

# GEAR MILLING

For Gear, Spline & Rack Manufacturing



INCH



# GEAR MILLING CATALOG

The Vardex Gear Milling Concept ..... 4

Gear Milling Ordering Code System ..... 6

## GEAR MILLING INSERTS

Gear Milling Tailor-Made Inserts ..... 7

Gear Milling Standard ANSI B92.1 Inserts for Spline Applications ..... 8

## STANDARD TOOLHOLDERS

Weldon Shank for IC 1/4"U ..... 10

Weldon Shank for IC 3/8"U ..... 10

Shell Mill for IC 3/8"U ..... 11

Shell Mill for IC 1/2"U ..... 11

Shell Mill for IC 1/2"UT ..... 12

Shell Mill for IC 5/8"U ..... 13

Shell Mill for IC 5/8"UT ..... 14

Disc Mill for IC 1/4"U ..... 15

Disc Mill for IC 3/8"U ..... 15

## TAILOR-MADE SOLID CARBIDE

Solid Carbide Gear Milling ..... 16

## TECHNICAL DATA

Recommended Grades and Cutting Speeds ..... 17

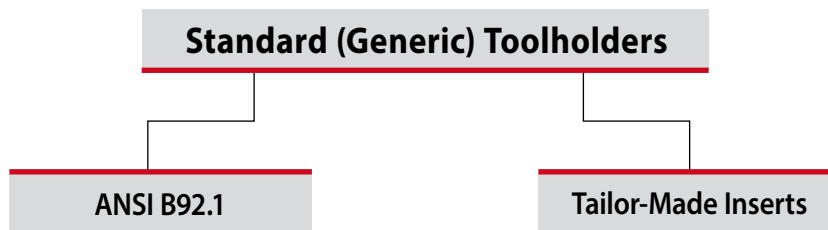
Gear Milling Request Form ..... 18

# GEAR MILLING

## Advanced Technologies for Gear, Spline and Rack Manufacturing

Vardex gear milling tools offer a competitive alternative to the traditional Hob system with multi-flute indexable carbide inserts for super-fast machining with absolute price/performance advantages over existing technologies.

### NEW CONCEPT FOR GEAR MILLING TOOLS



**Note:** Tailor-Made Toolholders and Solid Carbide Gear Milling Tools are available on request.

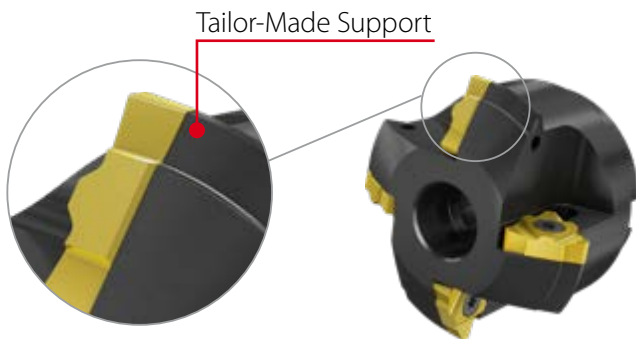
Standard (Generic) Gear Milling Holders (End Mill, Shell Mill, Disc Mill) are now suitable for all standard inserts ANSI B92.1 and tailor-made inserts.

The standard toolholder enables the use of the **same** toolholder for the **same** IC type inserts.

**No need for special toolholders for each individual profile!**

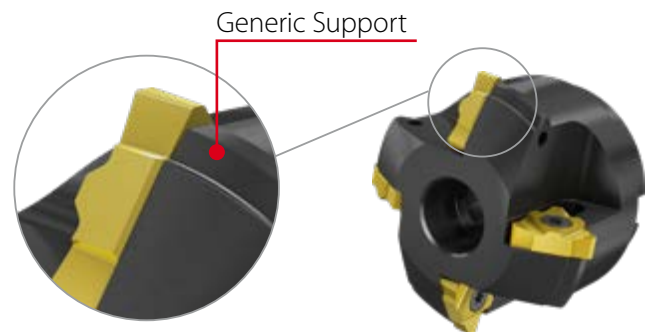
**Tailor-Made Toolholders  
According to the Specific Insert Profile**

**BEFORE**



**Standard (Generic) Toolholders  
For All Inserts with the Same IC Type**

**NEW**



### Advantages of the Vargus Gear Milling System

- Shorter machining time - at least 50% less machining cycle time over other methods
- Carbide inserts with semi partial & partial designed for single pass machining
- Long tool life and high accuracy
- Excellent surface finish
- Simplified machining - easy set-up and use on standard 3.5 axis CNC milling machines
- Complete the job with Vargus Gear Milling Tools - no need for additional machining
- High precision machining

For example:

- Gears: Up to Class 7 according to DIN 3962 and DIN 3967 or Class 11 according to AGMA
- Involute Splines: According to DIN 5480 or ANSI B92.1
- Straight Side Splines: According to ISO 14 and DIN 5463; 5464

# Gear Milling Tool Types

## Standard (Generic) Tools



End Mill



Shell Mill



Disc Mill

## Tailor-Made Tools

- Toolholders (End Mill, Shell Mill, Disc Mill) with indexable inserts
- Solid Carbide

## Major Applications

### GEAR



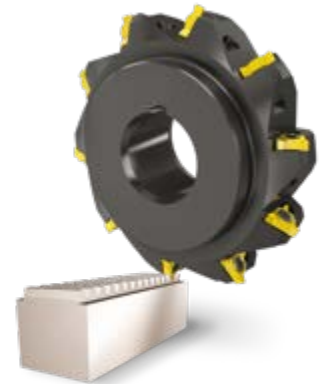
VARDEX Gear milling tools are suitable for machining both straight and helical teeth covering modules from 0.5-6.0mm or DP 52-4

### SPLINE



VARDEX Spline milling tools are suitable for machining both involute or straight-sided profiles, covering modules from 0.5-8.0mm or DP 48/96-4/8


### RACK




VARDEX Rack milling tools are suitable for covering modules from 0.5-6.0mm or DP 52-4

# Gear Milling Ordering Code System

## Tailor-Made Inserts for Gear, Rack and Spline

<b>4</b>	<b>U</b>	<b>T</b>	<b>E</b>	<b>DP</b>	<b>8/16</b>	<b>Z37</b>	<b>GM</b>	<b>VBX</b>	<b>210/..., 310/...</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>1 - Insert Size</b>	<b>2 - Insert Style</b>		<b>3 - No. of Cutting Edges</b>		<b>4 - Application</b>		<b>5 - Module or DP</b>		
2 - IC1/4" 3 - IC 3/8" 4 - IC 1/2" 5 - IC5/8"	U - U Style 		T - Single None - 3		E - External		DP - Diametral Pitch M - Module		
<b>6 - Module or DP</b>		<b>7 - No. of Gear/ Spline Teeth</b>		<b>8 - Product Line</b>		<b>9 - Grade</b>		<b>10 - Special Insert No.</b>	
M 0.5 - 6.0 DP 128.0 - 4.0		Z...		GM - Gear Milling		VBX		210/... 310/...	

## Standard Inserts for Spline ANSI B92.1

<b>5</b>	<b>U</b>		<b>E</b>	<b>DP</b>	<b>8/16</b>	<b>N7</b>	<b>Z35-54</b>	<b>GM</b>	<b>VBX</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>1 - Insert Size</b>	<b>2 - Insert Style</b>		<b>3 - No. of Cutting Edges</b>		<b>4 - Application</b>		<b>5 - DP</b>		
2 - IC1/4" 3 - IC 3/8" 4 - IC 1/2" 5 - IC5/8"	U - U Style 		None - 3		E - External		DP - Diametral Pitch		
<b>6 - DP Range</b>		<b>7 - Milling Cutter No.</b>		<b>8 - Teeth Range Gear</b>		<b>9 - Product Line</b>		<b>10 - Grade</b>	
32/64 - 8/16		N1 - N8		Zmin 10 - Zmax 135		GM - Gear Milling		VBX	

## Weldon Shank Toolholders

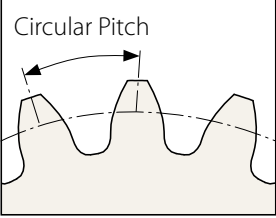
<b>GMG</b>	<b>E</b>	<b>4</b>	<b>S</b>	<b>100</b>	<b>W</b>	<b>119</b>	<b>-</b>	<b>197</b>	<b>2</b>	<b>U</b>	<b>215/...</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>		<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
<b>1 - Product Line</b>		<b>2 - Holder Type</b>		<b>3 - No. of Flutes</b>		<b>4 - Clamping System</b>		<b>5 - Shank Diameter</b>		<b>6 - Shank Style</b>	
GMG - Gear Milling		E - End Mill		5		S - Screw		1.0", 1.25"		W - Weldon Shank	
<b>7 - Cutting Diameter [inch]</b>			<b>8 - Toolholder Overhang</b>		<b>9 - Insert Size (IC)</b>		<b>10 - Insert Style</b>		<b>11 - Special Holder No.</b>		
1.19" - 1.42"			1.97" - 3.15"		2 - IC 1/4" 3 - IC 3/8"		U - U Style		215/... None - Standard Holder		

## Shell Mill and Disc Mill Toolholders

<b>GMG</b>	<b>S</b>	<b>6</b>	<b>S</b>	<b>D335</b>	<b>-</b>	<b>100</b>	<b>-</b>	<b>4</b>	<b>U</b>	<b>T</b>	<b>215/...</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>6</b>		<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>1 - Product Line</b>		<b>2 - Holder Type</b>		<b>3 - No. of Flutes</b>		<b>4 - Clamping System</b>		<b>5 - Cutting Diameter [inch]</b>			
GMG - Gear Milling		S - Shell Mill D - Disc Mill		3 - 10		S - Screw		1.73" - 3.54"			
<b>6 - Drive Hole Diameter [inch]</b>		<b>7 - Insert Size</b>		<b>8 - Insert Style</b>		<b>9 - No. of Cutting Edges</b>		<b>10 - Special Holder No.</b>			
.75", 1.0"		2 - IC1/4" 3 - IC 3/8" 4 - IC 1/2" 5 - IC5/8"		U - U Style		T - Single None - 3		215/... None - Standard Holder			

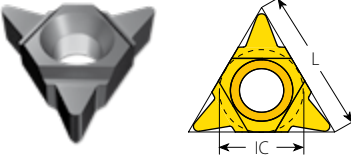
# Gear Milling Tailor-Made Inserts

**External**

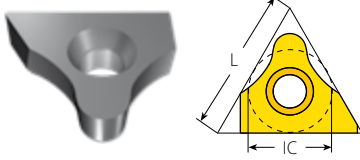


Circular Pitch

Module = Pitch /  $\pi$   
DP = 25.4 / Module






U Style -  
3 Cutting Edges



UT Style -  
1 Cutting Edge

Based on the required customer application, VARDEX designs and supplies tailor-made inserts to suit a **specific Module / DP** as well as the exact number of teeth used on the component.

## Tailor-Made Inserts for Gear, Spline and Rack Applications

Application	Module	Diametral Pitch (DP)	Insert Size	L	Cutting Edges	Toolholder / (EDP)	Page
   Rack	0.5-1.0	26-52	1/4"U	11	3	GMGE4S100W125-197-2U (66687) GMGD10SD335-100-2U (66683)	10 15
	1.0-1.5	17-26	3/8"U	16	3	GMGE3S125W142-315-3U (66686) GMGS4SD189-075-3U (66689) GMGD8SD354-100-3U (66685)	10 11 15
	1.75-2.0	13-16	1/2"U	22	3	GMGS4SD205-075-4U (66690) GMGS5SD275-100-4U (66692)	11 12
	3.0-3.5	7.5-9	1/2"UT	22	1	GMGS6SD335-100-4UT (66698)	12
	2.25-2.75	9.5-12	5/8"U	27	3	GMGS3SD237-075-5U (66688) GMGS4SD315-100-5U (66691)	13 13
	3.5-6	4.5-7	5/8"UT	27	1	GMGS5SD315-100-5UT (66695)	14
 Spline	0.5-1.25	48/96; 40/80; 32/64; 24/48	1/4"U	11	3	GMGE4S100W125-197-2U (66687) GMGD10SD335-100-2U (66683)	10 15
	1.5-2.0	20/40; 16/32	3/8"U	16	3	GMGE3S125W142-315-3U (66686) GMGS4SD189-075-3U (66689) GMGD8SD354-100-3U (66685)	10 11 15
	2.0-3.0	12/24; 10/20; 8/16	1/2"U	22	3	GMGS4SD205-075-4U (66690) GMGS5SD275-100-4U (66692)	11 12
	4.0-5.0	6/12; 5/10	1/2"UT	22	1	GMGS6SD335-100-4UT (66698)	12
	3.0-4.0	8/16; 6/12	5/8"U	27	3	GMGS3SD237-075-5U (66688) GMGS4SD315-100-5U (66691)	13 13
	5.0-8.0	5/10; 4/8	5/8"UT	27	1	GMGS5SD315-100-5UT (66695)	14

# Gear Milling Standard ANSI B92.1 Inserts for Spline Applications



According to Standard ANSI B92.1, there are 7 different diametral pitches available, ranging: DP32/64 to DP8/16. For each DP, there are 8 different types of inserts to select, according to the number of teeth on the spline.

## Standard Inserts for Spline Applications

IC	L Inch	Diametral Pitch (DP)	Ordering Code	EDP (VBX)	Milling Cutter No.	Z - Range of Teeth on Gear	Toolholder / (EDP)	Page
1/4"U	.43"	DP32/64	2UEDP32/64Z10-11N1GM...	30100	N1	10-11	GMGE4S100W125-197-2U (66687) GMGD10SD335-100-2U (66683)	10
			2UEDP32/64Z12-13N2GM...	30101	N2	12-13		
			2UEDP32/64Z14-16N3GM...	30102	N3	14-16		
			2UEDP32/64Z17-20N4GM...	30103	N4	17-20		
			2UEDP32/64Z21-25N5GM...	30104	N5	21-25		
			2UEDP32/64Z26-34N6GM...	30105	N6	26-34		
			2UEDP32/64Z35-54N7GM...	30106	N7	35-54		
			2UEDP32/64Z55-135N8GM...	30107	N8	55-135		
		DP24/48	2UEDP24/48Z10-11N1GM...	30108	N1	10-11		15
			2UEDP24/48Z12-13N2GM...	30109	N2	12-13		
			2UEDP24/48Z14-16N3GM...	30110	N3	14-16		
			2UEDP24/48Z17-20N4GM...	30111	N4	17-20		
			2UEDP24/48Z21-25N5GM...	30112	N5	21-25		
			2UEDP24/48Z26-34N6GM...	30113	N6	26-34		
			2UEDP24/48Z35-54N7GM...	30114	N7	35-54		
2UEDP24/48Z55-135N8GM...	30115		N8	55-135				
3/8"U	.63"	DP20/40	3UEDP20/40Z10-11N1GM...	30116	N1	10-11	GMGE3S125W142-315-3U (66686) GMGS4SD189-075-3U (66689) GMGD8SD354-100-3U (66685)	10
			3UEDP20/40Z12-13N2GM...	30117	N2	12-13		
			3UEDP20/40Z14-16N3GM...	30118	N3	14-16		
			3UEDP20/40Z17-20N4GM...	30119	N4	17-20		
			3UEDP20/40Z21-25N5GM...	30120	N5	21-25		
			3UEDP20/40Z26-34N6GM...	30121	N6	26-34		
			3UEDP20/40Z35-54N7GM...	30122	N7	35-54		
			3UEDP20/40Z55-135N8GM...	30123	N8	55-135		
		DP16/32	3UEDP16/32Z10-11N1GM...	30124	N1	10-11		11
			3UEDP16/32Z12-13N2GM...	30125	N2	12-13		
			3UEDP16/32Z14-16N3GM...	30126	N3	14-16		
			3UEDP16/32Z17-20N4GM...	30127	N4	17-20		
			3UEDP16/32Z21-25N5GM...	30128	N5	21-25		
			3UEDP16/32Z26-34N6GM...	30129	N6	26-34		
			3UEDP16/32Z35-54N7GM...	30130	N7	35-54		
3UEDP16/32Z55-135N8GM...	30131		N8	55-135	15			



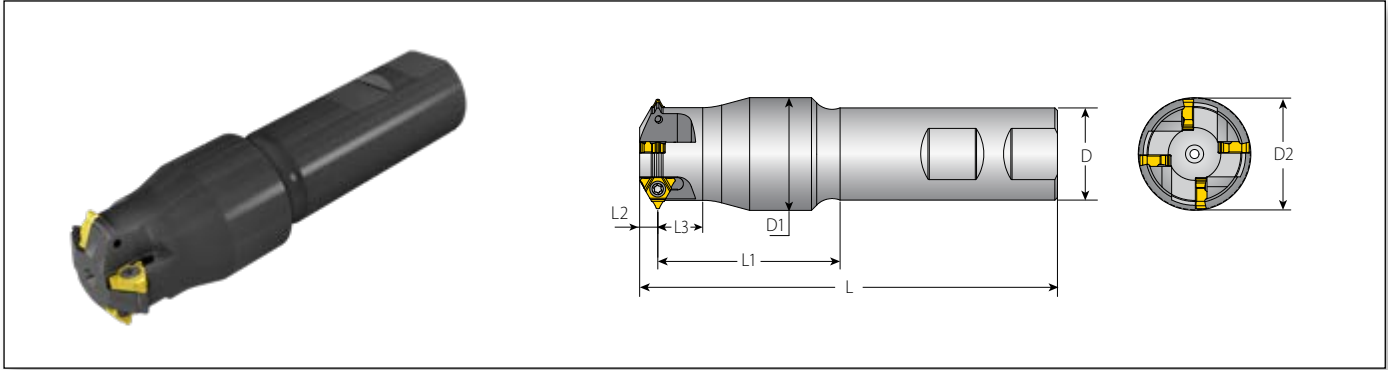
# Gear Milling Standard ANSI B92.1 Inserts for Spline Applications (con't)



## Standard Inserts for Spline Applications

IC	L Inch	Diametral Pitch (DP)	Ordering Code	EDP (VBX)	Milling Cutter No.	Z - Range of Teeth on Gear	Toolholder / (EDP)	Page
1/2"U	.87"	DP12/24	4UEDP12/24Z10-11N1GM...	30132	N1	10-11	GMGS4SD205-075-4U (66690) GMGS5SD275-100-4U (66692)	11
			4UEDP12/24Z12-13N2GM...	30133	N2	12-13		
			4UEDP12/24Z14-16N3GM...	30134	N3	14-16		
			4UEDP12/24Z17-20N4GM...	30135	N4	17-20		
			4UEDP12/24Z21-25N5GM...	30136	N5	21-25		
			4UEDP12/24Z26-34N6GM...	30137	N6	26-34		
			4UEDP12/24Z35-54N7GM...	30138	N7	35-54		
			4UEDP12/24Z55-135N8GM...	30139	N8	55-135		
		DP10/20	4UEDP10/20Z10-11N1GM...	30140	N1	10-11		12
			4UEDP10/20Z12-13N2GM...	30141	N2	12-13		
			4UEDP10/20Z14-16N3GM...	30142	N3	14-16		
			4UEDP10/20Z17-20N4GM...	30143	N4	17-20		
			4UEDP10/20Z21-25N5GM...	30144	N5	21-25		
			4UEDP10/20Z26-34N6GM...	30145	N6	26-34		
5/8"U	1.06"	DP8/16	5UEDP8/16Z10-11N1GM...	30148	N1	10-11	GMGS3SD237-075-5U (66688) GMGS4SD315-100-5U (66691)	13
			5UEDP8/16Z12-13N2GM...	30149	N2	12-13		
			5UEDP8/16Z14-16N3GM...	30150	N3	14-16		
			5UEDP8/16Z17-20N4GM...	30151	N4	17-20		
			5UEDP8/16Z21-25N5GM...	30152	N5	21-25		13
			5UEDP8/16Z26-34N6GM...	30153	N6	26-34		
			5UEDP8/16Z35-54N7GM...	30154	N7	35-54		
			5UEDP8/16Z55-135N8GM...	30155	N8	55-135		

## Standard Toolholder - Weldon Shank for IC 1/4"U

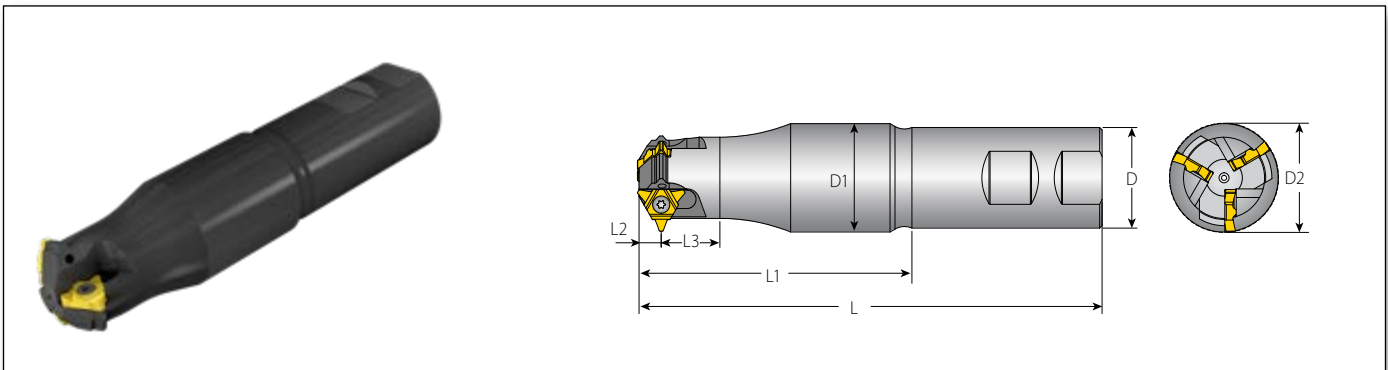


### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)								No. of Flutes	Spare Parts	
				L	L1	L3	D	D1	*D2 (ref)	L2	Z		Insert Screw	Torx Screwdriver
1/4"U	3	GMGE4S100W125-197-2U	66687	4.53	1.97	.47	1.00	1.22	1.25	.20	4	SN2T (70036)	HK2T (70227)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Weldon Shank for IC 3/8"U

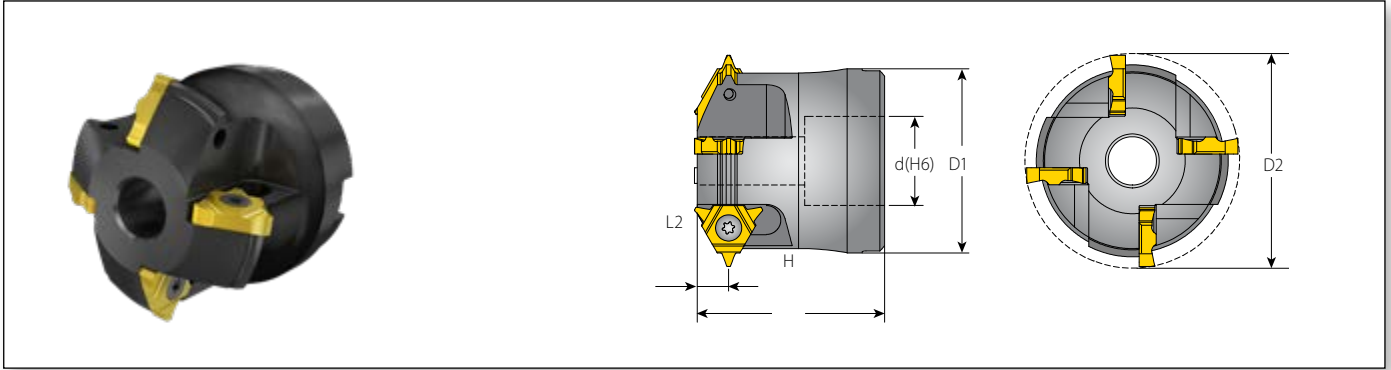


### For Gear, Rack and Spline Inserts




Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)								No. of Flutes	Spare Parts	
				L	L1	L3	D	D1	*D2 (ref)	L2	Z		Insert Screw	Torx Screwdriver
3/8"U	3	GMGE3S125W142-315-3U	66686	5.75	3.15	.73	1.25	1.35	1.42	.28	3	SN3T (70038)	HK3T (70228)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 3/8"U

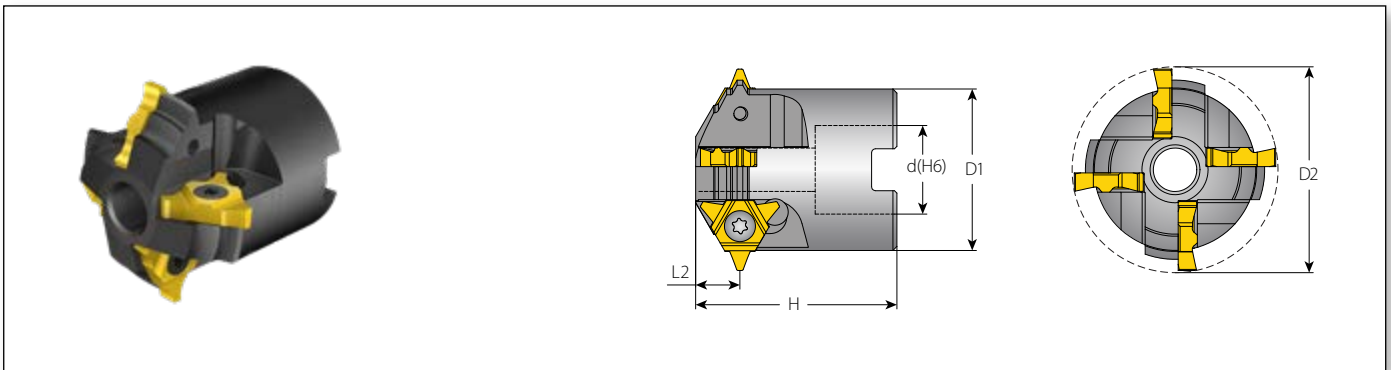


### For Gear, Rack and Spline Inserts




Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z				
IC				D1	*D2 (ref)	d (H6)	H	L2	Z	Insert Screw	Torx Screwdriver	Holder Screw	
3/8"U	3	GMSG4SD189-075-3U	66689	1.42	1.89	.75	1.57	.26	4	SN3T (70038)	HK3T (70228)	3/8-24x1.5 (70264)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 1/2"U

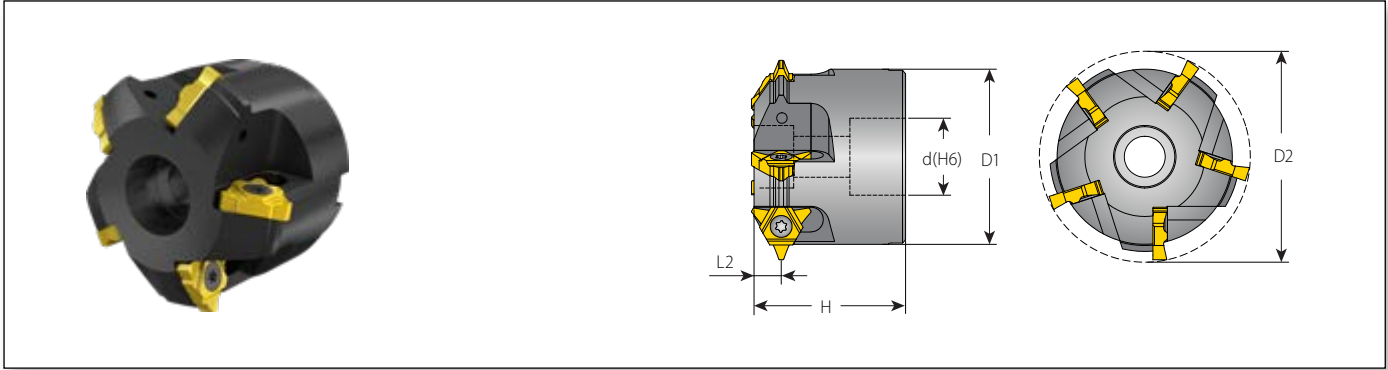


### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z				
IC				D1	*D2 (ref)	d (H6)	H	L2	Z	Insert Screw	Torx Screwdriver	Holder Screw	
1/2"U	3	GMSG4SD205-075-4U	66690	1.57	2.05	.75	1.97	.43	4	SN4T (70039)	HK4T (70241)	3/8-24x2.0 (70302)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 1/2"U (con't)

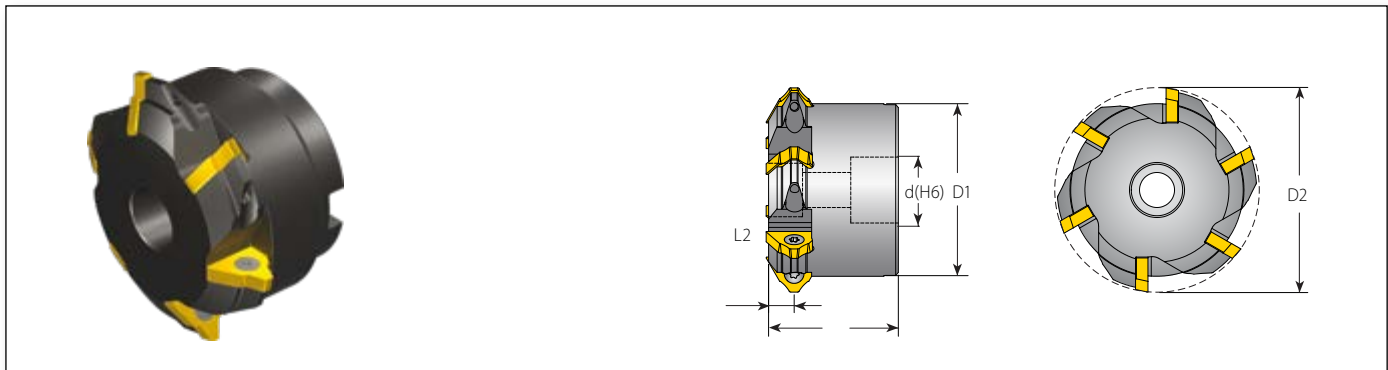


### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z		Insert Screw	Torx Screwdriver	Holder Screw
1/2"U	3	GMGS5SD275-100-4U	66692	2.28	2.75	1.00	1.97	.35	5	SN4T (70039)	HK4T (70241)	1/2-20x1.5 (70224)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 1/2"UT

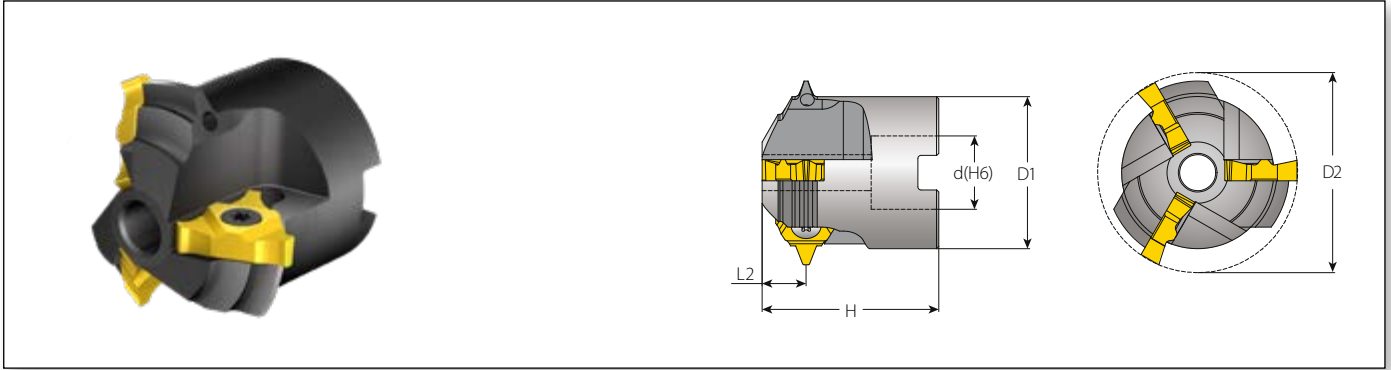


### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z		Insert Screw	Torx Key	Holder Screw
1/2"UT	1	GMGS6SD335-100-4UT	66698	2.62	3.35	1.00	1.97	.39	6	SN4T (70039)	Ballpoint T20 (70309)	1/2x20x1.5 (70224)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 5/8"U

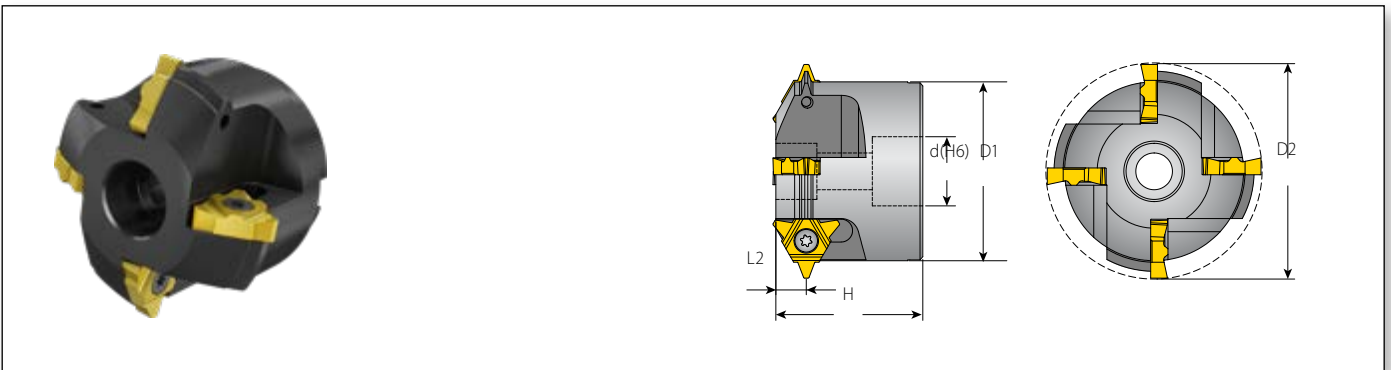


### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z		Insert Screw	Torx Screwdriver	Holder Screw
5/8"U	3	GMGS3SD237-075-5U	66688	1.80	2.37	0.75	2.05	.52	3	SN5TM (70041)	HK5T (70229)	3/8-24x2.0 (70302)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 5/8"U

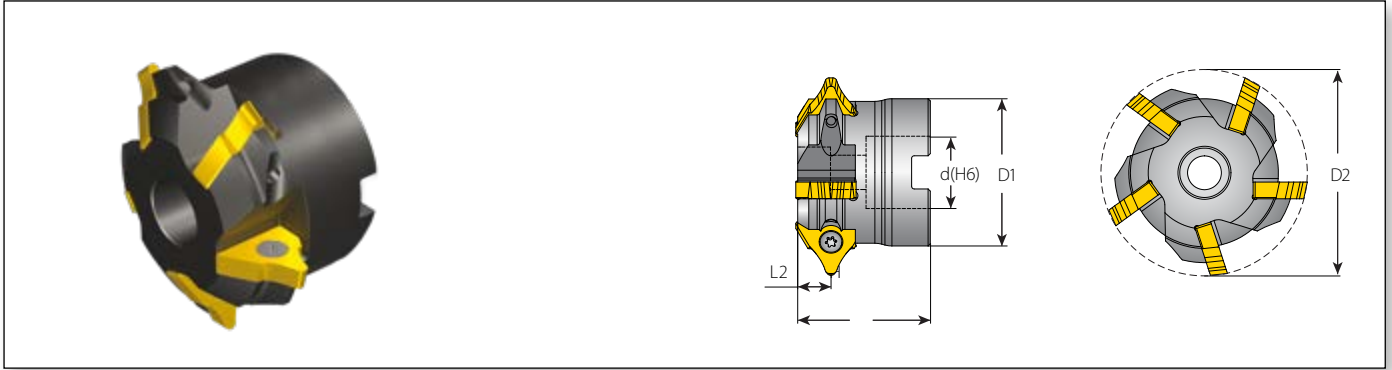


### For Gear, Rack and Spline Inserts



Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z		Insert Screw	Torx Screwdriver	Holder Screw
5/8"U	3	GMGS4SD315-100-5U	66691	2.59	3.15	1.00	2.13	.44	4	SN5TM (70041)	HK5T (70229)	1/2-20x1.5 (70224)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Shell Mill for IC 5/8"UT



### For Gear, Rack and Spline Inserts



Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts		
				D1	*D2 (ref)	d (H6)	H	L2	Z				
IC				D1	*D2 (ref)	d (H6)	H	L2	Z	Insert Screw	Torx Key	Holder Screw	
5/8"UT	1	GMGS5SD315-100-5UT	66695	2.17	3.15	1.00	1.97	.50	5	SN5TM (70041)	Ballpoint T25 (70310)	1/2-20x1.5 (70224)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Disc Mill for IC 1/4"U

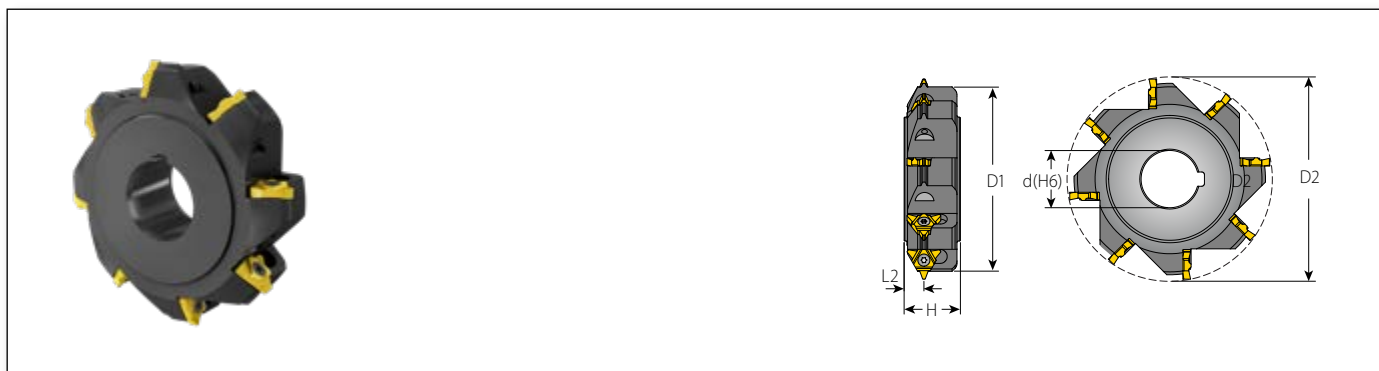


### For Gear, Rack and Spline Inserts



Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts	
				D1	*D2 (ref)	d (H6)	H	L2	Z			
IC				D1	*D2 (ref)	d (H6)	H	L2	Z	Insert Screw	Torx Screwdriver	
1/4"U	3	GMGD10SD335-100-2U	66683	3.13	3.35	1.00	.98	.49	10	SN2T (70036)	HK2T (70227)	

\* D2 refers to the mounted insert. Check D2 before machining.

## Standard Toolholder - Disc Mill for IC 3/8"U



### For Gear, Rack and Spline Inserts

Insert Size	Insert Cutting Edges	Ordering Code	EDP	Dimensions (inch)						No. of Flutes	Spare Parts	
				D1	*D2 (ref)	d (H6)	H	L2	Z			
IC				D1	*D2 (ref)	d (H6)	H	L2	Z	Insert Screw	Torx Screwdriver	
3/8"U	3	GMGD8SD354-100-3U	66685	3.23	3.54	1.00	.98	.35	8	SA3T (70028)	HK3T (70228)	

\* D2 refers to the mounted insert. Check D2 before machining.

# Tailor-Made Solid Carbide Gear Milling

**External**

Module = Pitch /  $\pi$   
DP = 25.4 / Module

## Solid Carbide Tool Benefits

### Small Tool Cutting Diameter

- Excellent solution for applications that require cutting close to the shoulder
- High RPM and fast feed

### Solid Carbide Tool

- Guarantees higher accuracy

### Multi-flute Tool

- Enables fast machining

### Tool Range

- Cutting Diameter Range: .23"-.75" (5.9-19.9mm)
- Module: 0.5-3.0
- DP: 52-13



## For Tailor-Made Gear, Rack and Spline Inserts




Shank Diameter		Gear & Rack Module Range, Max		Spline Module Range, Max	
Inch	mm	Module	Diametral Pitch (DP)	Module	Diametral Pitch (DP)
1/4"	6	0.5	DP52	0.8	DP40/80
5/16"	8	0.6	DP44	1.0	DP32/64
3/8"	10	0.8	DP32	1.25	DP24/48
1/2"	12	1.0	DP26	1.5	DP20/40
5/8"	14	1.25	DP22	1.75	DP16/32
5/8"	16	1.5	DP18	2.0	DP12/24
3/4"	18	1.75	DP15	2.5	DP10/20
3/4"	20	2.0	DP13	3.0	DP8/16



## Recommended Grades, Cutting Speeds Vc [ft/min] and Feed f [inch/tooth]

Material Group	Vardex No.	Material	Hardness Brinell HB	Vc [ft/min]	Feed f [inch/tooth]	
				VBX/ VTX		
<b>P</b> Steel	1	Unalloyed steel	Low carbon (C=0.1-0.25%)	125	328 - 689	.0079 - .0126
	2		Medium carbon (C=0.25-0.55%)	150	328 - 590	.0079 - .0126
	3		High Carbon (C=0.55-0.85%)	170	328 - 558	.0060 - .0090
	4	Low alloy steel (alloying elements ≤5%)	Non hardened	180	197 - 295	.0067 - .011
	5		Hardened	275	262 - 492	.0060 - .011
	6		Hardened	350	230 - 459	.0060 - .0098
	7	High alloy steel (alloying elements >5%)	Annealed	200	197 - 426	.0060 - .0087
	8		Hardened	325	227 - 361	.0051 - .0083
	9	Cast steel	Low alloy (alloying elements <5%)	200	328 - 558	.0060 - .0087
	10		High alloy (alloying elements >5%)	225	230 - 394	.0047 - .0087
<b>M</b> Stainless Steel	11	Stainless steel Ferritic	Non hardened	200	328 - 558	.0060 - .0087
	12		Hardened	330	328 - 558	.0063 - .0091
	13	Stainless steel Austenitic	Austenitic	180	230 - 460	.0060 - .0098
	14		Super Austenitic	200	230 - 460	.0047 - .0079
	15	Stainless steel Cast Ferritic	Non hardened	200	230 - 460	.0063 - .0094
	16		Hardened	330	230 - 460	.0047 - .0079
	17	Stainless steel Cast austenitic	Austenitic	200	230 - 394	.0060 - .0087
	18		Hardened	330	230 - 394	.0047 - .0079
<b>K</b> Cast Iron	28	Malleable Cast iron	Ferritic (short chips)	130	197 - 426	.0063 - .0095
	29		Pearlitic (long chips)	230	197 - 394	.0060 - .0087
	30	Grey cast iron	Low tensile strength	180	197 - 426	.0060 - .0087
	31		High tensile strength	260	197 - 328	.0060 - .0087
	32	Nodular SG iron	Ferritic	160	197 - 410	.0039 - .0079
	33		Pearlitic	260	164 - 295	.0060 - .0087
<b>N(K)</b> Non-Ferrous Metals	34	Aluminum alloys Wrought	Non aging	60	328 - 820	.0118 - .0197
	35		Aged	100	328 - 590	.011 - .0197
	36	Aluminum alloys	Cast	75	492 - 1312	.011 - .0197
	37		Cast & aged	90	492 - 918	.0098 - .0157
	38		Cast Si 13-22%	130	262 - 492	.011 - .0197
	39	Copper and Copper alloys	Brass	90	394 - 689	.0118 - .0197
	40		Bronze and non leaded copper	100	394 - 689	.011 - .0197
<b>S(M)</b> Heat Resistant Material	19	High temperature alloys	Annealed (Iron based )	200	66 - 148	.0035 - .0059
	20		Aged (Iron based)	280	66 - 98	.0028 - .0051
	21		Annealed (Nickel or Cobalt based)	250	49 - 66	.0031 - .0059
	22		Aged (Nickel or Cobalt based)	350	33 - 49	.0031 - .0059
	23	Titanium alloys	Pure 99.5 Ti	400Rm	230 - 459	.0028 - .0051
	24		α+β alloys	1050Rm	66 - 164	.0028 - .0051
<b>H(K)</b> Hardened Material	25	Extra hard steel	Hardened & tempered	45-50HRc	49 - 148	.002 - .0047
	26			51-55HRc*	49 - 131	.002 - .0047

\* Note: Special tools, which are not listed in this catalog, are required for extra hard steel (51-55HRc).

	Grade	Application	Sample
Indexable Insert	<b>VBX</b>	TiCN coated carbide grade. Excellent grade for <b>general use</b> .	
	<b>VTX</b>	TiAlN coated carbide grade. Excellent grade for <b>general use and hardened materials</b> .	
Solid Carbide	<b>VTH</b>	TiCN coated carbide grade. Excellent grade for <b>general use</b> .	

Other grades are available upon request.

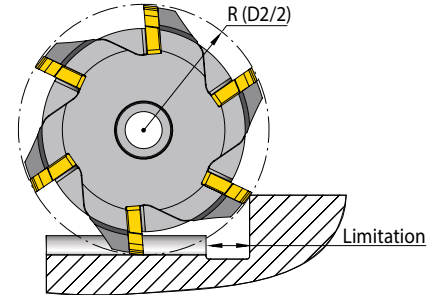
# GEAR MILLING Request Form\*

\* Please submit a completed version of this form with each request (a drawing is recommended).

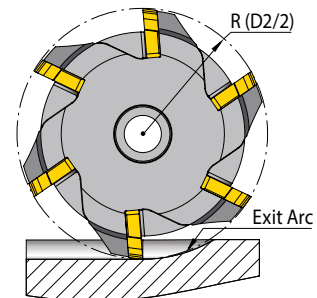
For Rack, Straight Spline, Worm or other special forms, a drawing **must** be supplied with all relevant dimensions!

## Basic Dimensions

- 1 | Gear / Spline Standard \_\_\_\_\_
- 2 | Class of Accuracy \_\_\_\_\_
- 3 | Module (M) / Diametral Pitch (DP) \_\_\_\_\_
- 4 | Number of Teeth \_\_\_\_\_
- 5 | Pressure Angle \_\_\_\_\_
- 6 | Helix Angle \_\_\_\_\_
- 7 | Direction of Helix (RH/LH) \_\_\_\_\_
- 8 | Pitch Diameter (REF) \_\_\_\_\_
- 9 | Major Diameter Max: \_\_\_\_\_ Min: \_\_\_\_\_
- 10 | Minor Diameter Max: \_\_\_\_\_ Min: \_\_\_\_\_
- 11 | Form Diameter (For Spline only) \_\_\_\_\_
- 12 | Fillet Radius \_\_\_\_\_
- 13 | Root Type (For Spline only)  Fillet Root  Flat Root



Tool Radius (R) < Tool Exit Limitation



Tool Radius (R) < Exit Arc

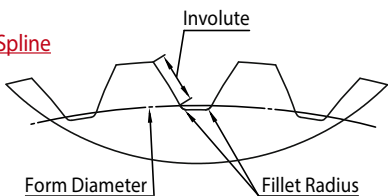
One of the following must be supplied:

- 14a | Measurement Over Pins  $\varnothing$ : \_\_\_\_\_ Max: \_\_\_\_\_ Min: \_\_\_\_\_
- 14b | Tangent Length Over (N) Teeth N: \_\_\_\_\_ Max: \_\_\_\_\_ Min: \_\_\_\_\_
- 14c | Actual - Tooth Thickness Max: \_\_\_\_\_ Min: \_\_\_\_\_

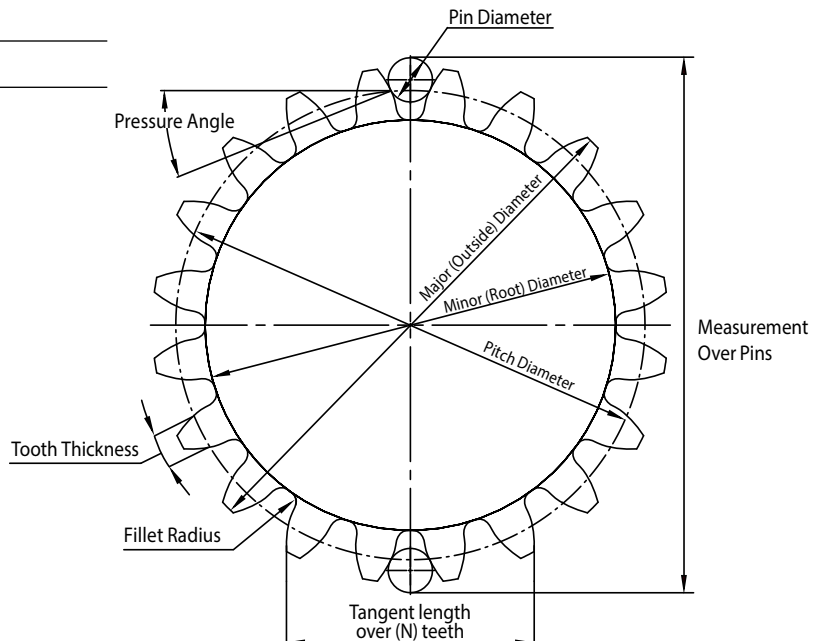
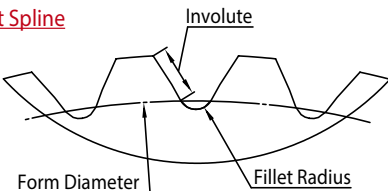
## Additional Information

- 15 | For Tool Exit Limitation, a detailed component drawing must be supplied!
- 16 | Exit Arc Radius (R) \_\_\_\_\_
- 17 | Material Hardness (During machining) \_\_\_\_\_
- 18 | Material Designation \_\_\_\_\_

### Flat Root Spline



### Fillet Root Spline







**GEAR MILLING**  
For Gear, Spline & Rack Manufacturing



**VARDEX**  
Advanced Threading Solutions



Vargus USA  
1149 Barberry Drive  
Janesville, WI 53545 U.S.A

Tel: +1-800-828-8765  
+1-608-756-4930  
Fax: +1-608-741-7125

[sales@vargususa.com](mailto:sales@vargususa.com)  
[www.vargususa.com](http://www.vargususa.com)

221-01321  
INCH EA  
09/2021  
EDITION 05