BD/[2•COS(Φ)]	1.41541



INTERNAL HELICAL GEARS
WIRE MEASUREMENTS

Determining Space Thickness Given Dimensions Under Pins or Balls

To Get	Having	Rule	Formula
N	Number of Teeth	Given	60
DP	Normal Diametral Pitch	Given	24
αn	Normal Pressure Angle	Given	22.5
h	Pitch Helix Angle	Given	7.50
d	Ball Diameter	Given	0.07377
DE	Dimension under balls even # of teeth	Given	2.41200
DO	Dimension under balls odd # of teeth	Given	******
αd	Transverse Pressure Angle	Tan(αd)=TAN(αn)/COS(h)	22.67458
H	Base Helix Angle	TAN(h)=TAN(h)•COSαd	6.92618
dD	Transverse Ball Diameter	d/COS(H)	0.07431
PD	Pitch Diameter	N/[DP•COS(h)]	2.52157
BD	Base Diameter	PD•COS(αd)	2.32668
CE	Twice the center distance of ball and gear even # of teeth	DE+d	2.48577
CO	Twice the center distance of ball and gear odd # of teeth	(DO+d)/COS(90/N)	******
β	Pressure angle to ball center	COS(β)=BD/CE or CO	20.60986
INVβ	Involute function of β	TAN(β)-[β(p/180)]	0.01636
INVαd	Involute function of αd	TAN(αd)-[αd(p/180)]	0.02204
D	-	dD/BD	.03194
sd	Transverse arc space width	PD•(INVβ+D-INVαd)	0.06621
sn	Normal arc space width	sd•COS(h)	0.06565



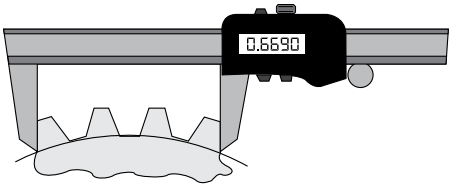
SPAN MEASUREMENTS
14-1/2° PA

Divide "W" measurement by actual D.P. for measuring standard tooth thickness. If tooth thickness is above or below standard, multiply the difference from standard tooth width by cosine of the pressure angle to obtain the change in "W" dimension.

N	T	W
10	2	4.6160
11	2	4.6213
12	2	4.6267
13	2	4.6321
14	2	4.6374
15	2	4.6428
16	2	4.6482
17	2	4.6536
18	2	4.6589
19	2	4.6643
20	2	4.6697
21	3	7.7166
22	3	7.7219
23	3	7.7273
24	3	7.7327
25	3	7.7380
26	3	7.7334
27	3	7.7488
28	3	7.7541
29	3	7.7595
30	3	7.7649
31	3	7.7702
32	3	7.7756
33	4	108225
34	4	10.8279
35	4	10.8332
36	4	10.8386
37	4	10.8440
38	4	10.8493
39	4	10.8547
40	4	10.8601
41	4	10.8654
42	4	10.8708
43	4	10.8762
44	4	10.8815
45	5	13.9284
46	5	13.9338
47	5	13.9392
48	5	13.9445
49	5	13.9499
50	5	13.9553
51	5	13.9606
52	5	13.9660
53	5	13.9714
54	5	13.9768
55	5	13.9821
56	5	13.9875
57	6	17.0344
58	6	17.0398
59	6	17.0451
60	6	17.0505
61	6	17.0559

N	T	W
62	6	17.0612
63	6	17.0666
64	6	17.0720
65	6	17.0773
66	6	17.0827
67	6	17.0881
68	6	17.0934
69	7	20.1403
70	7	20.1457
71	7	20.1511
72	7	20.1564
73	7	20.1618
74	7	20.1672
75	7	20.1725
76	7	20.1779
77	7	20.1833
78	7	20.1886
79	7	20.1940
80	7	20.1994
81	8	23.2463
82	8	23.2516
83	8	23.2570
84	8	23.2624
85	8	23.2677
86	8	23.2731
87	8	23.2785
88	8	23.2839
89	8	23.2892
90	8	23.2946
91	8	23.3000
92	8	23.3053
93	8	23.3107
94	9	26.3576
95	9	26.3630
96	9	23.3683
97	9	26.3737
98	9	26.3791
99	9	26.3844
101	9	26.3898
101	9	26.3952
102	9	26.4005
103	9	26.4059
104	9	26.4113
105	9	26.4166
106	10	29.4635
107	10	2934689
108	10	29.4743
109	10	29.4796
110	10	29.4850
111	10	29.4904
112	10	29.4957
113	10	29.5011

N	T	W
114	10	29.5065
115	10	29.5118
116	10	29.5172
117	10	29.5226
118	11	32.5695
119	11	32.5748
120	11	32.5802



All dimensions are for 1 diametral pitch
N = No. of teeth in gear
T = No. of teeth spanned
W = Span measurement (in inches)

1 DP span meas. = Approx. DP of Gear
"your" span meas.

SPAN MEASUREMENTS
20° PA

N	T	W
8	2	4.5402
9	2	4.5543
10	2	4.5683
11	2	4.5823
12	2	4.5963
13	2	4.6103
14	2	4.6243
15	2	4.6383
16	3	7.6044
17	3	7.6184
18	3	7.6324
19	3	7.6464
20	3	7.6604
21	3	7.6744
22	3	7.6885
23	3	7.7025
24	4	10.6686
25	4	10.6826
26	4	10.6968
27	4	10.7106
28	4	10.7246
29	4	10.7386
30	4	10.7526
31	4	10.7666
32	4	10.7806
33	5	13.7468
34	5	13.7608
35	5	13.7748
36	5	13.7888
37	5	13.8028
38	5	13.8188
39	5	13.8308
40	5	13.8448
41	6	16.8110
42	6	16.8250
43	6	16.8390
44	6	16.8530
45	6	16.8670
46	6	16.8810
47	6	16.8950

N	T	W
48	6	16.9090
49	6	16.9230
50	7	19.8891
51	7	19.9031
52	7	19.9171
53	7	19.9312
54	7	19.9452
55	7	19.9452
56	7	19.9732
57	7	19.9872
58	7	20.0012
59	8	22.9673
60	8	22.9813
61	8	22.9953
62	8	23.0093
63	8	23.0233
64	8	23.0373
65	8	23.0514
66	8	23.0514
67	8	23.0514
68	9	26.0455
69	9	26.0595
70	9	26.0735
71	9	26.0875
72	9	26.1015
73	9	26.1155
74	9	26.1295
75	9	26.1435
76	9	26.1575
77	10	29.1237
78	10	29.1377
79	10	29.1517
80	10	29.1657
81	10	29.1797
82	10	29.1900
83	10	29.2000
84	10	29.2200
85	10	29.2300
86	11	32.2010
87	11	32.2150

N	T	W
88	11	32.229
89	11	32.243
90	11	32.257
91	11	32.271
92	11	32.285
93	11	32.299
94	11	32.313
95	12	35.280
96	12	35.294
97	12	35.308
98	12	35.322
99	12	35.336
100	12	35.350
101	12	35.364
102	12	35.378
103	12	35.392
104	13	38.358
105	13	38.372
106	13	38.386
107	13	38.4002
108	13	38.4142
109	13	38.4283
110	13	38.4423
111	13	38.4563
112	13	38.4703
113	14	41.4364
114	14	41.4504
115	14	41.4644
116	14	41.4784
117	14	41.4924
118	14	41.5064
119	14	41.5204
120	14	41.5344

SPAN MEASUREMENTS
25° PA

N	T	W
10	2	4.5425
11	2	4.5697
12	2	4.5969
13	2	4.6240
14	2	4.6512
15	3	7.5256
16	3	7.5528
17	3	7.5800
18	3	7.6071
19	3	7.6343
20	3	7.6615
21	3	7.6886
22	4	10.5630
23	4	10.5902
24	4	10.6174
25	4	10.6445
26	4	10.6717
27	4	10.6989
28	4	10.7260
29	5	13.6005
30	5	13.6276
31	5	13.6548
32	5	13.6820
33	5	13.7091
34	6	13.7363
35	6	13.7635
36	6	16.6379
37	6	16.6620
38	6	16.6922
39	6	16.7194
40	6	16.7465
41	7	16.7737
42	7	16.8009
43	7	16.8281
44	7	19.7025
45	7	19.7296
46	7	19.7568
47	7	19.7840
48	7	19.8111
49	7	19.8383
50	7	19.8655
51	8	22.7399
52	8	22.7671
53	8	22.7942
54	9	22.8214
55	9	22.8486
56	9	22.8757
57	9	22.9029

N	T	W
58	9	25.7773
59	9	25.8045
60	9	25.8316
61	9	25.8588
62	9	25.8860
63	9	28.9131
64	10	25.9403
65	10	28.8147
66	10	28.8419
67	10	28.8691
68	10	28.8962
69	10	28.9234
70	10	28.9506
71	10	28.9777
72	11	31.8521
73	11	31.8793
74	11	31.9065
75	11	31.9336
76	11	31.9608
77	11	31.9880
78	11	32.0151
79	11	32.0423
80	12	32.9167
81	12	34.9439
82	12	34.9711
83	12	34.9982
84	12	35.0254
85	12	35.0526
86	12	35.0797
87	13	37.9541
88	13	37.9813
89	13	38.0085
90	13	38.0356
91	13	38.0228
92	13	38.0900
93	13	38.1171
94	14	40.9916
95	14	41.0187
96	14	14.0459
97	14	14.0731
98	14	14.1002
99	14	14.1274

SPAN MEASUREMENTS 30° PA

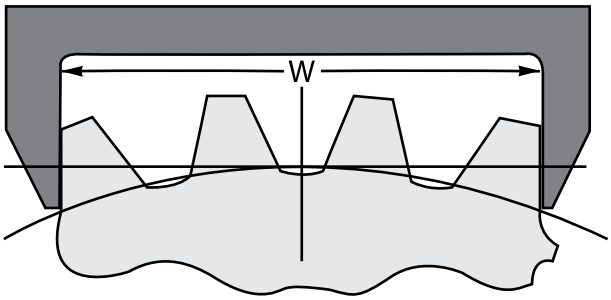
N	T	W
6	2	4.3604
7	2	4.4069
8	2	4.4534
9	2	4.5000
10	2	4.5465
11	3	7.3138
12	3	7.3604
13	3	7.4069
14	3	7.4534
15	3	7.5000
16	3	7.5465
17	4	10.3138
18	4	10.3604
19	4	10.4069
20	4	10.4534
21	4	10.5000
22	4	10.5464
23	5	13.3168
24	5	13.3604
25	5	13.4069
26	5	13.4534
27	5	13.5000
28	5	13.5464

N	T	W
29	6	16.3138
30	6	16.3604
31	6	16.4069
32	6	16.4534
33	6	16.5000
34	6	16.5465
35	7	19.3138
36	7	19.3604
37	7	19.4069
38	7	19.4534
39	7	19.500
40	7	19.5465
41	8	22.3138
42	8	22.3604
43	8	22.4069
44	8	22.4534
45	8	22.5000
46	9	25.2671
47	9	25.3138
48	9	25.3604
49	9	25.4069
50	9	25.4534

The limitations of span measurement are:

1) Span measurement cannot be applied when a combination of high helix angle and narrow face width prevent the caliper from spanning a sufficient number of teeth.

2) Readings are influenced by errors in base pitch, tooth profile, and lead. Readings would be erroneous if attempted on a portion of profile which had been modified from true involute shape.



Inspection of Tooth Thickness by means of a Span Measurement.

STANDARD TOOTH DIMENSIONS

Tooth Chart, 2.157/ DP System

DP

Diam. Pitch	CP	Tooth Thickness	Addendum	Dedendum	Whole Depth
1	3.1416	1.5708	1.000	1.571	2.1571
1-1/4	2.5133	1.2567	.8000	.9257	1.7257
1-1/2	2.0944	1.0472	.6667	.7714	1.4381
1-3/4	1.7952	.8976	.5714	.6612	1.2326
2	1.5708	.7854	.5000	.5786	1.0786
2-1/4	1.3963	.6985	.4444	.5143	.9587
2-1/2	1.2566	.6283	.4000	.4628	.8628
2-3/4	1.1424	.5712	.3636	.4208	.7844
3	1.0472	.5236	.3333	.3857	.7190
3-1/2	.8976	.4488	.2857	.3306	.6163
4	.7854	.3927	.2500	.2893	.5393
5	.6283	.3141	.2000	.2314	.4314
6	.5236	.2628	.1667	.1929	.3595
7	.4488	.2244	.1429	.1653	.3082
8	.3927	.1963	.1250	.1446	.2696
9	.3491	.1745	.1111	.1286	.2397
10	.3142	.1570	.1000	.1157	.2157
11	.2856	.1428	.0909	.1052	.1961
12	.2618	.1309	.833	.0964	.1798
13	.2417	.1208	.0769	.0890	.1659
14	.2244	.4422	.0714	.0827	.1541
15	.2094	.1047	.0667	.0771	.1438
16	.1963	.0982	.0625	.0723	.1348
17	.1848	.0924	.0588	.0687	.1269
18	.1745	.0873	.0556	.0643	.1198
19	.1653	.0827	.0526	.0609	.1135

Tooth Chart, 2.25/DP System

DP

Diam. Pitch	CP	Tooth Thickness	Addendum	Dedendum	Whole Depth
1	3.1416	1.5708	1.000	1.1571	2.250
1-1/4	2.5133	1.2567	.8000	.9257	1.800
1-1/2	2.0944	1.0472	.6667	.7714	1.500
1-3/4	1.7952	.8976	.5714	.6612	1.2857
2	1.5708	.7854	.5000	.6250	1.1250
2-1/4	1.3963	.6981	.4444	.5555	.9999
2-1/2	1.2566	.3283	.4000	.5000	.9000
2-3/4	1.1424	.5712	.3636	.4545	.8181
3	1.0472	.5236	.3333	.4166	.7499
3-1/2	.8976	.4488	.2857	.3571	.6428
4	.7854	.3927	.2500	.3125	.5625
5	.6283	.3141	.2000	.2500	.4500
6	.5236	.2618	.1666	.2083	.3750
7	.4488	.2244	.1429	.1786	.3215
8	.3927	.1963	.1250	.1562	.2812
9	.3491	.1745	.1111	.1389	.2500
10	.3142	.1570	.1000	.1250	.2250
11	.2856	.1428	.0909	.1136	.2045
12	.2618	.1309	.0833	.1042	.1875
13	.2417	.1208	.0769	.0961	.1730
14	.2244	.4422	.0714	.0893	.1607
15	.2094	.1047	.0666	.0833	.1500
16	.1963	.0982	.0625	.0781	.1406
17	.1843	.0924	.0588	.0735	.1323
18	.1745	.0873	.0556	.0694	.1250
19	.1653	.0827	.0526	.0658	.1184

STANDARD TOOTH DIMENSIONS

Tooth Chart, 2.20/DP+ .002 System

DP

Diam. Pitch	CP	Tooth Thickness	1/DP Addendum	1.25/DP Dedendum	Whole Depth
20	0.1571	0.0785	0.0500	0.0620	0.1120
21	0.1496	0.0748	0.0476	0.0591	0.1068
22	0.1428	0.0714	0.0455	0.0565	0.1020
24	0.1309	0.0654	0.0417	0.0520	0.0937
26	0.1208	0.0604	0.0385	0.0482	0.0866
28	0.1122	0.0561	0.0357	0.0449	0.0806
30	0.1047	0.0524	0.0333	0.0420	0.0753
32	0.0982	0.0491	0.0312	0.0395	0.0708
34	0.0924	0.0462	0.0294	0.0373	0.0667
36	0.08727	0.0436	0.0278	0.0353	0.0631
38	00827	0.0413	0.0263	0.0336	0.0599
40	0.0785	0.0393	0.0250	0.0320	0.0570
42	0.0748	0.0374	0.0238	0.0306	0.0544
44	0.0714	0.0357	0.0227	0.0293	0.0520
46	0.0683	0.0341	0.0217	0.0281	0.0498
48	0.0654	0.0327	0.0208	0.0270	0.0478
50	0.0628	0.0314	0.0200	0.0260	0.0460
56	0.0569	0.0280	0.0179	0.0234	0.0413
60	0.0524	0.0262	0.0167	0.0220	0.0387
64	0.0491	0.0245	0.0156	0.0208	0.0364
72	0.043	0.0218	0.0139	0.0187	0.0326
80	0.0393	0.0196	0.0125	0.0170	0.0295
96	0.0327	0.0164	0.0104	0.0145	0.0249
120	0.262	0.0131	0.0083	0.0120	0.0203

Tooth Chart, 2.157/DP System

CP

Fraction	CP	Tooth Thickness	Addendum	Dedendum	Whole Depth
1/8	0.125	0.625	0.0398	0.0625	0.0858
1/6	0.1667	0.08335	0.05306	0.06139	0.1144
1/5	0.2000	0.10000	0.06366	0.07366	0.1373
1/4	0.2500	0.12500	0.07958	0.09207	0.1716
5/16	0.3125	0.15625	0.09947	0.11509	0.2146
1/3	0.3333	0.16667	0.10610	0.12276	0.2288
3/8	0.3750	0.18750	0.1194	0.13810	0.2575
7/16	0.4375	0.21875	0.13826	0.16112	0.3004
1/2	0.5000	0.2500	0.15915	0.18414	0.3433
9/16	0.5625	0.28125	0.1790	0.20716	0.3862
5/8	0.6250	0.3125	0.19894	0.23018	0.4291
2/3	0.6667	0.3333	0.2122	0.2455	0.4578
11/16	0.6875	0.3437	0.2188	0.2532	0.4720
3/4	0.750	0.3750	0.2387	0.2763	0.5149
7/8	0.875	0.4375	0.2785	0.3222	0.6008
1	1.000	0.5000	0.3183	0.3683	0.6866
1-1/8	1.125	0.5625	0.3581	0.4143	0.7724
1-1/4	1.250	0.6250	0.3979	0.4604	0.8582
1-3/8	1.375	0.6875	0.4377	0.5064	0.9441
1-1/2	1.500	0.7500	0.4775	0.5524	1.0299
1-5/8	1.625	0.8125	0.5173	0.5985	1.1157
1-3/4	1.750	0.8750	0.5570	0.6445	1.2015
1-7/8	1.875	0.9375	0.5968	0.6805	1.2874
2	2.000	1.0000	0.6366	0.7366	1.3732

TOOTH CHART MODULE

2.25/DP Depth System

Module Pitch	DP	Tooth Thickness	1/DP Addendum	1.25/DP Dedendum	Whole Depth
1.25	20.32	0.0773	0.0492	0.0615	0.1107
1.50	16.9333	0.0928	0.0591	0.0738	0.1329
1.75	14.5142	0.1082	0.0689	0.0861	0.1550
2.0	12.70	0.1237	0.0787	0.0984	0.1771
2.25	11.2888	0.1391	0.0886	0.1107	0.1993
2.50	10.16	0.1546	0.0984	0.1230	0.2214
2.75	9.2363	0.1700	0.1083	0.1353	0.2436
3.0	8.4666	0.1855	0.1181	0.1476	0.2657
3.25	7.8153	0.2010	0.1280	0.1599	0.2879
3.50	7.2571	0.2164	0.1375	0.1722	0.3100
3.75	6.7733	0.2319	0.1473	0.1845	0.3321
4.0	6.35	0.2474	0.1575	0.1969	0.3544
4.25	5.9764	0.2628	0.1673	0.2092	0.3765
4.50	5.6444	0.2783	0.1772	0.2215	0.3987
4.75	5.3473	0.2938	0.1870	0.2338	0.4208
5.0	5.08	0.3092	0.1969	0.2461	.4430
5.25	4.838	0.3247	0.2067	0.2584	0.4651
5.50	4.5181	0.3401	0.2156	0.2707	0.4872
6.0	4.2333	0.3711	0.2362	0.2953	0.5315
6.25	4.064	0.3865	0.2461	0.3076	0.5537
6.50	3.9076	0.4020	0.2559	0.3199	0.5758
7.0	3.6285	0.4329	0.2756	0.3445	0.6201
7.25	3.5034	0.4484	0.2854	0.3568	0.6422
7.50	3.3866	0.4638	0.2953	0.3691	0.6644
8.0	3.175	0.4947	0.3150	0.3937	0.7088
8.25	3.0787	0.5102	0.3248	0.4060	0.7308
8.50	2.9882	0.5257	0.3346	0.4183	0.7529
9.0	2.8222	0.5566	0.35543	0.4429	0.7972
9.25	2.7450	0.5720	0.3642	0.4552	0.8194
9.50	2.6736	0.5875	0.3740	0.4672	0.8415
10.0	2.54	0.6184	0.3937	0.4921	0.8858
11.0	2.3090	0.6803	0.4330	0.5413	0.9744
12.0	2.1167	0.7410	0.4724	0.5906	1.0630
13.0	1.9538	0.8039	0.5118	0.6398	1.1516
14.0	1.8143	0.8658	0.5512	0.6890	1.2401
15.0	1.6933	0.9277	0.5906	0.7382	1.3287
16.0	1.5775	0.9895	0.6299	0.7874	1.4173
17.0	1.4911	1.0513	0.6693	0.8366	1.5059
18.0	1.4111	1.1132	0.7087	0.8858	1.5945
19.0	1.3368	1.1750	0.7480	0.9351	1.6831
20.0	1.2700	1.2368	0.7874	0.9843	1.7717
21.0	1.2095	1.2987	0.8268	1.0335	1.8602
22.0	1.1545	1.3606	0.8661	1.0827	1.9488
24.0	1.0583	1.4843	0.9449	1.1811	2.1260
25.0	1.0160	1.5466	0.9843	1.2303	2.2146

AGMA QUALITY CHART

COARSE PITCH GEAR TOLERANCES

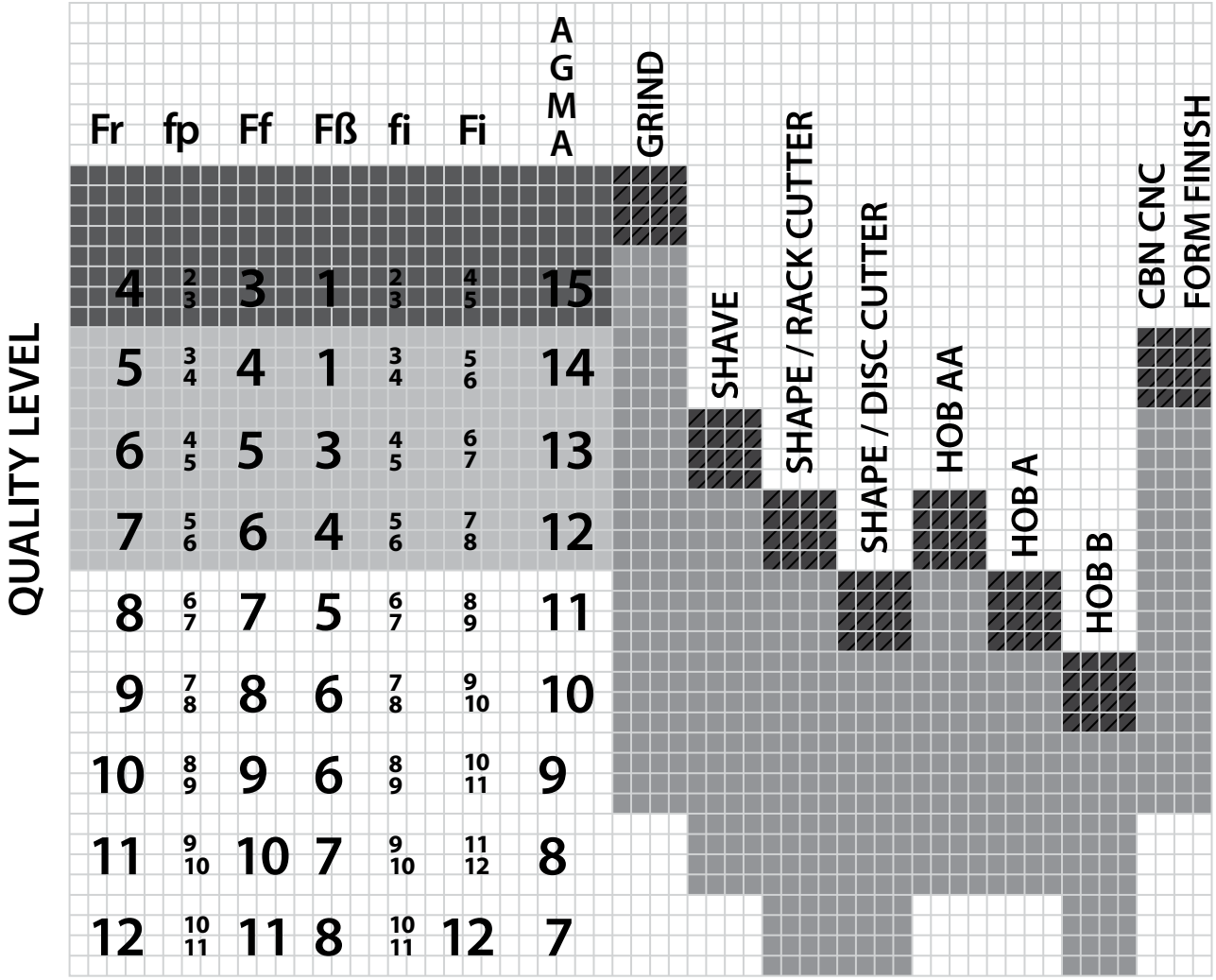
		RUNOUT TOLERANCE									
		PITCH DIAMETER (INCHES)									
AGMA QUALITY NUMBER	NORMAL DIAMETRAL PITCH	3/4	1 1/2	3	6	12	25	50	100	200	400
3	1/2	-	-	-	-	788.2	938.6	1106.9	1305.5	1539.6	1815.7
	1	-	-	-	477.8	563.5	671.1	791.4	933.4	1100.8	1298.1
	2	-	-	289.7	341.6	402.9	479.8	565.9	667.4	787.1	928.2
	4	-	-	207.1	244.3	288.1	343.1	404.6	477.2	562.7	663.7
	8	-	-	148.1	174.7	206.0	245.3	289.3	341.2	402.4	474.5
4	1/2	-	-	-	-	563.0	670.4	790.7	932.5	1099.7	1297.0
	1	-	-	-	341.3	402.5	479.3	565.3	666.7	786.3	927.3
	2	-	-	206.9	244.0	287.8	342.7	404.2	467.7	562.2	663.0
	4	-	-	147.9	174.5	205.8	245.0	289.0	340.8	102.0	474.1
	8	-	-	105.8	124.8	147.1	175.2	206.6	243.7	287.4	338.9
5	1/2	-	-	-	-	402.1	478.9	564.8	666.1	785.5	926.4
	1	-	-	-	243.8	287.5	342.4	403.8	476.2	561.6	662.4
	2	-	-	147.8	174.3	205.6	244.8	288.7	340.5	401.6	473.6
	4	-	89.6	105.7	124.6	147.0	175.0	206.4	243.5	287.1	338.6
	8	-	64.1	75.6	89.1	105.1	125.1	147.6	174.1	205.3	242.1
6	1/2	-	-	-	-	287.2	342.1	403.4	475.8	561.1	661.7
	1	-	-	-	174.1	205.4	244.6	288.4	340.2	401.2	473.1
	2	-	-	105.6	124.5	146.8	174.9	206.2	243.2	286.8	338.3
	4	-	64.0	75.5	89.0	105.0	125.0	147.4	173.9	205.1	241.9
	8	38.8	45.8	54.0	63.6	75.1	89.4	105.4	124.3	146.6	172.9
	12	31.9	37.6	44.4	52.3	61.7	73.5	86.6	102.2	120.5	142.1
	20	24.9	29.4	34.6	40.8	48.2	57.4	67.7	79.8	94.1	111.0
7	1/2	-	-	-	-	205.2	244.3	288.1	339.8	400.8	472.7
	1	-	-	-	124.4	146.7	174.7	206.0	243.0	286.6	337.9
	2	-	-	75.4	88.9	104.9	124.9	147.3	173.7	204.9	241.6
	4	-	45.7	53.9	63.6	75.0	89.3	105.3	124.2	146.5	172.8
	8	27.7	32.7	38.5	45.5	53.6	63.9	75.3	88.8	104.7	123.5
	12	22.8	26.9	31.7	37.4	44.1	52.5	61.9	73.0	86.1	101.5
	20	17.8	21.0	24.7	29.2	34.4	41.0	48.3	57.0	67.2	79.3

		PITCH TOLERANCE									
		PITCH DIAMETER (INCHES)									
AGMA QUALITY NUMBER	NORMAL DIAMETRAL PITCH	3/4	1-1/2	3	6	12	25	50	100	200	400
6	1/2	-	-	-	-	38.4	43.7	49.4	55.9	63.2	71.4
	1	-	-	-	29.1	32.9	37.4	42.3	47.8	54.1	61.1
	2	-	-	22.0	24.9	28.1	32.0	36.2	41.0	46.3	52.3
	4	-	-	18.9	21.3	24.1	27.4	31.0	35.1	39.6	44.8
	8	-	-	16.1	18.2	20.6	23.5	26.6	30.0	33.9	38.4
	12	-	-	14.7	16.7	18.8	21.5	24.3	27.4	31.0	25.0
	20	-	-	13.1	14.9	16.8	19.1	21.6	24.5	27.6	31.3
7	1/2	-	-	-	-	27.0	30.8	34.8	39.3	44.5	50.3
	1	-	-	-	20.5	23.1	26.4	29.8	33.7	38.1	43.1
	2	-	-	15.5	17.5	19.8	22.6	25.5	28.8	32.6	36.9
	4	-	11.7	13.3	15.0	17.0	19.3	21.8	24.7	29.9	31.6
	8	8.9	10.1	11.4	12.9	14.5	16.5	18.7	21.1	223.9	27.0
	12	8.1	9.2	10.4	11.7	13.3	15.1	17.1	19.3	21.8	24.7
	20	7.2	8.2	9.3	10.5	11.8	13.5	15.2	17.2	19.5	22.0

		RUNOUT TOLERANCE										PITCH TOLERANCE										PROFILE TOLERANCE										LEAD TOLERANCE				
		PITCH DIAMETER (INCHES)										PITCH DIAMETER (INCHES)										PITCH DIAMETER (INCHES)										PITCH DIAMETER (INCHES)				
AGMA QUALITY #	NORMAL DIAMETRAL PITCH	3/4	1-1/2	3	6	12	25	50	100	200	400	3/4	1-1/2	3	6	12	25	50	100	200	400	3/4	1-1/2	3	6	12	25	50	100	200	400	>1	2	3	4	5
8	1/2					146.5	174.5	205.8	242.7	286.3	337.6					19.0	21.7	24.5	27.7	31.3	35.4					42.6	47.7	53.1	59.1	65.7	73.1					
	1				88.8	104.8	124.8	147.2	173.6	204.7	241.4				14.4	16.3	18.6	21.0	23.7	26.8	30.3				28.3	31.5	35.3	39.3	43.7	48.6	54.1					
	2			53.9	63.5	74.9	89.2	105.2	124.1	146.3	172.6			10.9	12.3	14.0	15.9	18.0	20.3	23.0	26.0			18.8	21.0	23.3	26.1	29.0	32.3	36.0	40.0					
	4		32.7	38.5	45.4	53.6	63.8	75.2	88.7	104.6	123.4		8.3	9.3	10.6	11.9	13.6	15.4	17.4	19.7	22.2		12.5	13.9	15.5	17.2	19.3	21.5	23.9	26.6	29.6	5	8	11	13	16
	8	19.8	23.3	27.5	32.5	38.3	45.6	53.8	63.4	74.8	88.2	6.3	7.1	8.0	9.0	10.2	11.7	13.2	14.9	16.8	19.0	8.3	9.3	10.3	115	12.8	14.3	15.9	17.7	19.7	21.9					
	12	16.3	19.2	22.6	26.7	31.5	37.5	44.2	52.1	61.5	72.5	5.7	6.5	7.3	8.3	9.3	10.6	12.0	13.6	15.4	17.4	7.0	7.8	8.6	9.6	10.7	12.0	13.3	14.8	16.5	18.4					
	20	12.7	15.0	17.5	20.8	24.6	29.3	34.5	40.7	48.0	45.6	5.1	5.8	6.5	7.4	8.3	9.5	10.7	12.1	13.7	15.5	5.6	6.2	6.9	7.7	8.6	9.6	10.7	11.9	13.2	14.7					
9	1/2					104.7	124.7	147.0	173.4	204.5	241.2					13.4	15.3	17.3	19.5	22.1	24.9					30.4	34.1	37.9	42.2	46.9	52.2					
	1				63.5	74.8	89.1	105.1	124.0	146.2	172.4				10.2	11.5	13.1	14.8	16.7	18.9	21.4				20.2	22.5	25.2	28.1	31.2	34.7	38.6					
	2			38.5	45.4	53.5	63.7	75.2	88.6	104.5	123.3			7.7	8.7	9.8	11.2	12.7	14.3	16.2	18.3			13.5	15.0	16.7	18.6	20.7	23.1	25.7	28.6					
	4		23.3	27.5	32.4	38.3	45.6	53.7	63.4	74.7	88.1		5.8	6.6	7.4	8.4	9.6	10.8	12.2	13.8	15.7		8.9	10.0	11.1	12.3	13.8	15.3	17.1	19.0	21.1	4	7	9	11	13
	8	14.1	16.7	19.7	23.2	27.4	32.6	38.4	45.3	53.4	63.0	4.4	5.0	5.6	6.4	7.2	8.2	9.3	10.5	11.9	13.4	5.9	6.6	7.4	8.2	9.1	10.2	11.4	12.6	14.1	15.6					
	12	11.6	13.7	16.2	19.1	22.5	26.8	31.6	37.2	43.9	51.8	4.0	4.6	5.1	5.8	6.6	7.5	5.5	9.6	10.8	12.2	5.0	5.5	6.2	6.9	7.6	8.6	9.5	10.6	11.8	13.1					
	20	9.1	10.7	12.6	14.9	17.6	20.9	24.7	29.1	34.3	40.4	3.6	4.1	4.6	5.2	5.9	6.7	7.6	8.5	9.7	10.9	4.0	4.4	4.9	5.5	6.1	6.8	7.6	8.5	9.4	10.5					
10	1/2					74.8	89.0	105.0	123.8	146.1	172.3					9.4	10.8	12.2	13.7	15.5	17.6					21.7	24.3	27.1	30.1	33.5	37.3					
	1				45.3	53.5	63.7	75.1	88.5	104.4	123.2				7.2	8.1	9.2	10.4	11.8	13.3	15.0				14.5	16.1	18.0	20.0	22.3	24.8	27.6					
	2			27.5	32.4	38.2	45.5	53.7	63.3	74.7	88.1			5.4	6.1	6.9	7.9	8.9	10.1	11.4	12.9			9.6	10.7	11.9	13.3	14.8	16.5	18.3	20.4					
	4		16.7	19.6	23.2	27.3	32.5	38.4	45.3	53.4	63.0		4.1	4.6	5.2	5.9	6.7	7.6	8.6	9.8	11.0		6.4	7.1	7.9	8.8	9.9	11.0	12.2	13.6	15.1	3	5	7	9	10
	8	10.1	11.9	14.0	16.6	19.5	23.3	27.4	32.4	38.2	45.0	3.1	3.5	4.0	4.5	5.1	5.8	6.5	7.4	8.3	9.4	4.2	4.7	5.3	5.9	6.5	7.3	8.1	9.0	10.0	112					
	12	8.3	9.8	11.5	13.6	16.1	19.1	22.6	26.6	31.4	37.0	2.8	3.2	3.6	4.1	4.6	5.3	6.0	6.7	7.6	8.6	3.6	4.0	4.4	4.9	5.5	6.1	6.8	7.6	8.4	9.4					
	20	6.5	7.6	9.0	10.6	12.5	14.9	17.6	20.8	24.5	28.9	2.5	2.9	3.2	3.7	4.1	4.7	5.3	6.0	6.8	7.7	3.6	3.2	3.5	3.9	4.4	4.9	5.4	6.1	6.7	7.5					
11	1/2					53.4	63.6	75.0	88.5	104.3	123.0					6.6	7.6	8.6	9.7	10.9	12.4					15.5	17.4	19.3	21.5	24.0	26.7					
	1				32.4	38.2	45.5	53.6	63.2	74.6	88.0				5.0	5.7	6.5	7.3	8.3	9.4	10.6				10.3	11.5	12.9	14.3	15.9	17.7	19.7					
	2			19.6	23.1	27.3	32.5	38.3	45.2	53.3	62.9			3.8	1.3	4.9	5.6	6.3	7.1	8.0	9.0			6.9	7.6	8.5	9.5	10.6	11.8	13.1	14.6					
	4		11.9	14.0	16.6	19.5	23.2	27.4	32.3	38.1	45.0		2.9	3.3	3.7	4.2	4.8	5.4	6.1	6.9	7.8		4.6	5.1	5.6	6.3	7.0	7.8	8.7	9.7	10.8	3	4	6	7	8
	8	7.2	8.5	10.0	11.8	14.0	16.6	19.6	23.1	27.3	32.2	2.2	2..5	2.8	3.2	3.6	4.1	4.6	5.2	5.9	6.6	3.0	3.4	3.8	4.2	4.6	5.2	5.8	6.4	7.2	8.0					
	12	5.9	7.0	8.2	9.7	11.5	13.7	13.1	19.0	22.4	26.4	2.0	2.3	2.6	2.9	3.3	3.7	4.2	4.7	5.4	6.1	2.5	2.8	3.1	3.5	3.9	4.4	4.9	5.4	6.0	6.7					
	20	4.6	5.5	6.4	7.6	9.0	10.7	12.6	14.8	17.5	20.6	1.8	2.0	2.3	2.6	2.9	3.3	3.7	4.2	4.8	5.4	2.0	2.3	2.5	2.8	3.1	3.5	3.9	4.3	4.8	5.4					
12	1/2					38.1	45.4	53.6	63.2	74.5	87.9					4.7	5.3	6.0	6.8	7.7	8.7					11.1	12.4	13.8	15.4	17.1	19.0					
	1				23.1	27.3	32.5	38.3	45.2	53.3	62.8				3.5	4.0	4.6	5.2	5.8	6.6	7.5				7.4	8.2	9.2	10.2	11.4	12.7	14.1					
	2			14.0	16.5	19.5	23.2	27.4	32.3	38.1	44.9			2.7	3.0	3.4	3.9	4.4	5.0	5.6	6.4			4.9	5.5	6.1	6.8	7.6	8.4	9.4	10.4					
	4		8.5	10.0	11.8	13.9	16.6	19.6	23.1	27.2	32.1		2.0	2.3	2.6	2.9	3.3	3.8	4.3	4.8	5.5		3.3	3.6	4.0	4.5	5.0	5.6	6.2	6.9	7.7	2	3	5	6	7
	8	5.2	6.1	7.2	8.5	10.0	11.9	14.0	16.5	19.5	23.0	1.5	1.7	2.0	2.2	2.5	2.9	3.2	3.7	4.1	4.7	2.2	2.4	2.7	3.0	3.3	3.7	4.1	4.6	5.1	5.7					
	12	4.2	5.0	5.9	6.9	8.2	9.8	11.5	13.6	16.0	18.9	1.4	1.6	1.8	2.0	2.3	2.6	3.0	3.3	3.8	4.3	1.8	2.0	2.2	2.5	2.8	3.1	3.5	3.9	4.3	4.8					
	20	3.3	3.9	4.6	5.4	6.4	7.6	9.0	10.6	12.5	14.7	1.3	1.4	1.6	1.8	2.0	2.3	2.6	3.0	3.4	3.8	1.5	1.6	1.8	2.0	2.2	2.5	2.8	3.1	3.4	3.8					
13	1/2					27.2	32.4	38.3	45.1	53.2	62.8					3.3	3.8	4.2	4.8	5.4	6.1					7.9	8.9	9.9	11.0	12.2	13.6					
	1				16.5	19.5	23.2	27.4	32.3	38.1	44.9				2.5	2.8	3.2	3.6	4.1	4.6	5.3				5.3	5.9	6.6	7.3	8.1	9.0	10.1					
	2			10.0	11.8	13.9	16.6	19.6	23.1	27.2	32.1			1.9	2.1	2.4	2.8	3.1	3.5	4.0	4.5			3.5	3.9	4.3	4.9	5.4	6.0	6.7	7.4					
	4		6.1	7.2	8.4	10.0	11.9	14.0	16.5	19.5	22.9		1.4	1.6	1.8	2.1	2.4	2.7	3.0	3.4	3.8		2.3	2.6	2.9	3.2	3.6	4.0	4.4	4.9	5.5	2	3	4	4	5
	8	3.7	4.3	5.1	6.0	7.1	8.5	10.0	11.8	13.9	16.4	1.1	1.3	1.4	1.6	1.8	2.0	2.3	2.6	2.9	3.3	1.5	1.7	1.9	2.1	2.4	2.7	3.0	3.3	3.7	4.1					
	12	3.0	3.6	4.2	5.0	5.9	7.0	8.2	9.7	11.4	13.5	1.0	1.1	1.3	1.4	1.6	1.8	2.1	2.4	2.7	3.0	1.3	1.4	1.6	1.8	2.0	2.2	2.5	2.8	3.1	3.4					
	20	2.4	2.8	3.3	3.9	4.6	5.4	6.4	7.6	8.9	10.5	0.9	1.0	1.1	1.3	1.4	1.6	1.9	2.1	2.4	2.7	1.0	1.2	1.3	1.4	1.6	1.8	2.0	2.2	2.5	2.7					
14	1/2					19.5	23.2	27.3	32.2	38.0	44.8					2.3	2.6	3.0	3.4	3.8	4.3					5.7	6.3	7.1	7.8	8.7	9.7					
	1				11.8	13.9	16.6	19.5	23.0	27.2	32.1				1.8	2.0	2.3	2.6	2.9	3.3	3.7				3.8	4.2	4.7	5.2	5.8	6.5	7.2					
	2			7.2	8.4	9.9	11.8	14.0	16.5	19.4	22.9			1.3	1.5	1.7	1.9	2.2	2.25	2.8	3.2			2.5	2.8	3.1	3.5	3.9	4.3	4.8	5.3					
	4		4.3	5.1	6.0	7.1	8.5	10.0	11.8	13.9	16.4		1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.7		1.7	1.9	2.1	2.3	2.6	2.9	3.2	3.5	3.9	1	2	3	4	4
	8	2.6	3.1	3.7	4.3	5.1	6.1	7.1	8.4	9.9	11.7	0.8	0.9	1.0	1.1	1.2	1.4	1.6	1.8	2.1	2.3	1.1	1.2	1.4	1.5	1.7	1.9	2.1	2.3	2.6	2.9					
	12	2.2	2.5	3.0	3.5	4.2	5.0	5.9	6.9	8.2	9.6	0.7	0.8	0.9	1.0	1.1	1.3	1.5	1.7	1.9	2.1	0.9	1.0	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.4					
	20	1.7	2.0	2.3	2.	3.3	3.9	4.6	5.4	6.4	7.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.5	1.7	1.9	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.6	1.8	2.0					
15	1/2					13.9	16.6	19.5	23.0	27.2	32.0					1.6	1.9	2.1	2.4	2.7	3.0					4.0	4.5	5.0	5.6	6.2	6.9					
	1				8.4	9.9	11.8	14.0	16.5	19.4	22.9				1.2	1.4	1.6	1.8	2.0	2.3	2.6				2.7	3.0	3.3	3.7	4.1	4.6	5.1					
	2			5.1	6.0	7.1	8.5	10.0	11.8	13.9	16.4			0.9	1.1	1.2	1.4	1.5	1.7	2.0	2.2			1.8	2.0	2.2	2.5	2.8	3.1	3.4	3.8					
	4		3.1	3.7	4.3	5.1	6.1	7.1	8.4	9.9	11.7		0.7	0.8	0.9	1.0	1.2	1.3	1.5	1.7	1.9		1.2	1.3	1.5	1.6	1.8	2.0	2.3	2.5	2.8	1	2	2	3	3
	8	1.9	2.2	2.6	3.1	3.6	4.3	5.1	6.0	7.1	8.4	0..5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.6	0.8	0.9	1.0	1.1	1.2	1.4	1.5	1.7	1.9	2.1					
	12	1.5	1.8	2.1	2.5	3.0	3.6	4.2	4.9	5.8	6.9	0..5	0.6	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.5	0.7	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.6	1.7					
	20	1.2	1.4	1.7	2.0	2.3	2.8	3.3	3.9	4.6	5.4	0.4	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.2	1.3	0.5	0.6	0.7	0.7	0.8	0.9	1.0	1.1	1.3	1.4					

ACHIEVABLE GEAR QUALITIES

BY MACHINE METHOD



Fr = Runout
fp = Pitch Variation
Ff = Profile
Fß =Lead
f i = Tooth to tooth Composite
Fi = Total Composite

MACHINING METHOD

Possible only under special conditions

SOURCE COMPARISONS: DIN 3962 (1974) and AGMA 390.03
NOTE: SEE THE ACTUAL STANDARDS FOR EXACT COMPARISONS
Courtesy of Gleason Pfauter Hurth

HARDNESS CONVERSION

Brinell HB	Rockwell		MPa
10mm Ball 3000 Kg	C 120º Cone 150 Kg	B 1/16" Ball 100kg	N/mm²
800	72	-	-
780	71	-	-
760	70	-	-
745	68	-	-
725	67	-	-
712	66	-	-
682	65	-	-
668	64	-	-
652	63	-	-
626	62	-	-
614	61	-	-
601	60	-	2206
590	59	-	2033
576	57	-	1956
552	56	-	1944
545	55	-	1889
529	54	-	1802
514	53	120	1772
502	52	119	1725
495	51	119	1663
477	49	118	1617
461	48	117	1535
451	47	117	1524
444	46	116	1509
427	45	115	1420
415	44	115	1417
401	43	114	1355
388	42	114	1309
375	41	113	1289
370	40	112	1255
362	39	111	1232
351	38	111	1193
346	37	110	1186
331	36	110	1155
323	35	109	1103
311	34	106	1047
301	33	107	1014
293	32	106	993
285	31	105	965

Brinell HB	Rockwell		MPa
10mm Ball 3000 Kg	C 120º Cone 150 Kg	B 1/16" Ball 100kg	N/mm²
278	30	105	945
269	29	104	917
261	28	103	889
258	27	102	869
255	26	102	909
249	25	101	847
245	24	100	834
240	23	99	814
237	23	99	770
229	22	98	755
224	21	97	752
217	20	96	738
211	19	95	731
206	18	94	690
203	17	94	683
200	16	93	662
196	15	92	647
191	14	92	641
187	13	91	635
185	12	91	627
183	11	90	601
180	10	89	585
175	09	88	579
170	07	87	572
167	06	87	560
165	05	86	558
163	04	85	545
160	03	84	538
156	02	83	524
154	01	82	520
152	-	82	517
150	-	81	503
147	-	80	-
145	-	79	-
143	-	79	-
141	-	78	-
140	-	77	-
135	-	75	-
130	-	72	-

Hardness conversion between different methods and scales cannot be made mathematically exact for a wide range of materials. Different loads, different shape of indenters, homogeneity of specimen, cold working properties and elastic properties all complicate the problem. All tables and charts should be considered as giving approximate equivalents, particularly when converting to a method or scale which is not physically possible for the particular test material and thus cannot be verified.

NORMAL CUTTING TOOL HARNESS LEVELS

AISI	Grade Name	Typical Hardness	AISI	Grade Name	Typical Hardness
M1	REX® TMO	64-66	M35	CPM M35 HCHS	65-67
M2	REX® M2 (S)	64-66	T1	REX® AA	63-65
M2	REX® M2S (1.0C)	64-66	T4	REX® AAA	64-66
M3	REX® M3-1	65-67	T8	REX® 95	64-66
M3	REX® M3-2	65-67	T15	CPM T15 (HS)	65-67
M3	REX® M3 JCJS	65-67	M62	CPM REX® 20 (S)	66-68
M4	REX® M4	64-66	-	CPM REX®45 (HS)	66-68
M4	CPM M4 HC(HS)	64-66	M48	CPM REX® 76 (HS)	67-69
M5	REX® M7N	65-67	-		-

TOOL MATERIALS GRADE DESCRIPTION

The selection of a particular high speed steel will depend upon your particular production requirements and the type of material you are cutting.

Tool Steel Grade	Description
M2	Has been used extensively in the hob and shaper cutter industry. Desirable due to its low cost and good machinability, grindability and out of round control in heat treatment. Low red hardness, used for cutting standard steels, irons, brasses, copper wrought aluminum alloys not for aluminum extrusions, stainless or super alloys. Can be used for steels up to RC-35.
M3	Similar to ASP 23 except with a higher sulfur content for better machinability and grindability. Better wear and abrasion resistants than M2 with 25-30% better life. Can be used for steels up to RC-40.
M4	Best combination of toughness and wear resistance in the M- series high speed steels, good for cast irons which contain free carbides and effective on aluminum extrusions. Somewhat harder to grind than M3, more prone to chipping than M3. Wear resistance surpassed only by T15. CPM M4 is the favored material for hobs, shapers, broaches, etc. Can be used for steels up to RC-40. CPM M4 is the favored material for hobs, shapers, broaches, etc.
M42	Super high speed steel, capable of being heat treated to RC-68 for good red harness characteristics, better wear resistance than REX 45, not as tough as M4. Can be used for steels up to RC48
T15	Most wear resistant of the traditional AISI high speed steels. Good red hardness characteristics, better wear /resistance than REX 45, not as tough as M4. Can be used for steels up to RC48.
REX 76	Top of the line CPM high speed steel with highest combination of red hardness and wear resistance available. Comparable with ASP 60. Prone to chipping similar to T15, difficult to machine. Can be used for steels up to RC48.

NOMINAL CHEMISTRIES, FOR ASP HIGH SPEED STEELS

Material	C	CR	V	W	MO	CO	S	ALLOY %	RC
ASP 23	1.30	4.05	3.05	6.30	5.00	-	0.20*	19.9	65.5
ASP 30	1.30	4.05	3.05	6.30	5.00	8.50	0.12***	28.32	67.5
ASP 52	1.6	4.80	5.00	10.5	2.00	8.00	-	-	67
ASP 60	2.30	4.00	6.50	6.50	7.00	10.50	-	36.8	68

* May vary - Has been available in both low sulfur and high sulfur
** Has been available in both low sulfur and intermediate sulfur and intermediate sulfur

ASP GRADE	RECOMMENDED ALTERNATE CPM GRADE
ASP 23	Preferred grade CPM M4 for best combination of wear resistance and toughness or CPM M3HS for equivalent performance but better machining and grinding characteristics.
ASP 30	CPM REX®45 - same chemical composition; is an exact substitute. Where ASP 30 is only being used for its red hardness properties, also consider, CPM M4, CPM M35 HCHS or CPM M42.
ASP 60	No CPM material with comparable chemistry but recommended alternates would be: CPM REX®76 or CPM T15.

®Rex - Cruicible Materials Corp. CPM = Crucible powdered metal

MATERIALS COATING

Titanium Nitride Coating - TiN

Titanium Nitride or "Gold Coating" is applied to hobs by the use of a PVD (physical vapor deposition) coating process. This process utilizes physical vapor deposition techniques. The temperature associated with PVD is between 800°F and 850°F. Because of the low temperature along with the minimal amount of coating applied, the process does not cause any growth or shrinkage in the substrate material.

The characteristics of TIN which have the potential of providing wear and abrasion resistance are its high hardness, low coefficient of friction, and inertness which results in an anti-weld surface. These characteristics also allow use of cutting tools at higher speeds and feeds. This high quality coating commonly will increase tool life 2-300% while some applications will see 6-800% improvement as speeds and feeds are increased.

It is important to make sure that your machine is in good condition with special attention that the tool holder and arbors are set up for maximum rigidity. Coated tools can generally be run longer in-between sharpening. The tool generally does not need coating after sharpening because (unless there is an extreme condition), you will still benefit from the coating on the surfaces not sharpened - often 75-80% value retained.

As an added benefit, the user will generally realize an improvement in surface finish the hardness is 87 RC - 2-4 micron thickness.

TITANIUM CARBONITRIDE – Ti(C, N)

This (generally) "Blue/Gray" coating is beginning to gain popularity over TIN with abrasive, adhesive materials such as cast iron tool steels, aluminum copper and titanium alloys. This formulation has the same 2-4 micron thickness, but with a higher rockwell hardness of 90 RC.

TITANIUM ALUMINUM NITRIDE – (Ti, AL) N

The newest entry in coating - (generally) purple/black in color. Designed for use with difficult to machine materials including aluminum and nickel alloys. A good choice for interrupted cutting and high temperature machining. Thermal stability is high at 1350ºF.

Material Coating	Hardness (HV)	Thickness (Microns)	Thermal Stability (°C & °F)
Titanium Nitride	2800	2-4	550°C (1000°F)
Titanium Carbonitride	3000	2-4	400°C (750°F)
Titanium Aluminum Nitride	2800	2-4	750°C (1350°F)

Benefits Derived From Modern Coatings

1. Tool Life Increases
2. Higher Production Rates
3. More Parts Per Sharpening
4. Less Down Time
5. Better Surface Finish
6. Increased Profits

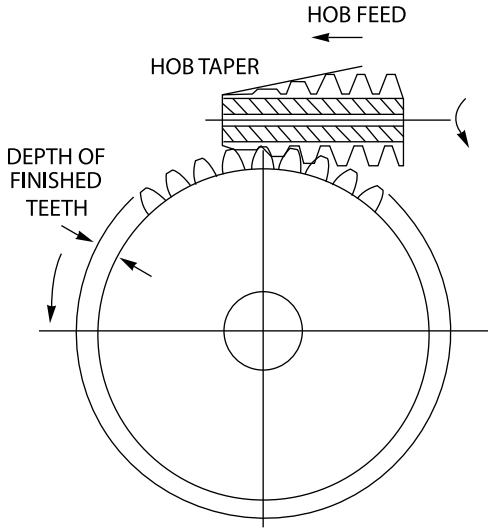
TYPES OF WORM GEAR HOBBING

Worm gears can be hobbed by feeding the hob tangentially past the worm gear blank or radially into the blank.

Tangential feed (figure #1).

When the thread lead angle is 15º or over , or has a large number of threads, the tangential hobbing method will achieve the best worm gear accuracy. The hob is fed in a direction tangent to the pitch diameter of the worm gear being hobbed.

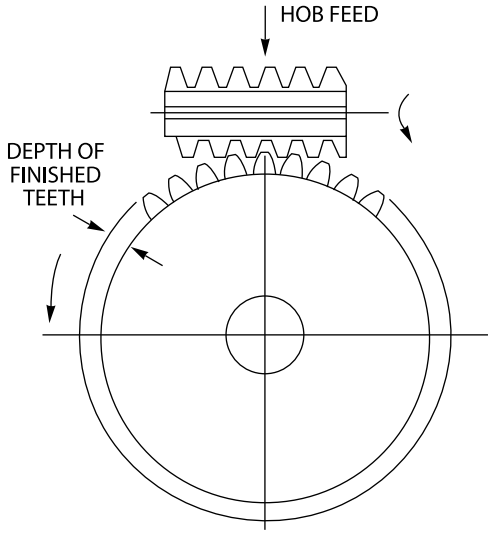
A tangential hob is tapered on the O.D. The starting end provides roughing teeth which remove much of the material. Several rows of full depth teeth are at the finishing end of the hob to generate the final tooth shape.



TANGENTIAL FEED fig.1

Radial feed (figure #2).

In radial feed hobbing, a cylindrical hob with finishing teeth along its entire length is fed radially into the gear blank. This infeed hobbing is best when the worm gear teeth have less than 15° lead angle and the mating worm does not have a large number of threads. See figure #2 for set up.

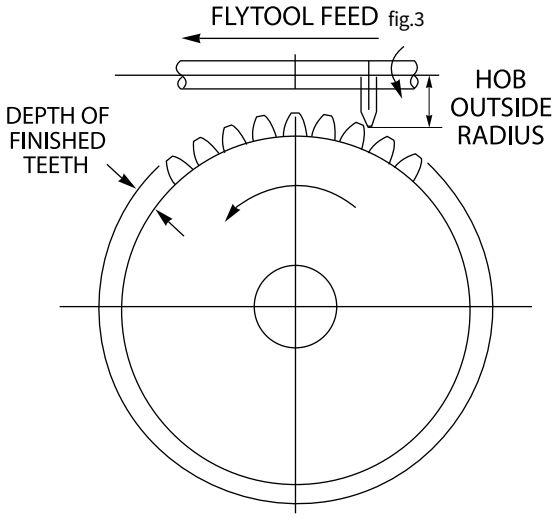


RADIAL FEED fig.2

Worm gear flyhobbing (figure #3).

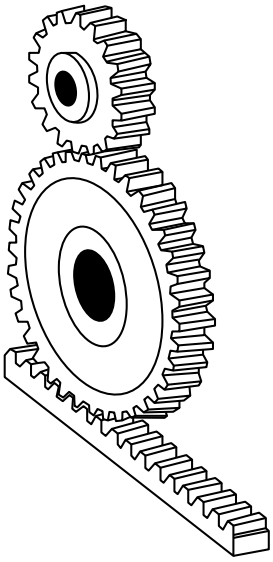
Where small quantities of worm gears are to be made, a single point tool can be used. This tool should have the equivalent form and size as the finishing teeth on what would be a tangential hob which can be mounted in an arbor in the hob spindle of the hobbing machine. The flytool would then be slowly fed tangentially through the worm gear blank to properly generate the worm gear teeth.

Infeeding or radial feeding of such a single point tool will not generate the wormgear teeth fully so the tool must be tangentially fed. It must be noted that with “flyhobbing” that all of the teeth will be generated on single start designs. Multiple start ratios must be hunting tooth in order to form all the teeth by the flytool method. Depending on the ratio, more than one cycle may be required.

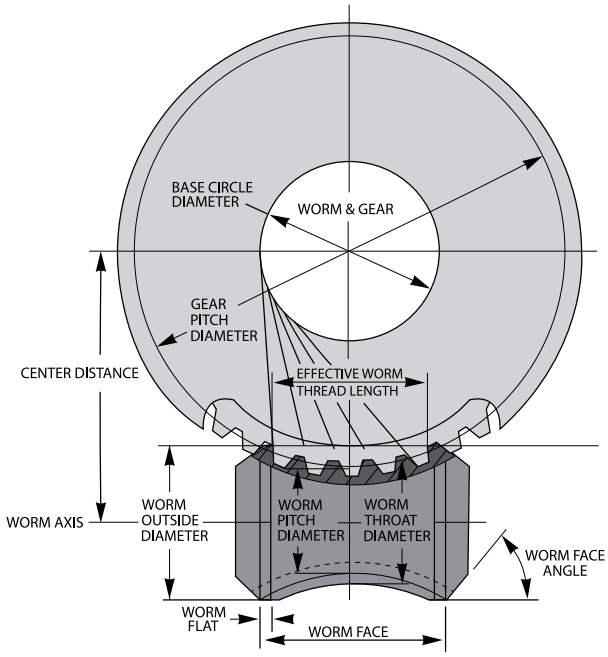


When selecting or designing a hob for a worm gear - the hob diameter should be slightly larger than the diameter of the worm because each time the hob is sharpened the hob diameter is smaller. To get maximum life out of the hob you would design the hob so that when the life was gone - the exact diameter of the worm had been reached! When using the single point tool method you can reset after each sharpening to accommodate the exact diameter desired, generally producing a more accurate worm gear.

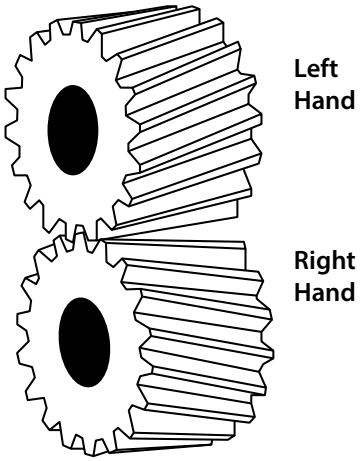
GEAR NOMENCLATURE



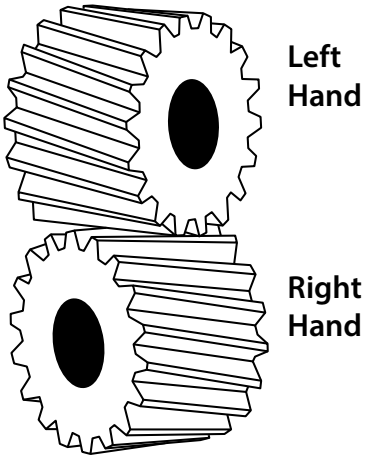
A Gear is a machine part with gear teeth. Of two gears that run together, the one with the larger number of teeth is called the gear, the one with the smaller number of teeth is called the pinion. A Rack is a gear with teeth spaced along a straight line, and suitable for straight-line motion.



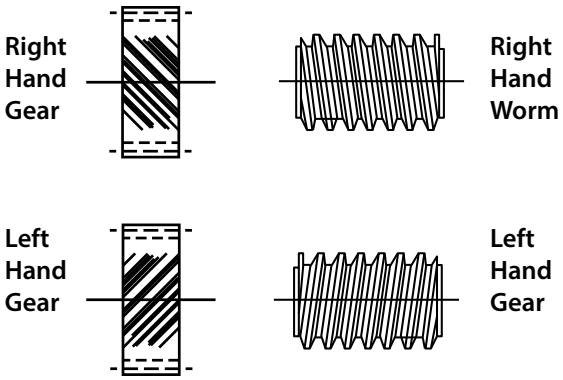
A Wormgear is the mate to a worm. A Wormgear that is completely conjugate to its worm has line contact and is said to be single enveloping. It is usually cut by a tool that is geometrically similar to the worm. An involute spur gear of helical gear used with a cylindrical worm has only point contacts. A worm is a gear with teeth in the form of screw threads.



Parallel Helical Gears operate on parallel axes,where both are external, the helices are of opposite hand.



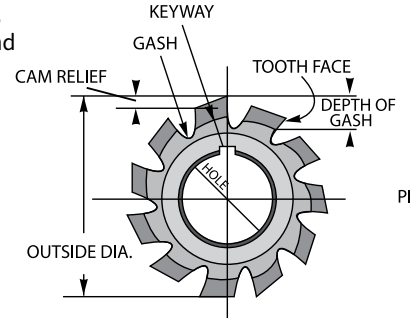
Crossed Helical Gears operate on crossed axes and may have teeth on the same or of opposite hand.

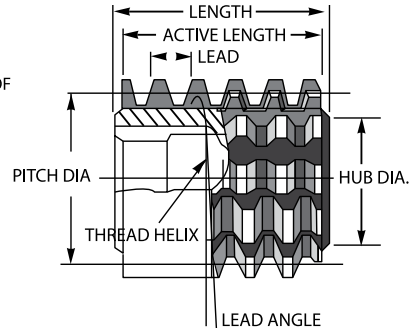


HOB NOMENCLATURE

THE HOBBING PROCESS

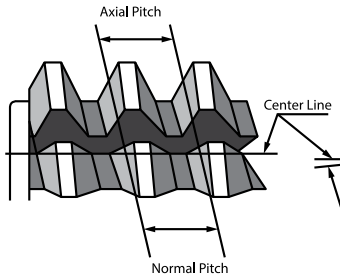
In hobbing a spur gear with a single thread hob, the contours of the gear teeth are generated by feeding a revolving hob across a rotating blank. A hob is basically like a worm with cutting edges. On the hobbing machine, the gear blank and the hob are both rotated by power, and their relative speeds are fixed by means of index change gears, so that the blank will move exactly one revolution. (ie) When hobbing a 30 tooth gear, the hob will rotate 30 times while the blank rotates once.

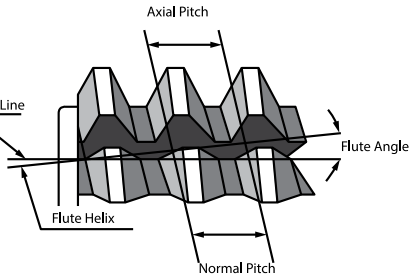




THE GENERATING ACTION OF A HOB

The drawing illustrates the generating action of the hobbing process. The teeth of the hob cut into the work piece in successive order, and each in a slightly different position. All hob teeth which come in contact with the work will remove a small chip to help form the full tooth profile. the cutting action is continuous, and several hob teeth will be cutting at the same time, each working on different portions of adjacent teeth. Thus, in the course of this uninterrupted working process, the teeth of the hob in positive progression envelop the teeth of the work with a network of cuts. The number of hob teeth that are involved in generating the work piece tooth profile increases with the number of flutes in the hob and the number of teeth in the work piece.

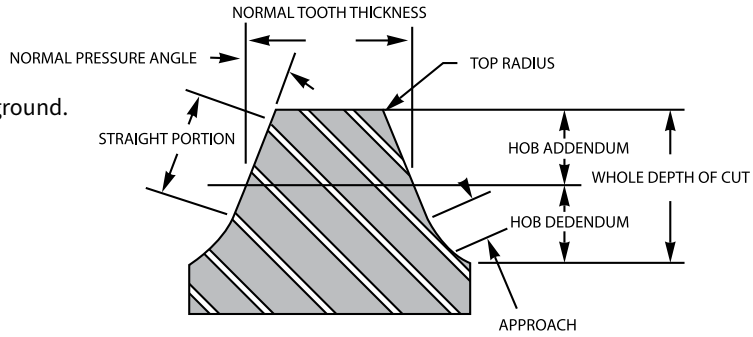




Since the gear hobbing process is a generating type of operation, the form or the hob the tooth is always different from the form of the tooth that it produces. For example, an involute form of gear tooth is produced by a hob having angular straight sides. A straight-sided spline tooth is produced by a hob having a curved tooth shape.

ACCURACY AND BASIC TYPES

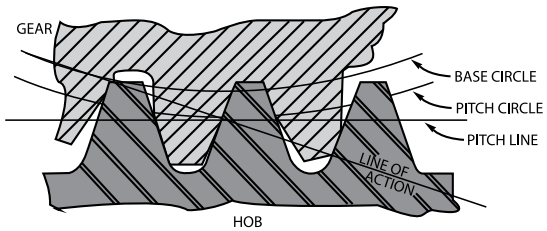
Hobs are generally put into five basic classes depending on accuracy - **AA** - Ultra Precision, **A** - Precision Ground, **B** - Ground, **C** - Unground (Accurate) and **D** - Commercial Unground.



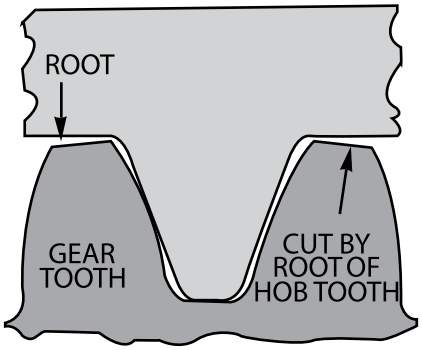
The requirements of a specific job will determine what class of hob should be used. However, keep in mind, that the results obtained when using any hob are dependent on the accuracy and condition of the machine and tooling with which the hob is used. Proper machine set-up, careful preparation, design of the workpiece holder, proper hob sharpening and inspection all are essential to obtain accurate results on a final part.

Hobs are made in three different types: Roughing, Semi-finishing, and Finishing. Roughing hobs usually allow more stock for finishing than a corresponding semifinishing hobs since the part is usually finish hobbed or shaped. Semi-finishing hobs allow only a small amount of stock for finishing either by shaving or by grinding. Finishing hobs are made to produce the finished tooth form of the part with no subsequent operations needed.

THE HOBBING PROCESS

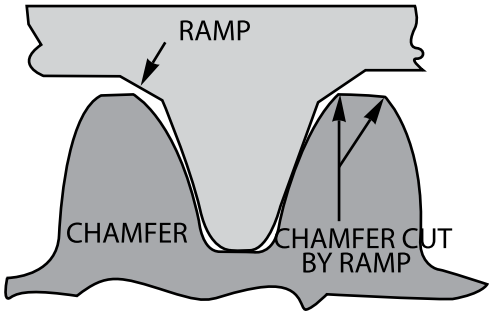


Special Gear Hob Tooth Forms



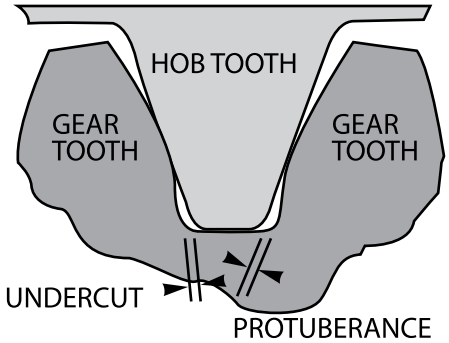
TOPPING

Topping hobs cut the outside diameter of the gear blank at the same time that the gear tooth is generated.



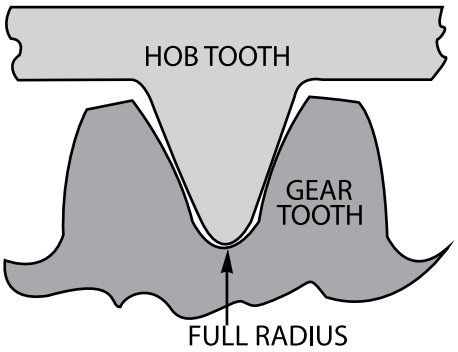
SEMI-TOPPING

A hob can be designed to chamfer the outside corners of the gear teeth at the same time that the teeth are generated. These chamfers are extremely beneficial in avoiding handling nicks which could interfere with correct rolling action.



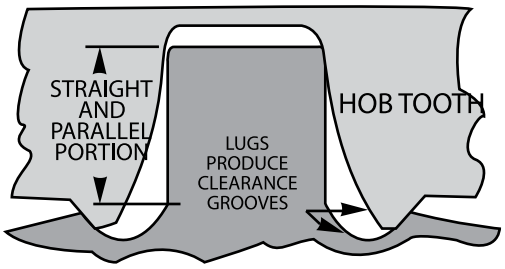
PROTUBERANCE TYPE

When hobbing operations are followed by gear shaving operations, it is important that the tip of the shaving cutter does not dig into the gear tooth fillet. A protuberance-type hob with projection as on the tip of the teeth actually undercut the gear tooth profile in such a manner that the shaving operation can produce a blended fillet profile.



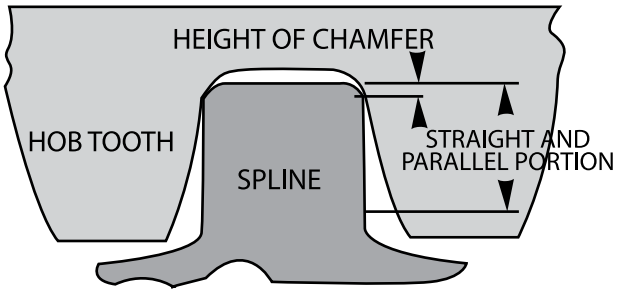
FULL RADIUS

When maximum strength is required a full radius is desirable, which produces a smoothly blended round bottom between the gear teeth.



STRAIGHT SIDE CLEARANCE GROOVE

Proper fit of straight-sided spline members can be achieved by hobbing a clearance groove in the area where the straight side meets the minor diameter of the spline. Small projections called lugs (or ears) on the tips on the hob teeth provide a blended clearance groove.



SEMI-TOPPING FLAT ROOT

A semi-topping hob can be used in straight-sided splines to produce a chamfer on the outside corners of the spline teeth.

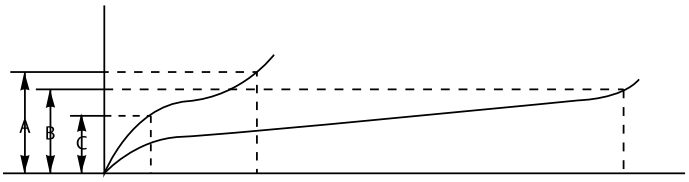
Hob Sharpening

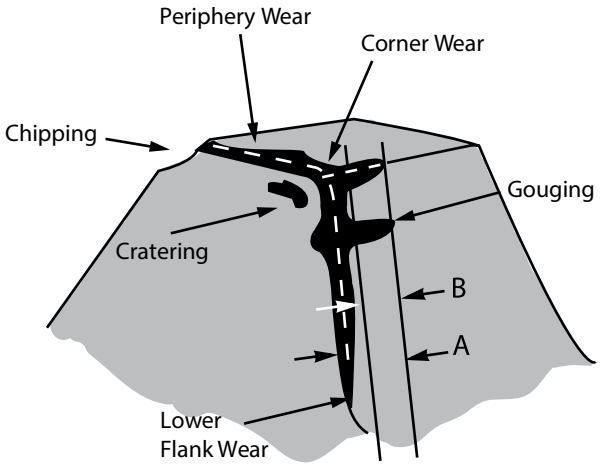
Fig. 1 illustrates the various types of wear often found on gear tools. Both chipping and gouging are types of wear which are due to deficiencies in the gear cutting operation which should be corrected.

For the purposes of clarity each of the three types of wear which occur on the relieved surfaces of the tooth directly in back of the cutting edge will be grouped together and referred to as “Flank Wear”.

These are periphery wear, corner wear, and lower flank wear, each occurring at a tooth location defined by its name. Flank wear is the type which is normally predominant in properly applied gear cutting tools.

Cratering is the eroding of material away from the cutting face of a hob or shaper cutter. The erosion of that surface is a result of the abrasive action of the chip curling over the face of the tooth or a chemical reaction of the chip and coolant combination of welding in which the high pressures and heat encountered in the cutting action tend to weld the chip to cutting face. As it is broken away a small particle of the face is removed with the chip. When cratering is a problem, it would generally be advisable to consider appropriate coolant changes or additives, or if possible the use of a higher alloy tool steel which would be resistant to the abrasive action which caused the cratering.





SHARPENING SUGGESTIONS

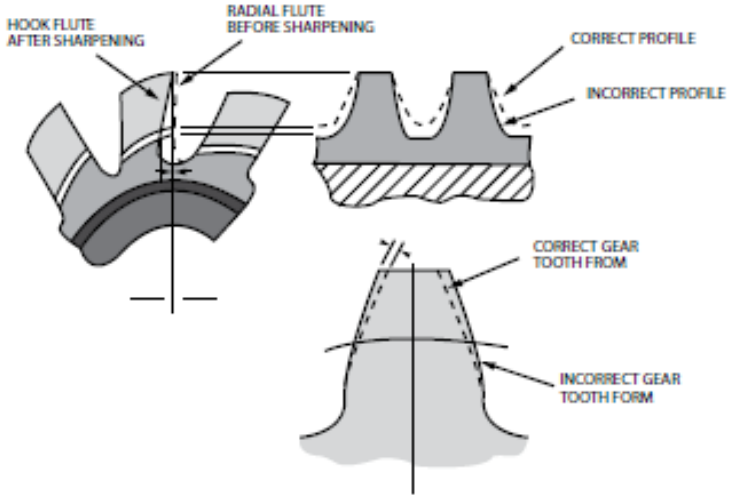
1) Hobs should be frequently re-sharpened to ensure that the wear is not greater than .012” to .020” Generally it is uneconomical to remove all the wear. As heavy initial wear occurs when hobbing the first few gears, after which the wear rate decrease. The left over wear depends in general on the material being machined. The harder it is, the more wear should be left.

2) For Tin (Gold Coat) coated hobs it is better to remove 100% of wear. This is because their wear curve is quite different from the wear curve of an uncoated hob (I) generally resharpening is made when the wear is about .007-.012”.

3) Hob cutting faces are normally radial and this must be maintained when resharpening, also the lead of the flutes must be correct, otherwise it will cause a change in the form.

4) Regrind with light cuts keeping the wheel sharp to avoid overheating which could alter the material structure.

EXAMPLES OF HOB SHARPENING ERRORS



Hob Sharpening errors influence he accuracy produced in the pars being hobbed.

These illustrations show some of the more common sharpening errors and their effects upon involute tooth profiles.

A sharp hob cuts faster, with less power and wear, and will produce more accurate work with a better finish.

1. Use a soft bevel or concave wheel of medium grain. Keep wheel clean as a glazed wheel may crack hob teeth.

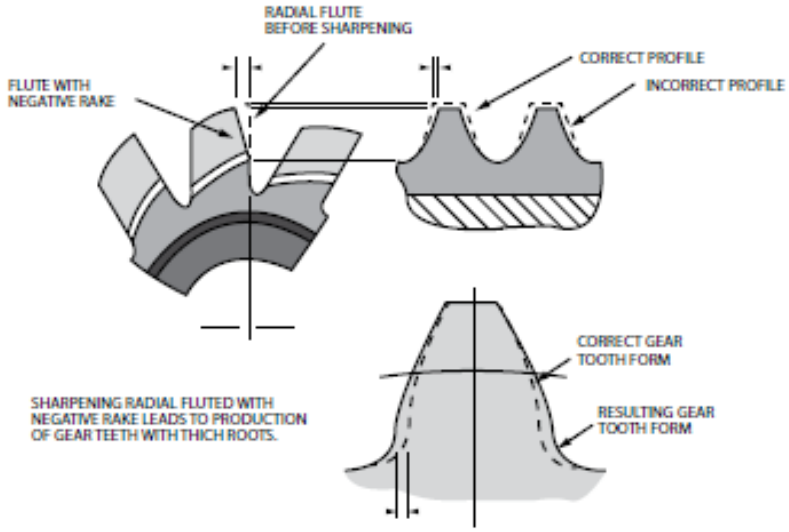
2. When using ordinary tool grinders use a sharpening guide for spiral fluted hobs.

3. Grind hob tooth faces on centerline (A" in drawing)

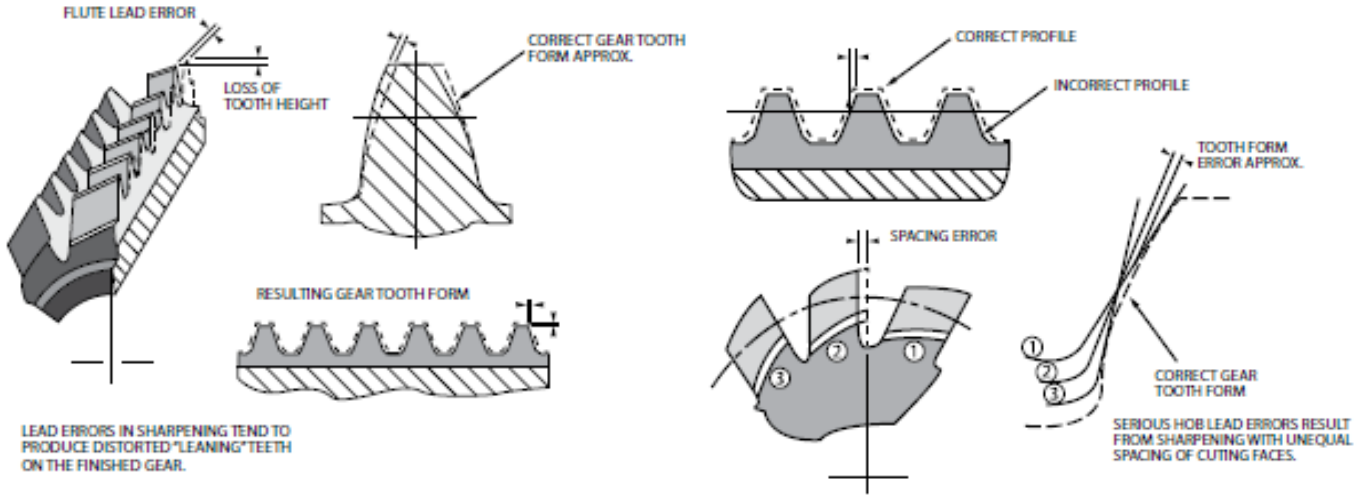
If undercut as at ("B"), hob tooth will cut too deep.

If ahead of center ("C"), tooth may drag on work.

If ground too far back ("D"), the tooth will be lower and gear contour will not be the same on both sides.



SHARPENING RADIAL FLUTED WITH NEGATIVE RAKE LEADS TO PRODUCTION OF GEAR TEETH WITH THICH ROOTS.



LEAD ERRORS IN SHARPENING TEND TO PRODUCE DISTORTED "LEANING" TEETH ON THE FINISHED GEAR.

SERIOUS HOB LEAD ERRORS RESULT FROM SHARPENING WITH UNEQUAL SPACING OF CUTING FACES.

COMMON SHARPENING PROBLEMS

PROBLEM	CAUSE	CORRECTION
Worm Index	Worm index plate or latch	Replace worn item.
	Loose index plate	Tighten retaining nut
	Centers (work holding) misaligned	Align Centers
Incorrect Radial Position and Rake Offset	Diamond positioned incorrectly	Reposition diamond.
	Dull Diamond	Turn or replace diamond
	Incorrect wheel position	Reposition wheel
	Excessive feed or wheel breakdown	Reduce feed and dress wheel
	Work eccentric or loose on arbor	True between neutral centers on proper sized arbor. Do not use shims.
	Dirt on faces of collars and nut or in centers	Clean faces and centers
	Faces of collar and nut not parallel	Grind faces parallel
	Worn index plate or latch	Replace worn item
	Loose index plate	Tighten retaining nut
	Centers (work holding) misaligned	Align centers
Curved or Stepped Flute	Incomplete wheel dressing	Dress wheel and be sure diamond traverses entire cone face
	Wheel not properly lowered in flute	Lower Wheel
	Excessive feed or wheel breakdown	Reduce feed and dress wheel
	Wheel head swiveled incorrectly	Set wheel head at proper helix angle
Incorrect Lead	Tangent bar set incorrectly or not clamped	Reset and clamp
	Wheel "sings"	Dress with sharp diamond or faster traverse
	Excessive table speed	Reduce speed
	Work eccentric or loose on arbor	True between neutral centers on proper sized arbor. Do not use shims
	Dirt on faces of collars and nut or in centers	Clean faces and centers
	Faces of collar and nut not parallel	Grind faces parallel
	Worn index plate or latch	Replace worn item
	Loose index plate	Tighten retaining nut
	Centers (work holding) misaligned	Align centers
Index Errors	Work arbor incorrectly tensioned between centers.	Tension correctly
	Excessive feed or wheel breakdown	Reduce feed and dress wheel
	Wheel "sings"	Dress with sharp diamond,one pass only
	Feeding at same flute each revolution	Change feed cam setting
	Work eccentric or loose arbor	True between neutral centers on proper sized arbor. Do not use shims.
	Dirt on faces of collars and nut or in centers	Clean faces and centers
Burned Teeth	Improper coolant action	Increase flow, redirect flow, or change to different coolant.
	Glazed wheel	Turn or replace diamond
	Excessive feed	Reduce feed
	Insufficient table speed	Increase speed
	Sparking out too long	Reduce number of revolutions of sparkout
Rough Finish	Dressing too rapidly	Dress wheel more slowly
	Wheel is too soft	Use harder wheel
	Excessive feed or wheel breakdown	Reduce feed and dress wheel
	Excessive table speed	Reduce table speed

HOB TOLERANCES

SINGLE & MULTI THREAD		NORMAL DIAMETRAL PITCH$_2$ in 10/1000th of an inch										
Runout$_3$	**Class**	**1-1.99**	**2-2.99**	**3-3.99**	**4-4.99**	**5-5.99**	**6-8.99**	**9-12.99**	**13-19.99**	**20-29.99**	**30-50.99**	**51 and finer**
Hub face 1-4 thread	AA	–	–	2	2	2	1	1	1	1	1	1
	A	8	5	2	2	2	2	2	2	2	2	2
	B	10	8	4	4	3	3	2	2	2	2	–
	C	10	8	4	4	3	3	2	2	2	2	2
	D	10	8	4	5	4	4	3	3	3	3	–
Hub Diameter 1-4 thread	AA	–	–	2	2	2	1	1	1	1	1	1
	A	10	5	4	3	3	3	2	2	2	2	2
	B	12	8	6	5	4	4	3	2	2	2	–
	C	12	8	6	5	4	4	3	2	2	2	2
	D	15	10	8	8	6	6	5	5	4	3	–
Outside Diameter 1-4 thread	AA	–	–	5	4	3	3	3	3	2	2	2
	A	30	20	15	15	10	10	10	10	10	7	5
	B	40	30	25	20	15	15	15	10	10	7	–
	C	50	45	40	25	20	17	17	12	12	10	8
	D	60	55	50	45	35	35	30	25	20	15	–
Lead$_3$												
Tooth to tooth 1 thread	AA	–	–	–	4	3	2	1.7	1.7	1.7	1.7	1.5
	A	7	5	5	4	3	2	2	2	2	2	2
	B	10	8	8	6	4	3	3	3	3	3	2
	C	15	12	12	8	6	5	4	4	4	4	3
	D	25	20	20	16	14	12	10	10	8	6	5
2 thread	A	8	6	5	4	3	3	3	3	2	2	2
	B	12	10	7	6	5	5	5	4	3	2	–
	C	18	14	10	9	7	6	6	5	5	3	3
	D	27	22	18	16	14	12	11	9	–	–	–
3 thread	A	9	7	6	4	4	4	3	3	3	2	2
	B	14	12	8	7	6	6	5	5	4	3	–
	C	21	16	12	10	8	7	6	5	5	4	3
	D	29	24	20	18	16	14	12	10	–	–	–
4 thread	A	10	7	6	5	4	4	4	3	3	3	2
	B	16	13	9	8	7	6	6	5	4	4	–
	C	24	18	13	11	9	7	7	6	5	4	4
	D	31	26	22	20	18	16	13	11	–	–	–
In any one turns of helix 1 thread	AA	–	–	–	8	6	4	3	3	2	2	1.5
	A	25	18	18	10	8	6	5	5	4	4	3
	B	35	25	25	17	11	9	7	7	6	6	4
	C	45	35	35	22	14	11	9	9	8	8	8
	D	60	50	50	40	30	25	20	20	18	16	14
2-4 thread	A	25	20	10	8	6	5	5	7	4	3	3
	B	35	30	17	12	10	8	8	7	7	4	–
	C	45	35	22	18	15	12	12	10	10	8	6
	D	60	50	40	30	25	20	20	18	–	–	–
In any three turns of helix 1 thread	AA	–	–	–	12	9	6	5	5	4	4	3
	A	38	26	26	15	12	9	8	8	7	7	5
	B	53	38	38	22	16	12	11	10	9	9	7
	C	70	50	50	30	21	16	14	13	12	12	12
	D	120	100	100	80	60	50	40	35	25	20	16
Any three axial pitches 2-4 thread	A	38	30	15	12	9	8	8	7	7	5	5
	B	53	38	22	20	15	12	12	10	10	7	–
	C	70	50	30	28	20	18	16	14	14	12	8
	D	120	100	80	60	50	40	35	25	–	–	–
Adjacent thread to thread spacing 2 thread	A	11	9	8	7	6	5	4	3	3	3	3
	B	14	12	11	10	9	8	6	5	5	5	–
	C	20	17	15	13	11	10	9	8	7	6	5
	D	26	22	19	17	15	13	12	11	–	–	–
3 thread	A	13	11	10	8	7	6	5	4	4	4	3
	B	16	14	12	14	10	9	7	7	6	6	–
	C	22	19	16	14	13	11	10	9	8	7	6
	D	28	24	20	18	16	15	13	12	–	–	–
4 thread	A	15	13	12	9	8	7	6	5	4	4	3
	B	18	16	14	12	11	10	8	7	7	6	–
	C	24	21	18	15	14	12	11	10	9	8	7
	D	30	26	22	20	18	16	14	13	–	–	–

HOB TOLERANCES

SINGLE & MULTI THREAD		NORMAL DIAMETRAL PITCH[2] in 10/1000th of an inch										
Tooth	**Class**	**1-1.99**	**2-2.99**	**3-3.99**	**4-4.99**	**5-5.99**	**6-8.99**	**9-12.99**	**13-19.99**	**20-29.99**	**30-50.99**	**51 and finer**
Pressure Angle[34] 1 thread	AA	–	–	2	2	1.7	1.7	1.7	1.7	1.7	1.5	1.5
	A	10	5	3	3	2	2	2	2	2	2	2
	B	16	8	5	5	4	3	3	3	3	2	–
	C	25	15	10	5	4	3	3	3	3	3	3
	D	80	55	30	18	12	8	8	6	5	4	–
2 thread	A	12	7	5	4	3	3	2	2	2	2	2
	B	18	10	7	5	5	4	3	3	3	2	–
	C	27	16	11	7	5	4	3	3	3	3	3
	D	80	55	30	18	12	8	8	7	–	–	–
3-4 thread	A	15	8	5	4	3	3	2	2	2	2	2
	B	20	10	7	5	5	4	3	3	3	2	–
	C	27	16	11	7	5	4	3	3	3	3	3
	D	80	55	30	18	12	8	8	7	–	–	–
Thickness (minus only) 1-4 thread	AA	–	–	15	15	10	10	10	10	10	5	5
	A	30	20	15	15	10	10	10	10	10	5	5
	B	30	20	15	15	10	10	10	10	10	5	–
	C	35	25	20	20	15	15	15	15	15	10	10
	D	40	35	30	25	20	20	20	20	20	15	–
Start of tip relief modification (plus or minus) 1 thread	AA	–	–	100	80	70	60	60	40	40	30	–
	A	200	180	160	140	120	100	80	60	40	30	–
	B	220	200	180	160	140	120	100	80	50	40	–
	C	220	200	180	160	140	120	100	80	60	50	–
	D	260	240	220	200	180	160	140	120	100	80	–
2-4 thread	A	200	180	160	140	120	100	80	60	50	40	–
	B	220	200	180	160	140	120	100	80	60	50	–
	C	220	200	180	160	140	120	100	80	60	50	–
	D	260	240	220	200	160	160	140	120	–	–	–
Symmetry in start of tip relief modification 1 thread	AA	–	–	70	60	50	40	40	25	25	25	–
	A	150	130	120	100	90	80	60	50	35	25	–
	B	180	150	130	120	100	90	80	70	45	35	–
	C	180	150	130	120	100	90	80	70	5	45	–
	D	200	180	160	140	120	110	100	90	80	60	–
2-4 thread	A	150	130	120	100	90	80	60	50	40	30	5
	B	180	150	130	120	100	90	80	70	60	50	5
	C	180	150	130	120	100	90	80	70	60	50	–
	D	200	180	160	140	120	110	100	90	–	–	10
Flutes												
Adjacent flute spacing[5] 1-4 thread	AA	-	-	20	15	10	8	8	6	6	6	6
	A	40	30	25	20	15	10	10	10	10	10	10
	B	50	45	40	30	20	15	15	10	10	10	–
	C	50	45	40	30	20	15	15	10	10	10	10
	D	60	60	50	50	30	25	25	20	17	17	–
Non adjacent flute spacing[5] 1-4 thread	AA	–	–	40	35	25	15	15	15	15	15	15
	A	80	60	50	40	30	30	30	25	25	20	20
	B	100	90	80	60	50	50	50	40	35	30	–
	C	100	90	80	60	50	50	50	40	35	30	30
	D	120	120	100	100	80	80	70	60	50	40	–
Rake to cutting depth 1-4 thread	AA	–	–	10	8	6	5	5	3	3	3	3
	A	30	15	10	8	6	5	5	3	3	3	3
	B	50	25	15	10	8	7	7	5	5	5	–
	C	50	25	15	10	8	7	7	5	5	5	5
	D	100	75	50	40	30	20	30	15	15	10	–

CUTTING FACE WIDTH						
Flutes	**Class**	**Up to 1**	**1.001-2**	**2.001-4**	**4.001-7**	**7.000+**
Flute lead over cutting face width	AA	8	10	15	20	20
	A	10	15	25	30	50
	B	10	15	25	30	50
	C	10	15	25	30	50
	D	15	23	38	45	75

HOLE DIAMETER						
Hole	**Class**	**2.500**	**2.000**	**1.500**	**1.250**	**.500 & smaller**
Hole Diameter (plus only)	AA	8	8	---	2	2
	A	10	10	5	2	2
	B	10	10	8	3	2
	C	10	10	8	3	2
	D	10	10	8	5	3

HOB TOLERANCES

INVOLUTE SPLINES 37-1/2º & 45º		NORMAL DIAMETRAL PITCH[2] in 10/1,000th of a inch									
Runout[2]	**Class**	**10/20**	**16/32**	**20/40**	**24/48**	**32/64**	**40/80**	**48/96**	**64/128**	**80/160**	**128/256**
Hub Face	A C	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
Hub Diameter	A C	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
Outside Diameter	A C	10 12	10 12	10 12	10 12	7 10	7 10	7 10	5 8	5 8	5 8
Lead[2]											
Tooth to tooth	A C	2 4	2 4	2 4	2 4	2 3	2 3	2 3	2 3	2 3	2 3
In any one turn of helix	A C	11 17	10 16	10 16	10 16	7 14	7 14	7 14	6 11	6 11	6 11
Tooth											
Pressure Angle[2]	A C	2 3	2 3	2 3	2 3	2 3	2 3	2 3	2 3	2 3	2 3
Thickness (minus only)	A C	10 15	10 15	10 15	10 15	8 10	8 10	8 10	5 10	5 10	5 10
Flutes											
Adjacent flute spacing[5]	A C	10 10	10 10	10 10	10 10	10 10	10 10	10 10	8 8	8 8	8 8
Non-adjacent flute spacing[5]	A C	25 40	25 40	25 35	25 35	20 30	20 30	20 30	15 25	15 25	15 25
Rake to cutting depth	A C	3 5	3 5	3 5	3 5	3 5	3 5	3 5	3 5	3 5	3 5

CUTTING FACE WIDTH				
Flutes	**Class**	**up to 1**	**1-2**	**2-4**
Flute lead over cutting face with	A C	10 10	15 15	25 25

HOLE FACE DIAMETER				
Hole	**Class**	**1.250**	**0.750**	**0.500 & smaller**
Flute lead over cutting face with	A C	2 3	2 2	2 2

1. Except for LEAD, these tolerances apply for all hob diameters. For hob diameters larger than those recommended for standard hobs, the LEAD tolerances shall be increased by a factor of one-half of the percent oversize.
2. Total indicator variation.
3. Compared against master index plate.
4. Radial (zero rake) tooth faces are standard.

Standard Corner Radius for Hob Tooth

$$\frac{1.57}{DP} = \text{Radius}$$

STANDARD KEYWAYS FOR HOBS			
Bore Diameter	**Keyway Size**	**Bore Diameter**	**Keyway Size**
3.5" (DP & Courser)	1/16" x 1/32	1-1/4"	1/4" x 1/8"
Finer than 32 DP	-	1-1/2"	3/8" x 3/16"
1/2"	1/8" x 1/16"	2"	1/2" x 1/4"
3/4"	1/8" x 1/16"	2-1/2"	5/8" x 5/16"

TOLERANCES FOR SINGLE AND MULTIPLE THREAD WORMGEAR HOBS

IN 10/1000TH OF AN INCH

			AXIAL PITCH OF WORM										
Runout (1-6 Threads)		Class	3.000 -1.501	1.500 -1.001	1.000 -0.751	0.750 -0.626	0.625 -0.501	0.500 -0.351	0.350 -0.251	0.250 -0.161	0.160 -0.101	0.100 -0.61	0.60 and finer
Hub Face		A	8	5	2	2	2	2	2	2	2	2	2
		B	10	8	4	4	3	3	2	2	2	2	–
		D	10	8	5	5	4	4	3	3	3	3	3
Hub Diameter		A	10	5	4	3	3	3	2	2	2	2	2
		B	12	8	6	5	4	4	3	2	2	2	–
		D	15	10	8	8	6	6	5	5	4	4	4
Lead Variation													
Tooth to Tooth*	Tooth to Tooth 1 thread	A	7	5	4	3	2	2	2	2	2	2	2
		B	10	8	6	4	3	3	3	3	3	4	–
		D	25	20	16	14	12	10	10	8	5	4	4
	Tooth to Tooth 2 thread	A	8	6	5	4	3	3	3	3	2	2	2
		B	12	10	7	6	5	5	5	4	3	2	–
		D	27	22	18	16	14	12	11	9	5	4	4
	Tooth to Tooth 3 thread	A	9	7	6	4	4	4	3	3	3	2	2
		B	14	12	8	7	6	6	5	5	4	3	–
		D	29	24	20	18	16	14	12	10	6	5	5
	Tooth to Tooth 4 thread	A	10	7	6	5	4	4	4	3	3	3	2
		B	16	13	9	8	7	6	6	5	4	4	–
		D	31	26	22	20	18	16	13	11	7	5	5
	Tooth to Tooth 5 thread	A	12	8	7	5	4	4	4	4	3	3	3
		B	18	14	10	9	8	7	6	6	5	4	–
		D	33	28	24	22	20	17	14	12	8	6	5
	Tooth to Tooth 6 thread	A	13	9	7	6	5	4	4	4	4	3	3
		B	19	15	11	9	8	7	7	7	6	5	–
		D	35	30	26	24	21	18	15	13	9	7	6
Any One Axial Pitch	1 thread	A	25	18	10	8	6	5	5	4	4	3	3
		B	35	25	17	11	9	7	7	6	6	4	–
		D	60	50	40	30	25	20	20	18	16	12	8
	2-6 thread	A	25	20	10	8	6	5	5	4	4	3	3
		B	35	30	17	12	10	8	8	7	7	4	–
		D	60	50	40	30	25	20	20	18	16	12	8
Any Three Axial Pitches	1 thread	A	38	26	15	12	9	8	8	7	7	5	5
		B	53	38	22	16	12	11	10	9	9	7	–
		D	120	100	80	60	50	40	35	25	20	16	12
	2-6 thread	A	38	30	15	12	9	8	8	7	7	5	5
		B	53	38	22	20	15	12	12	10	10	7	–
		D	120	100	80	60	50	40	35	25	20	16	12
Lead Variation													
Adjacent Thread to Thread Spacing	2 thread	A	11	9	8	7	6	5	4	3	3	3	3
		B	14	12	11	10	9	8	6	5	5	5	–
		D	26	22	19	17	15	13	12	11	7	6	6
	3 thread	A	13	11	10	8	7	6	5	4	4	4	3
		B	16	14	12	11	10	9	7	7	6	6	–
		D	28	24	20	18	16	15	13	12	8	7	7
	4 thread	A	15	13	12	9	8	7	6	5	4	4	3
		B	18	16	14	12	11	10	8	7	7	6	–
		D	30	26	22	20	18	16	14	13	9	7	7
	5 thread	A	17	15	14	10	9	8	7	6	5	4	3
		B	21	18	16	13	12	11	9	8	7	6	–
		D	32	28	24	22	20	17	15	14	10	8	8
	6 thread	A	19	17	16	12	10	9	8	7	6	5	4
		B	23	20	18	15	13	11	10	9	8	7	–
		D	34	30	26	24	22	18	16	15	11	9	8

TOLERANCES FOR SINGLE AND MULTIPLE THREAD WORM GEAR HOBS
IN 10/1000TH OF AN INCH

			AXIAL PITCH OF WORM										
	Tooth Profile	**Class**	**3.000-1.501**	**1.500-1.001**	**1.000-0.751**	**0.750-0.626**	**0.625-0.501**	**0.500-0.351**	**0.350-0.251**	**0.250-0.161**	**0.160-0.101**	**0.100-0.061**	**0.060 and finer**
Pressure Angle or Profile*	1 Thread	A	11	9	8	7	6	5	4	3	3	3	3
		B	14	12	11	10	9	8	6	5	5	5	-
		D	26	22	19	17	15	13	12	11	7	6	6
	2 Thread	A	13	11	10	8	7	6	5	4	4	4	3
		B	16	14	12	11	10	9	7	7	6	6	-
		D	28	24	20	18	16	15	13	12	8	7	7
	3-4 Thread	A	15	13	12	9	8	7	6	5	4	4	3
		B	18	16	14	12	11	10	8	7	7	6	-
		D	30	26	22	20	18	16	14	13	9	7	7
	5-6 Thread	A	17	15	14	10	9	8	7	6	5	4	3
		B	21	18	16	13	12	11	9	8	7	6	-
		D	32	28	24	22	20	17	15	14	10	8	8
Tooth Thickness (minus only) 1-6 thread		A	19	17	16	12	10	9	8	7	6	5	4
		B	23	20	18	15	13	11	10	9	8	7	-
		D	34	30	26	24	22	18	16	15	11	9	8

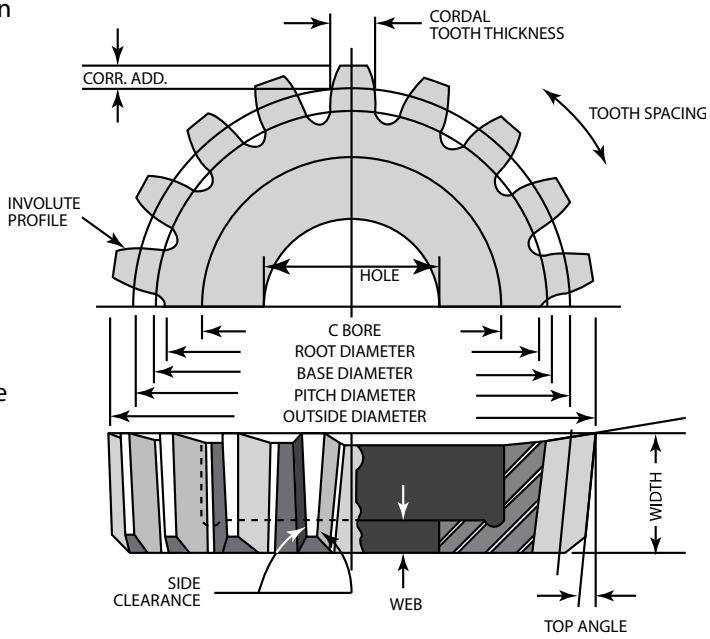
BORE DIAMETER							
Diameter Hole	**Class**	**2.500**	**2.000**	**1.5000**	**1.250**	**0.750**	**0.500 and smaller**
Diam. Straight Bore (minus only)	A	8	8	5	2	2	2
	B	10	10	8	3	2	2
	D	10	10	8	5	4	3
ALL							
Percent of bearing contact, straight bore	A	75	75	75	75	75	75
	B	75	75	75	75	75	75
	D	50	50	50	50	50	50

SHAPER CUTTER NOMENCLATURE

THE SHAPING PROCESS

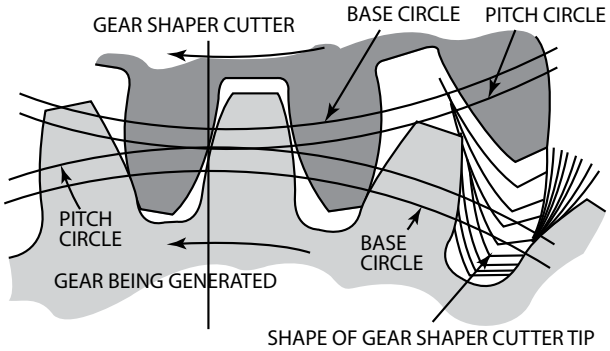
The gear shaper cutter is basically the same as a gear, except the teeth are relieved to provide clearance and the face is ground at a slight angle to provide the necessary cutting edges. Gear shaping itself is a generating process based upon the principle of the action of a cutter mounted on a cutter-spindle and a gear blank held on an arbor or fixture on the work-spindle. These spindles are driven by independent index worms and wheels which are connected by change gears or the proper relation between the cutter and the work. Synchronized as such, the cutter makes successive passes through the blank generating a series of closely spaced individual cuts. When the cutter reaches full depth the desired tooth form will have been produced.

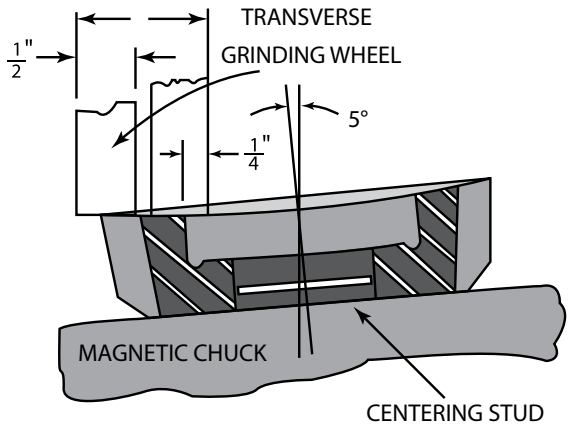
The Shaper Cutter is a full generating tool just as much as a hob, but it has an involute of finite base circle radius. The base circle is constant throughout cutter life, the base pitch also remains constant. On spur gear Shaper Cutters the same diameter of base circle is used to generate both sides of the cutter tooth. However, the actual size of the base circle for the cutter is not the same as the base circle of a gear of the same sizes. There must be an adjustment in base circle diameter for the cutter to correct the face sharpening angle and side relief angles. When a Pitch Diameter is given for a Shaper Cutter, it is considered a Nominal Pitch Diameter. When new, the shaper cutter is made with a slightly oversize operating diameter; when sharpened back, the operating diameter gradually becomes undersized with regard to the nominal value.



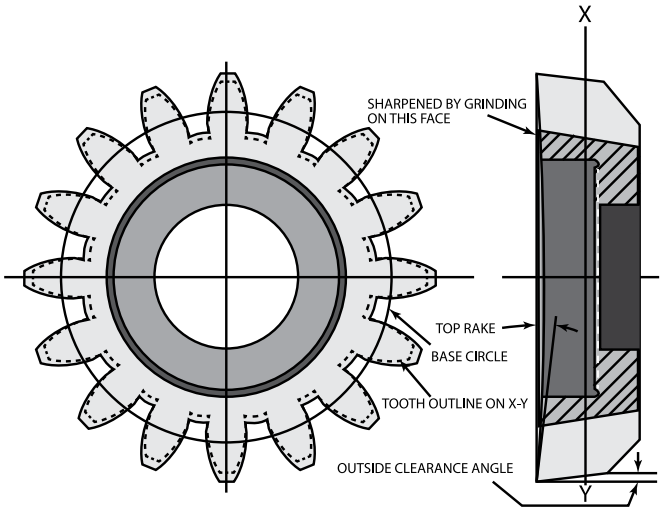
BASIC TYPES & FEATURES

There are basically three types of Shaper Cutters commonly in use; the disc type, hub type and shank type.
The disc type is by far the most common and generally used for external parts. When conditions warrant, the disc type can be manufactured with an extended hub which will form a deeper recess in the counter bore thus termed a "deep counter bore" cutter. Another variation of the disc shaper cutter is called a "Button" Cutter & generally has a 1/2" or 3/4" bore. The button Cutter is primarily used for internal work and can be adapted for any length of stroke.
The Hub type shaper has a threaded I. D. and will screw right on to the spindle. Truly a special application cutter not as popular now partially due to the introduction of the button cutter.
The shank type shaper cutter can be ordered in a variety of configurations, varying the stroke and number of teeth to fit the part. This cutter is used for internal work. Special features can be incorporated in the tooth form of the shaper cutter such as, chamfering, topping, protuberance, full radius etc. These features will be dictated directly by the configuration of the part desired.





POSITION OF GRINDING WHEEL ON SPUR CUTTERS



FORM REMAINS CONSTANT AS SHARPENED BACK

As shown in the drawing, the wheel should not leave the cutter when grinding. The inner edge is transversed to the root diameter of the cutter, and the vertical feed made when the wheel is in the position indicated by the dotted lines.

After the final vertical feed of cutter to wheel, the wheel is left in contact and traversed until “sparking” stops.

SHARPENING & SPUR GEAR SHAPER CUTTERS

In order to maintain quality of production parts and to obtain maximum cutter life, cutters must be sharpened regularly and frequently. The number of gears generated before sharpening should be so regulated that no more than 0.015 inch of stock need by removed from the cutter at each sharpening. With small fine pitch shaper cutters, no more than 0.010 inch should be removed at each sharpening. The tooth surfaces and cutting edges must have a smooth finish and be free of any burning or heat checks. In this connection there are these controlling factors:

1. Use a soft wheel with medium grain.
Keep wheel clean as a glazed wheel may crack cutter teeth.

2. Grinding too much metal at a time may cause heat-checks in the cutter teeth.

3. Never grind a cutter except on its face. “Touching up” sides or ends will alter the tooth form and spoil the cutter.

4. Be sure the cutting face is true with the bore. If not, cutting action will be irregular and tooth form changed.

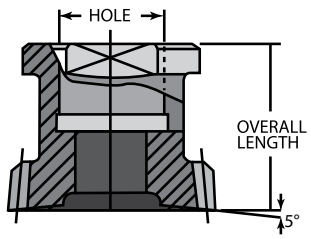
5. Always grind the correct face angle 5° (unless special).

If the original face angle (ie 5°) is decreased, the pressure angle will be changed and cutting efficiency decreased. If the angle is increased, the cutting efficiency may be increased but the pressure angle will be incorrect.

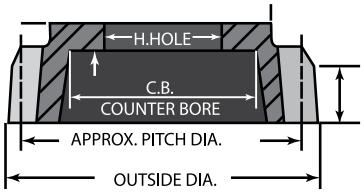
Also be sure that the mounting of the shaper cutter on the sharpening machine is concentric. Rotary surface grinders are used to sharpen disc and hub cutters.
Shank cutters may be sharpened by placing them in a cutter spindle adapter. For “rough” sharpening of gear shaper cutter, a vitrified grinding wheel 12 - 14 inches in diameter, 1 inch face width, 60-grit, grade H is employed. Recommended operation is a surface speed of 5400 to 6000 feet per minute. About 45 strokes a minute, each taking a cut of 0.001 inch is recommended; 0.0002 to 0.004 inches should be left for finish sharpening and wet grinding with either plain water or a compound.

For finish sharpening disc and hub type cutters use special fine grain, soft bound grinding wheels, 12 inches in diameter with a 1/2 inch face width. When new, the wheel should be operated at a speed of 5400 to 6000 surface feet per minute. The work is rotated at a speed of 160 RPM, and a cut of 0.00025 is taken at each traverse at a feed of 20 inches per minute.

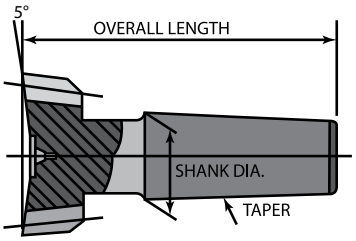
For disc type cutters smaller than 1 3/4 inches in diameter, and also for shank cutters, the wheel specifications are the same as above, but the wheel diameter should not exceed 5” with a face width of 1/2 inch.



HUB TYPE



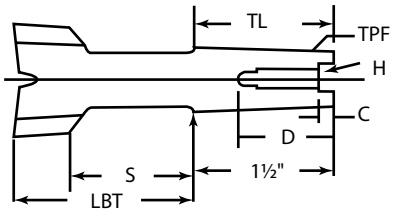
DISK TYPE



SHANK TYPE

Shank Shaper Cutters

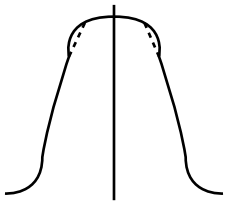
Shank Size	Taper Diam. (TD)	Taper Length (TL)	Taper Per Foot (TPF)	Thread Size (H)	Tapped Whole Depth (D)	Counter Bore Depth (C)	General Application
Long Fellows	1.062	2 1/4	0.623	1/2-13 UNC	1	1/8	Heavy duty & coarse pitch
Short Fellows	1.062	1 1/2	0.623	1/4-20 UNC or 1/2-13 UNC	13/16	1/4	Medium Duty & medium coarse pitch
No. 2 Morse	0.700	1 1/2	0.600	1/4-20 UNC	5/8	1/8	Medium Duty & Fine pitch
No. 1 Morse	0.475	1	0.599	#10-32 UNF	1/2	1/16	Very light duty & very fine pitch
No. 2 Jarno	0.250	3/4	0.600	#5-40 UNC	5/16	1/16	Extra light duty & extremely fine pitch



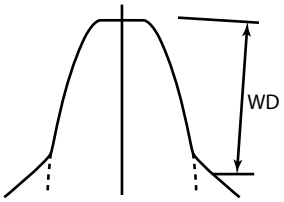
NO. 2 TAPER

Sizes and dimensions of ground finishing taper shank gear shaper cutters for cutting spur and helical teeth.

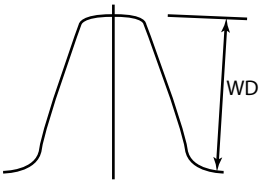
VARIOUS TYPES OF TOOTH MODIFICATIONS COMMON ON SHAPER CUTTERS



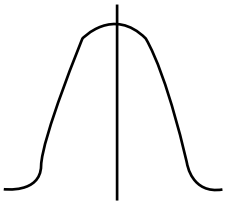
PROTUBERANCE TIP
Cutter tooth profile is built up on the tip to provide and undercut near the root of the gear being generated providing relief for subsequent finishing operations.



CHAMFERING OR SEMITOPPING
Root of cutter is filled in to generate a sharp corner break or chamfer on the tips of the gear.

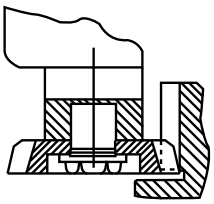


TOPPING
Cutter tooth depth os ground equal to the whole depth (WD) of the gear tooth.
The outside diameer of the gear is topped to size when the teeth are cut. Frequently used for fine pitch gearing.

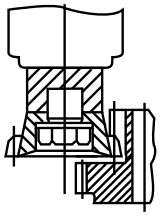


FULL FILLET RADIUS
Will produce a round bottom root on the gear being generated. This adds strength to the gear and will improve cutter life.

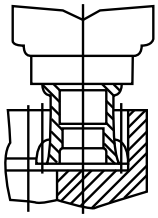
DIFFERENT METHODS OF MOUNTING GEAR SHAPER CUTTERS



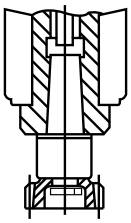
Typical Disk Cutter set up for cutting either external or internal gears.



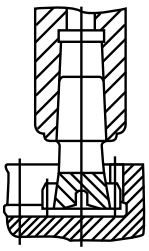
Typical Deep Counterbore type cutter set-up. This is necessary when the clamping nut cannot protrude beyond the cutting face at any time throughout the lofe of the cutter.



Typical Hub Type cutter set-up for an internal gear.



Internal gear being cut with a disc type cutter on an adapter. The adapter is mounted in a cutter-spindle having a tapered hole.



Taper Shank Cutter mountedin a cutter-spindle having a tapered hole. For cutting gears.

USAS B94.21 1968 Spacing Tolerances
Spur & Helical Gear Shaper Cutter

Measured at approximate pitch diameter

	Cutter Diameter		
	Thru 3.750 Pitch Diameter	Over 3.750-7.250 Pitch Diameter	Over 7.250 Pitch Diameter
Maximum variation between adjacent teeth- Spur Cutters and Helical Cutters thru 35º Helix Angle	0.0002	0.00025	0.0003
Maximum variation between adjacent teeth- Helical Cutters over 35º thru 45º Helix Angle	0.00025	0.0003	0.0004
Maximum variation between any two readings Spur Cutters and Helical Cutters thru 35º Helix Angle	0.0003	0.0004	0.0005
Maximum variation between any two readings Helical Cutters over 35º thru 45º Helix Angle	0.0004	0.0005	0.0006

*All dimensions given in inches.

Runout Tolerances
Nominal Pitch Diameter & Nominal Pressure Angle

Tiv measured by cone, ball, or pin at approximate pitch diameter

Cutter Diam.	thru 1.875		Over 1.875-3.250		Over 3.250-3.750		Over 3.750-6.250		Over 6.250-7.250		Over 7.250	
Normal PA	Over 19º	13º-19º	Over 19º	13º-19º	Over 19º	13º -19º	Over 19º	13º -19º	Over 19º	13º-19º	Over 19º	13º-19º
Disc Type Cutters Spur & Helical thru 35º Helix Angle	0.0004	0.0005	0.0005	0.0007	0.0006	0.008	0.007	0.009	0.009	0.0012	0.0012	0.0015
Disc Type Helical Cutters over 35º thru 45º Helix Angle	0.0006	0.0008	0.0007	0.0009	0.0008	0.0011	0.009	0.0012	0.0011	0.0015	-	-
Deep Counter Bore Type Cutters Spur & Helical thru 35º Helix Angle	0.0005	0.0007	0.0006	0.0008	0.0007	0.009	0.008	0.0011	0.0010	0.0013	0.0012	0.0015
Deep Counter Bore Type Helical Cutters over 35º thru 45º Helix Angle	0.0007	0.0009	0.0008	0.0011	0.0009	0.0012	0.0010	0.0013	0.0013	0.0015	-	-
Shank Type Cutters	0.0005	0.0007	-	-	-	-	-	-	-	-	-	-

*All dimensions given in inches.

Gear Shaper Cutters
Cutter Profile Tolerances (Tiv)
Spur And Helical Ground
Finishing Gear Shaper Cutters

	Whole Depth of Product			
	thru 0.335	0.335-0.010	0.010-0.980	0.980-1.125
Spur & Helical Cutters thru 35º Helix Angle	0.0002	0.0003	0.0004	0.0006
Helical Cutters over 35º thru 45º Helix Angle	0.0003	0.0004	0.0005	0.0005

*All dimensions given in inches.

Hole Tolerances
Spur And Helical Ground
Finishing Gear Shaper Cutters

Nominal Size	Actual Size & Tolerances
1/2	0.5000 +0.0001 -0.0000
3/4	0.7500 +0.0001 -0.0000
1	1.0000 +0.0001 -0.0000
1-1/4	1.2497 +0.0002 -0.0000
1-3/4	1.7500 +0.0002 -0.0000
4	4.0000 +0.0002 -0.0000

*All dimensions given in inches.

Other Tolerances
Spur and Helical ground finishing gear shaper cutter

1. Tooth thickness tolerance +0.000 - 0.001(with respect to finished outside diameter) except when coarser than 3 pitch(or over 7.250 pitch diameter) the tolerance is + 0.000 - 0.002

2. Back to be flat to concave within 0.0002

3. Outside angle ±0° 5′

4. Sharpening angle ±0° 5′
5. Side relief angle ±0° 5′

6. Shank taper radial runout, from centers, 0.0002 tiv.

7. Shank taper diameter 0.002 -0.000

8. Indicating band runout (when supplied) with respect to mounting surfaces 0.0002 tiv.

9. Outside diameter radial runout:
thru 3.250 PD 0.0005 tiv
over 3.250 PD thru 4.750 PD 0.0007 tiv
over 4.750 PD thru 7.250 PD 0.0010 tiv
over 7.250 PD 0.0015 tiv

10. Outside diameter tolerances (based on design proportions):

thru 1.875 PD	0.012
over 3.250 PD thru 4.750 PD	0.020
over 4.750 PD thru 6.250 PD	0.030
over 6.250 PD thru 7.250 PD	0.040
over 7.250 PD	0.050

TOLERANCE SHAPERS

USA STANDARD B94.21 1968

Spacing & Runout Tolerances
& Outside Diameter Tolerances

Nominal Pitch Diameter	Transverse Diametral Pitch	Tooth Spacing Adjacent Teeth	Tooth Spacing Any Two Readings	Diameter Runout	Outside Diameter
4	4-6 6-20	0.0003 0.0002	0.0004 0.0003	0.0007	0.020
6	2-6 6-16	0.0004 0.0003	0.0005 0.004	0.0009	0.030
8	1 1/2-3 3-6 6-1	0.0005 0.0004 0.0003	0.0006 0.0005 0.0004	0.0011	0.050

Spur & Helical ground finishing gear shaper cutter. (Measured at approximate pitch diameter)

INVOLUTE PROFILE & TOOTH THICKNESS TOLERANCES

	Transverse Diametral Pitch		
	1 1/2 - 3	3-6	6+
Involute Profile (tiv)	0.0005	0.0004	0.0003
Tooth Thickness	+0.000 -0.004	+0.000 -0.002	+0.000 -0.001

Herringbone ground finishing gear shaper cutters

OTHER TOLERANCES

Herringbone ground finishing gear shaper cutters in Inches

1. Hole Diameter +0.0002 -0.0000
2. Matched pairs, right-hand & left-hand, have outside diameters & widths within 0.002
3. Back to be flat to concave within 0.0002
4. Outside angle ±0° 5′
5. Side relief angle ±0° 5′
6. Outside diameter radial runout, 4 inches 0.0007 tiv; 6 inches & 8 inches 0.0010 tiv.
7. Indicating band runout (when supplied) with respect to hole 0.0002 tiv.

INTERNAL TRIMMING CHART

Maximum number of teeth recommended in gear shaper cutter forinternal (full depth) gears-to avoid trimming of teeth.

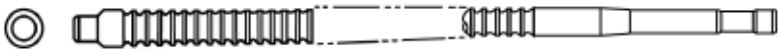
# of Teeth in Gear	14 1/2 PA	17 1/2 PA	20 PA	22 1/2 PA	20 Stub & 25 PA	27 1/2 PA	30 Full Fillet	30 Flat Root	45 PA
8									4
9									5
10								4	6
11							4	5	7
12					4	4	4	6	8
13			4	4	4	4	5	7	9
14			4	4	5	5	6	8	10
15			5	5	6	6	6	9	11
16			5	5	6	6	7	10	12
17		4	6	6	7	7	8	11	13
18	4	4	6	6	7	8	9	12	14
19	4	4	7	7	8	9	10	13	15
20	5	5	7	7	8	10	10	14	16
21	5	5	8	8	9	11	12	15	17
22	6	6	8	8	10	12	13	16	18
23	6	6	9	9	11	13	14	17	19
24	7	7	10	10	12	14	15	18	20
25	7	7	10	11	13	15	16	19	21
26	8	8	11	12	14	16	17	20	22
27	8	8	12	13	15	17	18	21	23
28	9	9	12	14	16	18	19	22	24
29	9	9	13	15	17	19	20	23	25
30	10	10	13	16	18	20	21	24	26
31	10	10	14	17	19	21	22	25	27
32	11	11	14	18	20	22	23	26	28
33	11	11	15	19	21	23	24	27	29
34	12	12	16	20	22	24	25	28	30
35	12	12	17	21	23	25	26	29	31
36	13	13	18	22	24	26	27	30	32
37	13	14	19	23	25	27	28	31	33
38	14	15	20	24	26	28	29	32	34
39	15	16	21	25	27	29	30	33	35
40	15	17	22	26	28	30	31	34	36
41	16	18	23	27	29	31	32	35	37
42	16	19	24	28	30	32	33	36	38
43	17	20	25	29	31	33	34	37	39
44	18	21	26	30	32	34	35	38	40
45	18	22	27	31	33	35	36	39	41
46	19	23	28	32	34	36	37	40	42
47	20	24	29	33	35	37	38	41	43
48	20	25	30	34	36	38	39	42	44
49	21	26	31	35	37	39	40	43	45
50	22	27	32	36	38	40	41	44	46
51	22	28	33	37	39	41	42	45	47
52	23	29	34	38	40	42	43	46	48
53	23	30	35	39	41	43	44	47	49
54	24	31	36	40	42	44	45	48	50
55	25	32	37	41	43	45	46	49	51

# of Teeth in Gear	14 1/2 PA	17 1/2 PA	20 PA	22 1/2 PA	20 Stub & 25 PA	27 1/2 PA	30 Full Fillet	30 Flat Root	45 PA
56	25	33	38	42	44	46	47	50	52
57	26	34	39	43	45	47	48	51	53
58	27	35	40	44	46	48	49	52	54
59	28	36	41	45	47	49	50	53	55
60	28	37	42	46	48	50	51	54	56
61	29	38	43	47	49	51	52	55	57
62	30	39	44	48	50	52	53	56	58
63	31	40	45	49	51	53	54	57	59
64	32	41	46	50	52	54	55	58	60
65	33	42	47	51	53	55	56	59	61
66	34	43	48	52	54	56	57	60	62
67	35	44	49	53	55	57	58	61	63
68	36	45	50	54	56	58	59	62	64
69	37	46	51	55	57	59	60	63	65
70	38	47	52	56	58	60	61	64	66
71	39	48	53	57	59	61	62	65	67
72	40	49	54	58	60	62	63	66	68
73	41	50	55	59	61	63	64	67	69
74	42	51	56	60	62	64	65	68	70
75	43	52	57	61	693	65	66	69	71
76	44	53	58	62	64	66	67	70	72
77	45	54	59	63	65	67	68	71	73
78	46	55	60	64	66	68	69	72	74
79	47	56	61	65	67	69	70	73	75
80	48	57	62	66	68	70	71	74	76
81	49	58	63	67	69	71	72	75	77
82	50	59	64	68	70	72	73	76	78
83	51	60	65	69	71	73	74	77	79
84	52	61	66	70	72	74	75	78	80
85	53	62	67	71	73	75	76	79	81
86	54	63	68	72	74	76	77	80	82
87	55	64	69	73	75	77	78	81	83
88	56	65	70	74	76	78	79	82	84
89	57	66	71	75	77	79	80	83	85
90	58	67	72	76	78	80	81	84	86
91	59	68	73	77	79	81	82	85	87
92	60	69	74	78	80	82	83	86	88
93	61	70	75	79	81	83	84	87	89
94	62	71	76	80	82	84	85	88	90
95	63	72	77	81	83	85	86	89	91
96	64	73	78	82	84	86	87	90	92
97	65	74	79	83	85	87	88	91	93
98	66	75	80	84	86	88	89	92	94
99	67	76	81	85	87	89	90	93	95
100	68	77	82	86	88	90	91	94	96
101	69	78	83	87	89	91	92	95	97
102	70	79	84	88	90	92	93	96	98
103	71	80	85	89	91	93	94	97	99

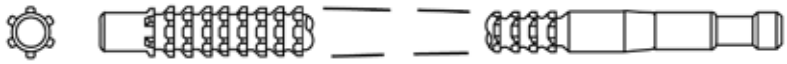
THE BROACHING PROCESS

Form Broaches
In form broaching, the broach starts in a round hole and nishes to any odd or irregular shape desired. The most common broaches of this type produce oval,square,or hexagon holes. Any shape than can be developed from a round hole can be broached.

Keyway Broaches
Broaching is widely used to cut keyways in parts. American stocks keyway broaches in sizes from 1/16" to 1". Keyway broaches cam be designed to cut chamgers at eh bore as well as cut the keyway.



Plain Round Broaches
Round broaches are used in nish holes in parts where close tolerance and high surface nishes are required. They are pulled or pushed through the workpiece. Round broaches usually have roughing, semi-nishing and nished teeth. Each tooth increases in diameter up to the nishing teeh which are all the same diameter.



Spline Broaches
Cutting of splines in previously nished holes is one of the most widely used broaching applications. In spline broaches, the cut is made by the top of the tooth, the sides being generated by the cut. Straight splines, involutes, or serrations can be produced by this method.

Combination Broaches
Combination broaches are used where two or more matching operations are required and production requirements are high. Front teeth nish the hole whole back teeth cut the spline. All spline broaches can be designed with alternating round and spline nish teeth to provide concentricity between the ID and the splines. Another popular combination is round and keyway (one spline), where the hole is nished and a keyway is then cut.

Broaching is a machining method in which a series of cutting teeth each remove a small portion of stock as they move past or through the work. It combines both roughing and finishing in one operation. The finished work can be held to very precise limits.

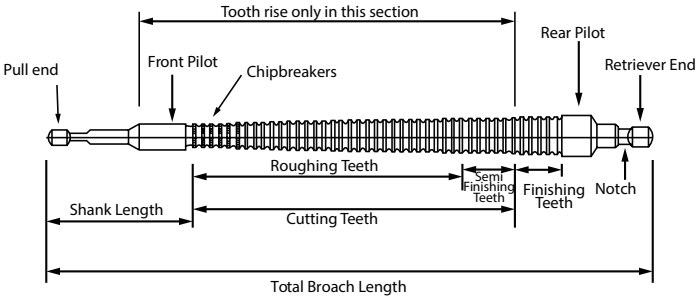
Broaching can be done on an internal or the surface of work. Internal broaching is used to finish holes, cut internal splines, or odd shaped holes. Surface broaching is used to produce finished surfaces to almost any contour and to cut external serrations, or slots.

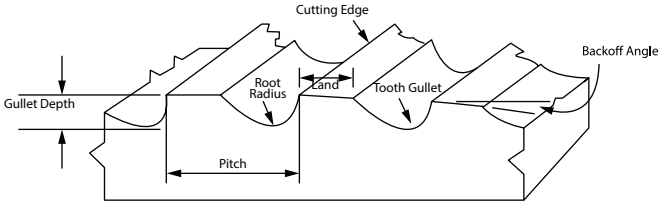
Broaching is an economical finishing method for both high and low production jobs.
For finishing odd shaped holes there is often no economical alternative to broaching.

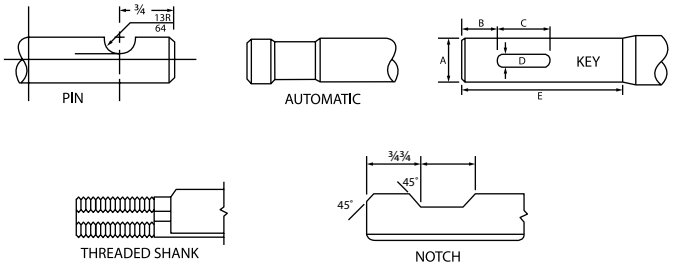
RECOMMENDED PITCH CHART
Based on Broach Tooth Data

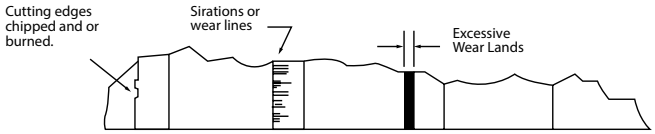
PART WIDTH	PITCH	LAND	DEPTH	RADIUS
7/32	1/8	3/64	3/64	0.02
1/4	5/32	3/64	1/16	0.02
3/8	3/16	1/16	1/16	1/32
1/2	7/32	1/16	5/64	3/64
5/8	1/4	1/16	3/32	1/16
3/4	9/32	3/32	7/64	1/16
1	5/16	3/32	1/8	5/64
1-1/8	11/32	3/32	1/8	5/64
1-1/2 1-3/4 to 2 2-1/2 3	3/8 7/16 1/2 9/16	7/64 1/8 1/8 9/64	9/64 5/32 3/16 7/32	3/32 7/64 1/18 9/64
3-1/2	5/8	5/32	15/64	5/32
4-1/2	11/16	11/64	9/32	3/16
5	3/4	3/16	19/64	3/16
6	13/16	3/16	5/16	13/64
7	7/8	7/32	11/32	7/32
8	15/16	7/32	23/64	7/32
9	1	1/4	3/8	1/4

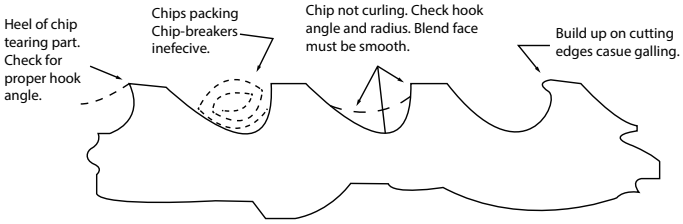
Broaching Problem	Possible Causes	Corrective Action
Workpiece Stuck on Broach	1. Insufficient machine capacity. 2. Dull cutting edges. 3. Clogged tooth gullets. 4. Failure of power during cutting stroke. 5. Misalignment of the broach puller with workpiece. 6. Hole in workpiece not square with face which contacts fixture.	1. Check broaching machine to see if it is delivering rated power. 2. Check broach design, perhaps back-off clearance is insufficient or stop per tooth is too great. 3. Sharpen broach if required. 4. Each tooth gulled should be cleaned of chips between passes. 5. Check alignment of fixture for holding workpiece with centerline of broach puller. 6. Be sure that the hole in the workpiece is square with the face that contacts the fixture.
Galling or Pick Up	1. Too low or variations in hardness of workpiece. 2.Insufficient or wrong type of coolant. 3.Poor broach design. 4.Dull or damaged broach. 5.Poorly sharpened broach. 6.Infufficient back-off clearance.	1. For the broaching of steel best results are obtained at Rockwell "C" 2. All major oil companies have qualified cutting oil consultants. 3 Inspect the broach closely and sharpen if necessary.
Broach Breakage	Check 1-6 in "Workpiece stuck on Broach" 7. Interrupted Cutting Stroke 8. Backing up broach with workpiece in fixture 9. Allowing broach to pass completely through guides. 10. Excessive hardness of workpiece.	Check 1-6 in "Workpiece stuck on Broach" 7. Stroke of machine should be adjusted so that broach never leaves guides.
Chatter	1.Too few teeth in contact with work. 2.Excessive hardness of workpiece. 3.Load variations in ram of machine.	1. Check pitch of broach using "Pitch Formula" 2. It is sometimes possible to eliminate chatter by changing the rate of travel,coolant, face angle, or the back-off clearance.
Broach Drifting in Cut	1.Poor Sharpening. 2.Broach not properly supported, especially in a horizontal machine. 3.Body diameter too small. 4.Variations in hardness of workpiece. 5.Not enough broach teeth in action simultaneously.	1. Check broach carefully and resharpen if necessary 2.If internal broaching on a horizontal machine rear support may 3.In broaching steel best results are obtained at a Rockwell "C" hardness of 25-35 4.Check pitch of teeth using "Pitch Formula"
Scores on Broached Surface	1.Poorly ground chip-breakers. 2.Metal pick-up. 3.Burrs left on cutting edges from sharpening 4.Scale on workpiece.	1.Change design of chip-breakers on last few roughing teeth or semi-finish teeth. 2.Remove any pick-up. 3.Grinding burrs must be removed after sharpening. A piece of hardwood may be used.
Rings in the Broached Hole or On the Surface of the Workpiece	1.Uniform pitch of teeth may cause surging. 2.Back-off clearance may be excessive, 3.Burrs left on cutting edges after sharpening. 4.Unevenstep per tooth on surface broach.	1. Sometimes the use of staggered pitches eliminates this condition. 2. Shear cutting teeth on surface broaches help prevent surging. 3. After sharpening burrs must be removed from cutting edges.



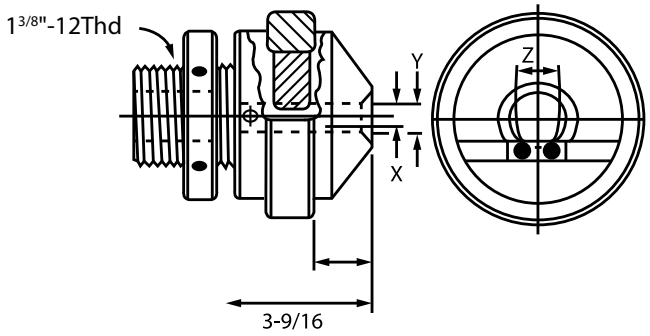






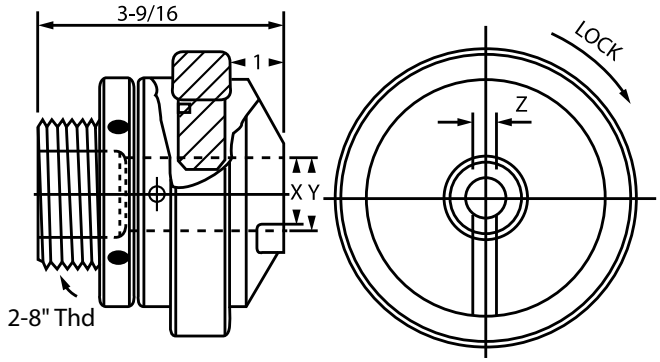


Broaching Pullheads
Typical Dimensions for Assorted Pullers



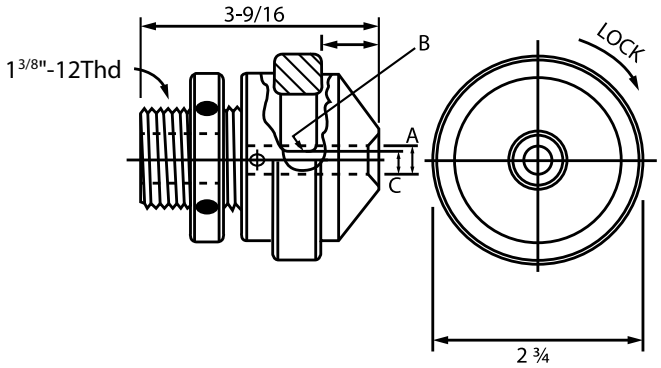
ROUND SEMI-AUTOMATIC PULLERS
Two Jaw Small

Size	X	Y	Z
3/16	.1525	.189	.128
7/32	.187	.220	.160
1/4	.221	.252	.194
5/16	.267	.314	.224
3/8	.330	.377	.291
1/2	.439	.502	.385



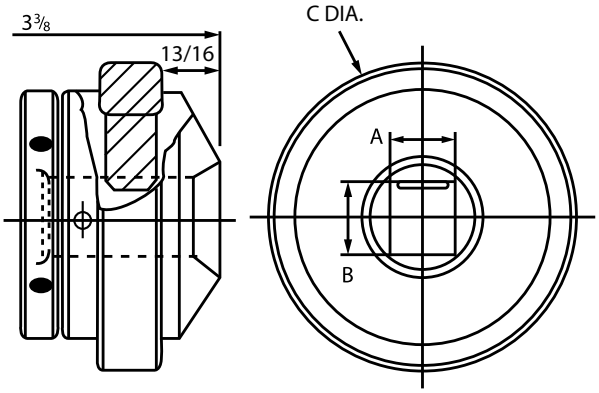
ROUND SEMI-AUTOMATIC PULLERS
Two Jaw Large

Size	X	Y	Z
5/8	.533	.627	.443
3/4	.658	.752	.573
7/8	.783	.877	.698
1	.908	1.002	.823



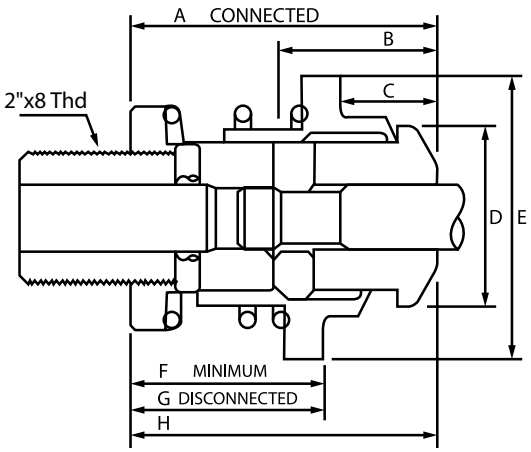
ROUND SEMI-AUTOMATIC PULLERS
Pin Type

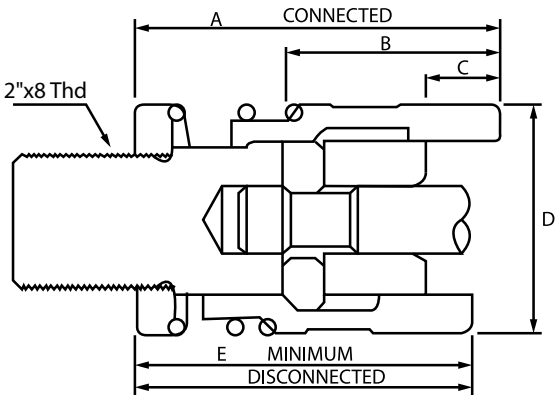
Size	A	B	C
1/8	.125	.125	.088
5/32	.1562	.125	.109
3/16	.1875	.125	.136
7/32	.2187	.125	.156
1/4	.250	.125	.177
5/16	.3125	.187	.219
3/8	.375	.187	.260
7/16	.4375	.187	.302
1/2	.500	.250	.344



STANDARD KEYWAY PULLERS

Size	A	B	C	K/W Broach Size
1	.192	.356	2-3/4	1/8
1/1	.383	.684	2-3/4	3/16-3/8
1/2	.596	.839	2-3/4	1/2-5/8
1/3	.764	.886	3-3/4	3/4





Horizontal "R" Type

Size	A	B	C	D	E	F
1/4 - 1	5 - 7/16	3 - 1/16	1 - 1/8	3 -3/8	4-9/16	5
1 1/16 - 1 11/16	5 - 9-16	3 - 3/16	1 - 1/8	4	4-11/16	5
1 3/4 -2	6 - 5/16	3 - 9/16	1 - 1/4	4 -3/4	5-5/16	5-5/8
2 1/8 - 2 1/2	7 - 5/8	4 - 1/8	1 - 3/8	5-3/4	6-3/16	6-15/16

- A four jaw broach pull head assures positive and automatic broach connection on horizontal or pull-up broaching machines.
- When the broach connects, a coil spring moves a sleeve forward engaging and locking all four jaws around the broach shank.
- The broach is disengaged by contact of the sleeve against preset stops, which moves the sleeve back, unlocking jaws. The puller can be provided with radial index key.
  Fits all standard broaching machines.

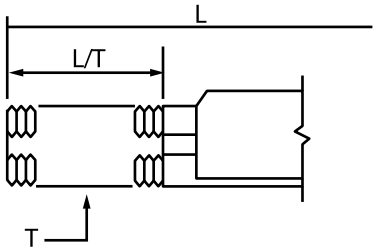
Vertical Pull Down "RD" Type

Size	A	B	C	D	E	F	G	H
1/4 - 1	3-3/16	2-5/16	1-1/2	2-3/4	4-3/16	2-5/16	2-13/16	4-11/16
1 1/16 - 1 11/16	3-1/4	2-7/16	1-9/16	3-1/2	4-3/4	2-3/8	2-3/4	4-13/16
1 3/4 - 2	3-17/32	2-13/16	2-1/32	4-1/4	5-7/8	2-9/16	2-27/32	5-9/16
2 1/8 - 2 1/2	4-3/4	3-1/4	1-17/16	5-1/4	6-3/8	3-9/16	4-1/4	6-7/16

- The "RD" style is recommended for pull down broaching operations where chips fall or are washed downward by coolant onto the pull head.
- Special design of the head provides an umbrella top to shed falling chips and a hole the length of the puller for chips to wash through. This head is identical in operation to the R type and can also be provided with radial index key.
- Fits all standard machines.

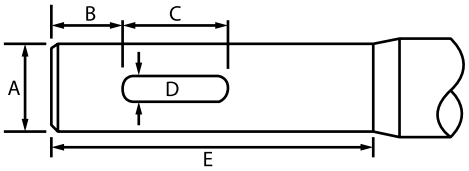
Broach No.	Key Width	Length of Broach	Thread	Length of Thread
501	1/16	20	1/4 to 20	2.25
502	3/32	24	5/16 to 18	2.25
503	3/32	33	3/8 to 16	2.25
504	1/8	30	3/8 to 16	2.25
505	1/8	36	1/2 to 13	2.25
506	5/32	30	3/8 to 16	2.25
507	5/32	33	1/2 to 13	2.25
508	3/16	36	1/2 to 13	2.25
509	3/16	36	1/2 to13	2.25
510	7/32	33		2.25
511	7/32	42	1/2 to13	2.25
512	1/4	36	1/2 to13	2.50
513	1/4	45	5/8 to 11	2.50
514	1/4	51	3/4 to 11	2.50
515	9/32	42	5/8 to 11	2.50
516	9/32	51	5/8 to 11	2.50
517	5/16	45	5/8 to 11	2.50
518	5/16	51	5/8 to 11	2.50
519	3/8	45	5/8 to 11	2.50
520	3/8	54	5/8 to 11	2.50
521	7/16	48	3/4 to 10	2.50
522	7/16	48	3/4 to 10	2.50
523	1/2	48	3/4 to 10	2.50
524	1/2	48	3/4 to 10	2.50
525	9/16	54	1 to 8	2.50
526	9/16	51	1 to 8	2.50
527	9/16	60	1 to 8	2.50
528	5/8	60	1 to 8	2.50
529	5/8	54	1 to 8	2.50
530	5/8	57	1 to 8	2.50
531	3/4	60	1 to 8	2.75
532	3/4	60	1-1/4 to 7	2.75
533	3/4	57	1-1/4 to 7	2.75
534	7/8	63	1-1/4 to 7	2.75
535	7/8	63	1-1/4 to 7	2.75
536	7/8	63	1-1/4 to 7	2.75
537	1	63	1-1/2 to 6	4.25
538	1	63	1-1/2 to 6	4.25
539	1	60	1-1/2 to 6	4.25
541	1-1/4	69	1-1/2 to 6	4.25

Typical Sizes For Thread Type Pull Heads



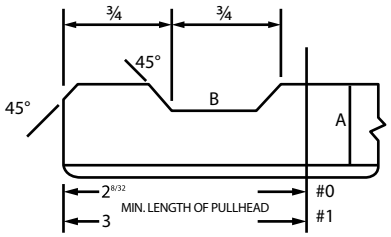
Size	A	B	C	D	E
3/8	0.373	5/8	3/4	3/32	3-1/4
7/16	0.4355	5/8	3/4	1/8	3-1/4
1/2	0.498	5/8	3/4	5/32	3-1/4
9/16	0.560	3/4	1	3/16	3-1/2
5/8	0.6225	3/4	1	3/16	3-3/4
3/4	0.746	3/4	1-1/8	1/4	4
7/8	0.871	3/4	1-1/8	9/32	4
1	0.996	3/4	1-1/4	5/16	4
1-1/8	1.121	3/4	1-1/4	5/16	4
1-1/4	1.246	3/4	1-1/4	11/32	4-1/4
1-3/8	1.371	3/4	1-3/8	3/8	4-1/4
1-1/2	1.496	3/4	1-3/8	3/8	4-1/4
1-5/8	1.620	7/8	1-3/8	13/32	4-1/2
1-3/4	1.745	7/8	1-7/16	7/16	4-1/2
1-7/8	1.870	1	1-1/2	15/32	4-1/2
2	1.995	1	1-1/2	1/2	4-1/2
2-1/4	2.245	1	1-5/8	9/16	4-3/4
2-1/2	2.495	1-1/8	1-3/4	21/32	5
2-3/4	2.745	1-1/4	1-7/8	23/32	5-1/2
3	2.995	1-3/8	1-7/8	23/32	6

Typical Sizes For Key Type Pull Heads



Height A	3/16 to 3/8	3/16 to 3/8	11/16 to 1	1 to 1-1/2
Depth B	1/16	1/8	3/16	7/32

Typical Notch Type Sizes



Gleason No. 104 Straight Bevel Generator

Table of Standard Cutter Specifications

Blade Point Width	Edge Radius	Cutter Description	Approximate Pitch 20º PA of Gear
	24 Blades	Gear Tooth Depth	.550" Max
0.020	Break Corner	E	
0.025	Break Corner	D E F	14-20 DP
0.031	Break Corner	D E F	
0.038	0.010"	C D E F	
0.048	0.010"	C D E F	6-16 DP
0.060	0.010	A B C D E F	
0.075	0.010	B C D E	
0.090	0.015	A B C D	4-8 DP
0.110	0.020	A B C	
	16 Blades	Gear Tooth Depth	.750" MAX
0.090	0.015	A B C D	3 DP
0.110	0.020	A B C	
0.130	0.030	A B	
0.160	0.040	A B	

System Tables from 3 DP through 20 DP where the face width does not exceed the recommended value of 0.30 of the outside cone distance.

As important feature of this system of cutters is the extent of bearing length control. For practically all face widths within
the range of the machine, this system permits a choice of various bearing lengths ranging from about 1/3 to 2/3 of the face width.

These cutters may also be used to produce gears with specifications different than those of the Gleason 20° Straight Bevel Gear System. If standard cutters are not applicable, complete gear specifications should be forwarded for determination of the necessary cutters. The selection of cutter point widths, blade letters, etc. is explained in the instructions for calculation of Machine Settings for Gleason No. 104 Straight Bevel Generator.

Identification of No. 104 Cutters

The blade point width and cutter designation of No. 104 cutters may be determined from the cutter number which is marked on the cutters.

A representative number for .550” whole depth cutter would be G104E-60T-C. G104E refers to the No. 104 Generator. 60 is equal to (Blade Point Width x 1000). Thus, 60 denotes a blade point width of .050”. T indicates a .550’ whole depth cutter. C is the cutter designation which may be A, B, C, D or E. (This is a letter system designating the pressure angle of the blades. Blade pressure angles are selected to produce a desire length of tooth bearing.)The cutter number of the .750” whole depth cutter carries the letter U instead of T as follows:G104-13OU-B

As explained above, this number refers to a No. 104 cutter with a blade point width of 130” and a B cutter designator. These cutters are manufactured so that each cutter of a pair is of the same diameter.

Each member of a pair is marked with the same series number to identify the part. For example, a pair marked RRM-37 would identify the cutters as the 37th pair of 24 bladed cutters. A pair marked serial RRL-14 would identify the cutters as the 14th pair of 16 bladed cutters. Cutters of the same serial number must be kept together, and their diameters maintained alike through the life of the cutters.

Other markings on the cutter indicate whether it is upper left hand or lower right hand; upper L.H. Meaning that it is a left-hand cutter and is used on the upper cutter spindle of the no. 104 Generator.

When ordering cutters, the following information should be furnished with the order:

1. Summary number: if the summary was furnished. Otherwise rend a copy of the summary.

2. Member: Pinion or Gear.

If a summary or summary number cannot be furnished when ordering cutters, then furnish the following information:

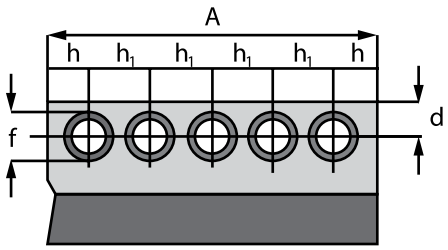
1. Blade Point Width

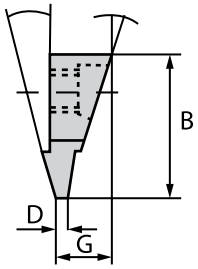
2. Blade Radius

3. Cutter Designation Letter

4. Maximum Tooth Depth

BEVEL GEAR GENERATING BLADES





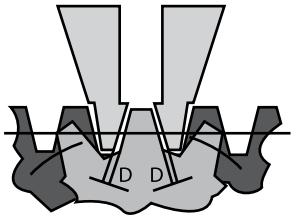
NOMENCLATURE

A: Blade Length
B: Blade Height
G: Distance of Mounting Surface
D: Point Width

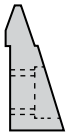
h,h1,d,f,l: mounting screw dimensions inclination of mounting surface, blade pressure angle

Finishing

Roughing



CALCULATION OF THE BLADE POINT WIDTH



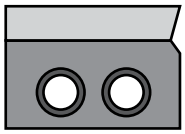
Finishing

Roughing

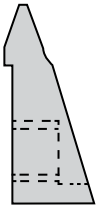
$$q = (lo - 2hf \cdot tg\ ao)\frac{R1}{Ra}$$

For finishing cytters: D<q
For roughing cutters: D<(q-2p)

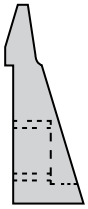
ao: pressure angle
D: Blade point width
q: width on the bottom of the basic rack referred to the distance R. from the cones center



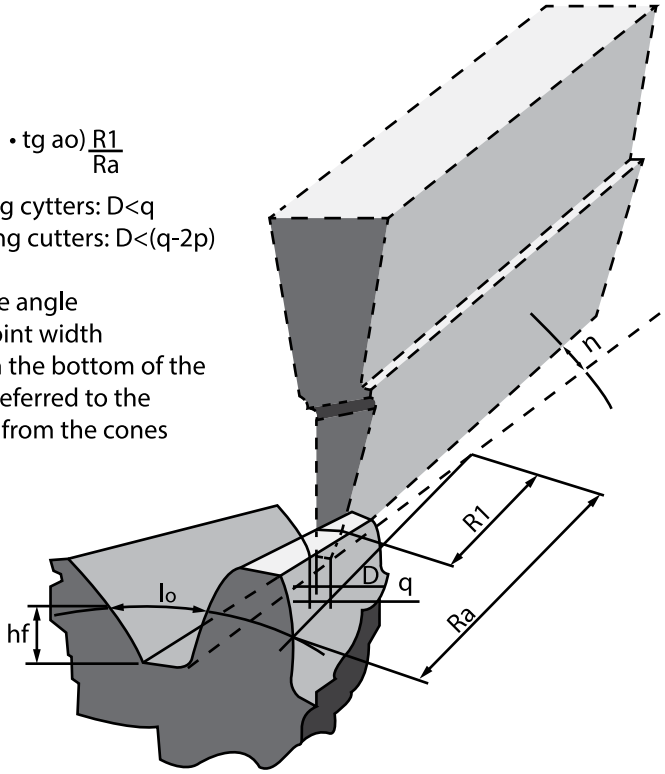
For Gleason 3" Machine

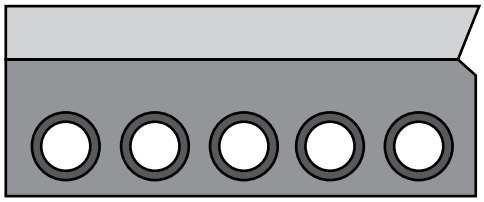


Finishing



Roughing

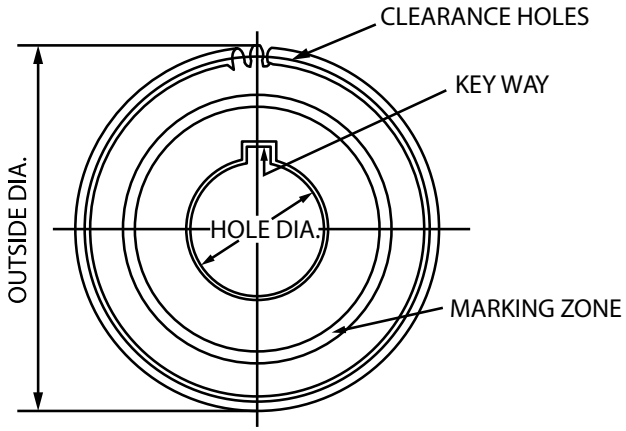




For Gleason 12" Machine

THE SHAVING PROCESS

The gear shaving process is a means of finishing cut gears to a higher degree of accuracy in tooth profile and spacing, at the same time producing a smooth surface finish. The shaving cutter removes the feed marks produced by the cutter or hob in the generating type gear cutting operation and equalizes the deviations from the true profile.

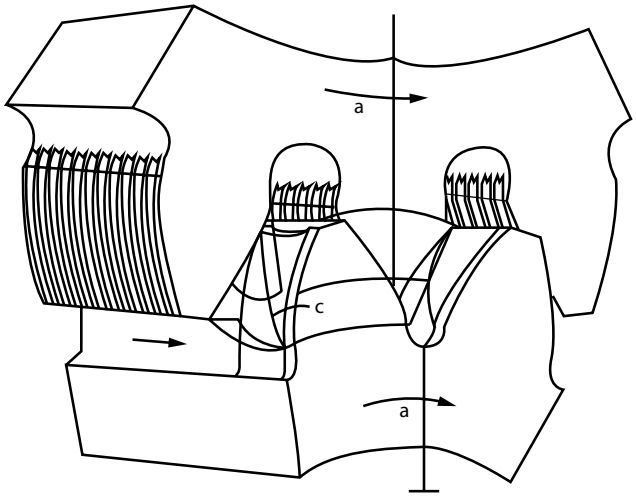


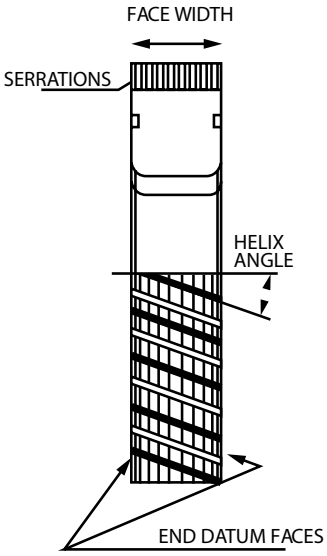
The cutter used in rotary gear shaving is a precision gear provided with a number of closely spaced grooves extending from the tip to roof of each tooth across the full cutter width. These grooves are called serrations. The work gear is held between tail-stock centers and driven by the tool. Both tool and work rotate in close mesh, under a certain amount of relative pressure and with their axes crossed, causing the teeth of the tool to slide along the teeth of the work and remove fine chips. By increasing or decreasing the crossed axes angle it is possible to provide the most desirable cutting conditions possible. The necessary contact pressure is obtained by radial in-feed of the work gear. The shaving machine provides a relative transversing motion between the cutter and the work in order to cover the full width of the work gear teeth.

SPEEDS, FEEDS & STOCK REMOVAL :
As a general rule, rotary shaving cutters are run at a speed of approximately 400 surface feet per minute. Usually a cutter rpm corresponding to this surface speed is selected as a starting point and then the cutter's speed is increased or decreased as necessary for optimum results. In gear shaving, a feed of approximately 0.0010 inch per revolution of the work gear is used. The formula used to obtain the table feed in inches per minute is:

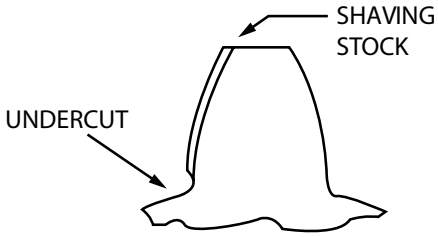
$$\text{Table Feed} = \frac{\text{Cutter rpm} \cdot \text{No. of Teeth in Cutter}}{\text{No. of Teeth in Gear} \cdot 0.010}$$

Shaving is basically a finishing operation and should not be expected to remove large amounts of stock.

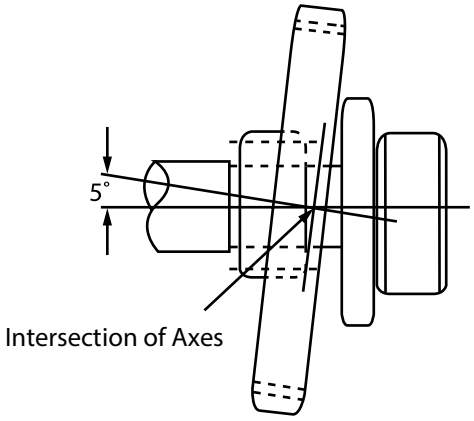




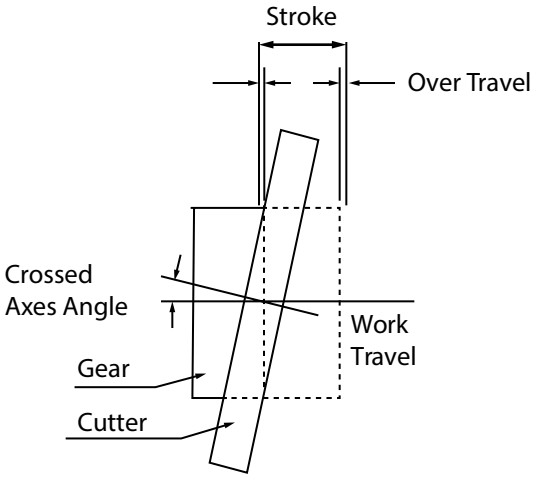
Normal DP	Stock Allowance on tooth thickness
2-4	0.0030" - 0.0040"
5-6	0.0025" - 0.0035"
7-10	0.0020" - 0.0030"
11-14	0.0015" - 0.0020"
16-18	0.0010" - 0.0020"
20-48	0.0005" - 0.0010"



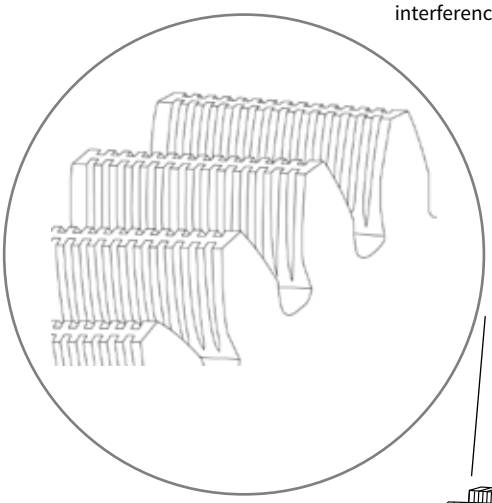
SHAVING CUTTERS

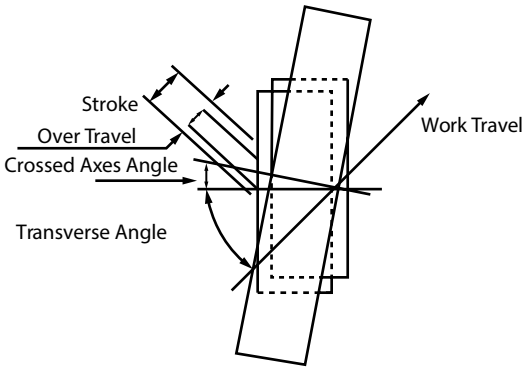


Shaving Cutter set at 5” to avoid interference with adjacent shoulder

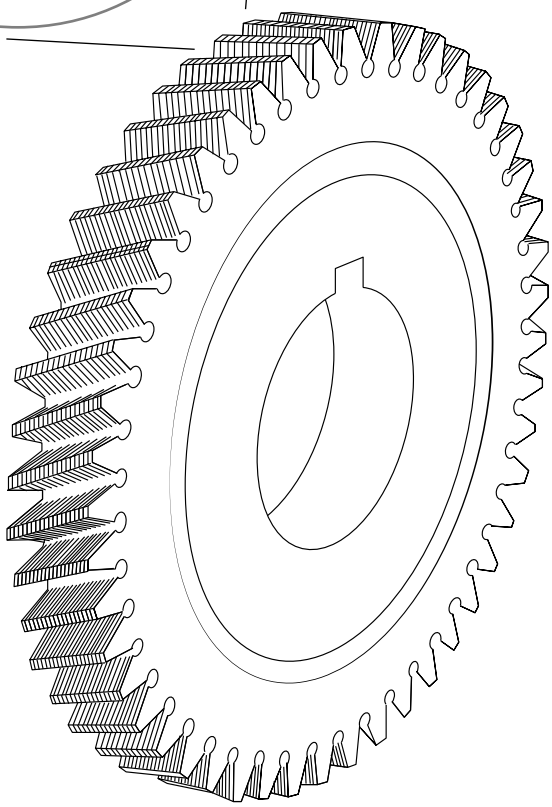


CONVENTIONAL

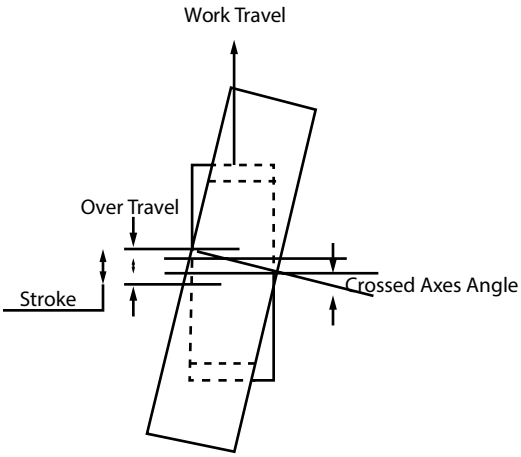




DIAGONAL TRAVERSE



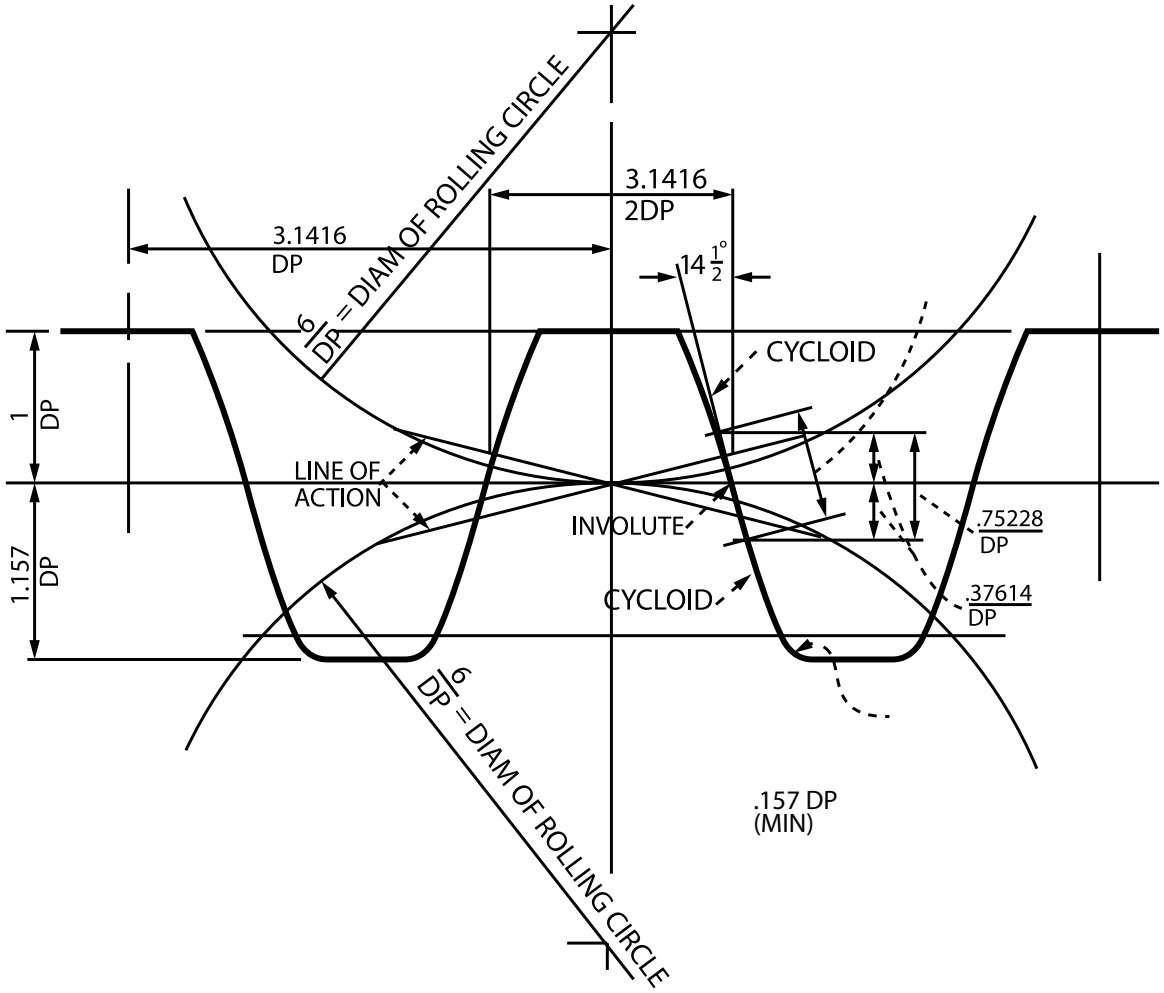
Typical Shaving Cutter



UNDERPASS

American Standard 14 ½ Degree Composite System

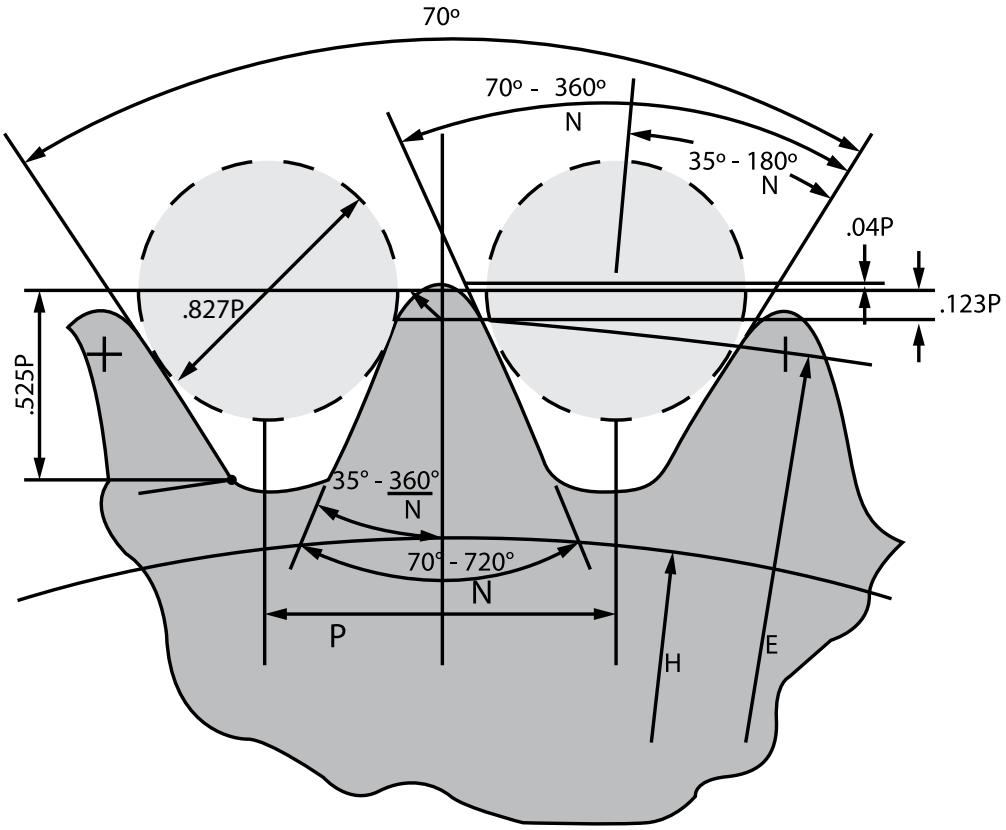
The basic rack of this system is shown by the diagram. This standard differs from the 14 1/2 degree full depth involute system in regard to the form of the basic rack teeth. The nominal pressure angle is the same and also the various formulas for determining tooth depth, addendum, dedendum, etc. The straight - sided or involute form of rack, however is modified by introducing a cyclocicial curve below the pitch line, and also one above it to make the tooth symmetrical as required for interchangeable gearing. Since it would be impractical to produce in the shop the rack, with its cycloidal curves, or a cutter of this exact form. The approximate form of rack shown by the diagram is used and meets practical requirements. The curves of this approximate rack are arcs having a radius equal to 3.750 divided by diametral pitch. These curves are close approximations of the cycloidal curves on the theoretical rack.



The 14 1/2 degree composite tooth form was originally developed for use with the form milling process. Gear teeth conforming to this standard generally are cut by form milling.

They can, however be produced readily on hobbing or other generating machines by making a hob or cutter of the basic rack form. If a hob is used, the relieving tool can be made to the form of the basic rack tooth. The line of tooth action is longer with the composite system then with the pure involute tooth form

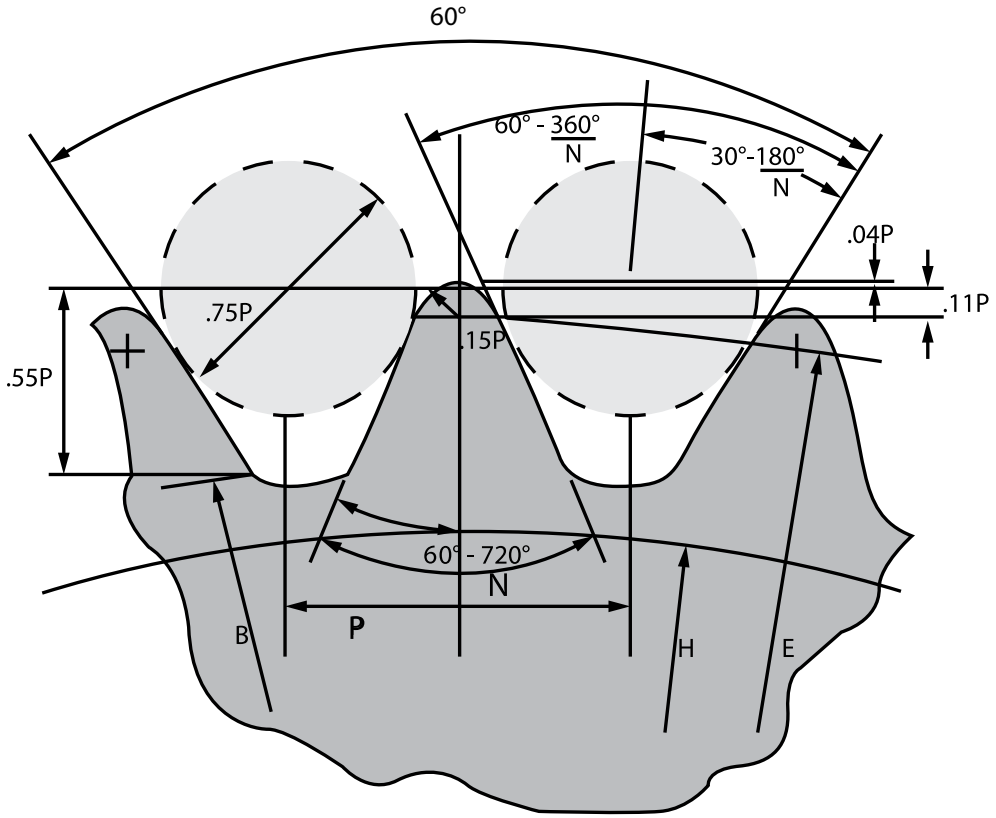
ASA SILENT CHAIN
70° INCLUDED ANGLE 3/16" PITCH
For 3/16" Pitch and Other 70° Included Angle Silent Chain Sprockets



Symbol	Description	Formula	Result
N	# of Teeth	Given	31
P	Chain Pitch	Given	0.1875
PD	Pitch Diameter	P/(Sin(180/N))	1.8533
E	Diameter to Center of Topping Curve	P•((1/(TAN(180/N))-.25))	1.7970
OD	Outside Diameter round teeth	P•(1/(TAN(180/N))-.032)	1.8378
H	Guide groove diameter max	P•(cot(180/N)-1.2)	1.6188
HM	Guide groove diameter min	H-.015	1.6038
W	Wire Size	.667•P	0.1251
MWO	MOW odd # of Teeth	cos(90/N)[PD-.160•P•csc(35-180/N)]+.667•P	1.9144
MWE	MOW even # of Teeth	PD-.160•P•csc(35-180/N)+.667•P	******
WOWT	MOW tolerance negative	15-63Teeth = .004 or 64&up = .005	-0.0040
	MOW tolerance positive	0.000	+0.0000

ASA SILENT CHAIN
60° INCLUDED ANGLE 3/8" PITCH & COARSER

For 3/8" Pitch and Other 60° Included Angle Silent Chain Sprockets



Symbol	Description	Formula	Result
N	# of Teeth	Given	72
P	Chain Pitch	Given	1.0000
PD	Chain Diameter	P/(Sin(180/N))	22.9256
E	Diameter to center of topping curve	P•((1/(TAN(180/N))-.22))	22.6838
OD	Outside Diameter round teeth	P•((1/(TAN(180/N))+.08	22.9838
t	Used in calculation of DO	30-(360/N)	25.0000
Y	Used in calculation of DO	Y=P•(.5-.375•sec(t))•cot(t)•+.11•P	0.2949
L	Used in calculation of DO	Y+(E/2)	11.6368
X	Used in calculation of DO	Y•cos(t)-SQRT((.15•P)^2-(Y•sin(t))^2))	0.1838
DO	Outside dia. with square teeth max.	2•SQRT(X^2+L^2-2•XL•cos(t))	22.9409
DM	Outside dia. with square teeth min.	DO-.050•P	22.8909
B	Diameter to base of working face	P•(SQRT(1.515213+((1/(tan(180/N)))-1.10)^2)	21.8723
H	Guide groove diameter max.	P•(cot(180/N)-1.16)	21.7438
HM	Guide groove diameter min.	P•(cot(180/N)-1.16)	21.7138
W	Wire Size	.625•P	0.6250
MWO	MOW odd # of teeth	cos(90/N)[PD-.125•P•csc(30-180/N)]+.625•P	******
MWE	MOW even # of teeth	PD-.125*P•csc(30-180/N)+.625•P	23.2799
WOWT	MOW tolerance negative	-(.004+.001•P•(SQRT(N)))	-0.0125
	MOW tolerance positive	0.000	+0.0000

SILENT CHAIN DRIVES

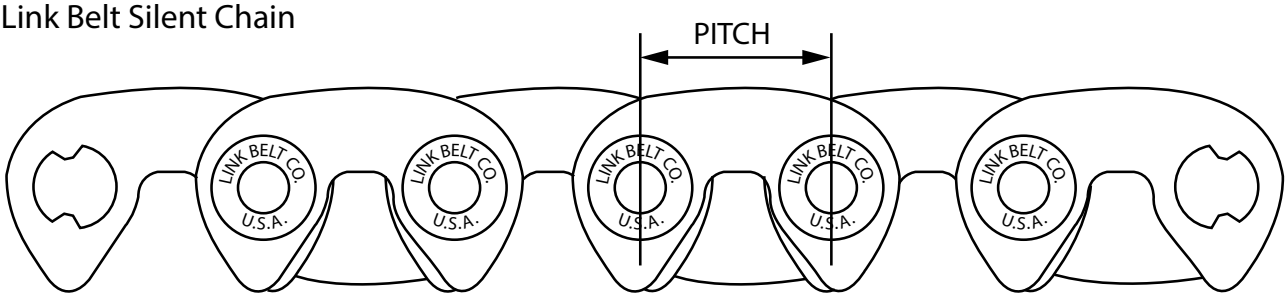
The purpose of this information is to assist in properly identifying the existing chain so that a correct sprocket cutter may be ordered. Silent Chain, sometimes referred to as inverted tooth chain, is made up of parts finished to close tolerances and designed to provide smooth, efficient operation.

When the chain is wrapped around the sprocket, the chain links simultaneously engage both sides of the sprocket teeth which insures smooth, quiet operation. This is particularly true in high speed operation.

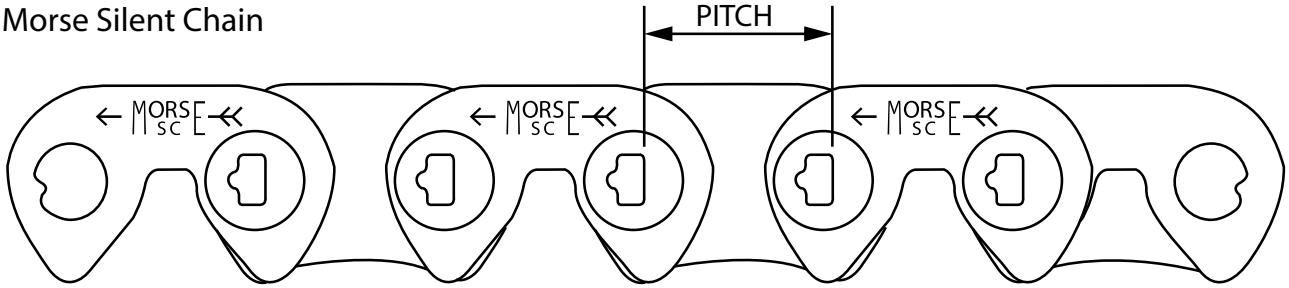
Identification: The manufacturer of a Silent chain can usually be identified by their outward appearance.

Although an ANSI standard (B29.2) has been developed, many Silent Chains are produced to the individual specification of the various manufacturers. In addition, due to the inherent long life of Silent Chain drives, many chains are in operation in the industry today that were supplied years before the adoption of the ANSI standard. For these reasons it is important that proper identification of the existing chain be made at the time a replacement is required.

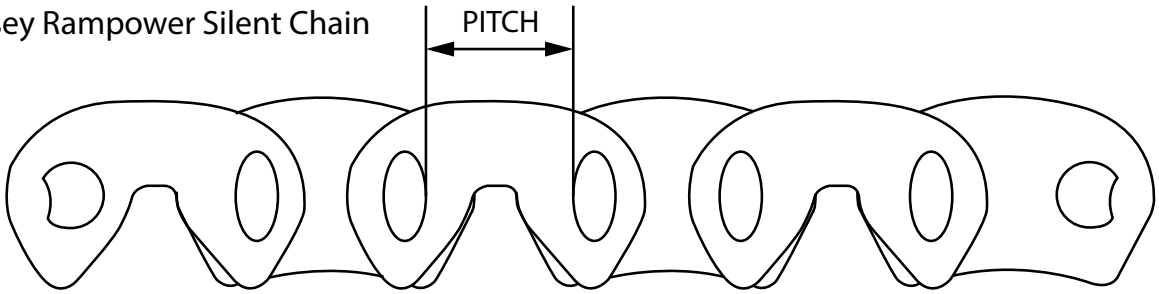
Link Belt Silent Chain



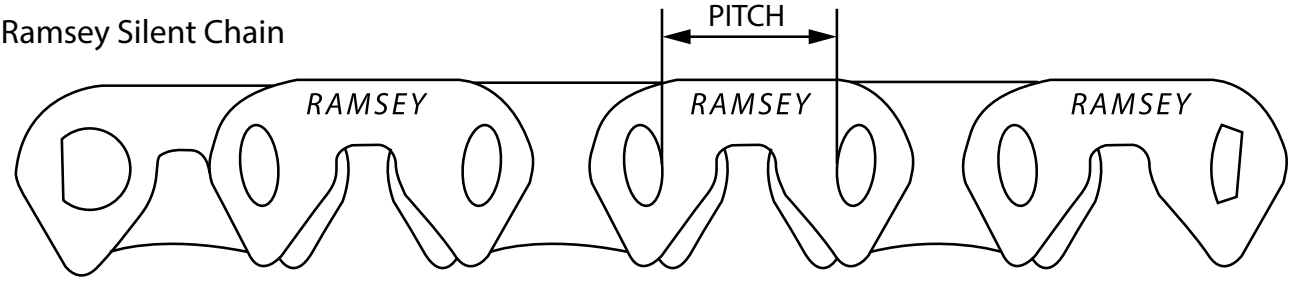
Morse Silent Chain



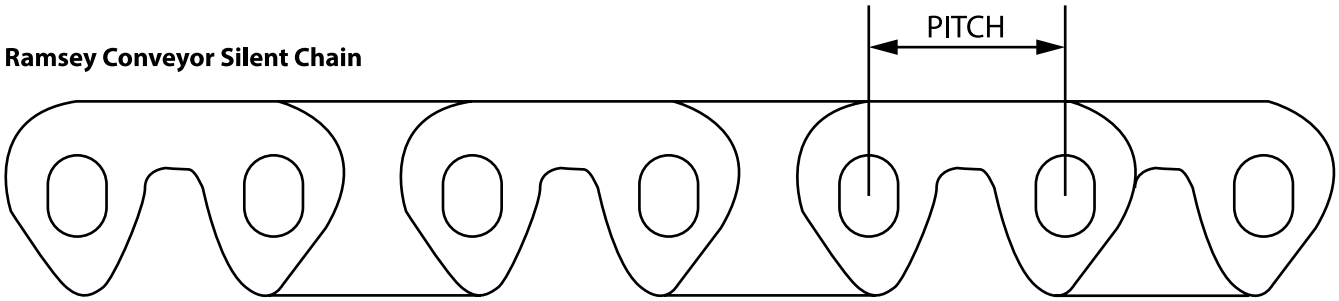
Ramsey Rampower Silent Chain



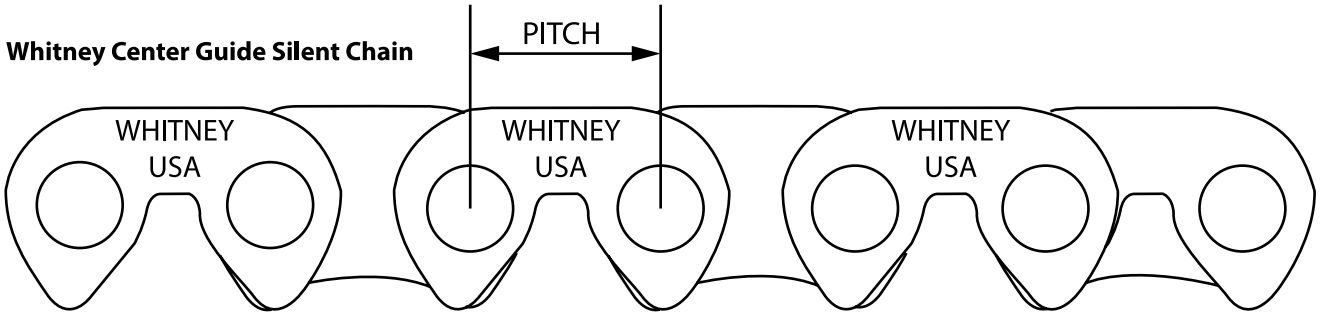
Ramsey Silent Chain



Ramsey Conveyor Silent Chain



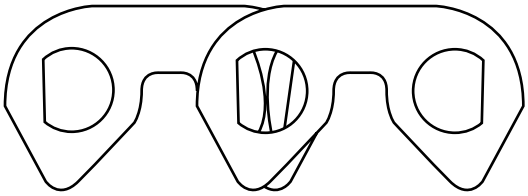
Whitney Center Guide Silent Chain



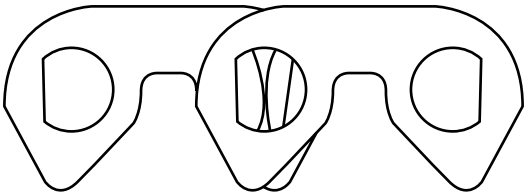
Joint Construction and or Link Plate Apertures

When the name of the manufacturer cannot be identified by the outward appearance due to paint,corrosion,ect. or from the amount of chain available for inspection. It can be identified by the joint construction and/or link plate apertures shown below.

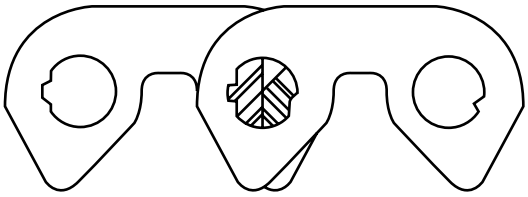
Ramsey Silent Chain



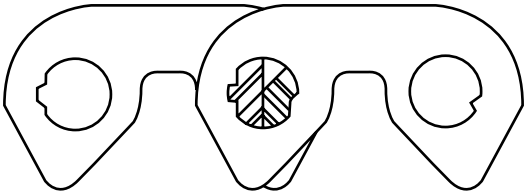
Ramsey Ram Power Chain



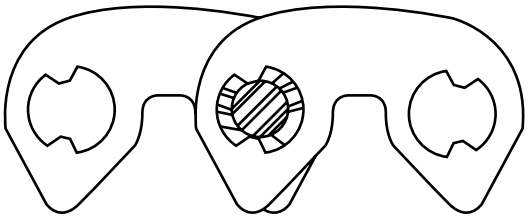
Morse Silent Chain



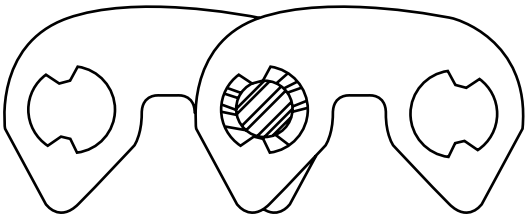
Morse Hy-Vo Chain



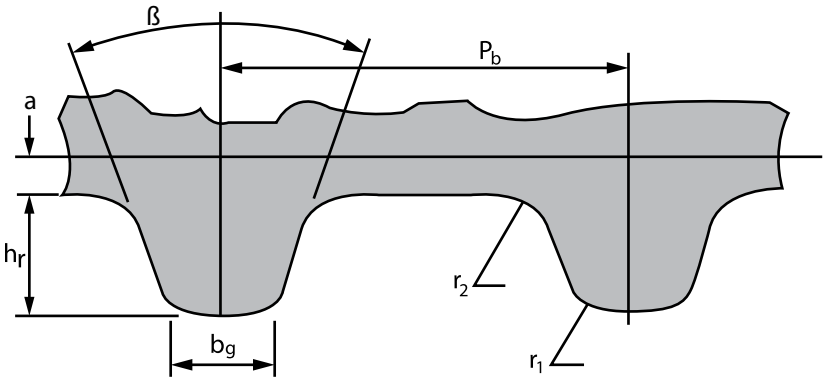
Link Belt Silent Chain



Whiteny Silent Chain



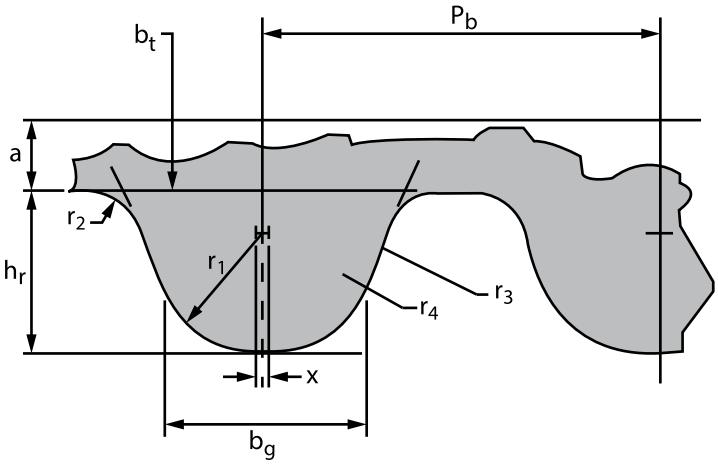
TIMING BELT CHAINS & SPROCKETS



AMERICAN STANDARD TIMING BELTS

Pulley, Generating Tool Rack Form Dimensions for Involute Teeth

Belt Section	Number of Grooves	P_b +0.0001	β 10.25º	h_r +0.0002 -0.000	bs +0.0002 -0.000	r_1 +0.0001	r_2 +0.0001	2a
MXL	10 - 23	0.0800	56	0.025	0.024	0.012	0.009	0.020
	24+	0.0800	40	0.125	0.0265	0.012	0.009	0.020
XL	10+	0.2000	50	0.056	0.050	0.024	0.024	0.020
L	10+	0.3750	40	0.084	0.122	0.034	0.021	0.030
H	14-19	.05000	40	0.102	0.167	0.058	0.041	0.054
	19+	0.5000	40	0.102	0.167	0.052	0.056	0.054
XI-I	18+	0.8750	40	0.271	0.299	0.079	0.076	0.110
XXH	18+	1.2500	40	0.405	0.457	0.106	0.111	0.120



FULL RADIUS TIMING BELT

Rack Form Dimensions

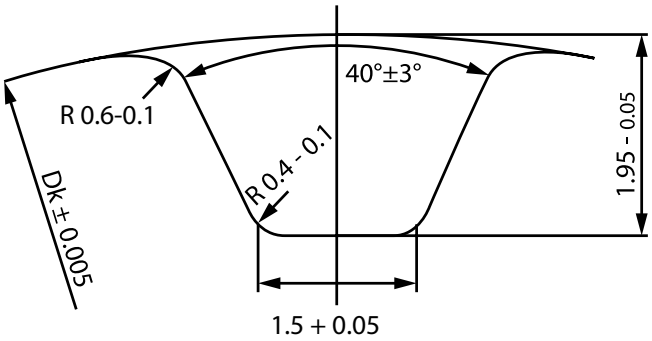
Belt Section	# of Grooves	Pb	hr	bg	bt	r1	r2	r3	r4	X	2a
8M	22-27	0.31496	0.1295	0.1370	0.2380	0.1005	0.045	*	0.0000	0.0000	0.054
	28-89	0.31496	0.1422	0.1640	0.2381	0.1092	0.042	0.508	0.0098	0.0098	0.054
	90-200	0.31496	0.1430	0.1671	0.2242	0.1038	0.037	*	0.0000	0.0000	0.054
14M	28-36	0.55118	0.2489	0.2799	0.4385	0.1857	0.074	0.820	0.0000	0.0000	0.110
	37-89	0.55118	0.2440	0.3043	0.4248	0.1836	0.072	0.620	0.0000	0.0000	0.110
	90-216	0.55118	0.2500	0.3192	0.4040	0.1820	0.075	0.792	0.0000	0.0000	0.110

**Blend*
***Chart Courtesy - Gates Rubber Co.*

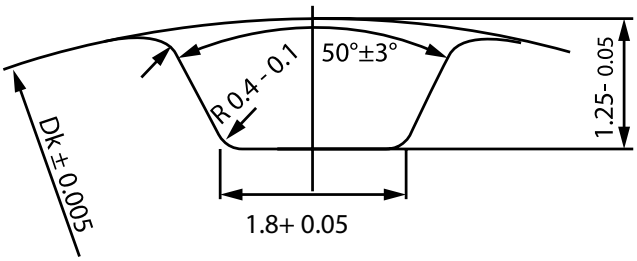
SYNCHROFLEX TIMING BELTS

Tooth Forms for T & AT Versions

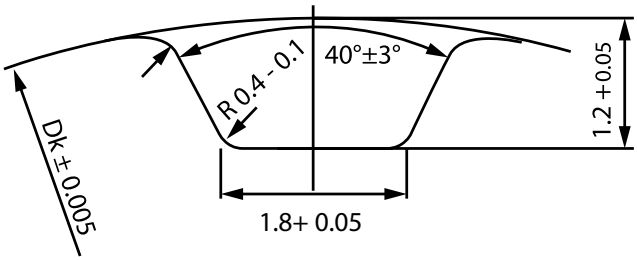
T5



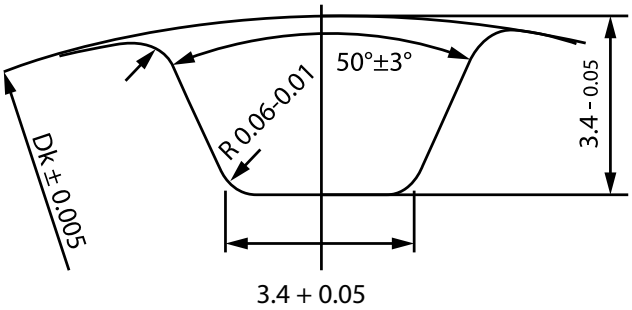
T5-Se



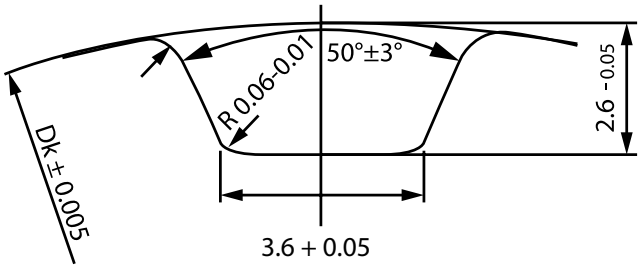
T5-0
No Backlash



T10



T10-Se



T10-0
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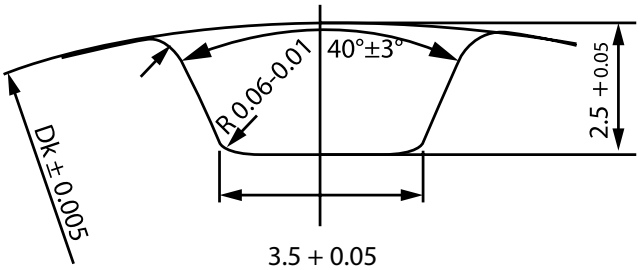

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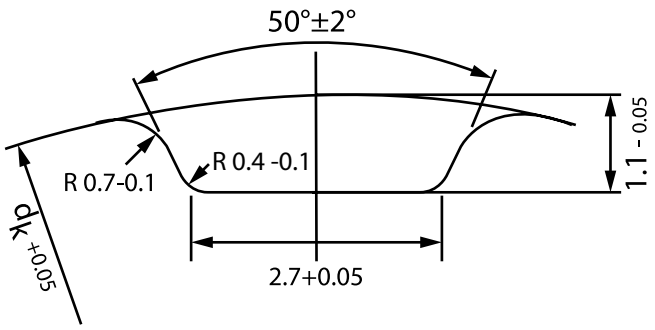
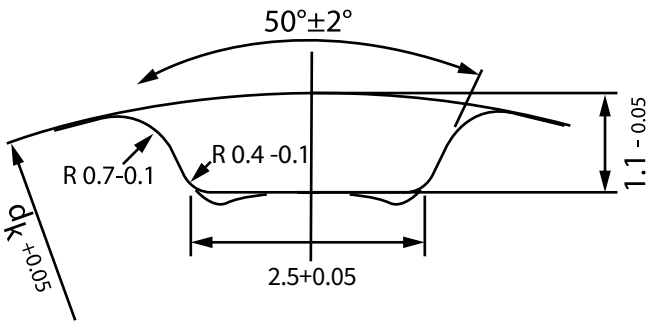
SYNCHROFLEX - TIMING BELTS

Tooth Forms for T& AT Versions

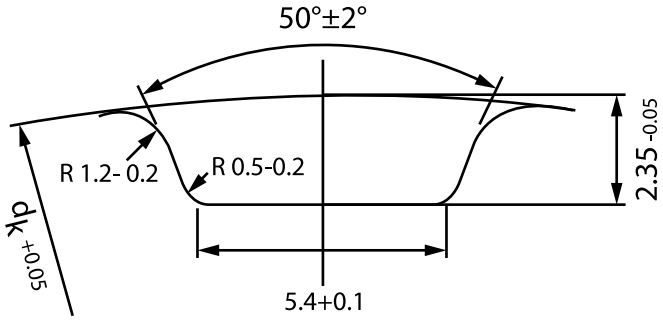
AT 5



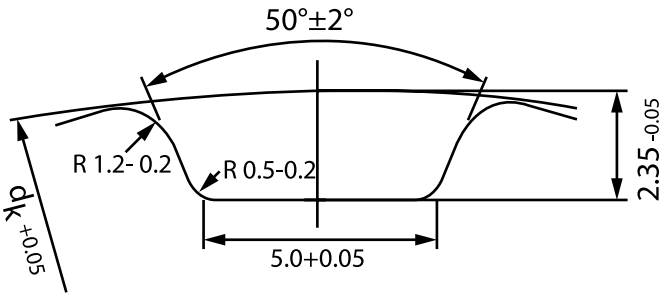
AT 5-0
NO BACKLASH



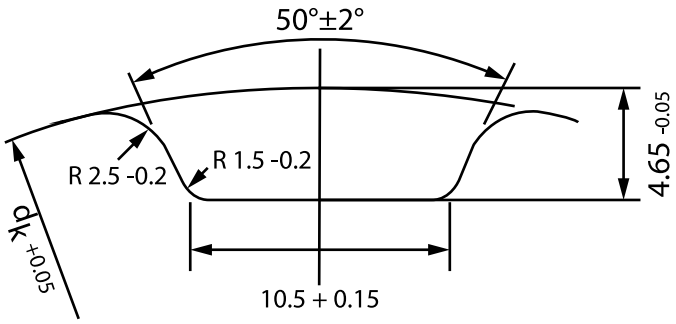
AT 10A



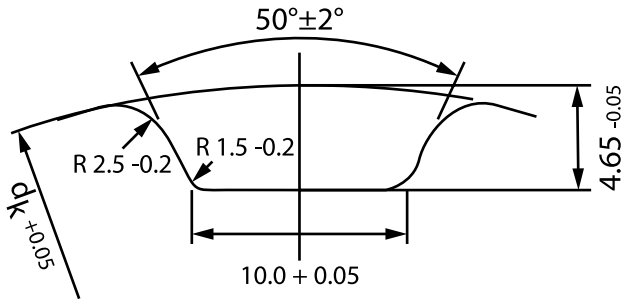
T 10-0
NO BACKLASH



AT 20



AT 20-0
NO BACKLASH



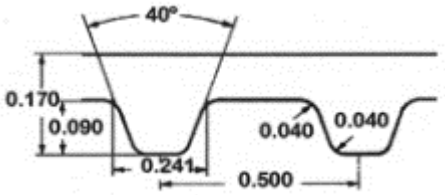
DIN 7721 CHAINS & SPROCKETS

SYNCROFLEX O.D. "T" & "AT" CHART

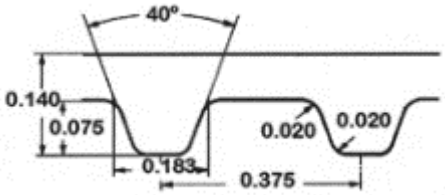
No. of Teeth	"T" do 2.5	"T" & "AT" do 5	"T" & "AT" do 10	"T" & "AT" do 20	No. of Teeth	"T" do 2.5	"T" & "AT" Version do 5	"T" & "AT" Version do 10	"T" & "AT" Version do 20
10	-	15.05	-	-	61	48.05	96.25	192.30	385.45
11	-	16.65	-	-	62	48.85	97.85	195.50	391.85
12	9.00	18.25	36.35	-	63	49.60	99.45	198.65	398.20
13	9.80	19.85	39.50	-	64	50.40	101.05	201.85	404.55
14	10.60	21.45	42.70	--	65	51.20	102.65	205.05	410.95
15	11.40	23.05	45.90	92.65	66	52.00	104.20	208.20	417.30
16	12.20	24.60	49.05	99.00	67	52.80	105.80	211.40	423.65
17	18.00	26.20	52.25	105.40	68	53.60	107.40	214.60	430.05
18	18.80	27.80	55.45	111.70	69	54.40	109.00	217.75	436.40
19	14.60	29.40	58.60	118.10	70	55.20	110.60	220.95	442.80
20	15.40	31.00	61.80	124.50	71	56.00	112.20	224.15	449.15
21	16.20	32.70	65.00	130.75	72	-	113.75	27.15	455.50
22	17.00	34.25	68.15	137.20	73	-	115.75	230.50	461.85
23	17.80	35.85	71.35	143.55	74	-	116.95	233.70	168.25
24	18.55	37.40	74.55	149.95	75	-	118.55	236.90	174.60
25	19.35	39.00	77.70	156.30	76	-	120.15	240.05	480.95
26	20.15	40.60	80.90	162.65	77	-	121.75	243.25	487.35
27	20.95	42.20	84.10	169.05	78	-	123.30	246.40	193.70
28	21.76	43.75	87.25	175.40	79	-	124.90	249.60	500.05
29	22.55	45.35	90.45	181.75	80	-	126.50	252.80	506.45
30	23.35	46.95	93.65	188.15	81	-	128.10	255.95	512.80
31	24.15	48.55	96.80	194.50	82	-	129.70	259.15	519.15
32	24.95	50.10	100.00	200.85	83	-	131.30	262.30	525.55
33	25.75	51.70	103.20	207.20	84	-	132.85	265.50	531.90
34	26.55	53.25	106.40	213.60	85	-	134.45	268.70	538.25
35	27.85	54.85	109.55	219.95	86	-	1.3.05	271.90	544.60
36	28.10	56.45	112.75	226.35	87	-	137.65	275.05	551.00
37	28.90	58.05	115.90	232.70	88	-	139.25	278.25	557.35
38	29.70	59.65	119.10	239.05	89	-	140.85	281.45	563.70
39	30.50	61.25	122.30	245.45	90	-	142.45	284.60	570.10
40	31.30	62.85	125.45	251.80	91	-	144.00	287.80	576.45
41	32.10	64.40	128.65	258.15	92	-	145.60	291.00	582.85
42	32.90	66.00	131.85	261.50	93	-	147.20	294.15	589.20
43	33.70	67.70	135.00	270.90	94	-	148.80	297.35	595.55
44	34.50	69.20	138.20	277.25	95	-	150.40	300.55	601.90
45	35.30	70.80	141.40	283.60	96	-	152.00	303.70	608.30
46	36.10	72.40	144.55	290.00	97	-	153.55	306.90	614.65
47	36.90	73.95	147.75	296.35	98	-	155.15	310.10	621.00
48	37.70	75.55	150.95	302.70	99	-	156.75	313.25	627.40
49	38.45	77.15	154.10	309.10	100	-	158.35	316.45	633.75
50	39.25	78.75	157.30	315.45	101	-	159.95	319.65	640.10
51	40.05	80.35	160.50	321.80	102	-	161.55	322.80	646.50
52	40.85	81.95	163.65	328.20	103	-	163.10	326.20	652.85
53	41.65	83.50	166.85	334.55	104	-	164.70	329.20	659.20
54	42345	85.10	170.05	340.90	105	-	166.30	332.35	665.60
55	43.25	86.70	173.20	347.30	106	-	167.90	335.55	671.95
56	44.05	88.30	176.40	353.65	107	-	169.50	338.75	678.30
57	44.85	89.90	179.60	360.00	108	-	171.10	341.91	684.70
58	45.65	91.50	182.75	366.40	109	-	172.65	345.10	691.05
59	46.45	93.05	185.95	372.75	110	-	174.25	348.30	697.40
60	47.25	94.65	189.10	379.10	-	-	-	-	-

AMERICAN STANDARD - TIMING BELTS
(Powergrip Timing)Tooth Forms

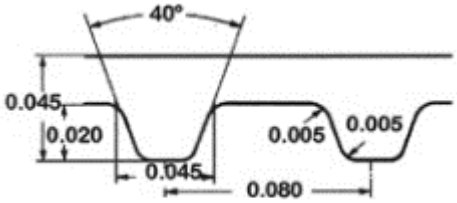
Series	Pitch (in)
XXL	-
MXL	0.08
XL	0.2
L	0.375
H	0.5
XH	0.875
XXH	1.25



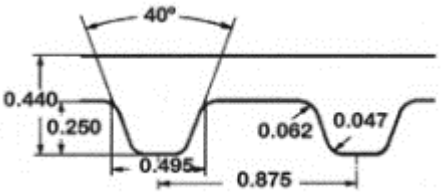
H-Pitch



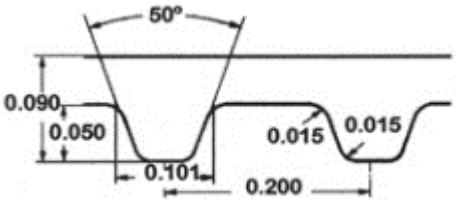
L-Pitch



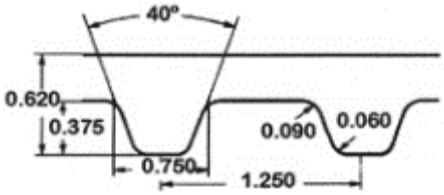
MXL-Pitch



XH-Pitch

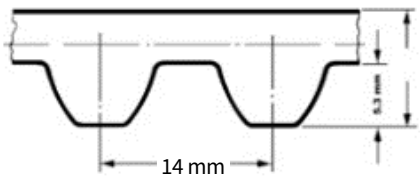


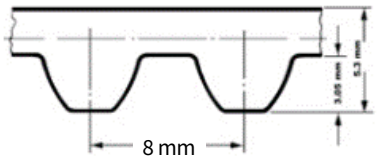
XL-Pitch

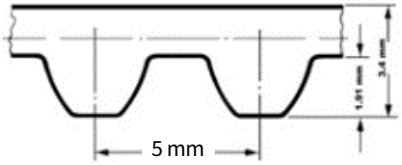


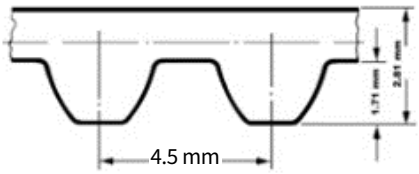
XXH-Pitch

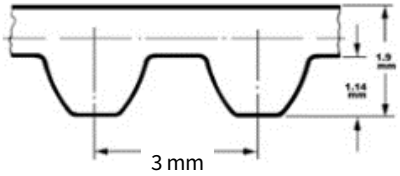
METRIC GOODYEAR - TIMING BELTS
(Super Torque - Neoprene)Tooth Forms

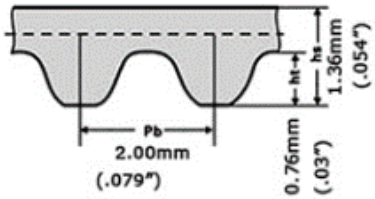








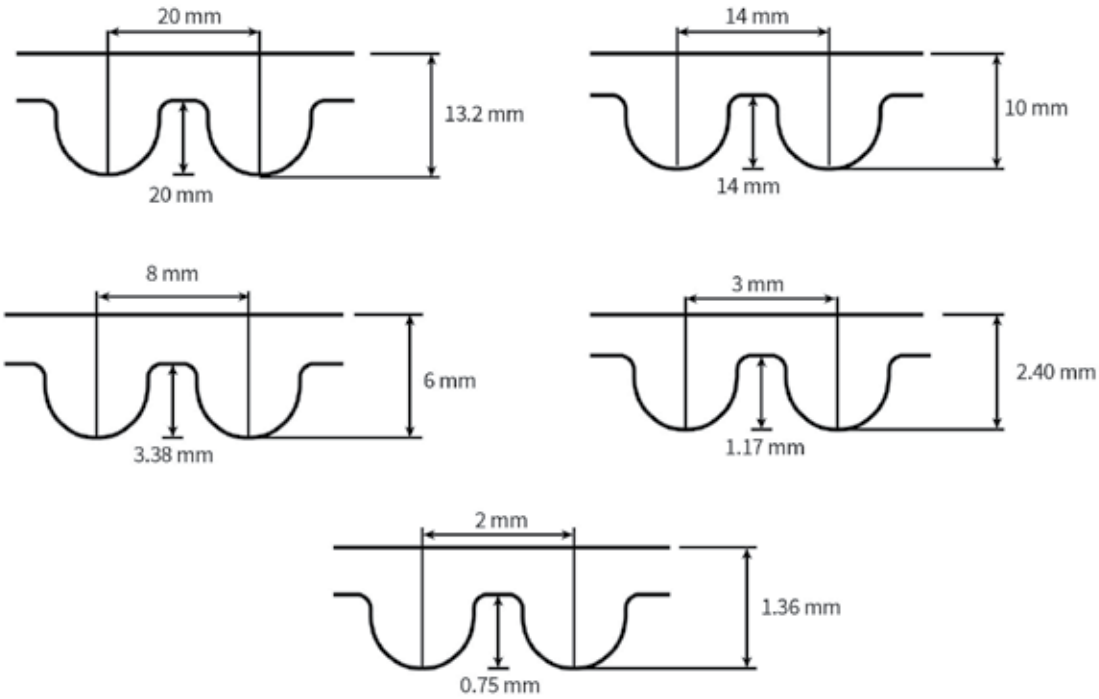




HIGH TORQUE DRIVE - TIMING BELTS

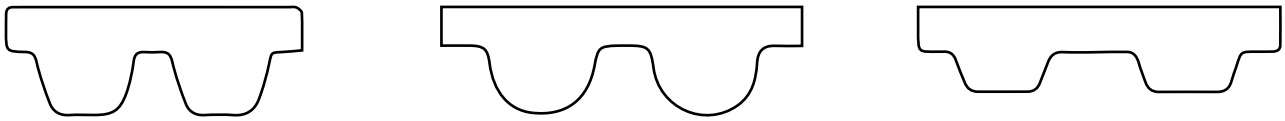
Tooth Forms

*HTD's have radius/round on tip, flat roots.



PowerGrip - TIMING BELTS

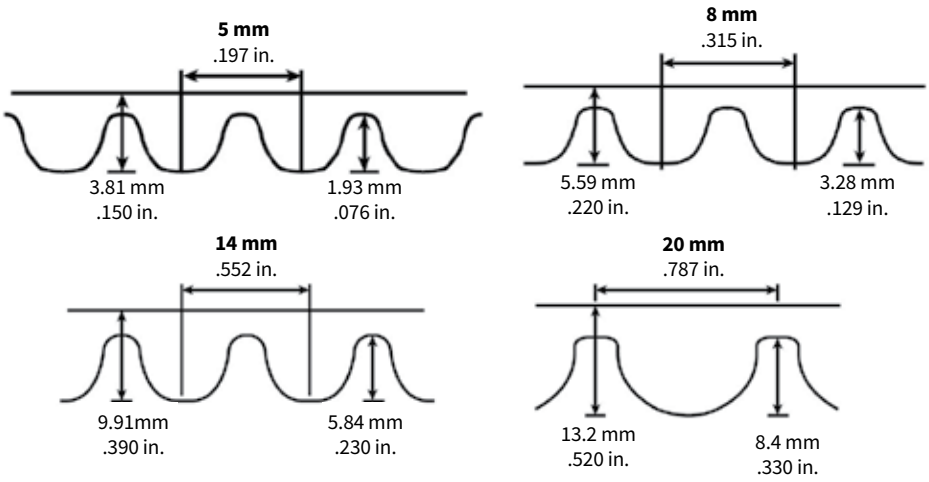
Tooth Forms



GT **HTD** **Timing**

PowerGrip GT2 (HTD)- TIMING BELTS

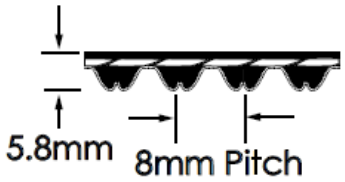
Tooth Forms

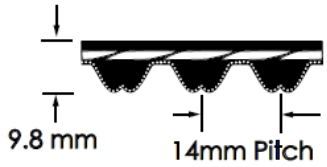


GOODYEAR - TIMING BELTS

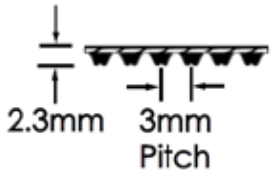
Tooth Forms

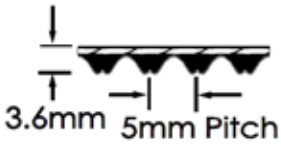
Falcon HTC Series

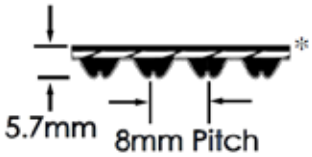


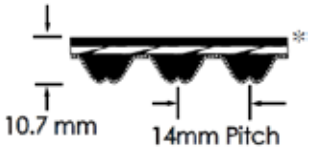


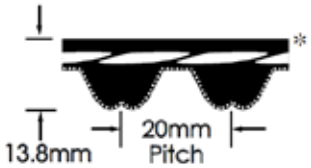
Hawk Pd Series



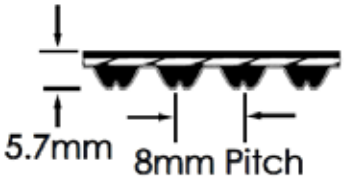


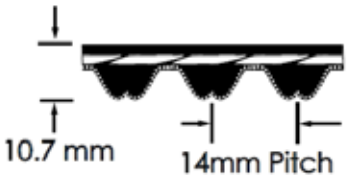




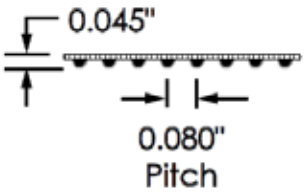


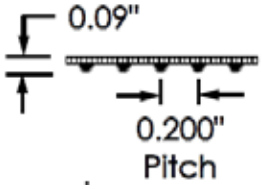
Blackhawk Series

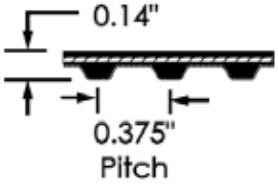


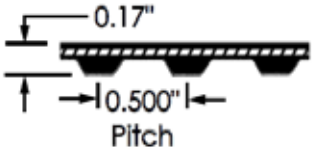


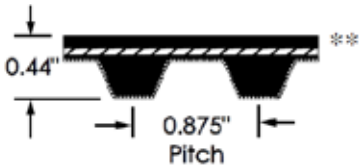
Positive Drive Pd Series

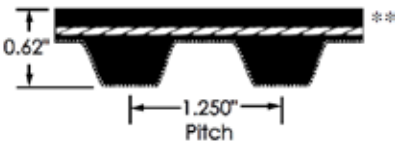




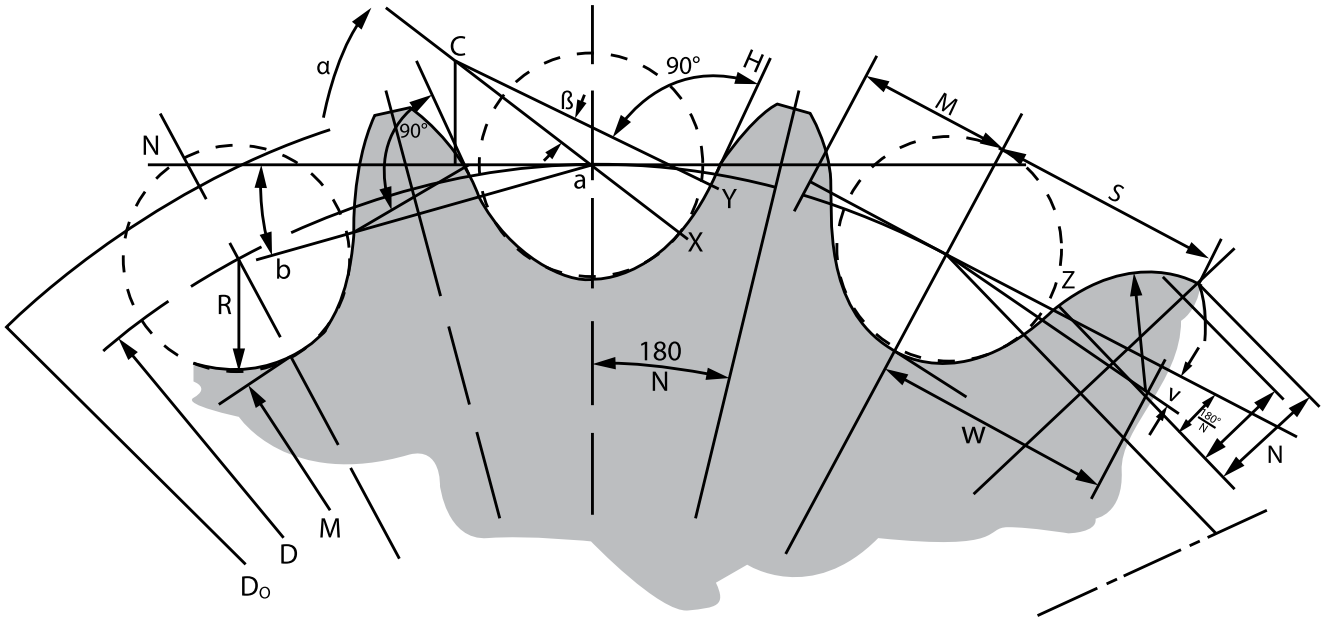






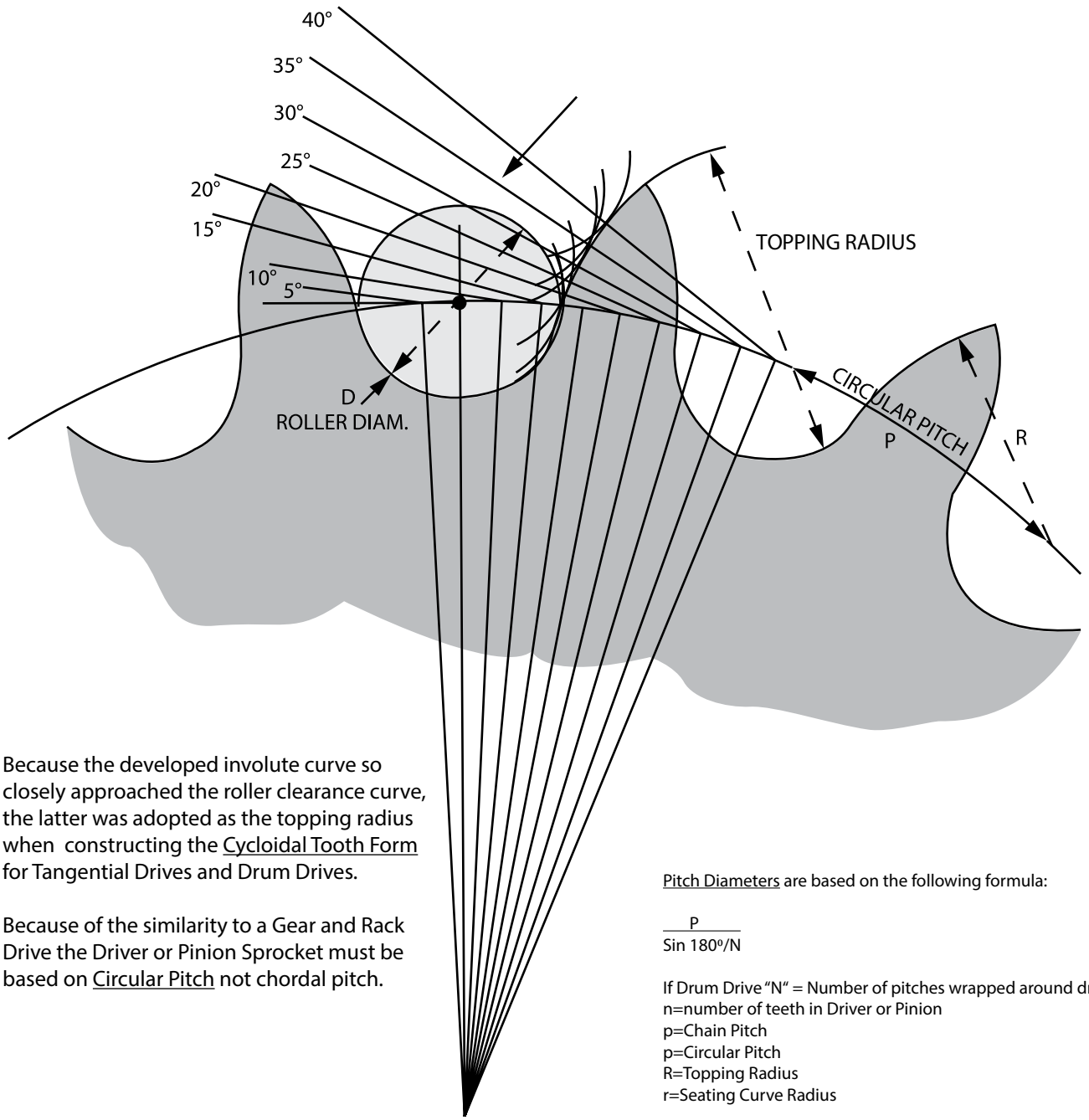


DESIGN FORMULAS FOR ASA ROLLER CHAIN & SPROCKETS



Symbol	Description	Formula	Result
N	# of teeth	Given	20
P	Chain pitch	Given	.750
Dr	Roller Diameter	Given	.4690
CI	Pitch Line Clearance min.	.07(P-Dr)+.002	.0217
CIM	Pitch Line Clearance max.	CI+.003(Dr)+.005	.0281
Rm	Seating curve radius min.	.5025(Dr)+.0015	.2372
RM	Seating curve radius max.	Rm+.0015(Dr)+.0025	.2404
D	Pitch Diameter	P/(sin(180/N))	4.7943
MM	Minor diameter max.	D-Dr	4.3253
Mm	Minor diameter min.	MM-(.001•P•SQRT(N)+.003)	4.3190
J	J Dimension	.3•P	.2250
DO	Outside Diameter	P(.6cot(180/N))	5.1853

ORIGINAL METHOD OF DEVELOPING CYCLOIDAL TOOTH FORM



Because the developed involute curve so closely approached the roller clearance curve, the latter was adopted as the topping radius when constructing the Cycloidal Tooth Form for Tangential Drives and Drum Drives.

Because of the similarity to a Gear and Rack Drive the Driver or Pinion Sprocket must be based on Circular Pitch not chordal pitch.

Pitch Diameters are based on the following formula:

$$\frac{P}{\sin 180^{o}/N}$$

If Drum Drive "N" = Number of pitches wrapped around drum
n=number of teeth in Driver or Pinion
p=Chain Pitch
p=Circular Pitch
R=Topping Radius
r=Seating Curve Radius

Pitch Diameter of Chain on Drum P.D.N. =
P=Circular pitch based on "N" $p = \frac{P.D.N. \cdot 3.1416}{N}$

Pitch Diameter of Pinion = P.D. $n = \frac{P \cdot n}{3.1416}$

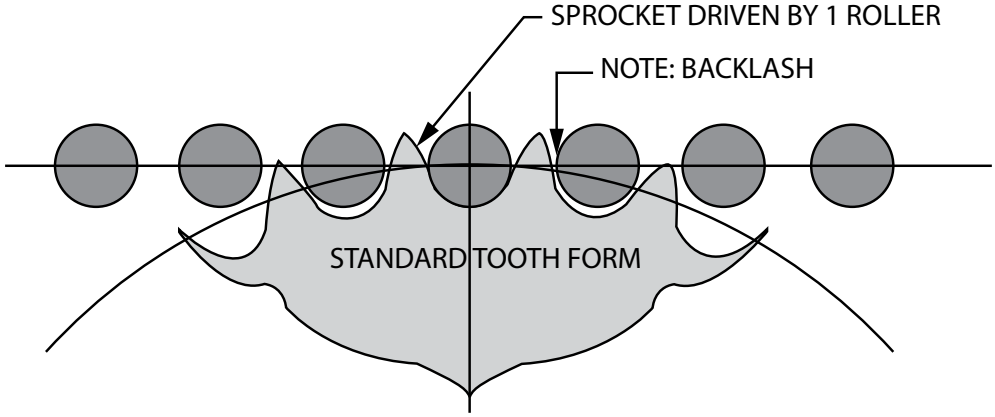
On Tangential Drives where chain is used as a rack, the circular pitch "p" = chain pitch

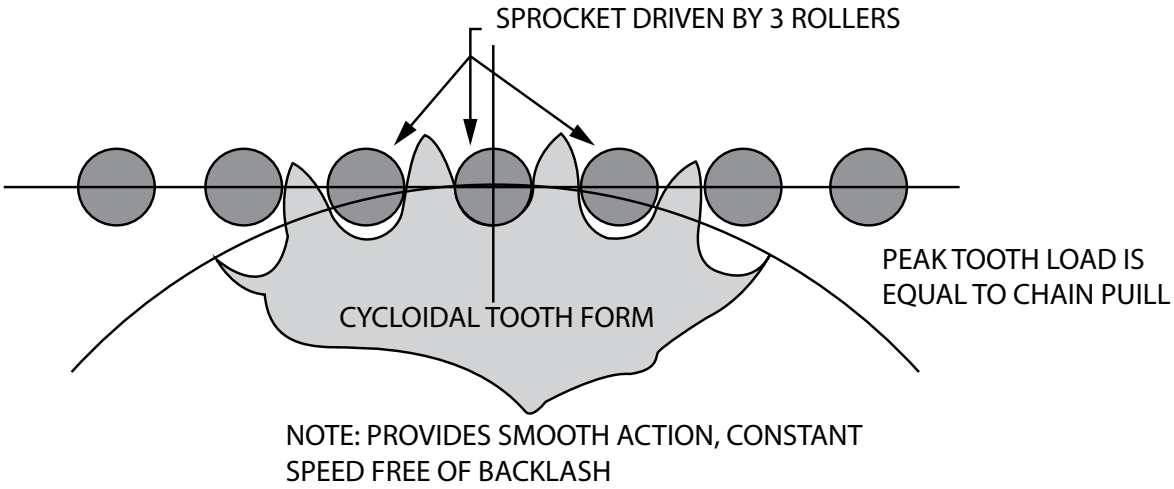
$$r = \frac{1.005D + 0.003}{2}$$

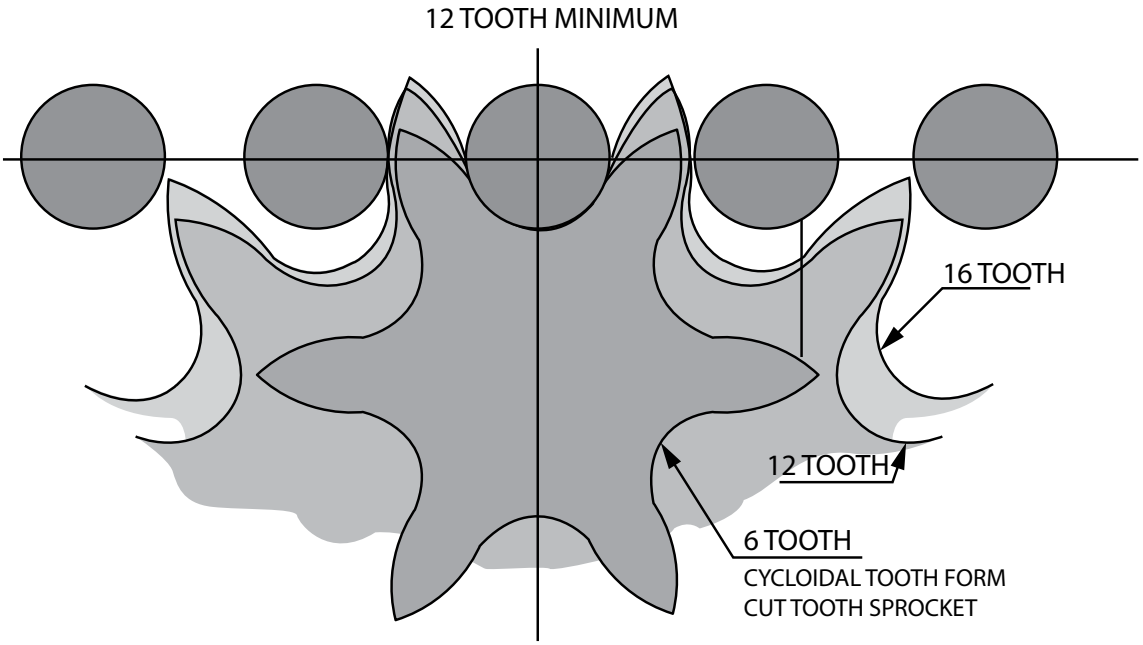
$$R = (\sin 180^{o} \cdot P.D.n.) - r$$

CYCLOIDAL SPROCKET

Chains & Sprockets







CONVEYOR CHAIN

Pitch Diameter, Maximum Outside and Bottom, Diameter for Normal Range of Sprocket Teeh Available

Number of Teeth		Pitch Diameter		Maximum Outside Diam.		Maximum Bottom Diam.	
act.	eff.	in.	mm.	in	mm.	in.	mm
12	6	3.000	76.20	2.848	72.34	2.475	62.87
13	6 1/2	3.228	81.99	3.108	78.94	2.703	68.66
14	7	3.457	87.81	3.365	85.47	2.932	74.47
15	7 1/2	3.688	93.68	3.619	91.92	3.163	80.34
16	8	3.920	99.57	3.871	98.32	3.395	36.23
17	8 1/2	4.152	105.46	4.122	104.70	3.627	92.13
18	9	4.386	111.40	4.371	111.02	3.861	98.07
19	9 1/2	4.620	117.35	4.620	117.35	4.095	104.01
20	10	4.854	123.29	4.854	123.29	4.329	109.96
21	10 1/2	5.089	129.26	5.089	129.26	4.564	115.93
22	11	5.324	135.23	5.324	135.23	4.799	121.89
23	11 1/2	5.560	141.22	5.560	141.22	5.035	127.89
24	12	5.796	147.22	5.786	147.22	5.271	133.88
25	12 1/2	6.032	153.21	6.032	153.21	5.507	139.88
26	13	6.268	159.21	6.268	159.21	5.743	145.87
27	13 1/2	6.504	165.20	6.504	165.20	5.979	151.87
28	14	6.741	171.22	6.741	171.22	6.216	157.89
29	14 1/2	6.978	177.24	6.978	177.24	6.453	163.91
30	15	7.215	183.26	7.215	183.26	6.690	169.93
31	15 1/2	7.452	189.28	7.452	189.28	6.927	175.95
32	16	7.689	195.30	7.689	195.30	7.164	181.97
33	16 1/2	7.926	201.32	7.926	201.32	7.401	187.99
34	17	8.163	2207.34	8.163	207.34	7.63	194.01
35	17 1/2	8.401	213.39	8.401	213.39	7.876	200.05
36	18	8.638	219.51	8.638	219.41	8.113	206.07
37	18 1/2	8.876	225.45	8.876	225.45	8.351	212.12
38	19	9.113	231.47	9.113	231.47	8.588	218.14
39	19 1/2	9.351	237.52	9.351	237.52	8.826	224.18
40	20	9.589	243.56	9.589	243.56	9.064	230.23
41	20 1/2	9.826	249.60	9.826	249.60	9.301	236.25

SPROCKET TOOTH FORM TYPE A RADIUS TOOTH FORM

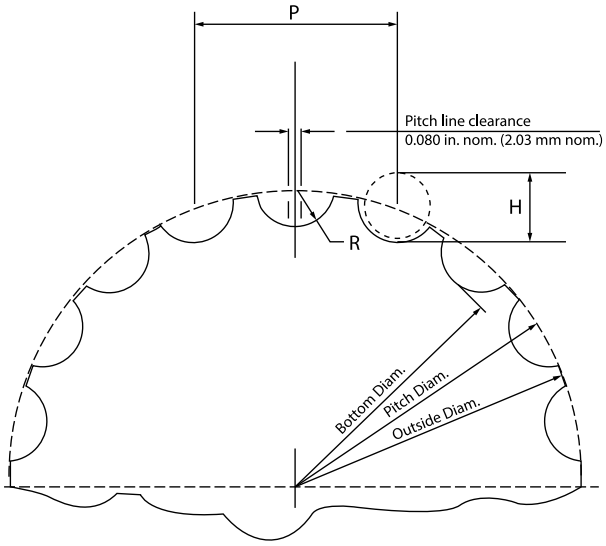
(see table above)

Hinge type flat top conveyor chains and sprocket teeth

	in	mm
P = Pitch	1.5	38.1
H = Max Curl Diameter	0.525	13.34
R = Pocket Radius Max.	0.265	6.73

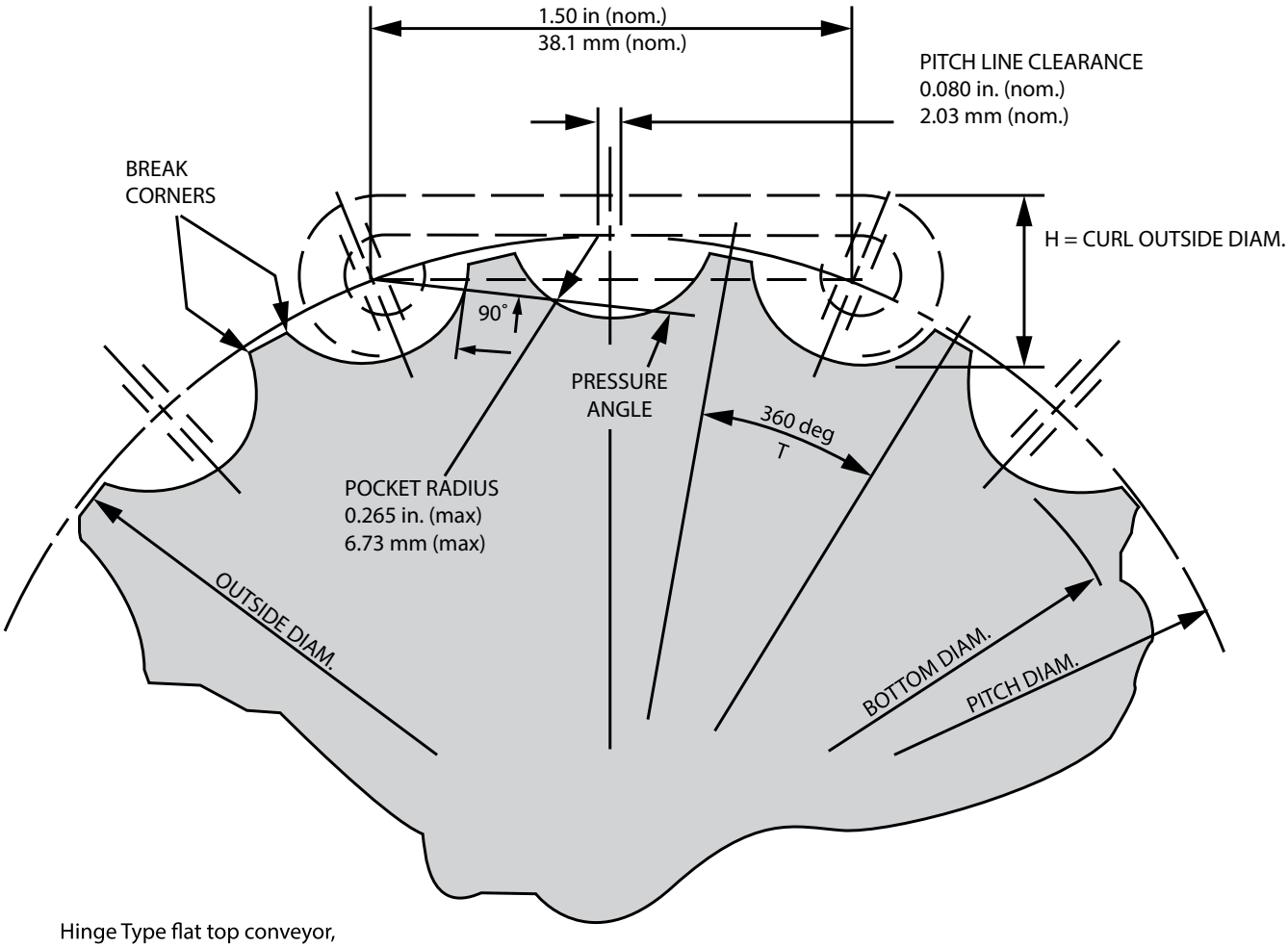
NOTE: All numbers of teeth may be made with one cutter if non-topping

ANSI/ ASME B 29.17M-1983
AN AMERICAN NATIONAL STANDARD



SPROCKET TOOTH FOR TYPE B

Straight Face Tooth Form



Hinge Type flat top conveyor, chains ans sprocket teeth.

ANSI/ ASME B 29.17M-1983
AN AMERICAN NATIONAL STANDARD

	in	mm
P=Pitch	1.5	38.1
H=Max CurlDiam	0.525	13.34
R=Pocket Radius (max)	0.265	6.73

MASTER GEARS:
Fine Pitch Spur & Helical Arbor Mounted Type

Master gears are used to determine the accuracy of work gears. When work gears and master gears are rolled together on rolling fixtures with either fixed or adjustable centers, dimensional variations may be determined through the use of indicators, charts, or other suitable indicating devices. Master gears can be either spur or helical. While master gears can be manufactured to any specification required, the standard 4"P.D. x 1-1/4" bore size is common for 3 through 6 P.D.; 3" x 1-1/4" bore for 6 through 16 P.D. and finer.

Classification by Composite Tolerance

Class	1	2	3	4	5	6
Tooth to Tooth	.0002 Ref.	.00014 Ref.	.00010 Ref	.00007	.00005	.00004
Total	.0005 Ref.	.00035 Ref.	.00025 Ref	.00018	.00013	.00009

Tolerances on Gear Elements

Class	1	2	3	4	5	6
Pitch	.00012	.00010	.00008	1	1	1
Profile2	.00015	.00013	.00010	.00010	.00010	.00010
Runout	.00030	.00021	.00015	1	1	1
Bore	.0001	.0001	.00005	.00003	.00003	.00003
Outside Radius	.0005	.0005	.0005	.0005	.00025	.00025

Gear Element	Tooth Thickness Grade	Pitch Diameter	Tolerance
Arc Tooth Thickness	Grade A	Thru 2.25	-0.0002
		Over 2.25	-0.0003
	Grade B	±1.25% of circular pitch	±1.25% of circular pitch
Lead- Max Total		5.001	5.001
Face Runout		.00005(.0001 Max.)	.00005(.0001 Max.)

1. Classification shall be composite tolerances in this area.

2. Not applicable 50 DP and finer. The profile tolerances shown are predicated on comparison of the master gear profile to the profile of a control master.

3. Over one pin.

4. Tolerance all plus.

5. Predicated on comparison with a control master, .0001 additional end easing is allowed is either end of the face, 80% central face shall be as shown.

6. Bore: The difference between the effective bore size and the size between any two diametrically opposite points shall not be more than the bore tolerance. Bell mouth will be allowed on 10% of the total bore length, with a length of bell mouth not to exceed .250 total.

7. Arc Tooth Thickness: After determination of arc tooth thickness, necessary adjustments to the OPD shall be calculated from the formulas shown for the calibration of master gears.
NOTE: Value is based on Arc Tooth Thickness = Cp/2

MASTER GEARS:
Coarse Pitch Spur & Helical Arbor Mounted Type

Classification by composite tolerance

Class		1	2	3	4	5	6	7
Total	Thru 4.25 PD	.00070 Ref.	.00050 Ref.	.00035 Ref.	.00025	.00018	.00013	.00009
	Over 4.25 Thru 8.25 PD	.00085 Ref.	.00060 Ref.	.00042 Ref.	.00030	.00022	.00016	.00011
Tooth to Tooth	Thru 4.25 PD	.00030 Ref.	.00020 Ref.	.00014 Ref.	.00010	.00007	-	-
	Over 4.25 Thru 8.25 PD	.00040 Ref.	.00025 Ref.	.00020 Ref.	.00012	.00009	-	-

Tolerances on Gear Elements, Lead Tolerances 1
(Based on comparison with a control master to the lead tolerances table)

Total Length/ Class	1	2	3	4	5	6	7
1"	.00023	.00020	.00018	.00017	.00016	.00015	.00014
2"	.00028	.00025	.00023	.00022	.00021	.00020	.00019
3"	.00033	.00030	.00028	.00026	.00025	.00025	.00024
4"	.00038	.00035	.00033	.00032	.00031	.00030	.00029

Involute Profile Tolerance 2
(Based on comparison to a control master)

Class/Pitch	4	6	8	10	12	14	16	18	20
1	.00035	.00035	.00035	.00035	.00032	.00029	.00027	.00025	.00023
2	.00035	.00035	.00030	.0026	.00024	.00022	.00020	.00020	.00020
3	.00031	.00027	.00024	.00021	.00020	.00020	.00020	.00020	.00020
4	.00026	.00022	.00020	.00020	.00020	.00020	.00020	.00020	.00020
5	.00022	.00020	.0002	.00020	.00020	.00020	.00020	.00020	.00020
6	.00020	.00020	.0002	.00020	.00020	.00020	.00020	.00020	.00020

Class	1	2	3	4	5	6	7
Bore+Tolerance-0.0000	.00023	.00020	.00018	.00017	.00016	.00015	.00014
Outside Radius	.00028	.00025	.00023	.00022	.00021	.00020	.00019
Face Runout per in. of radius .0001 min.	.00033	.00030	.00028	.00026	.00025	.00025	.00024
OD Runout	.00038	.00035	.00033	.00032	.00031	.00030	.00029

Gear Element	Tooth Thickness Grade	Pressure Angle	Tolerance Pitch Diameter Thru 4.25	Tolerance Pitch Diameter 4.25 Thru 8.25
Arc Tooth Thickness	Grade A	All Pressure Angles	-.0001	-.0003
	Grade B	All Pressure Angles	±.0025	±.0003
Runout	Grade A & B	13º-19º PA	.0004	.0005
		19º+ PA	.0003	.0004
Pitch	Grade A & B	All Pressure Angles	.0001	.00015

1. Lead: 0.0001 additional end easing allowed either end of face, 80% central face shall be within tolerance shown tolerance = (.5 tooth length + 4/class+2) 10^{-4} + .00005.
2. Involute Profile: Tolerance [200/(class+2)(pitch+9)]10^{-4}.
3. Bore: The difference between the effective bore size and the size between any two diametrically opposite points shall not be more than the bore tolerance. Bell mouth will be allowed on 10% of the total bore length, with a length of bell mouth not to exceed 0.250 total.
4. Arc Tooth Thickness: After determination of arc tooth thickness, necessary adjustments to the OPD shall be calculated from the formula shown for the calibration of master gears.

Straight Sided Serrations

Serrated Shaft Ends - SAE J500

Report of Parts and Fittings Division approved 1922 and last revised by Parts and Fittings Committee June 1955.

This Recommended Practice is intended for service only. Use SAE Standard, Involute Splines, Serrations, and Inspection - SAE J498 for new applications.

Straight Shafts

N = Number of serrations.
B = Included angle of the space in the hole, and the tooth on the shaft.

The pitch diameter (PD) and hole are basic.

The pitch line is midway between the inner and outer sharp points.

The minimum hole with maximum shaft as measured across wires in Table 1, produce basic (no clearance) fit.

The wire diameter in Table 1 is the diameter that will bear on the pitch line.

Tolerance for diameter across wires = 0.001 on tooth thickness of hole and shaft sizes from 1/3 to 1 3/4 in., and - 0.0015 on sizes from 2 to 3 in., inclusive.

Tooth thickness on the shaft may be varied from the tolerance given, to secure desired fit.

We = Constant to be added to measurement across wires for shaft, subtracted for hole, for each 0.001-in. increase in wire diameter used over wire size in Table 1.

When serrations are hobbed, the sides of teeth are involute. This departure from flat sides is slight and is ignored.

Formulas

1. Diameter over sharp points
   (OD) = 1.0476479 PD for 36 serrations.
   = 1.0349592 PD for 48 serrations.

2. Diameter under sharp points
   (RD) = 0.9523521 PD for 36 serrations.
   = 0.9650408 PD for 48 serrations.

3. Diameter of wire that will bear on pitch line of hole
   (Wh) = 0.05309792 PD for 36 serrations.
   = 0.04133332 PD for 48 serrations.
   Diameter of wire that will bear on pitch line of shaft
   (Ws) = 0.06565005 PD for 36 serrations.
   = 0.0485955 PD for 48 serrations.

4. Measurement across wires for hole
   = 0.9119441 PD for 36 serrations.
   = 0.9309375 PD for 48 serrations.
   Measurement across wires for shaft
   = 1.1113285 PD for 36 serrations.
   = 1.0823601 PD for 48 serrations.

5. Tolerance constant for measurement across wires per 0.0001-in.tooth

$$\text{thickness for hole} = 0.001 \frac{\sin 45}{\sin (45-180/N)}$$

$$\text{for shaft} = 0.001 \frac{\sin(45-180/N)}{\sin 45}$$

6. Wire diameter constant for use of other diameter wire than that which bears on pitch line. (We)

$$\text{thickness for hole} = \frac{0.001 + 0.001}{\sin (45-180/N)}$$

$$\text{for shaft} = \frac{0.001 + 0.001}{\cos 45}$$

Hole of Shaft						Hole							Shaft						
Nominal Pitch	Pitch Dia.	N	b, Deg	OD	RD	Large Dia. Min	Small Dia. Max	Small Dia. Min	Dia. Across Wires Max	Dia. Across Wires Min	Wire Size, Wh	Wc	Root Dia. Max	Outside Dia. Max	Outside Dia. Min	Dia. Across Wires Max	Dia. Across Wires Min	Wire Size, We	We
1/8	0.122	36	80	0.1278	0.1162	0.125	0.118	0.117	0.1124	0.1113	0.0065	0.0026	0.116	0.124	0.123	0.1356	0.1347	0.0080	0.0024
3/16	0.182	36	80	0.1907	0.1733	0.187	0.176	0.175	0.1671	0.1660	0.0097	0.0026	0.174	0.186	0.185	0.2023	0.2014	0.0120	0.0024
1/4	0.243	36	80	0.2546	0.2314	0.250	0.235	0.234	0.2227	0.2216	0.0129	0.0026	0.233	0.249	0.248	0.2701	0.2692	0.0160	0.0024
5/16	0.303	36	80	0.3174	0.2886	0.312	0.293	0.292	0.2774	0.2763	0.0161	0.0026	0.291	0.311	0.310	0.3367	0.3358	0.0200	0.0024
3/8	0.363	36	80	0.3603	0.3457	0.375	0.352	0.351	0.3321	0.3310	0.0193	0.0026	0.350	0.374	0.373	0.4034	0.4025	0.0239	0.0024
1/2	0.485	36	80	0.3081	0.4619	0.500	0.469	0.468	0.4434	0.4423	0.0258	0.0026	0.467	0.499	0.498	0.5390	0.5381	0.0319	0.0024
5/8	0.605	36	80	0.6338	0.5762	0.625	0.584	0.583	0.5528	0.5517	0.0321	0.0026	0.582	0.624	0.623	0.6724	0.6715	0.0398	0.0024
3/4	0.733	48	82.5	0.7586	0.7074	0.750	0.716	0.714	0.6835	0.6824	0.0303	0.0025	0.713	0.749	0.747	0.7934	0.7925	0.0356	0.0024
7/8	0.855	48	82.5	0.8849	0.8251	0.875	0.835	0.833	0.7971	0.7960	0.0353	0.0025	0.832	0.874	0.872	0.9254	0.9248	0.0415	0.0024
1	0.977	48	82.5	1.0112	0.9428	1.000	0.954	0.952	0.9106	0.9095	0.0404	0.0025	0.951	0.999	0.997	1.0575	1.0565	0.0475	0.0024
1-1/8	1.098	48	82.5	1.1364	1.0596	1.125	1.071	1.069	1.0233	1.222	0.0454	0.0025	1.068	1.124	1.122	1.1884	1.1875	0.0534	0.0024
1-1/4	1.220	48	82.5	1.2626	1.1773	1.250	1.190	1.188	1.1368	1.1357	0.0504	0.0025	1.187	1.249	1.247	1.3205	1.3196	0.0593	0.0024
1-3/8	1.342	48	82.5	1.3889	1.2951	1.375	1.309	1.307	1.2504	1.2493	0.0555	0.0025	1.306	1.374	1.372	1.4525	1.4516	0.0652	0.0024
1-1/2	1.464	48	82.5	1.5152	1.4128	1.500	1.428	1.426	1.3640	1.3829	0.0605	0.0025	1.425	1.499	1.497	1.5846	1.5837	0.0711	0.0024
1-3/4	1.708	48	82.5	1.7677	1.6483	1.750	1.666	1.664	1.5911	1.5900	0.0706	0.0025	1.663	1.749	1.747	1.8487	1.8478	0.0830	0.0024
2	1.952	48	82.5	2.0202	1.8839	2.00	1.904	1.902	1.8188	1.8172	0.0807	0.0025	1.901	1.999	1.997	2.1128	2.1114	0.0949	0.0024
2-1/4	2.196	48	82.5	2.2728	2.1192	2.250	2.142	2.140	2.0459	2.0443	0.908	0.0025	2.139	2.249	2.247	2.3769	2.3755	0.1067	0.0024
2-1/2	2.440	48	82.5	2.5252	2.3547	2.500	2.380	2.378	2.2731	2.2715	0.1009	0.0025	2.377	2.499	2.497	2.6410	2.6396	0.1180	0.0024
2-3/4	2.684	48	82.5	2.7778	2.5902	2.750	2.618	2.616	2.5002	2.6986	0.1109	0.0025	2.615	2.749	2.747	2.9051	2.9037	0.1304	0.0024
3	2.928	48	82.5	3.0304	2.8256	3.000	2.856	2.854	2.7274	2.7258	0.1210	0.0025	2.853	2.999	2.997	3.1692	3.1678	0.1423	0.0024

Straight Sided Serrations

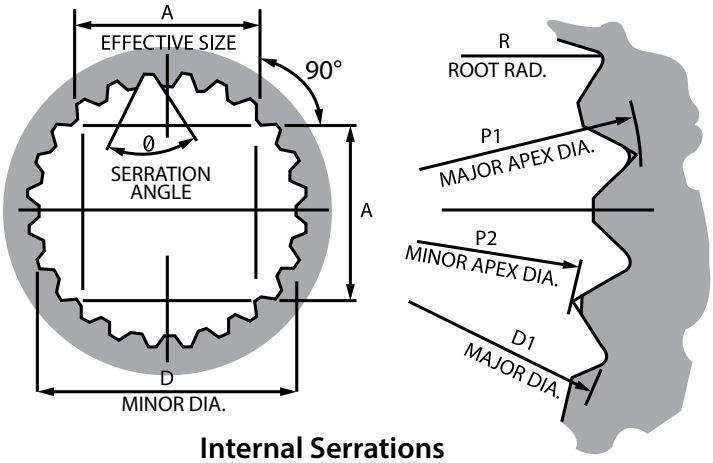
British Straight Sided Serration Standard

# of Serr. S	Nominal Size	0	P1	P2	C	C-S	R	Hole D1	Hole D	Hole A	Shaft D2	Shaft D3
12	1/4	60	0.2780	01966	0.0172	0.2064	0.009	0.268	0.2114	0.1390	0.248	0.199
12	1/4	60	0.2780	0.1966	0.0172	0.2064	0.006	0.268	0.2126	0.1399	0.247	0.199
12	5/16	60	0.3476	0.2458	0.0214	0.2568	0.012	0.335	0.2649	0.1738	0.310	0.249
12	5/16	60	0.3476	0.2458	0.0214	0.2568	0.007	0.335	0.2661	0.1747	0.309	0.249
16	3/8	67.5	0.3974	0.3123	0.0216	0.3456	0.009	0.389	0.3271	0.2208	0.373	0.314
16	3/8	67.5	0.3974	0.3123	0.0216	0.3456	0.006	0.389	0.3287	0.2217	0.372	0.314
16	7/16	67.5	0.4637	0.3643	0.0252	0.4032	0.011	0.456	0.3820	0.2576	0.435	0.366
16	7/16	67.5	0.4637	0.3643	0.0252	0.4032	0.006	0.456	0.3836	0.2585	0.434	0.366
16	1/2	67.5	0.5299	0.4163	0.0300	0.4800	0.012	0.520	0.4354	0.2944	0.498	0.419
16	1/2	67.5	0.5299	0.4163	0.0300	0.4800	0.007	0.520	0.4370	0.2953	0.497	0.419
20	5/8	72	0.6489	0.5394	0.0313	0.6260	0.011	0.643	0.5578	0.3814	0.540	0.523
20	5/8	72	0.6489	0.5394	0.0313	0.6260	0.006	0.643	0.5594	0.3826	0.540	0.522
20	3/4	72	0.7787	0.6473	0.0378	0.7560	0.013	0.769	0.6685	0.4577	0.748	0.650
20	3/4	72	0.7787	0.6473	0.0378	0.7560	0.008	0.769	0.6705	0.4589	0.746	0.650
20	7/8	72	0.9085	0.7552	0.0449	0.8980	0.015	0.896	0.7792	0.5340	0.873	0.760
20	7/8	72	0.9085	0.7552	0.0449	0.8980	0.010	0.896	0.7812	0.5352	0.871	0.760
24	1	75	1.0277	0.8847	0.0437	1.0488	0.013	1.020	0.9066	0.6256	0.998	0.886
24	1	75	1.0277	0.8847	0.0437	1.0488	0.008	1.020	0.9086	0.6271	0.996	0.896
24	1 1/8	75	1.1561	0.9953	0.0492	1.1808	0.015	1.146	1.0201	0.7038	1.123	0.999
24	1 1/8	75	1.1561	0.9953	0.0492	1.1808	0.010	1.146	1.0225	0.7053	1.121	0.999
24	1 1/4	75	1.2846	1.1059	0.0550	1.3200	0.017	1.272	1.1335	0.7820	1.248	1.111
24	1 1/4	75	1.2846	1.1059	0.0550	1.3200	0.012	1.272	1.1359	0.7835	1.246	1.111
24	1 3/8	75	1.4130	1.2165	0.0616	1.4784	0.018	1.399	1.2455	0.8602	1.373	1.222
24	1 3/8	75	1.4130	1.2165	0.0616	1.4784	0.018	1.399	1.2479	0.8617	1.371	1.222
24	1 1/2	75	1.5415	1.3271	0.0674	1.6176	0.020	1.525	1.3589	0.9384	1.498	1.335
24	1 1/2	75	1.5415	1.3271	0.0674	1.6176	0.015	1.525	1.3613	0.9399	1.496	1.335
36	1 5/8	80	1.6503	1.5002	0.0470	1.6920	0.014	1.643	1.52442	1.0608	1.523	1.502
36	1 5/8	80	1.6503	1.5002	0.0470	1.6920	0.009	1.643	1.5270	1.0626	1.521	1.502
36	1 3/4	80	1.7773	1.6156	0.0511	1.8396	0.015	1.769	1.6410	1.1424	1.748	1.618
36	1 3/4	80	1.7773	1.6156	0.0511	1.8396	0.010	1.769	1.6438	1.1442	1.746	1.618
36	1 7/8	80	1.9044	1.7311	0.0551	1.9836	0.016	1.895	1.7580	1.2241	1.873	1.743
36	1 7/8	80	1.9044	1.7311	0.0551	1.9836	0.011	1.895	1.7608	1.2259	1.871	1.743
36	2	80	2.0313	1.8465	0.0592	2.1312	0.017	2.021	1.8748	1.3057	1.998	1.851
36	2	80	2.0313	1.8465	0.0592	2.1213	0.012	2.021	1.8776	1.075	1.996	1.851
36	2	80	2.2852	2.0773	0.0672	2.4192	0.019	2.272	2.1084	1.4689	2.248	2.083
36	2	80	2.2852	2.0773	0.0672	2.4192	0.014	2.272	2.1116	1.4707	2.246	2.083
36	2 1/4	80	2.2852	2.3081	0.0750	2.7000	0.021	2.525	2.3428	1.6321	2.498	2.314
36	2 1/4	80	2.2852	2.3081	0.0750	2.7000	0.016	2.525	2.3460	1.6342	4.496	2.314
40	2 3/4	81	2.7885	2.5611	0.0735	2.9400	0.022	2.773	2.5972	1.8110	2.748	2.568
40	2 3/4	81	2.7885	2.5611	0.0735	2.9400	0.017	2.773	2.6004	1.8131	2.746	2.568
40	3	81	3.0420	2.7939	0.0798	3.1920	0.024	3.025	2.8328	1.9756	2.998	2.803
40	3	81	3.0420	2.7939	0.0798	3.1920	0.019	3.025	2.8364	1.9777	2.996	2.803
48	3 1/4	82.5	3.2893	3.0671	0.0686	3.2928	0.023	3.274	3.1053	2.1688	3.248	3.074
48	3 1/4	82.5	3.2893	3.0671	0.0686	3.2928	0.018	3.274	3.1089	2.1712	3.246	3.074
48	3 1/2	82.5	3.5424	3.3032	0.0741	3.5568	0.025	3.525	3.3442	2.3357	3.498	3.312
48	3 1/2	82.5	3.5424	3.3032	0.0741	3.5568	0.020	3.525	3.3478	2.3381	3.496	3.312
48	3 3/4	82.5	3.7954	3.6391	0.0804	3.8592	0.02	3.777	3.5815	2.5025	3.748	3.548
48	3 3/4	82.5	3.7954	3.6391	0.0804	3.8592	0.021	3.777	3.5851	5.5049	3.746	3.348
48	4	82.5	4.0484	3.7750	0.0859	4.1232	0.028	4.025	3.8202	2.6693	3.998	3.786
48	4	82.5	4.0484	3.7750	0.0859	4.1232	0.023	4.028	3.8242	2.6717	3.996	3.786
48	4 1/4	82.5	4.3015	4.0110	0.0911	4.3728	0.030	4.280	4.0598	2.8362	4.248	4.023
48	4 1/4	82.5	4.3015	4.0110	0.0911	4.3728	0.025	4.280	4.0638	2.8389	4.246	4.023

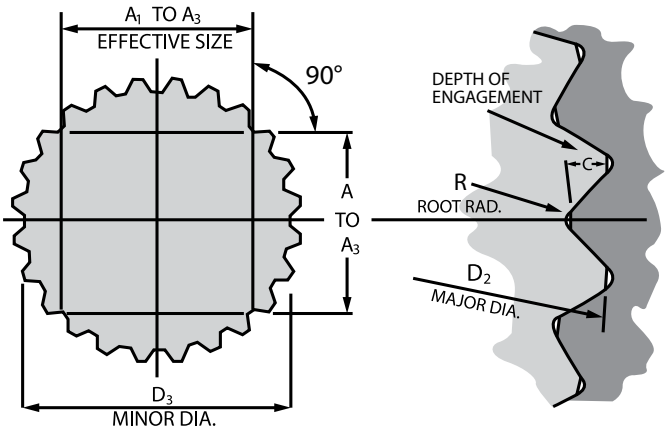
Straight Sided Serrations

British Straight Sided Serration Standard

Shaft			Resultants Fits		
A1	A2	A3	Fit 1 Inter - clearance A-A1	Fit 2 Transition A-A2	Fit 3 Clearance A-A3
0.1405	0.1393	0.1381	-1.5	-0.3	+0.9
0.1399	0.1384	0.1384	0	+1.5	+3.0
0.1753	0.1741	0.1741	-1.5	-0.3	+0.9
0.1747	0.1732	0.1732	0	+1.5	+3.0
0.2223	0.2211	0.2199	-1.5	-0.3	+0.9
0.2217	0.2202	0.2187	0	+1.5	+3.0
0.2591	0.2579	0.2567	-1.5	-0.3	+0.9
0.2585	0.2570	0.2555	0	+1.5	+3.0
0.2959	0.2947	0.2935	-1.5	-0.4	+1.2
0.2953	0.2938	0.2923	0	+2.0	+4.0
0.3834	0.3818	0.3802	-2.0	-0.4	+1.2
0.3826	0.3806	0.3786	0	+2.0	+4.0
0.4597	0.4581	0.4665	-2.0	-0.4	+1.2
0.4589	0.4569	0.4649	0	+2.0	+4.0
0.5360	0.5344	0.5328	-2.0	-0.4	+1.2
0.5332	0.5332	0.5312	0	+2.0	+4.0
0.6281	0.6261	0.6241	-2.5	-0.5	+1.5
0.6271	0.6246	0.6221	0	+2.5	+5.0
0.7063	0.7043	0.7023	-2.5	-0.5	+1.5
0.7053	0.7028	0.7003	0	+2.5	+5.0
0.7845	0.7825	0.7805	-2.5	-0.5	+1.5
0.7835	0.7810	0.7785	0	+2.5	+5.0
0.8627	0.8607	0.8587	-2.5	-0.5	+1.5
0.8617	0.8592	0.8567	0	+2.5	+5.0
0.9409	0.9389	0.9369	-2.5	-.05	+1.5
0.9399	0.9374	0.9349	0	+2.5	+5.0
1.0638	1.0614	1.0590	-3.0	-0.6	+1.8
1.0626	1.0596	1.0566	0	+3.0	+6.0
1.1454	1.1430	1.1406	-3.0	-0.6	+1.8
1.1442	1.1412	1.1382	0	+3.0	+6.0
1.2271	1.2247	1.2223	-3.0	-0.6	+1.8
1.2259	1.2229	1.2199	0	+3.0	+6.0
1.3087	1.3063	1.3039	-3.0	-0.6	+1.8
1.3075	1.3045	1.3015	0	+3.0	+6.0
1.4719	1.4695	1.4671	-3.0	-0.6	+1.8
1.4707	1.4677	1.4647	0	+3.0	+6.0
1.6356	1.6328	1.6300	-3.5	-0.7	+2.1
1.6342	1.6307	1.6272	0	+3.5	+7.0
1.8145	1.8117	1.8089	-3.5	-0.7	+2.1
1.8131	1.8096	1.8061	0	+3.5	+7.0
1.9791	1.9763	1.9735	-3.5	-0.7	+2.1
1.9777	1.9742	1.9707	0	+3.5	+7.0
2.1728	2.1696	2.1664	-4.0	-0.8	+2.4
2.1712	2.1672	2.1632	0	+4.0	+8.0
2.3397	2.3365	2.3333	-4.0	-0.8	+2.4
2.3381	2.3341	2.3301	0	+4.0	+8.0
2.5065	2.5033	2.5001	-4.0	-0.8	+2.4
2.5049	2.5009	2.4969	0	+4.0	+8.0
2.6733	2.6701	2.6669	-4.0	-.08	+2.4
2.6717	2.6677	2.6637	0	+4.0	+8.0
2.8407	2.8371	2.8371	-4.5	-.09	+2.7
2.8389	2.8344	2.8344	0	+4.5	+9.0



Internal Serrations

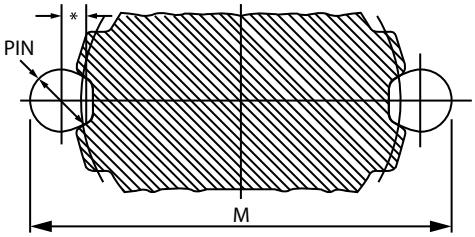


External Serrations

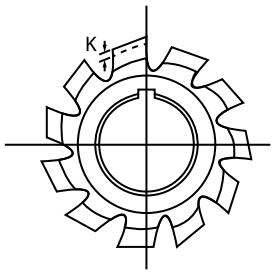
INVOLUTE SPLINES

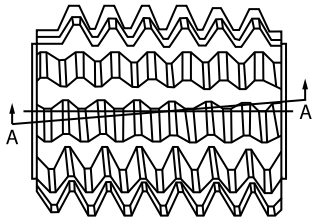
Old American Standard

Measurement Over Pins				
# of Splines	Pin Diameter	Deep Depth (z)	Intermediate (y)	Shallow (x)
6	D x 0.3660253	D x 1.580365	D x 1.590770	D x 1.601561
10	D x 0.2012936	D x 1.303923	D x 1.315660	D x 1.327740
16	D x 0.1205850	D x 1.173280	D x 1.86008	D x 1.99013
24	D x 0.0786596	D x 1.120219	D x 1.133819	D x 1.147595
36	D x 0.0517190	D x 1.097297	D x 1.106751	D x 1.116248

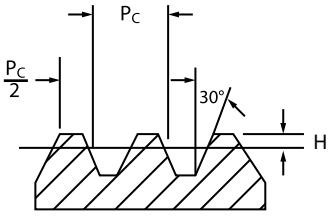


* PIN WILL HAVE TO BE FLATTENED FOR 6&10 SPLINE (0.4x PIN DIAM.)





NORMAL SECTION "AA" OF HOB TEETH



$$PC = \frac{3.1416}{D.P.}$$

K = Top Grind

6 Spline			
Diam. Pitch	Deep H	Intermediate H	Shallow H
8.0000	0.0375	0.0319	0.0263
6.4000	0.0469	0.0398	0.0328
5.3333	0.0563	0.0475	0.0394
4.5714	0.0656	0.0558	0.0459
4.0000	0.0750	0.0638	0.0525
3.5556	0.0844	0.0717	0.0591
3.2000	0.0938	0.0797	0.0656
2.9091	0.1031	0.0877	0.0722
2.6667	0.1125	0.0956	0.0788
2.4615	0.1219	0.1036	0.0853
2.2857	0.1313	0.1116	0.0919
2.1333	0.1406	0.1195	0.0984
2.0000	0.1500	0.1275	0.1050
1.8824	0.1594	0.1355	0.1116
1.7778	0.1688	0.1434	0.1181
1.6842	0.1781	0.1514	0.1247
1.6000	0.1875	0.1594	0.1313
1.5238	0.1969	0.1673	0.1378
1.4545	0.2063	0.1753	0.1444

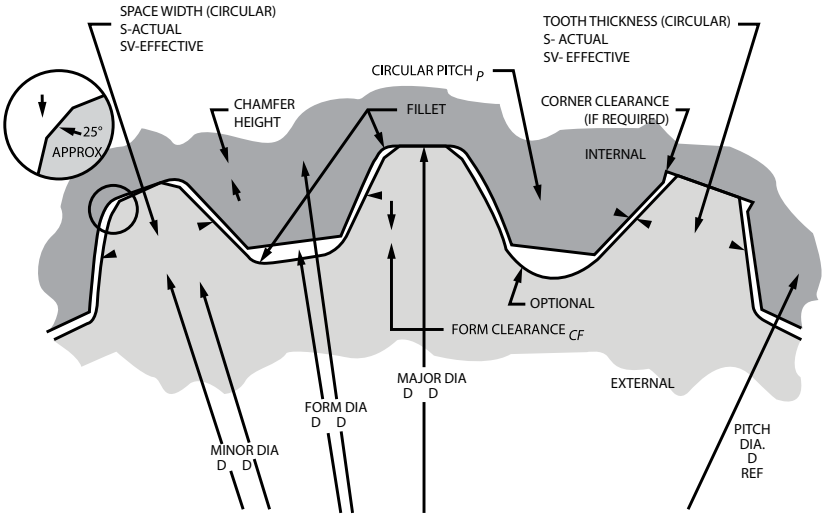
10 Spline			
Diam. Pitch	Deep H	Intermediate H	Shallow H
13.3333	0.0375	0.0319	0.0263
10.0667	0.0469	0.0398	0.0328
8.2222	0.0563	0.0478	0.0394
7.1905	0.0656	0.0558	0.0459
6.6667	0.0750	0.0638	0.0525
5.4815	0.0844	0.0717	0.0591
5.5333	0.0938	0.0797	0.0656
4.7576	0.1031	0.0877	0.0722
7.1111	0.1125	0.0956	0.0788
6.5641	0.1279	0.1036	0.0853
6.0952	0.1313	0.1116	0.0919
5.6889	0.1406	0.1195	0.0984
5.3333	0.1500	0.1275	0.1050
5.0196	0.1594	0.1355	0.1116
4.7407	0.1688	0.1434	0.1181
4.4912	0.1781	0.1514	0.1247
4.2667	0.1875	0.1594	0.1313
4.0635	0.1969	0.1673	0.1378
3.8788	0.2063	0.1753	0.1444

16 Spline			
Diam. Pitch	Deep H	Intermediate H	Shallow H
21.3333	0.0375	0.0319	0.0263
17.0667	0.0469	0.0398	0.0328
14.2222	0.0563	0.0478	0.0394
12.1905	0.0656	0.0558	0.0459
10.6667	0.0750	0.0638	0.0525
9.4815	0.0844	0.0717	0.0591
8.5333	0.0938	0.0797	0.0656
7.7576	0.1031	0.0877	0.0722
7.1111	0.1125	0.0956	0.0788
6.5641	0.1279	0.1036	0.0853
6.0952	0.1313	0.1116	0.0919
5.6889	0.1406	0.1195	0.9840
5.3333	0.1500	0.1275	0.1050
5.0196	0.1594	0.1355	0.1116
4.7407	0.1688	0.1434	0.1181
4.4912	0.1781	0.1514	0.1247
4.2667	0.1875	0.1594	0.1313
4.0635	0.1969	0.1673	0.1378
3.8788	0.2063	0.1753	0.1444

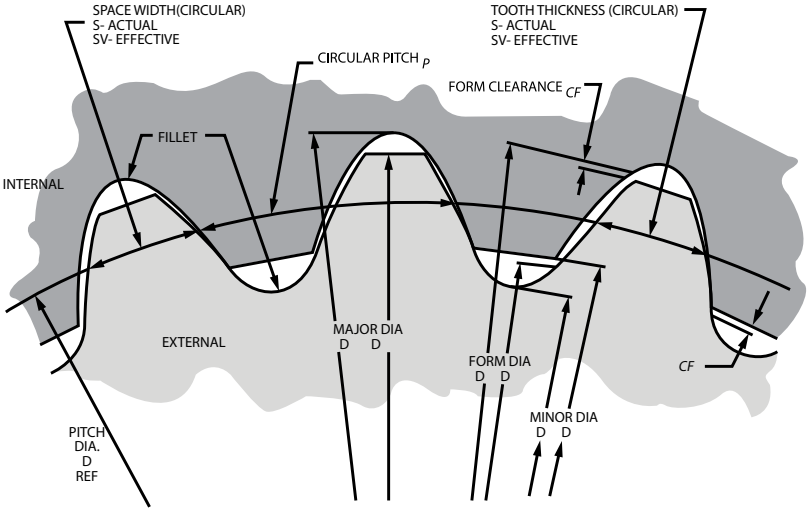
24 Spline			
Diam. Pitch	Deep H	Intermediate H	Shallow H
32.0000	0.0281	0.0225	0.0169
25.600	0.0352	0.0281	0.0211
21.3333	0.0422	0.0338	0.0253
18.2857	0.0492	0.0394	0.0295
16.0000	0.0563	0.0450	0.0338
14.2222	0.0633	0.0506	0.0380
12.8000	0.0703	0.0563	0.0422
11.6364	0.0773	0.0619	0.0464
10.6667	0.0844	0.0675	0.0506
9.8462	0.0914	0.0731	0.0548
9.1429	0.0984	0.0788	0.0591
8.5333	0.1055	0.0844	0.0633
8.0000	0.1125	0.0900	0.0675
7.5294	0.1195	0.0956	0.717
7.1111	0.1266	0.1013	0.0759
6.7368	0.1316	0.1069	0.0802
6.4000	0.1406	0.1125	0.0844
6.0952	0.1477	0.1181	0.0886
5.8182	0.1547	0.1238	0.0928

ANSI B92.1-1970
Involute Splines

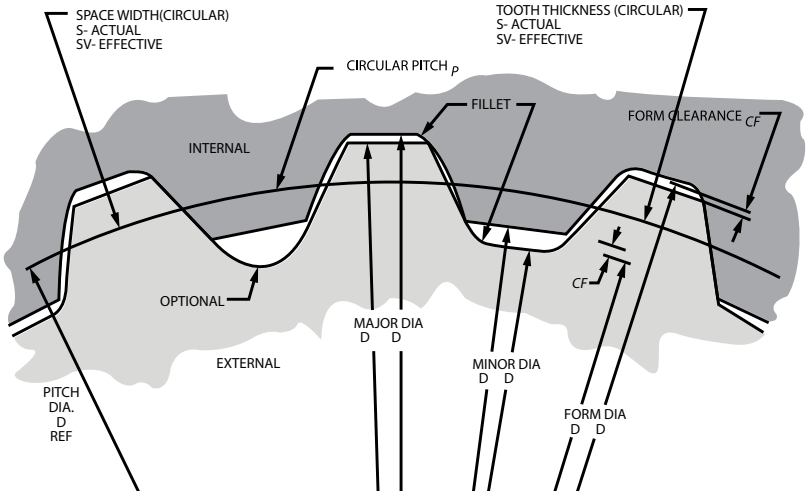
Flat Root - Major Diameter Fit
30° PA - for DP 3/6 thru 16/32



Fillet Root - Side Fit
30° PA - for DP 2.5/5 thru 48/96



Flat Root - Side Fit
30° PA - for DP 2.5/5 thru 32/64



ANSI B92.1-1970

FORMULAS FOR BASIC DIMENSIONS

30° 37.5° 45° PRESSURE ANGLE

Terms And Symbols		30º Spline			37.5º Spline	45º Spline
		Flat Root Side Fit	Flat Root Major Dia. Fit	Fillet Root Side Fit	Fillet Root Side Fit	Fillet Root Side Fit
		2.5/5-32/64 pitch	3/6-13/32 Pitch	2.5/5-48/96 Pitch	2.25/5-48/96 Pitch	10/20-128/256 Pitch
Stub Pitch (Ps)		2P	2P	2P	2P	2P
Pitch Diameter (D)		$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$
Base Diameter (Db)		D cos jΦ	D cos jΦ	D cos jΦ	D cos jΦ	D cos jΦ
Circular Pitch (P)		$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$
Min. Effective Space Width (Sv)		$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{5\pi + 0.1}{P}$	$\frac{5\pi + 0.2}{P}$
Major Diameter Internal (Dri)		$\frac{N + 1.35}{P}$	$\frac{N+1}{P}$	$\frac{N + 1.8}{P}$	$\frac{N + 1.6}{P}$	$\frac{N + 1.4}{P}$
Major Diameter External (Do)		$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$
Minor Diameter Internal (Di)		$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 0.8}{P}$	$\frac{N - 0.6}{P}$
Minor Diameter External (Dre)	2.5/5 - 12/24 Pitch	$\frac{N - 1.35}{P}$	$\frac{N -1.35}{P}$	$\frac{N - 1.8}{P}$	$\frac{N - 1.3}{P}$	N/A
	16/32 Pitch and Finer	$\frac{N - 1.35}{P}$	$\frac{N - 1.35}{P}$	$\frac{N - 2}{P}$	$\frac{N - 1.3}{P}$	N/A
	10/20 Pitch and Finer	$\frac{N - 1.35}{P}$	$\frac{N - 1.35}{P}$	N/A	$\frac{N - 1.3}{P}$	$\frac{N - 1}{P}$
Form Diameter Internal (Dfi)		$\frac{N + 1}{P} + 2cf$	$\frac{N + 0.8}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$	$\frac{N + 1}{P} + 2cf$
Form Diameter External (Dfe)		$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$	$\frac{N - 1}{P} + 2cf$
Form Clearance Radial (cf)		0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002	0.001 D Max of 0.010 Min of 0.002

This standard deals with full fillet and flat root, side fit, and major diameter fit, for 30° pressure angle splines; also 37.5° and 45° full fillet side sit pressure angle splines. Formulas for the basic dimensions of these fits are shown above.

ANSI B 92.1 -1970 MAXIMUM TOLERANCE

FOR SPACE WIDTH AND TOOTH THICKNESS OF TOLERANCE CLASS 5 SPLINES

P/Ps	2.5/5 and 3/6	4/8 and 5/8	6/12 and 8/16	10/20 and 12/24	16/32 and 20/40	24/48 and 48/96	64/128 and 80/160	128/256
N	**Machining Tolerance, m**							
10	15.8	14.5	12.5	12.0	11.7	11.7	9.6	9.5
20	17.6	16.0	14.0	13.0	12.4	12.4	10.2	10.0
30	18.4	17.5	15.5	14.0	13.1	13.1	10.8	10.5
40	21.8	19.0	17.0	15.0	13.8	13.8	11.4	-
50	23.0	20.5	18.5	16.0	14.5	14.5	-	-
60	24.8	22.	20.0	17.0	15.2	15.2	-	-
70	-	-	-	18.0	15.9	15.9	-	-
80	-	-	-	19.0	16.6	16.6	-	-
90	-	-	-	20.0	17.3	17.3	-	-
100	-	-	-	21.0	18.0	18.0	-	-
N	**Variation Allowance, ¥**							
10	23.5	20.3	17.0	15.7	14.2	12.2	11.0	9.8
20	27.0	22.6	19.0	17.4	15.4	13.4	12.0	10.6
30	30.5	24.9	21.0	19.1	16.6	14.6	13.0	11.4
40	34.0	27.2	23.0	21.6	17.8	15.8	14.0	-
50	37.5	29.5	25.0	22.5	19.0	17.0	-	-
60	41.0	31.8	27.0	24.2	20.2	18.2	-	-
70	-	-	-	25.9	21.4	19.4	-	-
80	-	-	-	27.6	22.6	20.6	-	-
90	-	-	-	29.3	23.8	21.8	-	-
100	-	-	-	31.0	25.0	23.0	-	-
N	**Total Index Variation**							
10	20	17	15	15	14	12	11	10
20	24	20	18	17	15	13	12	11
30	28	22	20	19	16	15	14	13
40	32	25	22	20	18	16	15	-
50	36	27	25	22	19	18	-	-
60	40	30	27	24	20	18	-	-
70	-	-	-	26	21	20	-	-
80	-	-	-	28	22	21	-	-
90	-	-	-	29	24	23	-	-
100	-	-	-	31	25	24	-	-
N	**Profile Variation**							
All	+7 -10	+6 -8	+5 -7	+4 -6	+3 -5	+2 -4	+2 -4	+2 -4

For other tolerance classes:
Class 4 = 0.71 x Tabulated value
Class 5 = 0.00 x Tabulated value
Class 6 = 1.40 x Tabulated value
Class 7 = 2.00 x Tabulated value

ANSI B92.1 -1970 INTERCHANGEABILITY

Year	Major Dia. Fit	Flat Root Fit	Fillet Root Side Fit
External Splines			
1946	Yes	No (A)	No (A)
1950a	Yes(B)	Yes (B)	Yes(C)
1950b	Yes(B)	No (A)	Yes(C)
1957 SAE	Yes	No (A)	Yes(C)
1960	Yes	No (A)	Yes(C)
Internal Splines			
1946	No(D)a	No(E)	No(D)
1950	Yes(F)	Yes	Yes(C)
1957 SAE	Yes(G)	Yes	Yes
1960	Yes(G)	Yes	Yes

Formulas for machining and variation allowances for space width and tooth thickness – class 5

Spline	m	y
2.5/5 & 3/6	0.18N + 14	0.35N + 20
4/8 & 5/10	0.15N + 13	0.23N + 18
6/12 & 8/16	0.15N + 11	0.20N + 15
10/20 & 12/24	0.10N + 11	0.17N + 14
16/31 & 20/40	0.07N + 11	0.12N +13
24/48 & thru 48/96	0.07N + 11	0.12N +11
64/128 & 80/160	0.06N + 9	0.10N + 10
128/256	0.05N + 9	0.08N + 9

For other tolerance classes:

Class 4 = 0.71 x Tabulated value
Class 5 = 0.00 x Tabulated value
Class 6 = 1.40 x Tabulated value
Class 7 = 2.00 x Tabulated value

Splines made to ANSI B92-1-1970 will generally be interchange with spline made to older standards. However the exceptions are listed below:
External Splines & Internal Splines
These will mate with older internal splines as follows:

Exceptions:

A: The external major diameter, unless chamfered or reduced, may interfere with the internal form diameter on flat root side fit splines. Internal splines made to the 1957 and1960 standards had the same dimensions as shown for the major diameter fit splines in this standard.

B: For 15 teeth or less, the minor diameter of the internal spline, unless chamfered, will interfere with the form diameter of the external spline.

C: For 9 teeth or less, the minor diameter of the internal spline, unless chamfered, will interfere with form diameter of the external spline.

D: The internal minor diameter, unless chamfered, will interfere with the external form diameter.

E: The internal minor diameter, unless chamfered, will interfere with the external form diameter.

F: For 10 teeth or less, the minimum chamfer on the major diameter of the external spline may not clear the internal form diameter.

G: Depending upon the pitch of the spline, the minimum character on the major diameter may not clear the internal form diameter.

INTERNAL MAJOR DIAMETERS

8/16 DP & 10/20, DP 30º PA
PER ANSI B92.1 1970

8/16 DP

# of Splines	Minor Diameter	Major Diameter Flat Root Major Diam. Fit	Major Diameter Flat Root Side Fit	Major Diameter Fillet Root Side Fit
6	0.664	0.8750	0.923	0.997
7	0.777/0.772	1.0000	1.048	1.122
8	0.896/0.886	1.1250	1.173	1.247
9	1.016/1.005	1.2500	1.298	1.373
10	1.138/1.125	1.3750	1.423	1.498
11	1.260/1.250	1.5000	1.548	1.623
12	1.383/1.375	1.6250	1.673	1.748
13	1.506/1.500	1.7500	1.798	1.873
14	1.629/1.625	1.8750	1.923	1.998
15	1.53/1.750	2.0000	2.048	2.123
16	1.877/1.875	2.1250	2.173	2.248
17	2.001/2.000	2.2500	2.298	2.374
18	2.125	2.3750	2.423	2.499
19	2.250	2.500	2.548	2.624
20	2.375	2.6250	2.673	2.749
21	2.500	2.7500	2.798	2.874
22	2.625	2.8750	2.923	2.999
23	2.750	3.0000	3.048	3.124
24	2.875	3.1250	3.173	3.249
25	3.000	3.2500	3.298	3.375
26	3.125	3.3750	3.423	3.500
27	3.250	3.5000	3.548	3.625
28	3.375	3.6250	3.673	3.750
29	3.500	3.7500	3.798	3.875
30	3.625	3.8750	3.923	4.000
31	3.750	4.0000	4.048	4.125
32	3.875	4.1250	4.173	4.250
33	4.000	4.2500	4.298	4.376
34	1.125	4.3750	4.423	4.501
35	4.250	4.5000	4.548	5.626
36	4.375	4.6250	4.673	4.751
37	4.500	4.7500	4.798	4.876
38	4.625	4.8750	4.923	5.001
39	4.750	5.0000	5.048	5.126
40	4.875	5.1250	5.173	5.251
41	5.000	5.2500	5.298	5.376
42	5.125	5.3750	5.423	5.502
43	5.250	5.5000	5.548	5.627
44	5.375	5.6250	5.673	5.752
45	5.500	5.7500	5.798	5.877

10/20 DP

# of Splines	Minor Diameter	Major Diameter Flat Root Major Diam. Fit	Major Diameter Flat Root Side Fit	Major Diameter Fillet Root Side Fit
6	0.534	0.700	0.739	0.799
7	0.622/0.621	0.800	0.839	0.899
8	0.717/0.710	0.900	0.939	0.999
9	0.814/0.805	1.000	1.039	1.100
10	0.911/0.901	1.100	1.139	1.200
11	1.008/1.000	1.200	1.239	1.300
12	1.107/1.100	1.300	1.339	1.400
13	1.205/1.200	1.400	1.439	1.500
14	1.304/1.300	1.500	1.539	1.600
15	1.403/1.400	1.600	1.639	1.00
16	1.502/1.500	1.700	1.739	1.800
17	1.601/1.600	1.800	1.839	1.900
18	1.700	1.900	1.939	2.000
19	1.800	2.000	2.039	2.100
20	1.900	2.100	2.139	2.201
21	2.000	2.200	2.239	2.301
22	2.100	2.300	2.339	2.401
23	2.200	2.400	2.439	2.501
24	2.300	2.500	2.539	2.601
25	2.400	2.600	2.639	2.701
26	2.500	2.700	2.739	2.801
27	2.600	2.800	2.839	2.901
28	2.700	2.900	2.393	3.001
29	2.800	3.000	3.039	3.101
30	2.900	3.100	3.139	3.201
31	3.000	3.200	3.239	3.302
32	3.100	3.300	3.339	3.402
33	3.200	3.400	3.439	3.502
34	3.300	3.500	3.539	3.602
35	3.400	3.600	3.639	3.702
36	3.500	3.700	3.739	3.802
37	3.601	3.800	3.839	3.902
38	3.700	3.900	3.939	4.002
39	3.800	4.000	4.039	4.102
40	3.900	4.100	4.139	4.202
41	4.000	4.200	4.239	4.302
42	4.100	4.300	4.339	4.403
43	4.200	4.400	4.439	4.503
44	4.300	4.500	4.539	4.603
45	4.400	4.600	4.639	4.703

INTERNAL MAJOR DIAMETERS

12/24 DP & 16/32, DP 30º PA
PER ANSI B92.1 1970

12/24 DP

# of Splines	Minor Diameter	Major Diameter Flat Root Major Diam. Fit	Major Diameter Flat Root Side Fit	Major Diameter Fillet Root Side Fit
6	0.448	0.5834	0.617	0.668
7	0.520	0.6667	0.700	0.751
8	0.598/0.592	0.7500	0.783	0.834
9	0.678/0.672	0.8334	00.867	0.918
10	0.759/0.752	0.9167	0.950	1.001
11	0.841/0.834	1.0000	1.033	1.085
12	0.922/0.917	1.0834	1.117	1.168
13	1.005/1.000	1.1667	1.200	1.252
14	1.087/1.084	1.2500	1.283	1.335
15	1.169/1.67	1.3334	1.367	1.418
16	1.252/1.250	1.4167	1.450	1.502
17	1.334	1.5000	1.533	1.585
18	1.417	1.5834	1.617	1.669
19	1.500	1.6667	1.700	1.752
20	1.584	1.7500	1.783	1.836
21	1.667	1.834	1.867	1.919
22	1.750	1.9167	1.950	2.002
23	1.834	2.0000	2.033	2.086
24	1.917	2.0834	2.117	2.169
25	2.000	2.1667	2.200	2.253
26	2.084	2.2500	2.283	2.336
27	2.167	2.3334	2.367	2.420
28	2.250	2.4167	2.450	2.503
29	2.334	2.5000	2.533	2.586
30	2.417	2.5834	2.617	2.670
31	2.500	2.6667	2.700	2.753
32	2.584	2.7500	2.783	2.837
33	2.667	2.8334	2.867	2.920
34	2.750	2.9167	2.950	3.004
35	2.834	3.0000	3.033	3.087
36	2.917	3.0834	3.117	3.170
37	3.000	3.1667	3.200	3.254
38	3.084	3.2500	3.283	3.337
39	3.167	3.3334	3.367	3.421
40	3.250	3.4167	3.450	3.504
41	3.334	3.500	3.533	3.587
42	3.414	3.5834	3.617	3.671
43	3.500	3.6667	3.700	3.754
44	3.584	3.7500	3.783	3.838
45	3.667	3.8334	3.867	3.921

16/32 DP

# of Splines	Minor Diameter	Major Diameter Flat Root Major Diam. Fit	Major Diameter Flat Root Side Fit	Major Diameter Fillet Root Side Fit
6	0.339	0.4375	0.463	0.502
7	0.393	0.5000	0.526	0.565
8	0.449/0.448	0.5625	0.588	0.628
9	0.509/0.505	0.6250	0.651	0.690
10	0.570/0.565	0.6875	0.713	0.753
11	0.631/0.625	0.7500	0.776	0.815
12	0.692/0.688	0.8125	0.838	0.878
13	0.754/0.750	0.8750	0.901	0.940
14	0.815/0.813	0.9375	0.963	1.003
15	0.877/0.875	1.0000	1.026	1.066
16	0.939/0.938	1.0625	1.088	1.128
17	1.001/1.000	1.1250	1.151	1.191
18	1.063	1.1875	1.213	1.253
19	1.125	1.2500	1.276	1.316
20	1.188	1.3125	1.338	1.378
21	1.250	1.3750	1.401	1.441
22	1.313	1.4375	1.463	1.504
23	1.375	1.5000	1.526	1.566
24	1.438	1.5625	1.588	1.629
25	1.500	1.6250	1.651	1.691
26	1.563	1.6875	1.713	1.754
27	1.625	1.7500	1.776	1.816
28	1.6688	1.8125	1.838	1.879
29	1.750	1.8750	1.901	1.941
30	1.813	1.9375	1.961	2.004
31	1.875	2.0000	2.026	2.067
32	1.938	2.0625	2.088	2.129
33	2.000	2.1250	2.151	2.192
34	2.063	2.1875	2.213	2.254
35	2.125	2.2500	2.276	2.317
36	2.188	2.3125	2.338	2.379
37	2.250	2.3750	2.401	2.442
38	2.313	2.4375	2.463	2.505
39	2.375	2.5000	2.526	2.567
40	2.438	2.5625	2.588	2.630
41	2.500	2.6250	2.651	2.692
42	2.563	2.6875	2.713	2.755
43	2.625	2.7500	2.776	2.817
44	2.688	2.8125	2.838	2.880
45	2.750	2.8750	2.901	2.943

INTERNAL MAJOR DIAMETERS
37 1/2 º & 45º PA FULL FILLET SIDE FIT
PER ANSI B92.1 1970

37½°

# of Teeth	10/20 DP Minor Diam.	10/20 DP Major Diam.	12/24 DP Minor Diam.	12/24 DP Major Diam.	16/32 DP Minor Diam.	16/32 DP Major Diam.
6	0.525	0.770	0.438	0.649	0.330	0.488
7	0.620	0.877	0.517	0.732	0.388	0.550
8	0.720	0.977	0.600	0.815	0.451	0.613
9	0.820	1.077	0.684	0.899	0.513	0.675
10	0.920	1.177	0.767	0.982	0.575	0.738
11	1.020	1.277	0.851	1.066	0.638	0.801
12	1.120	1.377	0.934	1.149	0.700	0.863
13	1.220	1.477	1.017	1.232	0.763	0.926
14	1.320	1.578	1.100	1.316	0.825	0.988
15	1.420	1.678	1.184	1.399	0.888	1.051
16	1.520	1.778	1.267	1.483	0.950	1.113
17	1.620	1.878	1.350	1.566	1.013	1.176
18	1.72.	1.978	1.434	1.649	1.075	1.238
19	1.820	2.078	1.517	1.733	1.138	1.301
20	1.920	2.178	1.600	1.816	1.200	1.363
21	2.020	2.278	1.684	1.900	1.263	1.426
22	2.120	2.378	1.767	1.983	1.325	1.489
23	2.220	2.478	1.850	2.066	1.388	1.551
24	2.320	2.578	1.934	2.150	1.450	1.614
25	2.420	2.678	2.017	2.233	1.513	1.676
26	2.520	2.778	2.100	2.318	1.575	1.739
27	2.620	2.878	2.184	2.400	1.638	1.801
28	2.720	2.978	2.267	2.483	1.700	1.864
29	2.820	3.079	2.350	2.567	1.763	1.926
30	2.920	3.179	2.434	2.650	1.825	1.989
31	3.020	3.279	2.517	2.734	1.888	2.052
32	3.120	3.379	2.601	2.817	1.950	2.114
33	3.221	3.479	2.684	2.901	2.013	2.177
34	3.321	3.579	2.767	2.984	2.075	2.239
35	3.421	3.679	2.851	3.067	2.138	2.302
36	3.521	3.779	2.934	3.151	2.200	2.364
37	3.621	3.879	3.017	3.234	2.263	2.427
38	3.721	3.979	3.100	3.318	2.325	2.489
39	3.821	4.079	3.184	3.401	2.388	2.552
40	3.921	4.179	3.267	3.484	2.450	2.614
41	4.020	4.279	3.350	3.568	2.513	2.677
42	4.120	4.379	3.434	3.651	2.575	2.740
43	4.220	4.479	3.517	3.735	2.638	2.802
44	4.320	4.579	3.601	3.818	2.700	2.865
45	4.420	4.679	3.684	3.901	2.763	2.927

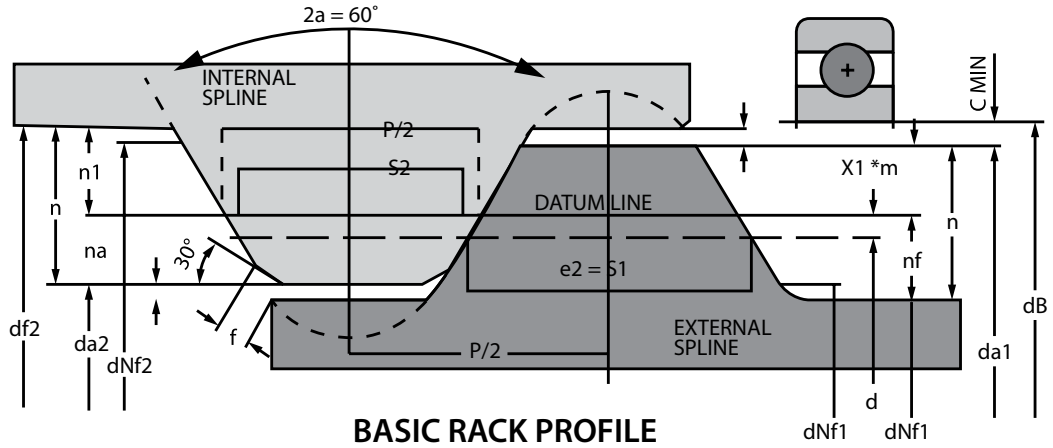
45°

# of Teeth	10/20 DP Minor Diam.	10/20 DP Major Diam.	12/24 DP Minor Diam.	12/24 DP Major Diam.	16/32 DP Minor Diam.	16/32 DP Major Diam.
6	0.540	0.755	0.450	0.630	0.338	0.474
7	0.640	0.855	0.534	0.714	0.400	0.536
8	0.740	0.955	0.617	0.797	0.463	0.599
9	0.840	1.055	0.700	0.880	0.525	0.661
10	0.940	1.156	0.784	0.964	0.588	0.724
11	1.040	1.256	0.868	1.047	0.650	0.786
12	1.140	1.356	0.950	1.131	0.713	0.849
13	1.240	1.456	1.034	1.214	0.775	0.912
14	1.340	1.556	1.117	1.297	0.838	0.974
15	1.440	1.656	1.200	1.381	0.900	1.037
16	1.540	1.756	1.284	1.464	0.963	1.099
17	1.640	1.856	1.367	1.548	1.025	1.162
18	1.740	1.956	1.450	1.631	1.088	1.224
19	1.840	2.056	1.534	1.714	1.150	1.287
20	1.940	2.156	1.617	1.798	1.213	1.349
21	2.040	2.256	1.700	1.881	1.275	1.412
22	2.140	2.356	1.784	1.965	1.338	1.474
23	2.240	2.456	1.867	2.048	1.400	1.537
24	2.340	2.556	1.950	2.131	1.463	1.599
25	2.440	2.656	2.034	2.215	1.525	1.662
26	2.540	2.756	2.117	2.298	1.588	1.725
27	2.640	2.856	2.200	2.381	1.650	1.787
28	2.740	2.957	2.284	2.465	1.713	1.850
29	2.840	3.057	2.367	2.548	1.775	1.912
30	2.940	3.157	2.450	2.632	1.838	1.975
31	3.040	3.257	2.534	2.715	1.900	2.037
32	3.140	3.357	2.617	2.798	1.963	2.100
33	3.240	3.457	2.700	2.882	2.025	2.162
34	3.340	3.557	2.784	2.965	2.088	2.225
35	3.440	3.657	2.867	3.049	2.150	2.287
36	3.540	3.757	2.950	3.132	2.213	2.350
37	3.640	3.857	3.034	3.215	2.275	2.412
38	3.740	3.957	3.117	3.299	2.338	2.475
39	3.840	4.057	3.200	3.382	2.400	2.538
40	3.940	4.157	3.284	3.465	2.463	2.600
41	4.040	4.257	3.367	3.549	2.525	2.663
42	4.140	4.357	3.450	3.632	2.588	2.725
43	4.240	4.457	3.534	3.716	2.650	2.788
44	4.340	4.557	3.617	3.799	2.713	2.850
45	4.440	4.657	3.700	3.882	2.775	2.220

MODULE-DIN 5480 FLAT ROOT INVOLUTE SPLINES

The modules covered by this standard are:
(0/6) - 0.8 - (1) - 1.25 - (1.5) - 2 (2.5) - 3 - (4) - 5 - (6) - 8 - (10).

Modules in parentheses should be avoided wherever possible, when designing or selecting a spline connection. Involute splines according to this Standard are used for easily detachable, sliding or tight connections between shaft and hub by a stub tooth system showing the characteristic required for the transmission of torque and for centering and also meeting the requirements for economic production. Tooth proportions of the external and internal spline are determined by the basis rack profile, the reference diameter d B and the number of teeth z. The latter is selected in such a way that the addendum modifications necessary to meet the reference diameter remain limited to smallest values and that the mean pressure angles will be kept close to 30°, which is expedient for self centering, accurate finish and low compressive stresses. The dedendum, hf or the tool addendum ha° are adjusted to the production techniques so that involve lengths corresponding to the form diameter are guaranteed.



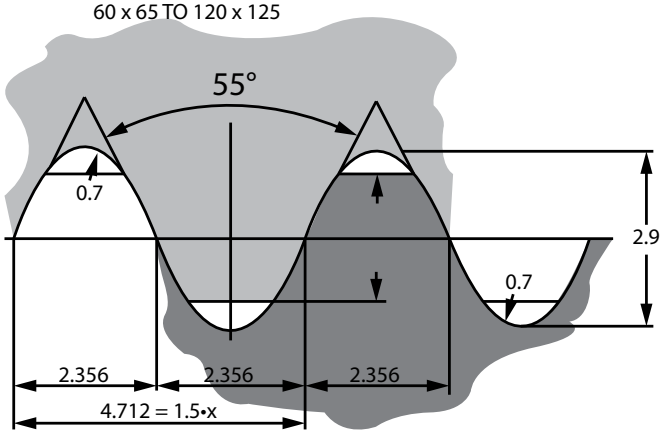
BASIC RACK PROFILE

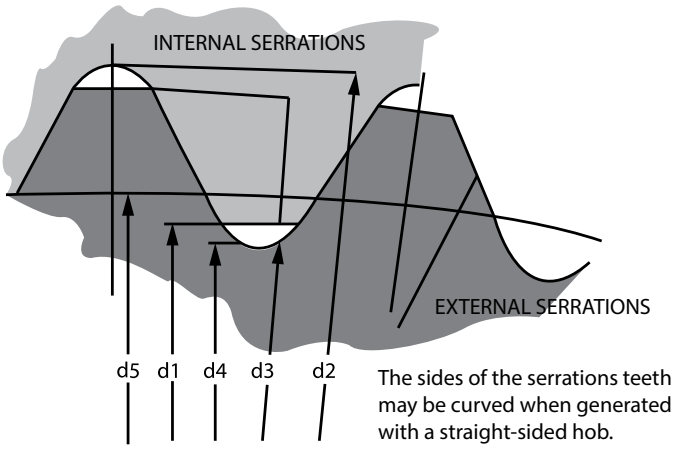
Module		m	
Pitch		p	= m•π
Pressure Angle		μ	=300
No. of Teeth	External Spline	z1	
	Internal Spline	z2	=z1
Addendum Modificaion	External Spline	x1	=-0.05 • m to + 0.45 • m
	Internal Spline	x2	= x1 • m
			=+ 0.05 • m to +0.45 • m
Tooth Depth		h	= ha +hf
Addendum		ha	= 0.45 • m
Dedendum		hf	= hao, see DIN 5480 pt. 16
			= 0.05 • m. min dimension,special tools
			= 0.05 • m, universal hob
			= 0.65 • m, universal pinion type cutter2
Tip Clearence		c	= hf - 0.45 • m
			= 0.1 • m to 0.2 • m
Fillet Radius		gt	= 0.16 • m (min dimension)
Tip chamfer of broached spline		f	= 0.15 • m
Pitch Diameter		d	= m • z
Base Diameter		db	= m • z • cos μ
Reference Diameter		dB	= [df2] min dimension
			=[m • z2 + 2x2 • m - 1.1 •m]
			= standard diameter DIN 323 & bearing bore diam.
		df2	= m • z2+ 2x2 • m 2hf2
Internal spline Major diam.		da2	= m • z2 + 2x2 • m + 0.9 • m
Internal spline Minor diam.		dnf2 max	= - (da1 + fr) with Fr according to DIN 5480 pt.14 quality 11
Internal spline Form diam.			
External spline Major diam.		da1	= m • z1 + 2x1 • 2hf2
External spline Major diam.		df2	= m • z1 + 2x1 • m + 0.9 • m
External spline Form diam.		dNf1 max	= - (da1 + fr) with Fr according to DIN 5480 pt. 14 quality 11
Internal Tooth Thickness		S2	= m • p/2 + 2x2 * m tan m
Internal Space Width		e2	=s1
Internal Tooth Thickness		s1	= m • p/2 + 2x1 • m tan m

DIN 5481 SERRATION - 55° INCLUDED

Nominal Diameter	D_1			D_2 Calc.	D_3			D_4 Calc.	D_5	Z No. of Teeth
	Nominal Dimension	Max	Min		Nominal Dimension	Max	Min			
65 x 60	60	60.53	60.34	65.40	65	64.66	64.47	59.60	61.5[4]	41
70 x 65	65	65.53	65.34	70.40	70	69.64	69.45	64.60	67.5	45
75 x 70	70	70.55	70.36	75.40	75	74.64	74.45	69.60	72[4]	48
80 x 75	75	75.55	75.36	80.40	80	79.64	79.45	74.60	76.5[4]	51
85 x 80	80	80.55	80.36	85.40	85	84.62	84.40	79.60	82.5	55
90 x 85	85	85.60	85.38	90.40	90	89.62	89.40	84.60	87[4]	58
95 x 90	90	90.60	90.38	95.40	95	94.62	94.40	89.40	91.5[4]	61
100 x 95	95	95.60	95.38	100.40	100	99.62	99.40	26.40	97.5	65
105 x 100	100	100.60	100.38	105.40	105	104.59	104.37	30.38	102[4]	68
110 x 150	100	105.63	105.41	110.40	110	109.59	109.37	104.60	106.5[4]	71
115 x 110	105	110.63	110.41	115.40	115	114.59	114.37	109.60	112.5	75
120 x 115	110	115.63	115.41	120.40	120	119.59	119.37	114.60	117[4]	78
125 x 120	120	120.63	120.41	125.40	125	124.54	124.37	119.60	121.5[4]	81

SERRATIONS WITH 55° INTERNAL
FROM ANGLE NOMINAL DIAMETER
60 x 65 TO 120 x 125





The sides of the serrations teeth may be curved when generated with a straight-sided hob.

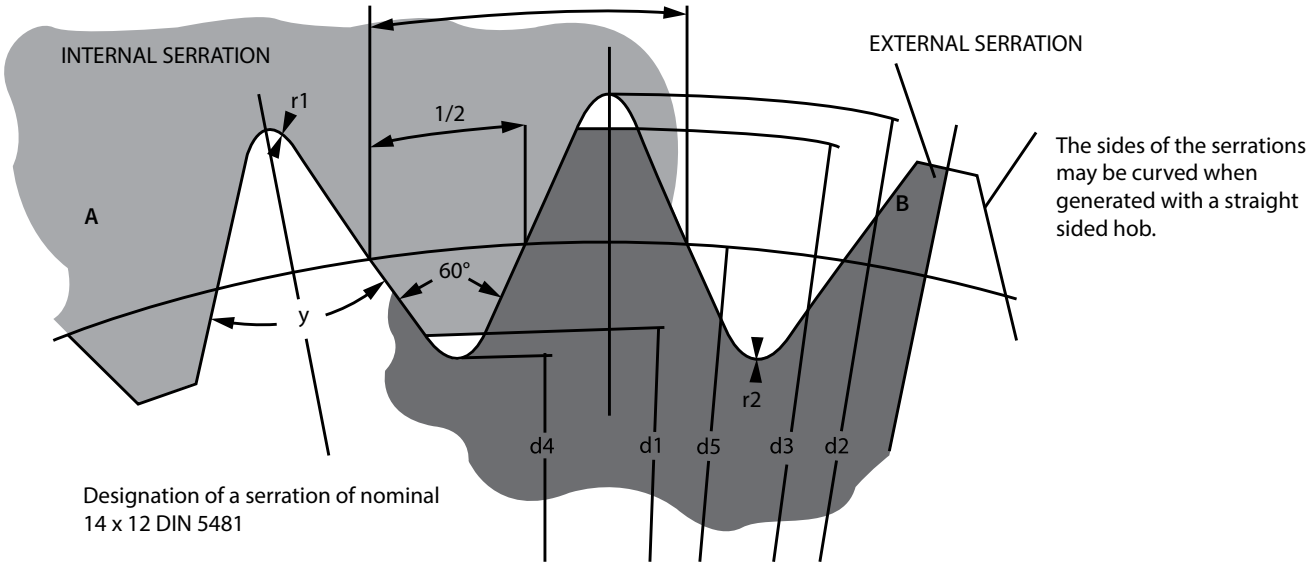
Designation of a serration of nominal diameter 75x80: serration 75x80 DIN 5481.

DIN 5481 SERRATION - 60º INCLUDED

Nom. Diam.	D1			D2 Calc.	D3			D4 Calc.	D5	R1 =	R2 =	Total Calc. D5	Inc Angle Y	Z # of Teeth
	Nom. Diam.	Max.	Min.		Nom. Dim.	Max	Min							
8 x 7	6.9	7.27	7.18	8.21	8.1	7.82	7.73	6.91	7.5	0.08	0.08	0.842	47°8′35″	28
10 x 8	8.1	8.47	8.38	9.9	10.1	9.81	9.70	8.26	9	0.08	0.08	1.010	47°8′35″	28
12 x 10	10.1	10.5	10.39	12	12	11.71	11.60	10.2	11	0.1	0.1	1.152	48°	30
14 x 12	12	12.4	12.4	14.18	14.2	13.91	13.80	12.06	13	0.1	0.1	1.317	48°23′14″	31
17 x 15	14.9	15.3	15.19	17.28	17.2	16.91	16.80	14.91	16	0.15	0.15	1.571	48°45′	32
20 x 17	17.3	17.7	17.59	20	20	19.7	19.57	17.37	18.5	0.15	0.20	1.761	49°5′27″	33
24 x 21	20.8	21.23	21.1	23.9	23.76	23.6	23.47	20.76	22	0.15	0.25	2.033	49°24′42″	34
30 x 26	26.5	26.93	26.8	30.06	30.06	29.57	29.57	26.40	28	0.25	0.30	2.513	49°42′52″	35
34 x 30	30.5	30.97	30.81	34.17	34.17	33.53	33.53	30.38	32	0.3	0.4	2.792	50°	36
40 x 36	36	36.47	36.31	40.16	40.16	39.59	39.43	35.95	38	0.5	0.4	3.226	50°16′13″	37
45 x 40	40	40.47	40.31	44.42	44.42	44	43.52	39.72	42	0.5	0.4	3.472	50°31′35″	38
50 x 45	45	45.48	45.32	50.2	50.2	50	49.52	44.97	47.5	0.5	0.4	3.472	50°46′9″	39
55 x 50	50	50.48	50.32	55.25	55.25	54.9	54.56	49.72	52.5	0.6	0.4	4.123	51°	40
60 x 55	55	55.53	55.34	60.39	60.39	60	59.66	54.76	57.5	0.6	0.5	1.301	51°25′43″	42

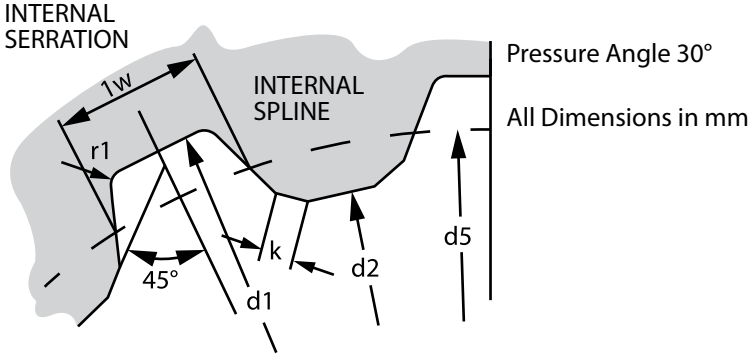
NOTE: all dimensions in mm

Serrations with 60° internal from angle
nominal diameter 7x8 to 55x60

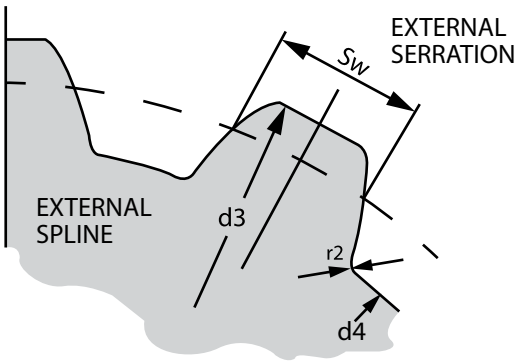


Designation of a serration of nominal
14 x 12 DIN 5481

MODULE DIN 5482 INVOLUTE SPLINE PROFILE DIMENSIONS



Designation of an internal spline A of nominal dimensions 25 x 22:
Internal spline A 25 x 22 DIN 5482. Has Chamfer.



Designation of an external spline B of nominal dimensions 25 x 22:
External spline B 25 x 22 DIN 5482. No Chamfer.

Nominal Profile Dimensions	D1 H12	D2 H11	D3 H11	D4	D5	# of Teeth	Mod. M	Profile Displ.	TW=SW Nom. Dim.	R1 Max.	R2 Max.	K Min.
15x12	15	12	14.5	11.5	12.8	8	1.60	+0.500	3.090	0.15	0.25	0.3
17x14	17	14	16.5	13.5	14.4	9	1.60	+0.700	3.321	0.15	0.25	0.3
18x15	18	15	17.5	14.5	16.0	10	1.60	+0.400	2.975	0.15	0.25	0.3
20x17	20	17	19.5	16.5	19.20	12	1.60	-0.200	2.282	0.15	0.25	0.3
22x19	22	19	21.5	18.5	20.80	13	1.60	0	2.513	0.15	0.25	0.3
25x22	25	22	24.5	21.2	22.40	14	1.60	+0.550	3.148	0.15	0.25	0.3
28x25	28	25	27.5	24.5	26.25	15	1.75	+0.302	3.098	0.15	0.25	0.3
30x27	30	27	29.5	26.3	28.00	16	1.75	+0.327	3.127	0.15	0.25	0.3
32x28	32	28	31.5	27.6	29.75	17	1.75	+0.102	2.867	0.15	0.25	0.3
35x31	35	31	34.5	30.5	31.50	18	1.75	+0.675	3.530	0.15	0.25	0.3
38x34	38	34	37.5	33.5	36.10	19	1.90	0	2.985	0.15	0.25	0.3
40x36	40	36	39.5	35.5	38.00	20	1.90	+0.049	3.042	0.15	0.25	0.3
42x38	42	38	41.5	37.5	39.90	21	1.90	+0.099	3.100	0.15	0.25	0.3
45x41	45	40	44.5	40.6	44.00	22	2.00	-0.181	2.933	0.25	0.35	0.4
48x44	48	44	47.5	43.2	46.00	23	2.00	+0.119	3.280	0.25	0.35	0.4
50x45	50	45	49.5	44.6	48.00	24	2.00	-0.181	2.933	0.25	0.35	0.4
52x47	52	47	51.5	46.6	50.00	25	2.00	-0.231	2.875	0.25	0.35	0.4
55x50	55	50	54.5	49.0	52.00	26	2.00	+0.019	3.164	0.25	0.35	0.4
58x53	58	53	57.5	52.0	54.00	27	2.00	+0.518	3.741	0.25	0.35	0.4
60x55	60	55	59.5	54.5	56.00	28	2.00	+0.768	4.030	0.25	0.35	0.4
62x57	62	57	61.5	56.5	60.90	29	2.10	-0.434	2.797	0.25	0.45	0.5
65x60	65	60	64.3	59.5	63.00	30	2.10	+0.15	3.317	0.35	0.45	0.5
68x62	68	62	67.3	61.5	65.10	31	2.10	-0.034	3.259	0.35	0.45	0.5
70x64	70	64	69.3	63.5	67.20	32	2.10	-0.184	3.201	0.35	0.45	0.5
72x66	72	66	71.3	65.5	69.30	33	2.10	-0.134	3.144	0.35	0.45	0.5
75x69	75	69	74.3	68.5	71.40	34	2.10	+0.315	3.663	0.35	0.45	0.5
78x72	78	72	77.3	71.5	73.50	35	2.10	+0.765	4.183	0.35	0.45	0.5
80x74	80	74	79.3	73.5	75.60	36	2.10	+0.715	4.125	0.35	0.45	0.5
82x76	82	76	81.3	75.5	83.25	37	2.25	-2.425	0.734	0.35	0.45	0.5
85x79	85	79	84.3	78.5	85.50	38	2.25	-2.050	1.167	0.35	0.45	0.5
88x82	88	82	87.3	81.5	87.75	39	2.25	-1.673	1.600	0.35	0.45	0.5
90x84	90	84	89.9	83.5	90.00	40	2.25	-1.799	1.456	0.35	0.45	0.5
92x86	92	86	91.3	855	92.25	41	2.25	-1.923	1.31	0.35	0.45	0.5
95x89	95	89	94.3	88.5	94.50	42	2.25	-1.549	1.744	0.35	0.45	0.5
98x92	98	92	97.3	91.5	96.75	43	2.25	-1.175	2.177	0.35	0.45	0.5
100x94	100	94	99.3	93.5	99.00	44	2.25	-1.299	2.033	0.35	0.45	0.5

INVOLUTE SPLINE FOR AUTOMOBILES
JAPANESE INDUSTRIAL STANDARD

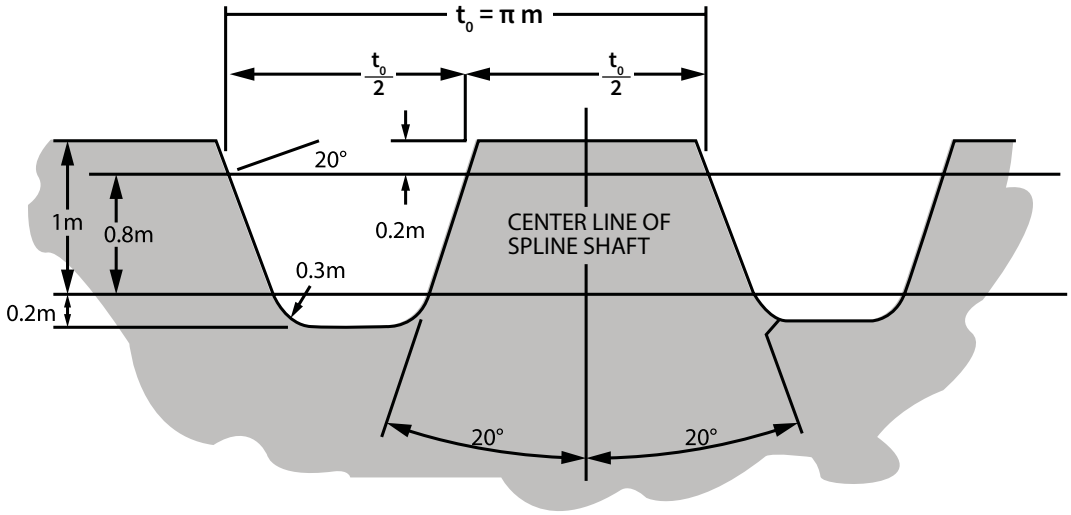
This standard is based on straight (non-helical) involute splines and are mainly in automobile mechanisms, specifically for coupling driving shafts and mating parts. They are based on 20° stub tooth form and provide a smooth transmission of torque.

1. Module
Consists of the following 15 modules classified in 3 series.
(1) 1 st series 0.5 1 1.25 1.667 2.5 5 10
(2) 2nd series 0.75 3.75 7.5
(3) 3rd series 1.5 2 3 4.5 6

Remarks: The modules is the 1st and the 2nd series are equal to the numerical valve of 10 and 7.5 divided by integers respectively, and are same as those in the ISO draft. Most of the nominal diameters of shafts for which these series are used coincide with the nominal inner diameters of radial ball and roller bearings.

The modules in the 3rd series are those providing the intermediate figures between two modules with a large step in the 1st and the 2nd series. The number of teeth is from 6 to 40.

2. Basic Form of Tooth
The tooth form of basic rack for spline shafts is shown in Fig. 1



In Fig.1 the standard pitch line is the pitch line specified so that the tooth thickness measured along the line is one half of the basic pitch.

The tip of basic rack is distant by 0.2 from standard pitch line.

The effective height of tooth of spline is equal to 1 m. When the shaft and the hole are meshed, the minimum radial clearance between two minor diameters is 0.2, and the root radius is 0.3m considering the amount of radial clearance.

Remarks
1. The elements of the spline hole is defined from those of the spline shaft.
2. The distance between the standard pitch line and the generating pitch line is the amount of profile shifting.

INVOLUTE SPLINE FOR AUTOMOBILES
(JAPANESE INDUSTRIAL STANDARD CONT.)

3. Class
To minimize the number of tools for cutting holes, the basic hole system is adopted, various classes of fit being obtained by varying the dimensions of the shaft. For this purpose the following grades for the measure of tooth surface and the major diameter of the shaft are prescribed without reference to their respective sizes and independently of each other.

Tooth Flank	Class A	Class B	Class C	Class D
Major Diameter	-	Class 2	Class 3	-
Fit	Loose Fit	Sliding Fit	Fixed Fit	Press Fit

3a. Fit
The standard fits for both flank fits and flank major diameter fits are four classes as follows:
(1) Loose fit: A clearance is always left.
(2) Sliding fit: Generally a slight clearance is left (2).
(3) Fixing fit: Generally a slight interference is kept (3).
(4) Press fit: An interference is always kept. This class of fit is used flank fit only.

When a hole and a shaft with the class specified in 3.A respectively are meshed each other, the method of alignment varies in relation to the clearance (interference) between the major diameters and the clearance (interference) normal to the flank surfaces of the mating members. However, any desired alignment and fit can be obtained by adopting the following combination of the grades of dimensions for the measure of tooth surface and the major diameter of spline shafts.

Alignment	Combination Fitting	Loose	Sliding	Fixed	Press
Tooth Flank Fit	Major Diameter	-	-	-	-
	Tooth Flank	Class A	Class B (3)	Class C (4)	Class D
Major Diameter Fit	Major Diameter		Class 2	Class 3 (4)	-
	Tooth Flank		Class A	Class A or B	-

Remarks: In the case of flank fit, since the major diameter of shaft is used as the basic dimension, grades for it are not required.

Notes
(3) In the case of b class, a slight inference may rarely occur.
(4) A slight-clearance may occur sometimes.

Flat Root Side Fit	Non-Chamfering	WD 1.2m
Full Fillet Side Fit	Non-Chamfering	WD 1.346m
Flat Root Major Diameter Fit	Chamfering	WD 1.2m
Full Fillet Major Diameter Fit	Chamfering	WD 1.345m

AMERICAN STANDARD PARALLEL
EXTERNAL SPLINES

6 Spline

FIT	Major	Minor	Spline Width
A	.746	.675	.188
B		.635	.185
C		.597	1.85
A	.871	.788	.219
B		.741	.215
C		.696	.215
A	.996	.900	.250
B		.847	.246
C		.796	.246
A	1.121	1.013	.281
B		.953	.277
C		.894	.277
A	1.245	1.126	.313
B		1.060	.309
C		.996	.309
A	1.369	1.239	.345
B		1.165	.340
C		1.096	.340
A	1.493	1.350	.375
B		1.271	.371
C		1.196	.371
A	1.618	1.465	.406
B		1.378	.402
C		1.296	.402
A	1.741	1.577	.438
B		1.485	.434
C		1.396	.434
A	1.990	1.802	.500
B		1.696	.495
C		1.595	.495
A	2.240	2.027	.563
B		1.908	.558
C		1.795	.558
A	2.490	2.252	.625
B		2.120	.620
C		1.996	.620
A	2.990	2.702	.750
B		2.545	.745
C		2.394	.745
A	3.488	3.152	.875
B		2.970	.870
C		2.794	.870
A	3.984	3.502	1.001
B		3.394	.994
C		3.193	.994

10 Spline

FIT	Major	Minor	Spline Width
A	.746	.6825	.117
B		.601	.114
C		.550	.114
A	.871	.7965	.137
B		.706	.134
C		.642	.134
A	.996	.9105	.156
B		.805	.153
C		.734	.153
A	1.121	1.024	.176
B		.904	.173
C		.824	.173
A	1.245	1.038	.195
B		1.002	.192
C		.916	.192
A	1.369	1.252	.215
B		1.107	.212
C		1.008	.212
A	1.493	1.366	.2345
B		1.200	.2305
C		1.100	.2305
A	1.618	1.480	.255
B		1.305	.2505
C		1.190	.2505
A	1.741	1.594	.2735
B		1.408	.2695
C		1.282	.2695
A	1.990	1.821	.3125
B		1.608	.307
C		1.461	.307
A	2.240	2.049	.3515
B		1.812	.346
C		1.642	.346
A	2.490	2.277	.3905
B		2.008	.385
C		1.830	.385
A	2.990	2.732	.4685
B		2.412	.463
C		2.195	.463
A	3.492	3.187	.5465
B		2.814	.541
C		2.560	.541
A	3.990	3.642	.6245
B		3.216	.619
C		3.927	.619

AMERICAN STANDARD PARALLEL
INTERNAL SPLINES

6 Spline

FIT	Major	Minor	Spline Width
A B C	.749-.750	.674-.675 .637-.638 .599-.600	.186-.188
A B C	.874-.875	.787-.788 .743-.744 .699-.700	.217-.219
A B C	.999-1.000	.899-.900 .849-.850 .799-.800	.248-.250
A B C	1.24-1.125	1.012-1.013 .955-.956 .899-.900	.279-281
A B C	1.249-1.250	1.124-1.125 1.062-1.063 .999-1.000	.311-.313
A B C	1.374-1.375	1.237-1.238 1.168-1.169 1.099-1.100	.342-.344
A B C	1.499-1.500	1.349-1.350 1.274-1.275 1.199-1.200	.373-.375
A B C	1.624-1.625	1.462-1.463 1.380-1.381 1.299-1.300	.404-.406
A B C	1.749-1.750	1.574-1.575 1.487-1.488 1.399-1.400	.436-.438
A B C	1.998-2.000	1.7889-1.800 1.698-1.700 1.598-1.600	.497-.500
A B C	2.248-2.250	2.023-2.025 1.911-1.913 1.798-1.800	.560-.563
A B C	2.498-2.500	2.248-2.250 2.123-2.125 1.998-2.000	.622-.625
A B C	2.998-3.000	2.698-2.700 2.548-2.550 2.398-2.400	.747-.750
A B C	3.498-3.500	3.148-3.150 2.973-2.975 2.798-2.800	.872-.875
A B C	3.998-4.000	3.498-3.500 3.398-3.400 3.198-3.200	.997-1.000

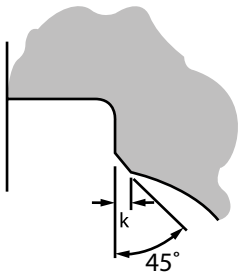
10 Spline

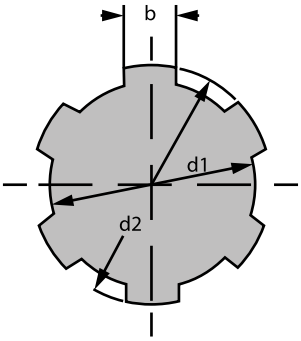
FIT	Major	Minor	Spline Width
A B C	.749-.750	.682-.683 .644-.645 .599-.600	.155-.177
A B C	.874-.875	.795-.796 .752-.753 .708-.709	.135-1.37
A B C	.999-1.000	.909-.910 .859-.860 .809-810	.154-.156
A B C	1.24-1.125	1.023-1.024 .967-.968 .910-.911	.174-.176
A B C	1.249-1.250	1.138-1.138 1.074-1.075 1.012-1.013	.193-.195
A B C	1.374-1.375	1.250-1.251 1.182-1.183 1.113-1.114	.213-.215
A B C	1.499-1.500	1.364-1.365 1.289-1.290 1.214-1.215	.232-.234
A B C	1.624-1.625	1.478-1.479 1.397-1.398 1.315-1.316	.252-.254
A B C	1.749-1.750	1.592-1.593 1.504-1.505 1.417-1.418	.271-273
A B C	1.998-2.000	1.818-1.819 1.718-1.719 1.618-1.620	.309-.312
A B C	2.248-2.250	2.046-2.048 1.933-1.935 1.821-1.823	.348-.351
A B C	2.498-2.500	2.273-2.275 2.148-2.150 2.023-2.025	.387-.390
A B C	2.998-3.000	2.728-2.730 2.578-2.580 2.428-2.430	.465-.468
A B C	3.498-3.500	3.138-3.185 3.008-3.010 2.833-2.835	.543-.546
A B C	3.998-4.000	3.638-3.640 3.438-3.440 3.238-3.240	.621-.624

METRIC PARALLEL SPLINE SHAFT CONNECTIONS

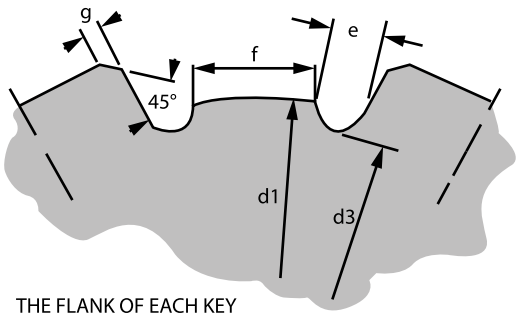
DIN 5462 IN MM

PROFILE A. SPLINE BORE PROFILE





PROFILE B. SPLINE SHAFT PROFILE



THE FLANK OF EACH KEY MUST BE PARALLEL TO THE INSIDE DIAMETER AS FAR AS TO THE THE POINT OF INTERSECTION.

DETAILS LEFT UNSPECIFIED ARE TO BE DESIGNED AS APPROPRIATE

DESIGNATION OF A SPLINE BORE PROFILE A, HAVING A NOMINAL DIMENSIONS 6 x 28 x 32:
SPLINE BORE PROFILE A 6 x 28 x 32 DIN 5462

DESIGNATION ON A SPLINE SHAFT PROFILE B, HAVING THE NOMINAL DIMENSIONS 8 x 42 x 46:
SPLINE SHAFT PROFILE B 8 x 42 x 46 DIN 5462

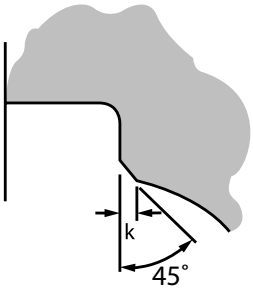
Nominal Dimensions		No. of Keys	Centering	d[1]	d[2]	b	D[3]	e[2]	f	g	K	r
New Symbol Number of Keys inside diameter outside diam.	Old Symbol inside diam. outside diam. width of key											
6 x 23 x 26	23 x 46 x 6	6	Interior Centering	23	26	6	22.1	1.25	3.54	0.3	0.3	0.2
6 x 26 x 30	26 x 30 x 6			26	30	6	24.6	1.84	3.85	0.3	0.3	0.2
6 x 28 x 32	28 x 32 x 7			28	32	7	26.7	1.77	4.3	0.3	0.3	0.2
6 x 28 x 32	32 x 36 x 6	8	Interior or Flank Centering	32	36	6	30.42	1.89	2.71	0.4	0.4	0.3
8 x 36 x 40	36 x 40 x 7			36	40	7	34.5	1.79	3.46	0.4	0.4	0.3
8 x 42 x 46	42 x 46 x 8			42	46	8	40.4	1.68	5.03	0.4	0.4	0.3
8 x 46 x 50	46 x 50 x 9			46	50	9	44.62	1.61	5.75	0.4	0.4	0.3
8 x 52 x 58	52 x 58 x 10			52	58	10	49.7	2.72	4.89	0.5	0.5	0.5
8 x 56 x 62	56 x 62 x 10			56	62	10	53.6	2.76	6.38	0.5	0.5	0.5
8 x 62 x 68	62 x 68 x 12			62	68	12	59.82	2.48	7.31	0.5	0.5	0.5
10x 72x 78	72 x 72 x 12	10	Interior or Flank Centering	72	78	12	69.6	2.54	5.45	0.5	0.5	0.5
10x 82x 88	82 x 88 x 12			82	88	12	79.32	2.67	8.62	0.5	0.5	0.5
10x 92x 98	92 x 98 x 14			92	98	14	89.44	2.36	10.08	0.5	0.5	0.5
10x 102x 108	102x 108x 16			102	108	16	99.9	2.32	11.49	0.5	0.5	0.5
10x 102x 108	102x 108x 18			102	120	18	108.8	3.23	10.72	0.5	0.5	0.5

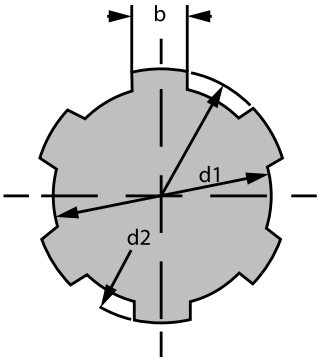
1) Interior Centering is not possible for all profiles when producing spline shaft profile by the hobbing process.
2) These values have been calculated on the basis that the spline shaft profiles are produced by the hobbing process.
3) Tolerances for inside diameter d1, outside diameter d2, and key width b should be stated.
4) The old symbol should no longer be used for new construction and remains in force only for the transition period.

METRIC PARALLEL SPLINE SHAFT CONNECTIONS

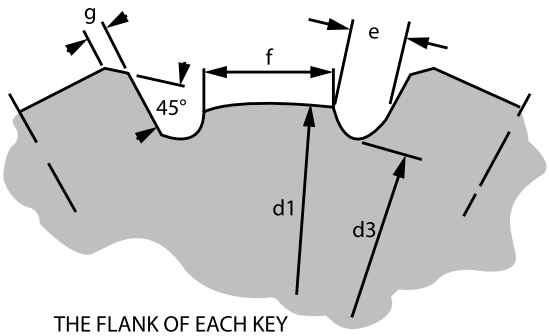
DIN 5463 IN MM

PROFILE A. SPLINE BORE PROFILE





PROFILE B. SPLINE SHAFT PROFILE



THE FLANK OF EACH KEY MUST BE PARALLEL TO THE INSIDE DIAMETER AS FAR AS TO THE THE POINT OF INTERSECTION.

DETAILS LEFT UNSPECIFIED ARE TO BE DESIGNED AS APPROPRIATE

DESIGNATION OF A SPLINE BORE PROFILE A, HAVING A NOMINAL DIMENSIONS 8 x 32 x 38:
SPLINE BORE PROFILE A 8 x 32 x 38 DIN 5462

DESIGNATION ON A SPLINE SHAFT PROFILE B, HAVING THE NOMINAL DIMENSIONS 8 x 46 x 54
SPLINE SHAFT PROFILE B 8 x 46 x 54 DIN 5463

Nominal Dimensions		No. of Keys	Centering	d[1]	d[2]	b	D[3]	e[2]	f	g	K	r
New Symbol Number of Keys Inside diameter Outside diam.	Old Symbol Inside diam. Outside diam. Width of key											
6 x 11 x 14	11 x 14 x 4	6	Interior Centering	11	14	3	9.9	1.55	-	0.3	0.3	0.2
6 x 13 x 16	13 x 16 x 3.5			13	16	3.5	12.0	1.5	0.32	0.3	0.3	0.2
6 x 16 x 20	16 x 20 x 4			16	20	4	14.54	2.1	0.16	0.3	0.3	0.2
6 x 16 x 22	18 x 22 x 5			18	22	5	16.7	1.95	0.45	0.3	0.3	0.2
6 x 21 x 25	21 x 25 x 5			21	25	5	19.5	1.98	1.95	0.3	0.3	0.2
6 x 23 x 28	23 x 28 x 6			23	28	6	21.3	2.3	1.34	0.3	0.3	0.2
6 x26 x 32	26 x 32 x 6			26	32	6	23.4	2.94	1.65	0.4	0.4	0.3
6 x 28 x 34	28 x 34 x 7			28	34	7	25.9	2.94	1.7	0.4	0.4	0.3
8 x 32 x 36	32 x 38 x 6	8	Interior or Flank Centering	32	38	6	29.4	3.3	0.15	0.4	0.4	0.3
8 x 36 x 40	36 x 42 x 7			35	42	7	33.9	3.01	1.02	0.4	0.4	0.3
8 x 42 x 46	42 x 48 x 8			42	48	8	39.5	2.91	2.57	0.4	0.4	0.3
8 x 46 x 54	46 x 54 x 9			46	54	9	42.7	4.1	0.86	0.4	0.4	0.3
8 x 52 x 58	52 x 60 x 10			52	60	10	48.7	4.0	2.44	0.5	0.5	0.5
8 x 56 x 62	56 x 65 x 10			56	65	10	52.2	4.74	2.5	0.5	0.5	0.5
8 x 62 x 68	62 x 72 x 12			62	72	12	57.8	5.0	2.4	0.5	0.5	0.5
10 x 72 x 72	72 x 82 x 12	10	Interior or Flank Centering	72	78	12	67.4	5.43	-	0.5	0.5	0.5
10 x 82 x 92	82 x 92 x 12			82	88	12	77.1	5.4	3.0	0.5	0.5	0.5
10 x 92 x 102	92 x 12 x 14			92	98	14	87.3	5.2	4.5	0.5	0.5	0.5
10 x 102 x 112	102 x 112 x 16			102	108	16	97.7	4.9	6.3	0.5	0.5	0.5
10 x 112 x 125	112 x 125 x 18			112	120	18	106.3	8.4	4.4	0.5	0.5	0.5

1) Interior Centering is not possible for all profiles when producing spline shaft profile by the hobbing process.
2) These values have been calculated on the basis that the spline shaft profiles are produced by the hobbing process.
3) Tolerances for inside diameter d1, outside diameter d2, and key width b should be stated.
4) The old symbol should no longer be used for new construction and remains in force only for the transition period.

NUTALL SYSTEM OF STUB TEETH

Diametral Pitch	Circular Pitch	Arc Thickness of Tooth on Pitch Line	Addendum	Working Depth	Dedendum	Whole Depth
1	3.1416	1.5708	0.7854	1.5708	0.9424	1.7278
1-1/4	2.5133	1.2566	0.6283	1.2566	0.7539	1.3822
1-1/2	2.0944	1.0472	0.5236	1.0472	0.6283	1.1519
1-3/4	1.7952	0.8976	0.4488	0.8976	0.5385	0.9873
2	1.5708	0.7854	0.3927	0.7854	0.4712	0.8639
2-1/4	1.3963	0.6981	0.3490	0.6981	0.4188	0.7678
2-1/2	1.2566	0.6282	0.3141	0.6282	0.3769	0.6910
2-3/4	1.1424	0.5712	0.2856	0.5712	0.3427	0.6283
3	1.0472	0.5236	0.2618	0.5236	0.3141	0.5759
3-1/2	0.8976	0.4488	0.2244	0.4488	0.2692	0.4936
4	0.7854	0.3927	0.1963	0.3927	0.2355	0.4318
5	0.6283	0.3141	0.1570	0.3141	0.1884	0.3454
6	0.5236	0.2618	0.1309	0.2618	0.1571	0.2880
7	0.4488	0.2244	0.1122	0.2244	0.1346	0.2468
8	0.3927	0.1963	0.0981	0.1963	0.1177	0.2158
9	0.3491	0.1745	0.0872	0.1745	0.1046	0.1918
10	0.3142	0.1571	0.0785	0.1571	0.0942	0.1727
11	0.2856	0.1428	0.0714	0.1428	0.0857	0.1571
12	0.2618	0.1309	0.0654	0.1309	0.0785	0.1439
13	0.2417	0.1208	0.0604	0.1208	0.0725	0.1329
14	0.2244	0.1122	0.0561	0.1122	0.0673	0.1234
15	0.2094	0.1047	0.0532	0.1047	0.0627	0.1150
16	0.1963	0.0982	0.0491	0.0982	0.0589	0.1080
17	0.1848	0.0924	0.0462	0.0924	0.0554	0.1016
18	0.1745	0.0873	0.0436	0.0873	0.0532	0.0959
19	0.1653	0.0827	0.0413	0.0827	0.0495	0.0908
20	0.1571	0.0785	0.0392	0.0785	0.0470	0.0862
22	0.1428	0.0714	0.0357	0.0714	0.0428	0.0785
24	0.1309	0.0654	0.0327	0.0654	0.0392	0.0719
26	0.1208	0.0604	0.0302	0.0604	0.0362	0.0664
28	0.1122	0.0561	0.0280	0.0561	0.0336	0.0616
30	0.1047	0.0524	0.0262	0.0524	0.0313	0.0575
32	0.0982	0.0491	0.0245	0.0491	0.0294	0.0539

In the Nutall system of stub gear teeth, the tooth dimensions are based directly on the circular pitch. The addendum is made 0.250 x the circular pitch, and the dedendum, 0.300 x the circular pitch.

BASE PITCH

How To Use Base Pitch Charts

When trying to find the pitch and pressure angle of gears that don't figure "standard "by normal methods, measuring the "base pitch" can help determine it the gear is truly an odd pitch or if it is just over or undersized.

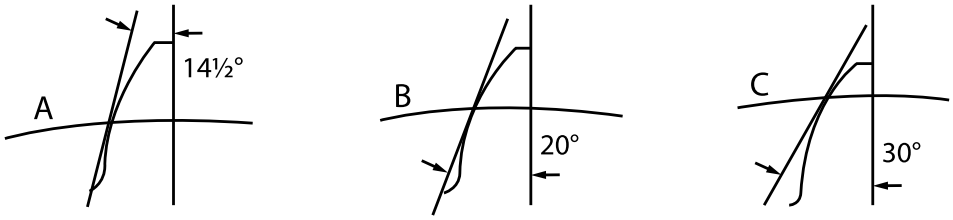
FOR EXAMPLE:
A gear with 10 teeth and an outer diameter of 1.400". If we use the common formula of taking the number of teeth plus two (10+2) and dividing the sum by the O.D. of the part (12 / 1.400"). This would give us a diametral pitch of 8.5714. This would be a nonstandard pitch and a special tool would be required to produced it. Now lets measure based pitch.

The base pitch is like the circular pitch in that it is the distance from the center of one tooth to the center of the next, the difference is that circular pitch is measured at the pitch diameter and the base pitch is measured at the base diameter.
Using a pair of vernier calipers, span over two teeth and then over three teeth. The difference is the base pitch. The number of teeth in the gear determines the number of teeth to span over. The more teeth in the gear the more teeth should be spanned over, (always a difference of one tooth).

The idea is to have the involute form portion of teeth holding the verniers out, not the tips of the tooth at the O.D., or the bottom of the teeth at the root. In our example lets say our base pitch measurement came out to .30415" . If we take and divide it by the cosine of any given pressure angle, the circular pitch will be the result. This circular pitch is at the pitch diameter corresponding to the pressure angle used.

If we try this in our example using 20 deg. P.A. we get a circular pitch of .3237". (.30415" .93969 = .327") .3237" C.P. is 9.7045 D.P.. This still does not appear standard. If we try again using 14 1/2 deg. P.A. we get .31416" C.P. (.30415 .96815 = .31416) Remember that the base pitch should be divided by the cosine of the pressure angle, not the pressure angle itself. .31416" C.P. is 10 D.P., Therefore a 10 D.P. 14 1/2 deg. P.A. cutter would work, because the part is just oversized. A simple way to confirm this is to roll a hob or shaper against the part. Even if 10 D.P. 14 1/2 deg P.A. is not the "true" pitch and pressure angle of this gear the cutter will probable still roll smoothly, as long as it is not to deep (cutter addendum will contact the parts root diameter). The base pitch can also be determined mathematically if the diametral pitch and pressure angle are known. Convert the D.P. to C.P. and multiply by the cosine of the pressure angle. If all this seems a little confusing, remember that a gears pitch and pressure angle are measured at a giving pitch diameter. If we measure at an increased pitch diameter then the pitch and pressure angle will increase, if measured an at a decreased pitch diameter the pitch and pressure angle will decrease.

FIG.1



If the cutter in our example seems shy of the gears root diameter then the gear could actually be as first calculated at 8.5714 D.P.
To determine what the pressure angle is at this pitch diameter, divide the base pitch by the circular pitch. This will give the cosine of the pressure angle.
.30415 base pitch .3665" c.p. = 33.9139 deg. P.A.
If you don't have an 8.5714 D.P. , 33.9139 deg P.A. cutter, then a tool of similar base pitch, that reaches the root diameter of the gear may work. To figure what pressure angle would be produced by a tool of similar base pitch, take the base pitch of the tool divide by the circular pitch of the gear. This will give you the cosine of the P.A. produced. Invert the cosine and this is the pressure angle produced.

FOR EXAMPLE:

Using the same gear data. We have a hob that is 9 D.P. 29 deg P.A.. The base pitch would be .3053, .3053 base pitch divided by .3665" C.P. (circular pitch of gear) = .8330 (this is the cosine of the P.A. produced) inverted it is 33.59029 deg., this is approx. 20min. less than the desired 33.9218 deg P.A.
Base pitch charts are printed in the technical section of this catalogue on pages I-158 to I-160.
When using tooling that matches on the base pitch, like in our example, the number of teeth in the part should be considered. 10 teeth is low enough that a hob or a shaper could be used, but when producing a gear with the same pitch as above with 100 teeth, a shaper may work where a hob would not. This is because when using a hob on a gear with a lot of teeth the difference in the pitch may keep the hob from meshing.
The less teeth in contact with the part the more extreme you can be with pitch and pressure angle when cutting by base pitch.

-Scott Atkinson
Tool Engineer, Ash Gear

BASE PITCH CHARTS

Diametral Pitch

Base Pitch = π/DP • (COS PA)

Diam. Pitch	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1	3.0414	2.9963	2.9522	2.9025	2.8473	2.7866	2.7206
1.25	2.4332	2.3970	2.3617	2.3220	2.2778	2.2293	2.1765
1.5	2.0276	1.9975	1.9681	1.9350	1.8982	1.8578	1.8138
1.75	1.7379	1.7121	1.6870	1.6585	1.6270	1.5924	1.5547
2	1.5210	1.4981	1.4761	1.4512	1.4236	1.3933	1.3603
2.25	1.3517	1.3316	1.3121	1.2900	1.2655	1.2385	1.2092
2.5	1.2166	1.1985	1.1809	1.1610	1.1386	1.1147	1.0883
2.75	1.1060	1.0895	1.0735	1.0554	1.0354	1.0133	.9894
3	1.0138	.9987	.9841	.9675	.9491	.9289	.9069
3.5	.8690	.8561	.8435	.8293	.8135	.7962	.7773
4	.7604	.7491	.7380	.7256	.7118	.6967	.6802
4.5	.6759	.6658	.6560	.6450	.6327	.6193	.6046
5	.6083	.5992	.5904	.5805	.5695	.5573	.5441
5.5	.5530	.5448	.5368	.5277	.5177	.5067	.4947
6	.5069	.4994	.4920	.4837	.4745	.4644	.4534
7	.4345	.4280	.4217	.4146	.4068	.3981	.3887
8	.3802	.3745	.3690	.3628	.3559	.3483	.3401
9	.3380	.3329	.3280	.3225	.3164	.3096	.3023
10	.3041	.2996	.2952	.2903	.2847	.2787	.2721
11	.2765	.2724	.2684	.2639	.2588	.2533	.2473
12	.2535	.2497	.2460	.2419	.2373	.2322	.2267
13	.2340	.2305	.2271	.2233	.2190	.2144	.2093
14	.2172	.2140	.2109	.2073	.2034	.1991	.1943
15	.2028	.1998	.1968	.1935	.1898	.1858	.1814
16	.1901	.1873	.1845	.1814	.1780	.1741	.1700
17	.1789	.1763	.1737	.1707	.1674	.1640	.1600
18	.1690	.1665	.1640	.1613	.1582	.1548	.1512
20	.1521	.1498	.1476	.1451	.1424	.1393	.1360
22	.1383	.1362	.1342	.1320	.1294	.1267	.1237
24	.1267	.1248	.1230	.1209	.1186	.1161	.1134
26	.1170	.1152	.1136	.1116	.1095	.1072	.1046
28	.1086	.1073	.1054	.1037	.1017	.0995	.0972
30	.1014	.0999	.0984	.0968	.0949	.0929	.0907
32	.0950	.0939	.0923	.0907	.0890	.0871	.0850
36	.0845	.0832	.0820	.0806	.0791	.0774	.0756
40	.0760	.0746	.0738	.0726	.0712	.0697	.0680
44	0.0691	.0681	.0671	.0660	.0647	.0633	.0618
48	0.634	.0624	.0615	.0605	.0593	.0581	.0567
56	0.543	.0535	.0527	.0518	.0508	.0498	.0486
64	0.475	.0468	.0461	.0454	.0445	.0435	.0425
72	0.422	.0416	.0410	.0403	.0396	.0387	.0378
96	0.317	.0312	.0308	.0302	.0297	.0290	.0283

BASE PITCH CHARTS

Module Pitch

Base Pitch = Module • .12368•(COS PA)

Normal Module	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
.30	.0359	.0354	.0349	.0343	.0336	.0329	.0321
.40	.0479	.0472	.0465	.0457	.0448	.0439	.0428
.45	.0539	.0531	.0523	.0512	.0504	.0494	.0482
.50	0.599	.0590	.0581	.0571	.0560	.0549	.0536
.55	0.659	.0649	.0639	.0629	.0617	.0603	.0589
.60	.0718	.0708	.0697	.0686	.0673	.0658	.0643
.65	.078	.0767	.0756	.0743	.0729	.0713	.0696
.70	.0838	.0826	.0814	.0800	.0785	.0768	.0750
.75	.0898	.0885	.0872	.0857	.0841	.0823	.0803
.80	.0958	.0944	.0930	.0914	.0897	.0878	.0857
.90	.1078	.1062	.1046	.1028	.1009	.0987	.0964
1.0	.1197	.1180	.1162	.1143	.1121	.1097	.1071
1.25	.1497	.1475	.1453	.1428	.1401	.1371	.1339
1.5	.1796	.1769	.1743	.1714	.1682	.1646	.1607
1.75	.2096	.2064	.2034	.2000	.1962	.1920	.1875
2.0	.2395	.2359	.2325	.2285	.2242	.2194	.2142
2.25	.2694	.2654	.2615	.2571	.2522	.2468	.2410
2.5	.2994	.2949	.2906	.2857	.2802	.2743	.2678
2.75	.3293	.3244	.3196	.3142	.3083	.3017	.2946
3.0	.3592	.3539	.3487	.3428	.3363	.3291	.3213
3.25	.3892	.3834	.3778	.3714	.3643	.3566	.3481
3.5	.4191	.4129	.4068	.3999	.3923	.3840	.3749
3.75	.4490	.4425	.4359	.4285	.4204	.4114	.4017
4.0	.4790	.4718	.4649	.4571	.4484	.4388	.4285
4.25	.5089	.5013	.4940	.4856	.4765	.4663	.4552
4.5	.5389	.5308	.5230	.5142	.5044	.4937	.4820
4.75	.5688	.5603	.5521	.5428	.5325	.5211	.5088
5.0	.5987	.5898	.5811	.5713	.5605	.5485	.5356
5.25	.6287	.6193	.6102	.5999	.5885	.5760	.5624
5.5	.6586	.6488	.6393	.6285	.6165	.6034	.5891
5.75	.6885	.6783	.6683	.6571	.6446	.6308	.6159
6.0	.7185	.7078	.6974	.6856	.6726	.6583	.6427
6.25	.7484	.7373	.7264	.7142	.7006	.6857	.6695
6.5	.7783	.7667	.7555	.7428	.7286	.7131	.6962
6.75	.8083	.7962	.7845	.7713	.7567	.7405	.7230
7.0	.8382	.8258	.8136	.7999	.7847	.7680	.7498
7.25	.8682	.8552	.8427	.8285	.8127	.7954	.7766
7.5	.8981	.8847	.8717	.8570	.8407	.8228	.8034
7.75	.9280	.9142	.9008	.8856	.8688	.8503	.8301
8.0	.9580	.9437	.9298	.9142	.8968	.8777	.8569
8.25	.9879	.9747	.9589	.9427	.9248	.9051	.8837
8.5	1.0178	1.0027	.9878	.9713	.9528	.9325	.9105
8.75	1.0478	1.0322	1.0170	.9999	.9809	.9600	.9373
9.0	1.0777	1.0616	1.0460	1.0284	1.0089	.9874	.9640
9.25	1.1077	1.0911	1.0751	1.0570	1.0369	1.0148	.9908
9.5	1.1376	1.1206	1.1042	1.0856	1.0649	1.0422	1.0176
10	1.1975	1.1796	1.1623	1.1427	1.1210	1.0971	1.0712
11	1.3172	1.2976	1.2785	1.2570	1.2331	1.2068	1.1783
12	1.4370	1.4155	1.3947	1.3712	1.3452	1.3165	1.2854
14	1.6764	1.6514	1.6272	1.5998	1.5694	1.5359	1.4996
15	1.7962	1.7694	1.7434	1.7140	1.6815	1.6456	1.6067
16	1.9159	1.8874	1.8596	1.8283	1.7936	1.7554	1.7138
18	2.1554	2.1232	2.0921	2.0569	2.0178	1.9748	1.9281
20	2.3949	2.3592	2.3245	2.2854	2.2419	2.1942	2.1423
22	2.6344	2.5951	2.5570	2.5139	2.4661	2.4136	2.3565
24	2.8739	2.8310	2.7894	2.7425	2.6903	2.6330	2.5707

BASE PITCH CHARTS

Circular Pitch

Base Pitch = CP•(COS PA)

Normal Circular Pitch	Decimal Equivalent	14-1/2° PA	17-1/2°PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1/20	.0500	.0484	.0477	.0470	.0462	.0453	.0444	.0433
1/16	.0625	.0605	.0596	.0587	.0577	.0566	.0554	.0541
1/10	.1000	.0968	0.954	.0940	.0924	.0906	.0887	.0866
1/8	.1250	.1210	.1192	.1175	.1155	.1133	.1109	.1083
1/6	.1666	.1607	.1589	.1565	.1539	.1510	.1478	.1443
3/16	.1875	.1815	.1788	.1762	.1732	.1699	.1663	.1624
1/5	.2000	.1936	.1907	.1879	.1848	.1813	.1774	.1732
1/4	.2500	.2420	.2384	.2349	.2310	.2266	.2218	.2165
5/16	.3125	.3026	.2980	.2937	.2887	.2832	.2772	.2706
1/3	.3333	.3224	.3178	.3129	.3079	.3020	.2956	.2886
3/8	.3750	.3631	.3576	.3524	.3465	.3399	.3326	.3248
2/5	.4000	.3873	.3815	.3759	.3696	.3625	.3548	.3464
7/16	.4375	.4236	.4173	.4111	.4042	.3965	.3881	.3789
1/2	.5000	.4841	.4769	.4699	.4619	.4532	.4435	.4330
9/16	.5625	.5446	.5365	.5286	.5197	.5098	.4989	.4871
5/8	.6250	.6051	.5961	.5873	.5774	.5664	.5544	.5413
2/3	.6666	.6448	.6357	.6264	.6159	.6041	.5913	.5773
11/16	.6875	.6656	.6557	.6460	.6352	.6231	.6183	.5954
3/4	.7500	.7261	.7153	.7048	.6929	.6797	.6652	.6495
13/16	.8125	.7866	.7749	.7635	.7507	.7364	.7207	.7037
7/8	.8750	.8471	.8345	.8220	.8084	.7930	.7761	.7578
15/16	.9375	.9076	.8941	.8810	.8661	.8497	.8316	.8119
1	1.000	.9682	.9537	.9397	.9239	.9063	.8870	.8660
1-1/8	1.125	1.0891	1.0729	1.0572	1.0394	1.0196	.9979	.9743
1-1/4	1.250	1.2102	1.1922	1.1746	1.1549	1.1329	1.1088	1.0825
1-3/8	1.375	1.3312	1.3114	1.2921	1.2703	1.2462	1.2196	1.1908
1-1/2	1.500	1.4522	1.4306	1.4095	1.3858	1.3595	1.3305	1.2990
1-5/8	1.625	1.5732	1.5498	1.5270	1.5013	1.4728	1.4414	1.4073
1-3/4	1.750	1.6943	1.6690	1.6445	1.6168	1.5860	1.5523	1.5155
1-7/8	1.875	1.8153	1.7882	1.7619	1.7323	1.6993	1.6631	1.6238
2	2.000	1.9363	1.9074	1.8794	1.8478	1.8126	1.7740	1.7321
2-1/4	2.250	2.1783	2.1459	2.1143	2.0787	2.0392	1.9958	1.9486
2-1/2	2.500	2.4202	2.3843	2.3492	2.3097	2.2658	2.2175	2.1651
2-3/4	2.750	2.6624	2.6227	2.5842	2.5407	2.4923	2.4393	2.3816
3	3.000	2.9044	2.8612	2.8190	2.7716	2.7189	2.6610	2.5981
3-1/4	3.250	3.1465	3.0996	3.0540	3.0026	2.9455	2.8828	2.8146
3-1/2	3.500	3.3885	3.3380	3.2889	3.2336	3.1721	3.1045	3.0311
3-3/4	3.750	3.6306	3.5764	3.5238	3.4645	3.3987	3.32633	3.2476
4	4.000	3.8726	3.8149	3.7588	3.6955	3.6252	3.5480	3.4641

Base Pitch - is a method to determine if an "on the shelf" tool, of a slightly different pitch and pressure angle, may be used to produce a desired part.

Example - Desired part: 4.8224 D.P. 25°PA .4473 D + F .3257 T.T. (Base Pitch .5904263)
Hob in stock: 5 D.P. 20° PA Full Fillet .467 D + F .3142 T.T. (Base Pitch .5904263)

NOTE: Tooth thickness & depth must also be considered. In the above example a depth of approximately .4607 is necessary to produce the correct tooth thickness

PITCH COMPARISONS

MOD - Module Pitch- (PD)

In the module-system the diameter pitch, $\frac{pd}{T}$ is specified as a standardized value, if possible as an integer.

$$\text{Module} = \frac{pd(mm)}{teeth}$$

$$\text{Example: } \frac{81\ mm}{27T} = 3 \text{ Module}$$

In order that the center distance of a spur gear pair becomes possibly a rounded number. In the countries of the English measurement system (1 inch = 25.4 mm) other sizes are used for the pitch standardization.

DP- Diametral Pitch (DP)

In the DP-system the inverse relation, the number of teeth for every unit of the inch-measured reference diameter, is chosen as characterizing value.

$$DP = \frac{teeth}{pd''}$$

$$\text{Example: } \frac{30T}{3\ pd} = 10 \text{ DP} \qquad \text{Module} = \frac{25.4}{DP}$$

The advantage of this pitch scale is, that for any inch-integer of the reference diameter can be specified a gear with an integer of teeth, if only integer DP-values are admitted.

CP- Circular Pitch (CP)

In the CP- system the pitch itself is graduated.

CP = 1/16", 1/8", 3/16", etc.
Module = 8.085 • CP

The basic rack of these systems is that of the standardized gears, the standard pressure angles being 14 1/2° 20°, and 25°. The following table contains for the standardized module, DP and CP values the corresponding conjugate values.

$\frac{25.4}{MOD} = DP$	$\frac{25.4}{MOD} = MOD$	$\frac{\pi}{DP} = CP$	$\frac{\pi}{CP} = DP$	Mod • 0.12368 = CP

PITCH COMPARISONS

DP	CP	MOD	Whole Depth 2.157/DP	Whole Depth 2.25/DP
1	3.1416	25.4	2.157	2.250
1.013	3.0921	25	2.123	2.215
1.047	3	24.245	2.0598	2.149
1.058	2.968	24	2.0381	2.126
1.250	2.513	20.32	1.7257	1.800
1.27	2.474	20	1.6984	1.772
1.411	2.226	18	1.5286	1.595
1.5	2.094	16.933	1.4381	1.5
1.571	2	16.170	1.3732	1.433
1.588	1.979	16	1.35	1.417
1.750	1.795	14.514	1.233	1.286
1.814	1.732	14	1.189	1.240
1.795	1.75	14.149	1.202	1.253
2	1.571	12.7	1.0786	1.250
2.5	1.2567	10.160	.8628	.900
2.5133	1.250	10.1062	.8582	.8952
2.54	1.2368	10	.8492	.8858
2.75	1.1424	9.2364	.7844	.8182
2.7925	1.125	9.0958	.7724	.8057
2.8222	1.1132	9	.7643	.7972
3	1.0472	8.4667	.7190	.7500
3.1416	1	8.0851	.6866	.7162
3.175	.9895	8	.7643	.7972
3.250	.9666	7.8154	.66369	.6923
3.3867	.9276	7.5	.6369	.6644
3.5	.8976	7.2571	.6163	.6429
3.5904	.875	7.0744	.6008	.6267
3.6285	.8658	7	.5944	.6201
3.9077	.8048	6.5	.5520	.5758
4	.7854	6.35	.5393	.5625
4.1887	.750	6.0639	.515	.5371
4.2333	.7421	6	.3095	.5315
4.4174	.7112	5.75	.4883	.5094
4.5	.6981	5.6440	.4793	.5000
4.724	.666	5.3900	.4577	.4775
4.8	.6493	5.25	.4458	.4651
5	.6283	5.0800	.4314	.4500

DP	CP	MOD	Whole Depth 2.157/DP	Whole Depth 2.25/DP
5.0265	.625	5.0532	.4291	.4476
5.0800	.6184	5	.4246	.4429
5.3474	.5875	4.75	.4034	.4208
5.5	.5712	4.6182	.3922	.4091
5.6444	.5566	4.5	.3821	.3986
5.9765	.5257	4.25	.3609	.3765
6	.5236	4.2333	.3595	.3750
6.2831	.5000	4.042	.3433	.3581
6.3500	.4947	4	.3397	.3543
6.5	.4833	3.9077	.3318	.3462
6.77	.4638	3.75	.3185	.3322
7	.4488	3.6286	.3082	.3214
7.2571	.4329	3.5	.2972	.3100
7.5	.41887	3.38	.2876	.3000
7.8153	.4020	3.25	.2760	.2879
8	.3927	3.175	.2696	.2813
8.3775	.375	3.0319	.2575	.2686
8.4667	.3711	3	.2548	.2657
9	.3491	2.8222	.2397	.2500
9.2364	.3401	2.75	.2335	.2436
9.4248	.3333	2.6950	.2289	.2387
10	.3142	2.5400	.2157	.2250
10.1600	.3092	2.5	.2123	.2215
11	.2856	2.3091	.1961	.2045
11.2889	.2783	2.25	.1911	.1993
12	.2618	2.1167	.1798	.1875
12.5663	.250	2.0213	.1716	.1791
12.7	.2474	2	.1698	.1772
13	.2417	1.9538	.1659	.1731
14	.2243	1.8143	.1541	.1607
14.5143	.2164	1.75	.1486	.1550
15	.2094	1.6933	.1438	.1500
15.7079	.200	1.6173	.13731	.14324
16	.1963	1.5875	.1348	.1406
16.9333	.1855	1.5	.1274	.1329
17	.1848	1.4941	.1268	.1323
18	.1745	1.4111	.1198	.1250

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Diametral Pitch

Depth = 2.157

Diametral Pitch	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1	.9723	.841	.7285	.6122	.4917	.3661	.2347
1.5	.6482	.5608	.4857	.4081	.3278	.2441	.1565
1.75	.5556	.4806	.4163	.3498	.2810	.2092	.1341
2	.4862	.4206	.6343	.3061	.2458	.1831	.1173
2.25	.432	.3738	.3238	.2721	.2185	.1627	.1043
2.75	.3536	.3059	.2649	.2226	.1788	.1331	.0853
3	.3241	.2804	.2428	.2041	.1639	.1220	.0782
3.5	.2778	.2403	.2081	.1749	.1405	.1046	.0671
4	.2431	.2103	.1821	.1531	.1229	.0915	.0587
4.5	.2161	.1866	.1619	.1360	.1093	.0814	.0522
5	.1945	.1682	.1457	.1224	.0983	.0732	.0469
5.5	.1768	.1529	.1325	.1113	.0894	.0666	.0426
6	.1621	.1402	.1214	.1020	.0819	.0610	.0391
7	.1389	.1202	.1041	.0875	.0702	.0523	.0335
8	.1215	.1051	.0911	.0765	.0615	.0458	.0293
9	.1080	.0935	.0809	.0680	.0546	.0407	.0261
10	.0972	.0841	.0728	.0612	.0492	.0366	.0235
11	.0884	.0765	.0662	.0557	.0447	.0333	.0213
12	.0810	.0701	.0607	.0510	.0410	.0305	.0196
13	.0748	.0647	.0560	.0471	.0378	.0282	.0181
14	.0695	.0601	.0520	.0437	.0351	.0261	.0168
15	.0648	.0561	.0486	.0408	.0328	.0244	.0156
16	.0608	.0526	.0455	.0383	.0307	.0229	.0147
17	.0572	.0495	.0429	.0360	.0289	.0215	.0138
18	.0540	.0467	.0405	.0340	.0273	.0203	.0130
20	.0486	.0421	.0364	.0306	.0246	.0183	.0117
22	.0442	.0382	.0331	.0278	.0223	.0166	.0107
24	.0405	.0350	.0304	.0255	.0205	.0153	
26	.0374	.0324	.0281	.0235	.0189	.0141	-
28	.0347	.0300	.0260	.0219	.0176	.0131	-
30	.0324	.0280	.0243	.0204	.0164	.0122	-
32	.0304	.0263	.0228	.0191	.0154	.0114	-
36	.0270	.0234	.0202	.0170	.0137	.0102	-
40	.0243	.0210	.0182	.0153	.0123	-	-
44	.0221	.0191	.0166	.0139	.0112	-	-
48	.0203	.0175	.0152	.0128	.0102	-	-
56	.0174	.0150	.0130	.0109	-	-	-
64	.0152	.0131	.0114	-	-	-	-
72	.0135	.0117	.0101	-	-	-	-
96	.0101			-	-	-	-

Examples show how one cutter can be used on several different requirements with use of point width charts.

Cutter Used: 10 DP 20° PA Standard Depth Point Width .0728
9 DP Deep Depth Point Width .0734
12 DP AMGA Stub Depth .0702
5/16 CP Standard Depth .0725
2.5 Module Old Standard Depth .0717
2.75 Module New Standard Depth .0716

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Diametral Pitch

Depth = 2.25

Diametral Pitch	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1	.9243	.7825	.6609	.5353	.4050	.2694	.1274
1.5	.6162	.5217	.4406	.3568	.2700	.1796	.0849
1.75	.5281	.4472	.3776	.3059	.2314	.1539	.0728
2	.4621	.3913	.3304	.2676	.2025	.1347	.0637
2.25	.4108	.3478	.2937	.2379	.1800	.1197	.0566
2.5	.3697	.3130	.2643	.2141	.1620	.1078	.0510
2.75	.3361	.2846	.2403	.1946	.1473	.0980	.0463
3	.3081	.2608	.2203	.1784	.1350	.0898	.0425
3.5	.2641	.2236	.1888	.1529	.1157	.0770	.0364
4	.2311	.1956	.1652	.1338	.1013	.0676	.0319
4.5	.2054	.1739	.1469	.1189	.0900	.0599	.0283
5	.1849	.1565	.1322	.1071	.0810	.0539	.0255
5.5	.1680	.1423	.1202	.0973	.0736	.0490	.0232
6	.1540	.1304	.1101	.0892	.0675	.0449	.0212
7	.1320	.1118	.0944	.0765	.0579	.0385	.0182
8	.1155	.0978	.0826	.0669	.0506	.0337	.0159
9	.1027	.0869	.0734	.0595	.0450	.0299	.0142
10	.0924	.0783	.0661	.0535	.0405	.0269	.0127
11	.0840	.0711	.0601	.0487	.0368	.0245	.0116
12	.0770	.0652	.0551	.0446	.0338	.0224	.0106
13	.0711	.0602	.0508	.0412	.0312	.0207	-
14	.0660	.0559	.0472	.0382	.0289	.0192	-
15	.0616	.0522	.0441	.0357	.0270	.0180	-
16	.0578	.0489	.0413	.0335	.0253	.0168	-
17	.0544	.0460	.0389	.0315	.0238	.0158	-
18	.0513	.0435	.0367	.0297	.0225	.0150	-
20	.0462	.0391	.0330	.0268	.0203	.0135	-
22	.0420	.0356	.0300	.0243	.0184	.0122	-
24	.0385	.0326	.0275	.0223	.0169	.0112	-
26	.0355	.0301	.0254	.0206	.0156	.0104	-
28	.0330	.0279	.0236	.0191	.0145	-	-
30	.0308	.0261	.0220	.0178	.0135	-	-
32	.0289	.0245	.0207	.0167	.0127	-	-
36	.0257	.0217	.0184	.0149	.0113	-	-
40	.0231	.0196	.0165	.0134	.0101	-	-
44	.0210	.0178	.0150	.0122	-	-	-
48	.0193	.0163	.0138	.0112	-	-	-
56	.0165	.0140	.0118	-	-	-	-
64	.0144	.0122	.0103	-	-	-	-
72	.0128	.0109		-	-	-	-

Examples show how one cutter can be used on several different requirements with use of point width charts.

Cutter Used: 10 DP 20° PA Standard Depth Point Width .0728
9 DP Deep Depth Point Width .0734
12 DP AMGA Stub Depth .0702
5/16 CP Standard Depth .0725
2.5 Module Old Standard Depth .0717
2.75 Module New Standard Depth .0716

SINGLE CUTER POINT WIDTH FOR RACK & WORM

AGMA Stub

Depth = 1.8/DP

Diametral Pitch	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1	1.0536	.9402	.8429	.7424	.6382	.5297	.4161
1.25	.8428	.7522	.6743	.5939	.5105	.4237	.3329
1.5	.7024	.6268	.5619	.4949	.4255	.3531	.2774
1.75	.6020	.5373	.4816	.4242	.3647	.3027	.2378
2	.5268	.4701	.4214	.3712	.3191	.2648	.2080
2.25	.4682	.4179	.3746	.3299	.2836	.2354	.1849
2.5	.4214	.3761	.3371	.2969	.2553	.2119	.1664
3	.3512	.3134	.2810	.2475	.2127	.1766	.1387
3.5	.3010	.2686	.2408	.2121	.1823	.1513	.1189
4	.2634	.2350	.2107	.1856	.1595	.1324	.1040
4.5	.2341	.2089	.1873	.1650	.1418	.1177	.0925
5	.2107	.1880	.1686	.1485	.1276	.1059	.0832
6	.1756	.1567	.1405	.12337	.1064	.0883	.0693
7	.1505	.1343	.1204	.1061	.0912	.0757	.0594
8	.1317	.1175	.1054	.0928	.0798	.0662	.0520
9	.1171	.1045	.0937	.0825	.0709	.0589	.0462
10	.1054	.0940	.0843	.0742	.0638	.0530	.0416
12	.0878	.0783	.0702	.0619	.0532	.0441	.0347
14	.0753	.0672	.0602	.0530	.0456	.0378	.0297
16	.0658	.0588	.0527	.0464	.0399	.0331	.0260

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Combination Pitch

Depth = 2.25/DP (denominator)

Diametral Pitch	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
2.5/3	.4128	.3656	.3250	.2831	.2390	.1945	.1472
3/4	.3620	.3265	.2961	.2647	.2322	.1982	.1628
4/5	.2634	.2350	.2107	.1856	.1595	.1324	.1040
5/7	.2218	.2016	.1842	.1662	.1476	.1282	.1080
6/7	.1694	.1492	.1342	.1139	.0953	.0759	.0556
6/8	.1810	.1633	.1481	.1324	.1161	.0991	.0814
7/9	.1526	.1368	.1233	.1093	.0949	.0798	.0640
8/10	.1317	.1175	.1054	.0928	.0798	.0662	.0520
9/11	.1158	.1029	.0918	.0804	.0686	.0562	.0433
10/12	.1032	.0914	.0813	.0708	.0599	.0486	.0368
12/14	.0847	.0746	.0659	.0569	.0476	.0379	.0278
14/16	.0718	.0629	.0553	.0475	.0393	.0309	.0220
16/21	.0674	.0606	.0548	.0489	.0427	.0362	.0294

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Circular Pitch

Depth = 2.157/DP

Normal Circular Pitch	Decimal Equivalent	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
1/20	.0500	.0155	.0134	.0166	-	-	-	-
1/16	.0625	.0193	.0167	.0145	.0121	-	-	-
1/10	.1000	.0310	.0268	.0232	.0195	.0157	.0117	-
1/8	.1250	.0387	.0335	.0290	.0244	.0196	.0146	-
1/6	.1667	.0514	.0444	.0385	.0333	.0260	.0194	.0124
3/16	.1875	.0580	.0502	.0435	.0365	.0293	.0219	.0140
1/5	.2000	.0619	.0536	.0464	.0390	.0313	.0233	.0149
1/4	.2500	.0775	.0669	.0580	.0487	.0391	.0291	.0187
5/16	.3125	.0967	.0837	.0725	.0609	.0489	.0364	.0233
1/3	.3333	.1031	.0892	.0772	.0649	.0521	.0388	.0249
3/8	.3750	.1166	.1004	.0870	.0731	.0587	.0437	.0280
2/5	.4000	.1238	.1071	.0928	.0780	.0626	.0466	.0299
7/16	.4375	.1354	.1171	.1015	.0853	.0685	.0510	.0327
1/2	.5000	.1548	.1339	.1159	.0974	.0783	.0583	.0374
9/16	.5625	.1741	.1506	.1304	.1096	.0880	.0656	.0420
5/8	.6250	.1934	.1673	.1449	.1218	.0978	.0728	.0467
2/3	.6667	.2061	.1783	.1546	.1298	.1042	.0776	.0498
11/16	.6875	.2128	.1841	.1594	.1340	.1076	.0801	.0514
3/4	.7500	.2321	.2001	.1739	.1462	.1174	.0874	.0560
13/16	.8125	.2515	.2175	.1884	.1583	.1272	.0947	.0607
7/8	.8750	.2708	.2343	.2029	.1705	.1369	.1020	.0654
15/16	.9375	.2902	.2510	.2174	.1827	.1467	.1093	.0700
1	1.000	.3095	.2677	.2319	.1949	.1565	.1165	.0747
1-1/8	1.125	.3483	.3012	.2609	.2192	.1760	.1311	.0840
1-1/4	.1250	.3869	.3347	.2899	.2436	.1956	.1457	.0933
1-3/8	1.375	.4256	.3681	.3189	.2680	.2152	.1602	.1027
1-1/2	1.500	.4642	.4016	.3478	.2923	.2348	.1748	.1121
1-5/8	1.625	.5029	.4350	.3768	.3167	.2543	.1893	.1214
1-3/4	1.750	.5416	.4686	.4056	.3410	.2739	.2039	.1307
1-7/8	1.875	.5803	.5019	.4338	.3654	.2934	.2184	.1401
2	2.000	.6190	.5355	.4638	.3898	.3130	.2330	.1494
2-1/4	2.250	.6964	.6023	.5218	.4385	.3521	.2621	.1681
2-1/2	2.500	.7737	.6695	.5797	.4872	.3913	.2913	.1868
3	3.000	.9285	.8032	.6957	.5846	.4695	.3496	.2241
3-1/2	3.500	1.0833	.9370	.8117	.6822	.5478	.4078	.2615
4	4.000	1.2380	1.0708	.9276	.7796	.6260	.4660	.2988

ACME THREADS

14½° PA

T.P.I	Decimal Equivalent	Point Width
1	1.000	.3655
1-1/2	.6666	.2419
2	.5000	.1801
2-1/2	.4000	.1431
3	.3333	.1184
3-1/2	.2857	.1007
4	.2500	.0875
4-1/2	.2222	.0772
5	.2000	.0689
5-1/2	.1818	.0622
6	.1666	.0566
7	.1429	.0478

T.P.I	Decimal Equivalent	Point Width
8	.1250	.0411
9	.1111	.0360
10	.1000	.0319
11	.0909	.0285
12	.0833	.0257
14	.0714	.0213
16	.0625	.01797
20	.0500	.01333
24	.0416	.01025

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Module

Depth = 2.157/DP

Module	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
.30	.0115	-	-	-	-	-	-
.40	.0153	.0132	.0115	-	-	-	-
.50	.0191	.0166	.0143	.0121	-	-	-
.60	.0230	.0199	.0172	.0145	.0116	-	-
.70	.0268	.0232	.0201	.0169	.0136	.0101	-
.75	.0287	.0248	.0215	.0181	.0145	.0108	-
.80	.0306	.0265	.0230	.0193	.0155	.0115	-
90	.0345	.0298	.0258	.0217	.0174	.0130	-
1	.0383	.0331	.0287	.0241	.0194	.0144	
1.25	.0479	.0414	.0359	.0301	.0242	.0180	.0116
1.5	.0574	.0497	.0430	.0362	.0290	.0216	.0139
1.75	.0670	.0580	.0502	.0422	.0339	.0252	.0162
2	.0766	.0662	.0574	.0482	.0387	.0288	.0185
2.25	.0861	.0745	.0645	.0542	.0436	.0324	.0208
2.5	.0958	.0828	.0717	.0603	.0484	.0360	.0231
2.75	.1053	.0911	.0789	.0663	.0532	.0396	.0254
3	.1148	.0993	.0860	.0723	.0581	.0432	.0277
3.25	.1244	.1076	.0932	.0783	.0629	.0468	.0300
3.5	.1340	.1159	.1004	.0844	.0678	.0505	.0323
3.75	.1436	.1242	.1076	.0904	.0726	.0541	.0347
4	.1531	.1325	.1147	.0964	.0774	.0577	.0370
4.25	.1627	.1407	.1219	.1024	.0823	.0613	.0393
4.5	.1723	.1490	.1291	.1085	.0871	.0649	.0416
4.75	.1818	.1573	.1362	.1145	.0920	.0685	.0439
5	.1914	.1656	.1434	.1205	.0968	.0721	.0462
5.25	.2010	.1739	.1506	.1265	.1016	.0757	.0485
5.5	.2105	.1821	.1578	.1326	.1065	.0793	.0508
5.75	.2201	.1904	.1649	.1386	.1113	.0829	.0531
6	.2297	.1987	.1721	.1446	.1161	.0865	.0554
6.25	.2395	.2070	.1793	.1507	.1210	.0901	.0578
6.5	.2488	.2153	.1864	.1567	.1258	.0937	.0601
6.75	.2584	.2235	.1936	.1627	.1307	.0973	.0624
7	.2680	.2318	.2008	.1687	.1355	.1009	.0647
7.25	.2775	.2401	.2079	.1748	.1403	.1045	.0670
7.5	.2871	.2484	.2151	.1808	.1452	.1081	.0693
8	.3062	.2649	.2295	.1928	.1549	.1153	.0739
8.25	.3158	.2732	.2366	.1989	.1597	.1189	.0762
8.5	.3254	.2815	.2438	.2049	.1645	.1225	.0785
8.75	.3350	.2898	.2510	.2109	.1694	.1261	.0809
9	.3445	.2980	.2581	.2169	.1742	.1297	.0832
9.25	.3541	.3063	.2653	.2230	.1791	.1333	.0855
9.5	.3637	.3146	.2725	.2290	.1839	.1369	.0878
9.75	.3732	.3229	.2796	.2350	.1887	.1405	.0901
10	.3828	.3312	.2868	.2410	.1936	.1441	.0924
1	.4211	.3643	.3155	.2651	.2129	.1586	.1016
12	.4594	.3974	.3442	.2892	.2323	.1730	.1109
14	.5359	.4636	.4015	.3375	.2710	.2018	.1294
15	.5742	.4967	.4302	.3616	.2904	.2162	.1380
16	.6125	.5299	.4589	.3857	.3097	.2306	.1478
18	.6890	.5961	.5163	.4339	.3484	.2594	.1663
20	.7656	.6623	.5736	.4821	.3871	.2883	.1843

SINGLE CUTER POINT WIDTH FOR RACK & WORM

Module

Depth = 2.25/DP

Module	14-1/2° PA	17-1/2° PA	20° PA	22-1/2° PA	25° PA	27-1/2° PA	30° PA
.30	.109	-	-	-	-	-	-
.40	.0146	.0123	.0104	-	-	-	-
.50	.0182	.0154	.0130	.0105	-	-	-
.60	.0218	.0185	.0156	.0126	-	-	-
.70	.0255	.0216	.0182	.0148	.0112	-	-
.75	.0273	.0231	.0195	.0158	.0120	-	-
.80	.0291	.0246	.0208	.0169	.0128	-	-
90	.0327	.0277	.0234	.0190	.0144	-	-
1	.0364	.0308	.0260	.0211	.0159	.0106	-
1.25	.0455	.0385	.0325	.0263	.0199	.0133	-
1.5	.0546	.0462	.0390	.0316	.0239	.0159	-
1.75	.0637	.0539	.0455	.0369	.0279	.0186	-
2	.0728	.0616	.0520	.0421	.0319	.0212	.0100
2.25	.0819	.0693	.0585	.0474	.0359	.0239	.0113
2.5	.0910	.0770	.0650	.0527	.0399	.0265	.0125
2.75	.1001	.0847	.0716	.0580	.0439	.0292	.0138
3	.1092	.0924	.0781	.0632	.0478	.0318	.0150
3.25	.1183	.1001	.0846	.0685	.0518	.0345	.0163
3.5	.1274	.1078	.0911	.0738	.0558	.0371	.0176
3.75	.1365	.1155	.0976	.0790	.0598	.0398	.0188
4	.1456	.1232	.1041	.0843	.0638	.0424	.0201
4.25	.1546	.1309	.1106	.0896	.0678	.0451	.0213
4.5	.1637	.1386	.1171	.0948	.0718	.0477	.0226
4.75	.1728	.1463	.1236	.1001	.0757	.0504	.0238
5	.1819	.1540	.1301	.1054	.0797	.0530	.0251
5.25	.1910	.1617	.1366	.1106	.0837	.0557	.0263
5.5	.2001	.1694	.1431	.1159	.0877	.0593	.0276
5.75	.2092	.1772	.1496	.1212	.0917	.0610	.0288
6	.2183	.1849	.1561	.1264	.0957	.0636	.0301
6.25	.2274	.1929	.1626	.1317	.0997	.0663	.0314
6.5	.2365	.2003	.1691	.1370	.1036	.0689	.0326
6.75	.2456	.2080	.1756	.1422	.1076	.0716	.0339
7	.2547	.2157	.1821	.1475	.1116	.0742	.0351
7.25	.2638	.2234	.1886	.1528	.1156	.0769	.0364
7.5	.2729	.2311	.1951	.1580	.1196	.0795	.0376
7.75	.2820	.2388	.2016	.1633	.1236	.0822	.0389
8	.2911	.2465	.2081	.1686	.1276	.0848	.0401
8.25	.3002	.2542	.2147	.1739	.1316	.0875	.0414
8.5	.3093	.2619	.2212	.1791	.1355	.0901	.0426
8.75	.3184	.2696	.2277	.1844	.1395	.0928	.0439
9	.3275	.2773	.2342	.1897	.1435	.0954	.0451
9.25	.3366	.2850	.2407	.1949	.1475	.0981	.0464
9.5	.3457	.2927	.2472	.2002	.1515	.1008	.0477
9.75	.3548	.3004	.2537	.2055	.1555	.1034	.0489
10	.3639	.3081	.2602	.2107	.1595	.1061	.0502
11	.4003	.3389	.2862	.2318	.1754	.1167	.0552
12	.4367	.3697	.3122	.2518	.1914	.1273	.0602
14	.5094	.4313	.3643	.2529	.2232	.1485	.0702
15	.5458	.4621	.3903	.3161	.2392	.1591	.0752
16	.5822	.4929	.4163	.3372	.2551	.1697	.0803
18	.6550	.5546	.4683	.3793	.2870	.1909	.0903
20	.7278	.6162	.5204	.4215	.3189	.2121	.1003

DIAMETRAL PITCH
HELICAL CONVERSION CHART

Trans Diam. Pitch	7-1/2° Helix	10° Helix	15° Helix	20° Helix	23° Helix	30° Helix	45° Helix
72	72.6213	73.1107	74.5398	76.6208	78.2179	83.1384	101.8234
64	64.5522	64.9873	66.2577	68.1074	69.5271	73.9008	90.5097
48	48.4142	48.7405	49.6933	51.0805	52.1453	55.4256	67.8823
40	40.3452	40.6171	41.4111	42.5671	43.4544	46.1880	56.5685
36	36.3106	36.5554	372699	38.3104	39.1090	41.5692	50.9117
32	32.2761	32.4937	33.1288	34.0537	34.7635	36.9504	45.2548
28	28.2416	28.4319	28.9877	29.7970	30.4181	32.3316	39.5980
24	24.2071	24.3702	24.8466	25.5403	24.9205	27.7128	33.9400
20	20.1726	20.3085	20.7055	21.2836	21.7272	23.0940	28.2800
16	16.1381	16.2468	16.5643	17.0268	17.3818	18.4752	22.6272
14	14.1208	14.2160	14.4939	14.8985	15.2090	16.1658	19.7990
12	12.1036	12.1851	12.4233	12.7701	13.0363	13.8560	16.9704
10	10.0863	10.1543	10.3527	10.6418	10.8636	11.5470	14.1420
9	9.0776	9.1388	9.3175	9.5776	9.7772	10.3923	12.7279
8	8.0690	8.1234	8.2822	8.5134	8.6909	9.2376	11.3136
7	7.0604	7.1079	7.2469	7.4492	7.6045	8.0829	9.8995
6	6.0518	6.0925	6.2116	3.3851	6.5182	6.9282	8.4852
5	5.0431	5.0771	5.1764	5.3209	5.4318	5.7735	7.0710
4.5	4.5388	4.5694	4.6587	4.7888	4.8886	5.1962	6.3640
4	4.0345	4.0617	4.1411	4.2567	4.3454	4.6188	5.6568
3.5	3.5302	3.5539	3.6235	3.7246	3.8020	4.0414	4.9497
3	3.0259	3.0463	3.1058	3.1925	3.2591	3.4641	4.2426
2.75	2.7737	2.7924	2.8470	2.9265	2.9875	3.1754	3.8891
2.5	2.5216	2.5385	2.5882	2.6604	2.7159	2.8867	3.5355
2.25	2.2694	2.2847	2.3294	2.3944	2.4443	2.5981	3.1820
2	2.0172	2.0309	2.07055	2.1284	2.1727	2.3094	2.8284
1.75	1.7651	1.7770	1.8117	1.8623	1.9011	2.0207	2.4729
1.5	1.5129	1.5231	1.5529	1.5963	1.6295	1.7320	2.1213
1.25	1.2608	1.2693	1.2941	1.3302	1.3579	1.4434	1.7678
1	1.0086	1.0154	1.0353	1.0643	1.0863	1.1547	1.4142

Formula: TDP/cos Helix Angle =NDP

MODULE
HELICAL CONVERSION CHART

MOD Pitch	7-1/2° Helix	10° Helix	15° Helix	20° Helix	23° Helix	30° Helix	45° Helix
0.75	34.1589	34.3891	35.0613	36.0401	36.7914	39.1059	47.8947
0.80	32.0239	32.2397	32.8700	33.7876	34.4919	36.6617	44.9013
1.00	25.6191	25.7918	26.2960	27.0301	27.5935	29.3294	35.9210
1.25	20.4953	20.6334	21.0368	21.6240	22.0748	23.4635	28.7368
1.50	17.0794	17.1945	17.5306	18.0200	18.3956	19.5329	23.9473
1.75	14.6395	14.7382	15.0263	15.4457	15.7677	16.7597	20.5263
2.00	12.8095	12.8959	13.1480	13.5150	13.7967	14.6647	17.9605
2.50	10.2476	10.3167	10.5184	10.8120	11.0374	11.7318	14.3684
3.00	8.5397	8.5973	8.7653	9.0100	9.1978	9.7765	11.9737
3.50	7.3197	7.3690	7.5131	7.7228	7.8838	8.3798	10.2631
4.00	6.4047	3.4479	6.5740	6.7575	6.8983	7.3323	8.9803
4.50	5.6931	5.7314	5.8435	6.0066	6.1318	6.5176	7.9818
5.00	5.1238	5.1583	5.2592	5.4060	5.5187	5.8659	7.1842
6.00	4.2698	4.2986	4.3826	4.5049	4.5988	4.8882	5.9868
7.00	3.6599	3.6845	3.7566	3.8614	3.9419	4.1899	5.1316
8.00	3.2023	3.2239	3.2870	3.3787	3.4491	3.6662	4.4901
9.00	2.8465	2.8657	2.9217	3.0033	3.0659	3.2588	3.9912
10.00	2.5619	2.5791	2.6296	2.7030	2.7593	2.9329	3.5921
11.00	2.3289	2.3446	2.3904	2.4571	2.5084	2.6662	3.2654
12.00	2.1349	2.1493	2.1913	2.2525	2.2994	2.4442	2.9935

Formula: TMOD • cos HA=NMOD
25.4/NMOD=NDP

Diametral Charts

Base Pitch = π/DP • (COS .PA)

1-18 Diametral Pitch

Diam. Pitch	Circular Pitch	Module	Whole Depth				
			Std. 2.157/DP	Deep 2.25/DP	Pre-Shave 2.35/DP	Full Fillet 2.335/DP	Agma Stub 1.800/DP
1	3.1416	25.4000	2.1571	2.2500	2.3500	2.3350	1.8000
1.25	2.533	20.3200	1.7257	1.8000	1.8800	1.8680	1.4400
1.5	2.0944	16.9333	1.4381	1.5000	1.5667	1.5567	1.2000
1.75	1.7952	14.5143	1.2326	1.2857	1.3429	1.3343	1.0286
2	1.5708	12.7000	1.0786	1.1250	1.1750	1.1675	0.9000
2.25	1.3963	11.2889	0.9587	1.0000	1.0444	1.0378	0.8000
2.5	1.2567	10.1600	0.8628	0.9000	0.9400	0.9340	0.7200
2.75	1.1424	9.2364	0.7844	0.8182	0.8545	0.8491	0.6545
3	1.0472	8.4667	0.7190	0.7500	0.7833	0.7780	0.6000
3.5	0.8976	7.2571	0.6163	0.6429	0.6714	.06671	0.5143
4	0.7854	6.3500	0.5393	0.5625	0.5875	0.5838	0.4500
4.5	0.6981	5.6440	0.4793	0.5000	0.5222	0.5188	0.4000
5	0.6283	5.0800	0.4314	0.4500	0.4700	0.4670	0.3600
6	0.8236	4.2333	0.3595	0.3750	0.3917	0.3892	0.3000
7	0.4488	3.6286	0.3082	0.3214	0.3357	0.3336	0.2571
8	0.3927	3.1750	0.2696	0.2813	0.2938	0.2919	0.2250
9	0.3491	2.8222	0.2397	0.2500	0.2611	0.2595	0.2000
10	0.3142	2.5400	0.2157	0.2250	0.2350	0.2335	0.1800
11	0.2856	2.3091	0.1961	0.2045	0.2136	0.2123	0.1636
12	0.2618	2.1167	0.1798	0.1875	0.1958	0.1946	0.1500
13	0.2417	1.9538	0.1659	0.1731	0.1807	0.1796	0.1385
14	0.2243	1.8143	0.1541	0.1607	0.1679	0.1668	0.1286
15	0.2094	1.6933	0.1438	0.1500	0.1567	0.1557	0.1200
16	0.1963	1.5875	0.1348	0.1406	0.1469	0.1459	0.1125
17	0.1848	1.4941	0.1268	0.1323	0.1382	0.1374	0.1056
18	0.1745	1.4111	0.1198	0.1250	0.1306	0.1297	0.1000

20 Diametral Pitch and Finer

Diam. Pitch	Circular Pitch	Module	Fine Pitch 2.20/DP + .002	British System 2.40/DP
20	0.1571	1.2700	0.1120	0.1200
22	0.1428	1.1545	0.1020	0.1092
24	0.1309	1.0583	0.0937	0.1000
26	0.1208	0.9769	0.0866	0.0923
28	0.1122	0.9071	0.0805	0.0857
30	0.1047	0.8467	0.0753	0.0800
32	0.0982	0.7938	0.0708	0.0750
36	0.0873	0.7056	0.0631	0.0667
40	0.0785	0.6350	0.0570	0.0600
44	0.0714	0.5773	0.0520	0.0545
48	0.0654	0.5292	0.0470	0.0500
56	0.0561	0.4536	0.0413	0.0429
64	0.0491	0.3963	0.0364	0.0375
72	0.0436	0.3528	0.0326	0.0333
96	0.0327	0.2646	0.0249	0.0250

CIRCULAR PITCH CONVERSION CHART

Circular Pitch	Diametral Pitch	Module	Whole Depth	
			2.157/DP	2.25/DP
1/16	50.2654	0.5053	0.0429	0.0448
1/8	25.1327	1.0106	0.0858	0.0895
3/16	16.751	1.5160	0.1287	0.343
1/4	12.5663	2.0213	0.1716	0.1791
5/16	10.0530	2.5266	0.2146	0.2238
3/8	8.3775	3.0319	0.2575	0.2686
7/16	7.1807	3.5373	0.3004	0.3133
1/2	6.2831	4.0426	0.3433	0.3581
9/16	5.5850	4.5479	0.3862	0.4028
5/8	5.0265	5.0532	0.4291	0.4476
1-1/16	4.5695	5.5586	0.4720	0.4924
3/4	4.1887	6.0639	0.5150	0.5371
13/16	3.8665	6.5692	0.5579	0.5815
7/8	3.5904	7.0744	0.6008	0.6267
15/16	3.3510	7.5798	0.6437	0.6714
1	3.1416	8.0851	0.6866	0.7162
1-1/8	2.7925	9.0958	0.7724	0.8057
1-1/4	2.5133	10.1062	0.8582	0.8952
1-1/2	2.0944	12.1276	1.0299	1.0743
1-3/4	1.7952	14.1488	1.2015	1.2533
2	1.5708	16.1701	1.3732	1.4329
2-1/2	1.2567	20.2117	1.7164	1.7904
3	1.0472	24.2452	2.0598	2.1486

INVOLUTE SPLINE CHART

Diam. Pitch	30° Involute Spline		37.5° & 45° Involute Spline	
	Whole Depth Full Fillet	Whole Depth Flat Root	Whole Depth 37.5° PA	Whole Depth 45° PA
2.5/5	0.5600	0.4700	0.5060	-
3/6	0.4667	0.3917	0.4178	-
4/8	0.3500	0.2940	0.3133	-
5/10	0.2800	0.2350	0.2540	-
6/12	0.2333	0.1960	0.2078	-
8/16	0.1750	0.1470	0.1557	0.1310
10/20	0.1400	0.1180	0.1245	0.1050
12/24	0.1250	0.0980	0.1040	0.0901
16/32	0.0937	0.0730	0.0785	0.0656
20/30	0.0803	0.0635	-	-
20/40	0.0750	0.0590	0.0600	0.0525
24/48	0.0625	0.0490	0.0510	0.0438
32/64	0.0469	0.0370	0.0385	0.0328
40/80	0.0375	0.0295	0.0315	0.0263
48/96	0.0313	0.0249	0.0265	0.0219

Note: These depth are considered standard by Ash Gear and may be used as a quick reference guide for your convenience.
However, this data does not necessarily reflect any single set of published standards,so always check your specific requirements.

MODULE CONVERSION CHART

Module	Diametral Pitch	Circular Pitch	Whole Depth 2.157/DP	Whole Depth 2.25/DP	Whole Depth 2.20/DP + .002
0.20	127.0000	0.0247	0.0170	0.0177	0.0193
0.30	84.6667	0.0371	0.0255	0.0266	0.0280
0.35	72.5714	0.0433	0.0297	0.0310	0.0323
0.40	63.5000	0.0495	0.0340	0.354	0.0367
0.45	56.4444	0.0557	0.0382	0.0399	0.0410
0.50	50.80000	0.0618	0.0425	0.0443	0.0453
0.60	42.3333	0.0742	0.0510	0.0531	0.0539
0.70	36.2857	0.0866	0.0594	0.0620	0.0626
0.75	33.8667	0.0928	0.0637	0.0664	0.0670
0.80	31.7500	0.0989	0.0679	0.0709	0.0713
0.90	28.2222	0.1113	0.0764	0.0797	0.0800
1	25.4000	0.1237	0.0849	0.0886	0.0886
1.25	20.3200	0.1546	0.1062	0.1107	-
1.50	16.9333	0.1855	0.1274	0.1329	-
1.75	14.5143	0.2164	0.1486	0.1550	-
2	12.7000	0.2474	0.1698	0.1772	-
2.25	11.2889	0.2783	0.1911	0.1993	-
2.5	10.1600	0.3092	0.2123	0.2215	-
2.75	9.2364	0.3401	0.2335	0.2436	-
3	8.4667	0.3711	0.2548	0.2657	-
3.25	7.8153	0.4020	0.2760	0.2879	-
3.50	7.2571	0.4329	0.2972	0.3100	-
3.75	6.7733	0.4638	0.3185	0.3322	-
4	6.3500	0.4947	0.3397	0.3543	-
4.25	5.9765	00.5257	0.3609	0.3765	-
4.50	5.6444	0.5566	0.3821	0.3986	-
4.75	5.3474	0.5875	0.4034	0.4208	-
5	5.0800	0.6184	0.4246	0.4429	-
5.25	4.8381	0.6493	0.4458	0.4651	-
5.50	4.6182	0.803	0.4671	0.4872	-
5.75	4.4174	0.7112	0.4883	0.5094	-
6	4.2333	0.7421	0.5095	0.5315	-
6.5	3.9077	0.8048	0.5520	0.5758	-
7	3.6286	0.8658	0.5944	0.6201	-
7.50	3.3867	0.9276	0.6369	0.6644	-
8	3.1750	0.9895	0.6794	0.7087	-
9	2.8222	1.1132	0.7643	0.7972	-
10	2.5400	1.2368	0.8492	0.8858	-
11	2.3090	1.2606	0.9342	0.9744	-
12	2.1167	1.4842	1.0191	1.0630	-
14	1.8143	1.7316	1.1890	1.2401	-
15	1.6933	1.8553	1.2738	1.3287	-
16	1.5875	1.9790	1.3588	1.4173	-
18	1.4111	2.2263	1.5286	1.5945	-
20	1.2700	2.4737	1.6984	1.7717	-
22	1.1545	2.7211	1.8683	1.9488	-
24	1.0583	2.9684	2.0381	2.1260	-
25	1.0160	3.0921	2.1230	2.2146	-

ROLLER CHAIN SPROCKET AMERICAN STANDARD

Chain Number	Circular Pitch	Roller Diameter
spec.	0.1227	0.060
spec.	0.1475	0.090
25	1/4	0.130
spec.	1/4	0.134
35	3/8	0.200
40	1/2	0.313
41	1/2	0.306
spec.	1/2	0.322
50	5/8	0.400
spec.	5/8	0.313
60	3/4	0.469
80	1	0.625
spec.	1	0.5625
100	1-1/4	0.750
120	1-1/2	0.875
140	1-3/4	1.000
160	2	1.125
180	2-1/4	1.406
200	2-1/2	1.563
240	3	1.875
spec.	6 mm	4 mm
spec.	8 mm	5 mm

ROLLER CHAIN SPROCKET BRITISH STANDARD B.S 228:1962

Chain Number	Circular Pitch	Roller Diameter
36	3/5	0.2500
42	1/2	0.355
51	5/8	0.400
61	3/4	0.475

INCH METRIC CONVERSION CHART

Inch Fractions	Inch Decimals	Millimeters	Inch Fractions	Inch Decimals	Millimeters
	.003937	.1	15/32	.46875	11.9063
	.007874	.2		.472441	12
	.011811	.3	31/64	.483375	12.3031
1/64	.015625	.3969	1/2	.500	
	.015748	.4		.511811	13
	.019685	.5	33/64	.515625	13.0969
	.023622	.6	17/32	.53125	13.4938
	.027559	.7	35/64	.546875	13.8906
1/32	.03125	.7938		.551181	14
	.031496	.8	9/16	.5625	14.2875
	.035433	.9	37/64	.578125	14.6844
	.03937	1		.590551	15
3/64	.046875	1.1906	19/32	.59378	15.0813
1/16	.0625	1.5875	39/64	.609375	15.4781
5/64	.078125	1.9844	5/8	.625	15.875
	.078740	2		.629921	16
3/32	.140625	3.5719	41/64	.640625	16.2719
7/64	.15625	3.9688	21/32	.65625	16.6688
	.157480	4		.669291	17
1/8	.171875	4.3656	43/64	.671875	17.0656
9/64	.140625	3.5719	11/16	.6875	17.4625
5/62	.15625	3.9688	45/64	.703125	17.8594
	.157480	4		.708661	18
11/64	.171875	4.3656	23/32	.71875	18.2563
3/16	.1875	4.7625	47/64	.734375	18.6531
	.196850	5		.748031	9
13/64	.203125	5.1594	3/4	.750	19.050
7/32	.21875	5.5563	49/64	.765625	19.4469
15/64	.234375	5.9531	25/32	.78125	19.8438
	.236220	6		.787402	20
1/4	.250	6.350	51/64	.796875	20.2406
17/64	.265625	6.7469	13/16	.8125	20.6375
	.275591	7		.826772	21
9/32	.28125	7.1438	53/64	.828125	21.0344
19/64	.296875	7.5406	27/32	.84375	21.4313
5/16	.3125	7.9375	55/64	.859375	21.8281
	.314961	8		.866142	22
21/64	.328125	8.3344	7/8	.875	22.225
11/32	.34375	8.37313	57/64	.890625	22.6219
	.354331	9		.905512	23
23/64	.359375	9.1281	29/32	.90625	23.0188
3/8	.375	9.525	59/64	.921875	23.4156
25/64	.390625	9.9219	15/16	.9375	23.8125
	.393701	10		.944882	24
13/32	.40625	10.3188	61/64	.953125	24.2094
27/64	.421875	10.7156	31/32	.96875	24.6063
	.433071	11		.984252	25
7/16	.4375	11.1125	63/64	.984375	25.0031
29/64	.453125	11.5094	1″	1	25.400

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ASH GEAR & SUPPLY CREDIT APPLICATION

Credit Reference Information

Company Name		Years in Business	
Address # & Street		Suite #	Phone #
City	State	Zip Code	County
President of Company	Financial Officer	Bookkeeper	
Tax ID#			

Bank Reference

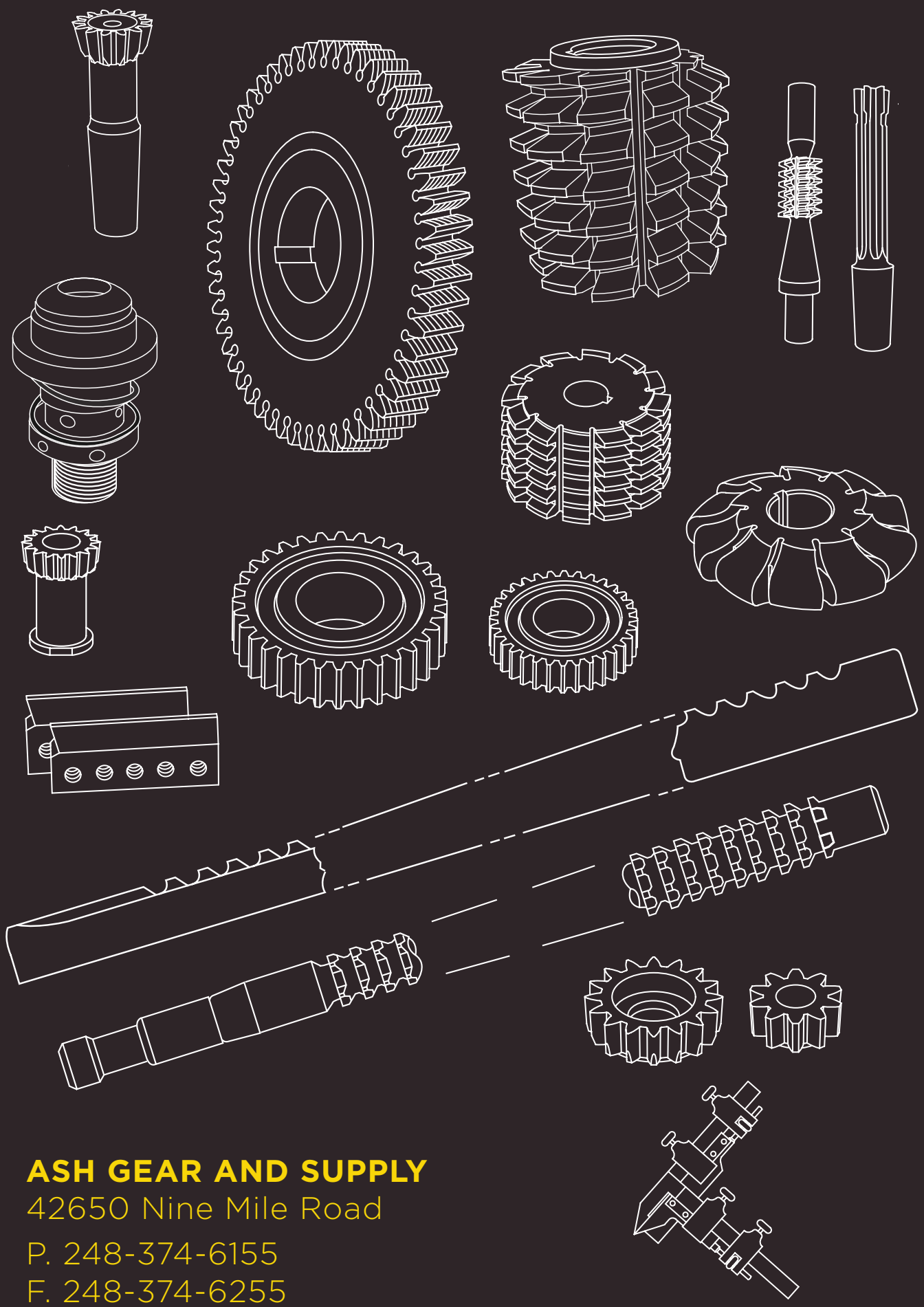
Bank Name		
Address # & Street		Suite #
City	State	Zip Code
Account #('s)		
Phone #	Fax #	Contact Person

Trade Reference

Company Name			
Address # & Street		Suite #	# of years doing bus. with
City	State	Zip Code	
Phone #	Fax #	Contact Person	
Company Name			
Address # & Street		Suite #	# of years doing bus. with
City	State	Zip Code	
Phone #	Fax #	Contact Person	
Company Name			
Address # & Street		Suite #	# of years doing bus. with
City	State	Zip Code	
Phone #	Fax #	Contact Person	
Company Name			
Address # & Street		Suite #	# of years doing bus. with
City	State	Zip Code	
Phone #	Fax #	Contact Person	

I the undersigned to hereby certify that all the information contained in this application is correct to the best of my knowledge. I understand that by filling out this application I give Ash Gear the right to examine my credit history.

Signature _____ **Date** _____



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