DORIAN INTERNATIONAL TOOL

The First Choice Technology

Carbide Turning Inserts

Section: A of 2016 Indexable Cutting Tools

Geometry Tolerances

The physical characteristics of an insert that differentiates one shape from the next.
The allowed deviation of all insert dimensions.

Substrate

The alloy carbide's properties, grain size, and cobalt content.

Coating

Thin layer of titanium nitrate on the surface of the insert that allows for greater cutting speeds, wear resistance and longer insert life.

Grade

A combination of substrate and coating that determines the hardness and toughness of the insert for the specific material application.

Geometry

The physical characteristics of an insert that differentiates one shape from the next.

Rake Angle

The angle formed on the insert from the top surface area and the bottom of the insert chip flow area when parallel to the floor.

Chipbreaker

The formed groove or recess along the cutting edge of the insert that breaks chips into small manageable lengths.

Relief Angle

The angle measured from the vertical line perpendicular to the cutting edge of the insert and the cutting face of the insert.

Edge Preparation

The process used to prepare the insert's edge cutting condition for specific application and material. Achieved by honing, chamfering,"T" land or any combination there of.

Negative Turning Insert

Double Sided Cutting Edge with a Negative Relief Angle.

The First Choice for high metal removal and high precision applications. Available molded or precision ground with a wide range of geometries, chipbreakers and grades.

Positive Turning Insert

Single Sided Cutting Edge with a Positive Relief Angle.

The First Choice for light roughing to precision finishing applications. Available in multiple varieties of relief angles, geometries and chipbreakers in both ANSI and ISO styles, precision grounded or molded.

Carbide, also called **Hard metal** or **Widia**, is a hard metal used in machining Ferrous and non Ferrous Materials. **Carbide Turning Inserts** will withstand higher cutting temperatures (higher than standard high speed steel tools), allow faster machining with better finishes, closer tolerances on the part and longer tool life.

The initial development of cemented and sintered carbide occurred in Germany in the 1920s to replace diamonds as a material for machining metal. The carbide insert found its way onto the German market under the name **WIDIA** (acronym for **WI**e **DIA**mant *meaning like diamond*) and reached the United States market in 1928.

Today, most Carbide Turning Inserts are made from a combination of Tungsten Carbide (WC), Titanium Carbide (TiC), and Cobalt (Co); the bonding metal. Tungsten and Titanium carbide hard particles provide the insert with the hardness, while the Cobalt makes the insert tougher and impact resistant.

Insert Application Guide

Finishing

- Hard and Wear resistant
- PVD and CVD Coating
- Small Nose radius
- Light Honed Edge
- Small Chipbreaker

Cutting Data

- Small Depth of cut (a_p)
- Small Feed per Revolution (f_n)
- High Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

Universal

- Wear Resistant and Tough
- PVD and CVD Coating
- Medium Nose Radius
- Medium Honed Cutting Edge
- Medium Chipbreaker

Cutting Data

- Medium Depth of cut (a_p)
- Medium Feed per Revolution (f_n)
- Medium Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

Roughing

- Tough and Impact Resistant
- PVD and CVD Coating
- Large Nose Radius
- Heavy Honed Cutting Edge
- Large Chip Breaker

Cutting Data

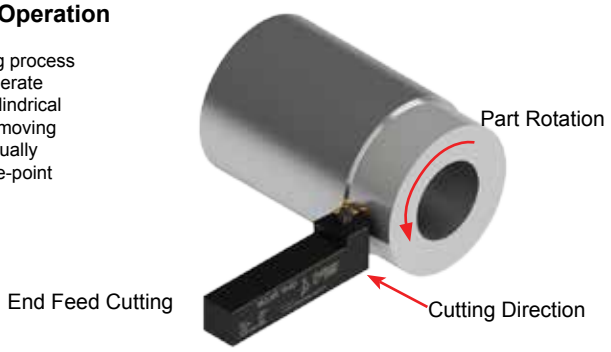
- Large Depth of cut (a_p)
- High Feed per Revolution (f_n)
- Low Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

For Insert Best Performance

Starting:	Application:	Optimum:	Coolant:
Follow the recommended use and cutting parameters of the insert according to material and application.	**For Roughing,** use a tough coated insert grade with a large nose radius, heavy honed cutting edge and large chipbreaker. Cut at a low SFM with a large Depth of Cut (a_p) and high Feed Rate per Rev. (f_n). **For Universal,** use a hard, tough & wear resistant coated insert grade with a medium nose radius, honed cutting edge and medium chipbreaker. Cut at a medium SFM with a medium Depth of Cut (a_p) and medium Feed Rate per Rev. (f_n). **For Finishing,** use a hard & wear resistant coated insert grade with a small nose radius, sharp to light honed cutting edge and small chipbreaker. Cut at a high SFM with a medium Depth of Cut (ap) and medium Feed Rate per Rev. (f_n)	**Insert Wear**, decrease Spindle Speed (n) and/or increase Feed (f_n) or change to a harder insert grade. **Insert Chipping,** increase Spindle Speed (n), decrease Feed (f_n), and/or change to a heavier honed edge or change to a tougher insert grade.	**Use Coolant**, if the insert grade allows, and always use high pressure coolant to remove the hot chips and heat from the insert to reduce thermal shock. **For Ultimate Performance** Use Dorian Inserts with Dorian Jet-Stream™ Thru Coolant System. The insert will operate at a constant low temperature, with a clean and undamaged cutting edge, Increasing Insert Life Up to 200%.

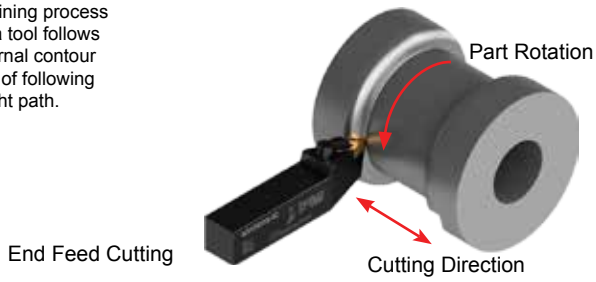
Turning Operation

A machining process used to generate external, cylindrical forms by removing material, usually with a single-point cutting tool.



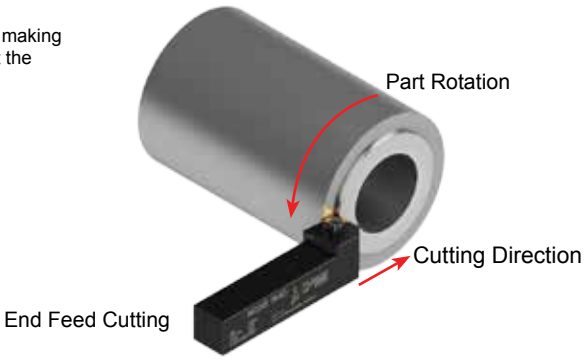
O.D. Profile

A machining process where a tool follows an external contour instead of following a straight path.



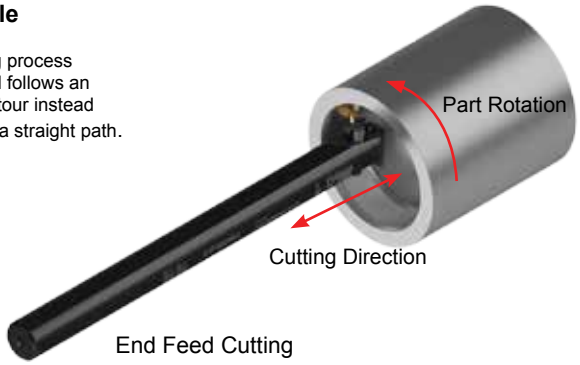
Facing Operation

The process of making a flat surface at the end of a part.



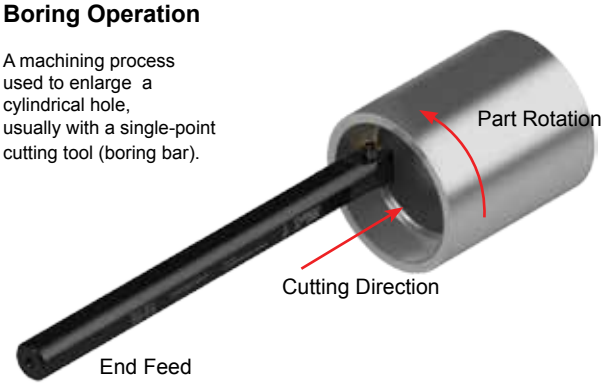
I.D. Profile

A machining process where a tool follows an internal contour instead of following a straight path.



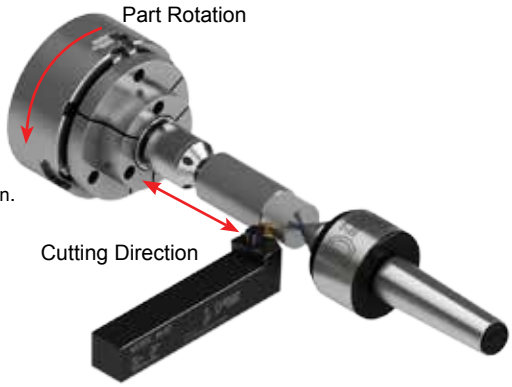
Boring Operation

A machining process used to enlarge a cylindrical hole, usually with a single-point cutting tool (boring bar).



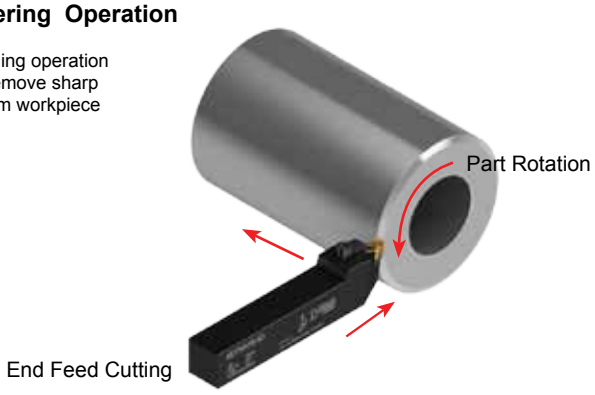
Between Centers Work

A machining process where a work piece is held by using centers on each end. It allows the entire length of the outside diameter of the part to be machined in one continuous operation.



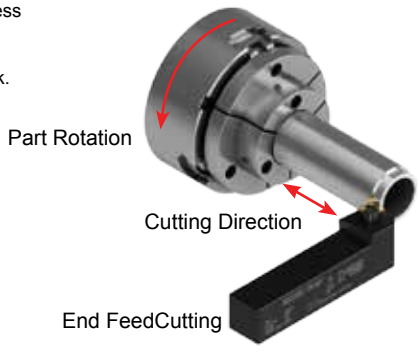
Chamfering Operation

Metal turning operation used to remove sharp edges from workpiece diameter.



Chuck Work

A machining process where any type of workpiece has to be held by a chuck.

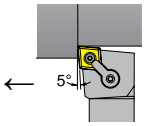


Turning and Boring Operation Selection and Application Form

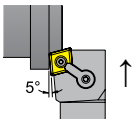
When selecting an indexable cutting tool & Insert you must check the appropriate box ☐ for each area 1-10 below and fax to 979-282-2951.

1. Operations

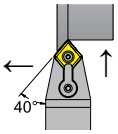
☐ Turning



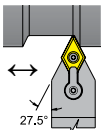
☐ Facing



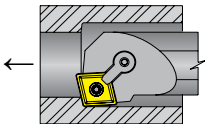
☐ Chamfering



☐ Profiling

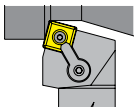


☐ Boring

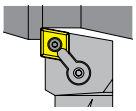


2. Application

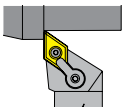
☐ Roughing



☐ Medium



☐ Finishing



3. Material

☐ Carbon Steel
☐ Alloy Steel
☐ Hardened Steel
☐ Martensitic Stainless Steel
☐ PH Series Stainless Steel
☐ 400 Series Stainless Steel
☐ 300 Series Stainless Steel
☐ Cast Iron
☐ Aluminum
☐ High Temper Alloy
☐ Non-Ferrous

4. Material Form

☐ Bar Stock ☐ Tubing ☐ Casting ☐ Forging

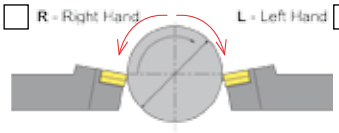
5. Tool Size

Square Shank ☐ Size: _____

Boring Bar ☐ Size: _____

6 A. Turning Direction

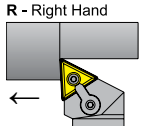
☐ R - Right Hand ☐ L - Left Hand



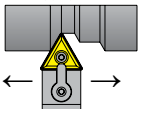
6 B. Cutting Direction

Square Shank

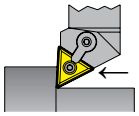
☐ R - Right Hand



☐ N - Neutral

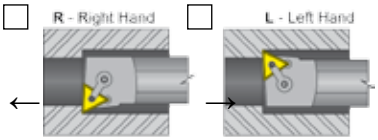


☐ L - Left Hand



Boring Bar

☐ R - Right Hand ☐ L - Left Hand



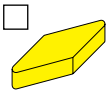
7. Machine Type

☐ Manual ☐ Swiss ☐ CNC ☐ Other

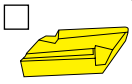
8. Insert Geometry

Finishing - Light Roughing

☐ V - 35° Diamond



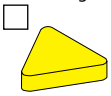
☐ K - 55° Parrellogram



☐ D - 55° Diamond

Multi-application

☐ T - Triangle



☐ W - 80° Trigon

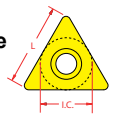
☐ C - 80° Diamond

Roughing

☐ S - Square

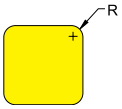
☐ R - Round

9. Insert Size



A.N.S.I	☐ 5/32"	☐ 7/32"	☐ 1/4"	☐ 3/8"	☐ 1/2"	☐ 5/8"	☐ 3/4"	☐ 1.0"
I.S.O.	☐ 6mm	☐ 9mm	☐ 11mm	☐ 12mm	☐ 15mm	☐ 16mm	☐ 19mm	☐ 25mm

10. Insert Tip Radius



☐ Sharp Point

☐ 1/128"	0,2mm	☐ 1/32"	0,8mm	☐ 1/16"	1,6mm
☐ 1/64"	0,4mm	☐ 5/128"	1,0mm	☐ 3/32"	2,4mm
☐ 5/256"	0,5mm	☐ 3/64"	1,2mm	☐ 1/8"	3,2mm

Turning Application Data Sheet

FREE INSERTS
Complete Form For Test Inserts!

Please complete and email to sales@doriantool.com or fax to 888-508-7055

Custome Name:	**Person Filling Out the Form:**
Contact Name:	**Name:**
Adress:	**Adress:**
Phone:	**Phone:**
Fax:	**Fax:**
Email:	**Email:**

Application Data:

Operation Type:	☐ Turning	☐ Boring		
Material Type:				
Material Hardeness:				
Material Form:	☐ Bar Stock	☐ Tubing	☐ Casting	☐ Forging
Machine Type:	☐ Manual	☐ CNC	☐ Swiss	
Coolant:	☐ High Pressure	☐ Flood	☐ None	
SFM:				
Depth of Cut:				
Feed Rate:				
Interrupted Cuts?:				
Competitor Insert Info:				

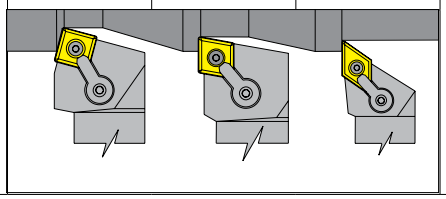
Use this space for any aditional information you would like to include

NOTES:

Turning and Boring Operation Selection and Application Form

M-Style

Machining Application

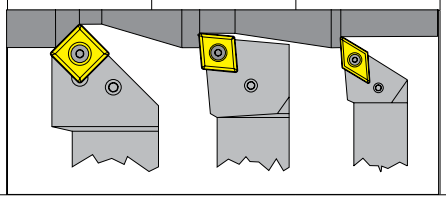
External	Best	Good	Average
	Roughing	Medium	Finishing
Internal			

Negative Turning Insert Shape

Roughing	Medium	Finishing
Round	80° Diamond	55° Diamond
	Triangle	
Square	80° Trigon	35° Diamond

P-Style

Machining Application

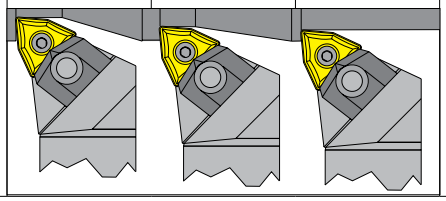
External	Good	Best	Good
	Roughing	Medium	Finishing
Internal			

Negative Turning Insert Shape

Roughing	Medium	Finishing
Square	80° Diamond	55° Diamond

W-Style

Machining Application

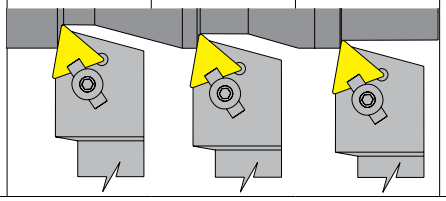
External	Good	Best	Average
	Roughing	Medium	Finishing
Internal			

Negative Turning Insert Shape

Roughing	Medium	Finishing
	Triangle	
	80° Trigon	

C-Style

Machining Application

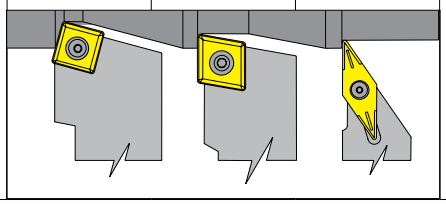
External	NOT Recommended	Best	Average
	Roughing	Medium	Finishing
Internal			

11° Positive Turning InsertShape

Roughing	Medium	Finishing
	Square	
	Triangle	

S-Style

Machining Application

External	NOT Recommended	Average	Best
	Roughing	Medium	Finishing
Internal			

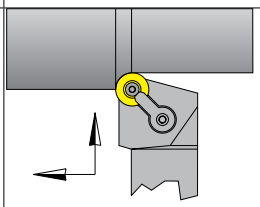
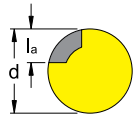
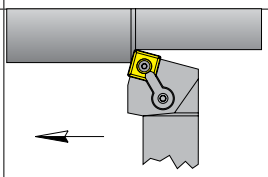
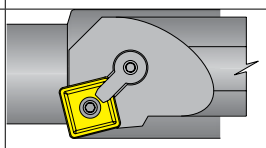
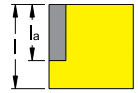
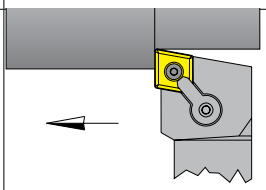
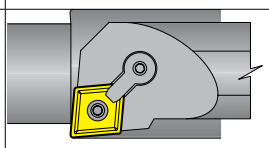
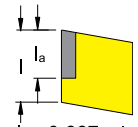
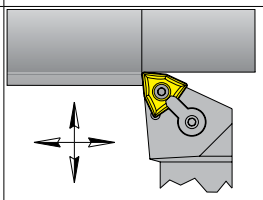
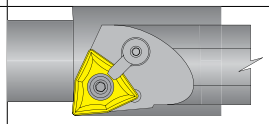
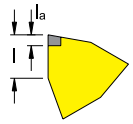
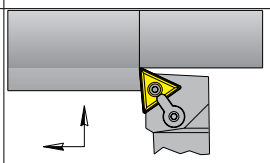
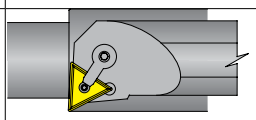
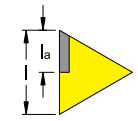
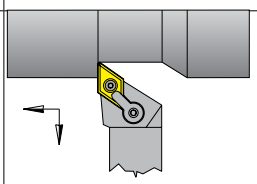
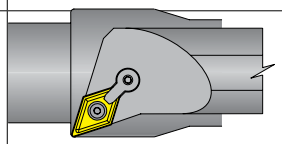
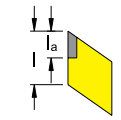
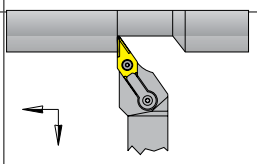
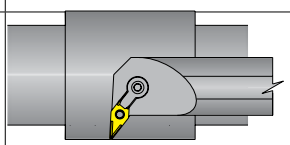
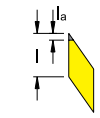
7º/ 11º/ 15º Positive Turning Insert Shape

Roughing	Medium	Finishing
Round	80° Diamond	55° Diamond
	Triangle	
Square	80° Trigon	35° Diamond

Insert Geometry and Application Selection

Stronger Roughing Low SFM

Weaker Finishing High SFM

Insert Geometry	Application	O.D. Turning	I.D. Turning	Max. Depth of Cut
Round	• Heavy Duty Roughing • Facing • Turning		N/A	 l_a = 0.400 x d
Square	• Heavy Duty Roughing • Facing • Turning • Chamfering • I.D. Turning			 l_a = 0.667 x l
80º Diamond	• Roughing • Finishing • Turning • Facing • Chamfering • I.D. Turning			 l_a = 0.667 x l
80º Trigon	• Roughing • Finishing • Turning • Facing • I.D. Turning			 l_a = 0.250 x l
Triangle	• Light Roughing • Finishing • Turning • Facing • Chamfering • I.D. Turning			 l_a = 0.500 x l
55º Diamond	• Light Roughing • Finishing • Turning • O.D. Profiling • I.D. Profiling			 l_a = 0.500 x l
35º Diamond	• Very Light Roughing • Finishing • O.D. Profiling • I.D. Profiling			 **l_a = 0.125 x l**

The Indexable Carbide Insert: A cutting bit that has multiple cutting edges and fits in a Toolholder or Boring Bar. Once the insert cutting edge wears a machinist can re-index to a new cutting edge or replace the insert.

Factors For Determining Effective Cutting Edge Length

Shape - As the insert cutting angle becomes smaller, the strength of the insert declines. An 80° triangle insert will be stronger than a 55° diamond insert.

Type - Insert type must be taken into consideration in addition to shape. Some cutting geometries are designed for roughing and some for finishing.

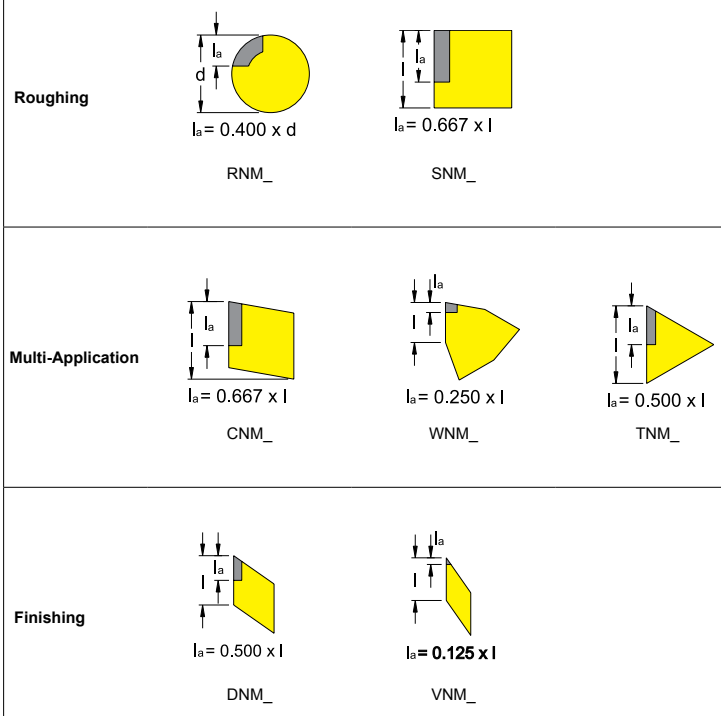
Toolholder lead angle - As the toolholder lead angle increases, the length of the effective cutting edge required for a cut also increases.

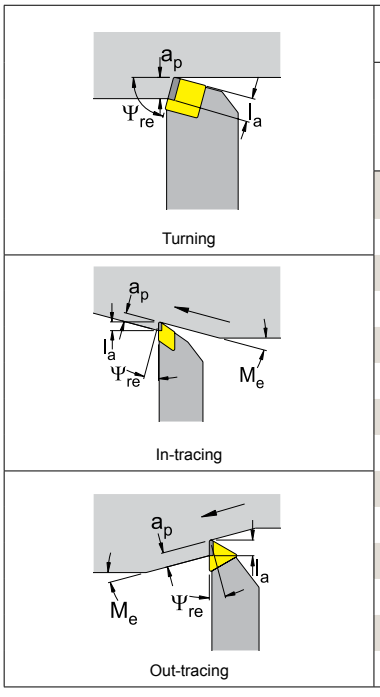
If the depth of cut- Is greater than the effective cutting edge, either a smaller depth of cut or a larger size insert should be selected.

Variables- For Determining Effective Cutting Edge:

a_p = Depth of Cut
l = Total Insert Cutting Edge
l_a = Effective Cutting Edge
M_e = Tracing Angle
Ψ_r = Toolholder Lead Angle
$\Psi_{re} = \Psi_r - M_e$ = Effective Lead Angle

Effective Insert Cutting Edge by Insert Shape

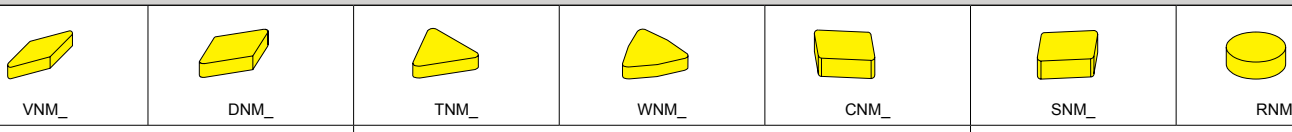




Effective Insert Cutting Edge Length for Selected Lead Angles

Cutting Depth (a_p)		Lead Angle Ψ_r											
		0° 3° 5°		15°		30°		45°		60°		75°	
		Effective Insert Cutting Edge Length (l_a) of the Insert											
Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
0.010	0,25	0.010	0,25	0.010	0,25	0.012	0,30	0.014	0,35	0.020	0,50	0.036	0,90
0.020	0,50	0.020	0,50	0.021	0,53	0.023	0,58	0.028	0,70	0.039	0,98	0.072	1,80
0.040	1,00	0.040	1,00	0.041	1,03	0.046	1,15	0.056	1,40	0.078	1.95	0.145	3.63
0.080	2,00	0.080	2,00	0.083	2,08	0.092	2,30	0.113	2,83	0.156	3,90	0.290	7,25
0.120	3,00	0.120	3,00	0.124	3,10	0.138	3,45	0.169	4,23	0.234	5,85	0.434	10,85
0.160	4,00	0.160	4,00	0.166	4,15	0.184	4,60	0.226	5,65	0.312	7,80	0.579	14,48
0.200	5,00	0.200	5,00	0.207	5,18	0.230	5,75	0.282	7,05	0.390	9,75	0.724	18,10
0.240	6,00	0.240	6,00	0.248	6,20	0.276	6,90	0.338	8,45	0.468	11,70	0.869	21,73
0.280	7,00	0.280	7,00	0.290	7,25	0.322	8,05	0.395	9,88	0.546	13,65	1.014	25,35
0.315	7,88	0.315	7,88	0.326	8,15	0.362	9,05	0.444	11,10	0.614	15,35	1.140	28,50
0.350	8,75	0.350	8,75	0.362	9,05	0.403	10,08	0.494	12,35	0.683	17,05	1.267	31,68
0.400	10,00	0.400	10,00	0.414	10,35	0.460	11,50	0.564	14,10	0.780	19,50	1.448	36,20
0.600	15,00	0.600	15,00	0.621	15,53	0.690	17,25	0.846	21,15	1.170	29,25	2.172	54,30

Insert Geometry Application



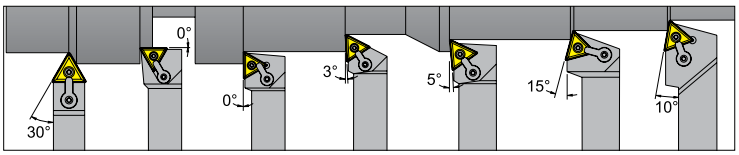
Finishing	Multi-Application	Roughing
The smaller insert angles of the 55° diamond and 35° diamond inserts are the best choice. These inserts allow for a finer finish.	When turning, facing, chamfering, profiling, or light roughing, use the 80° diamond, 80° trigon, or triangle for best results. Though these inserts combine some of the best features of both the roughing and finishing inserts, they should not be The First Choice for either heavy roughing or extreme finishing.	Round or square inserts are the best choice because of their superior strength due to large insert angles.

Insert Properties

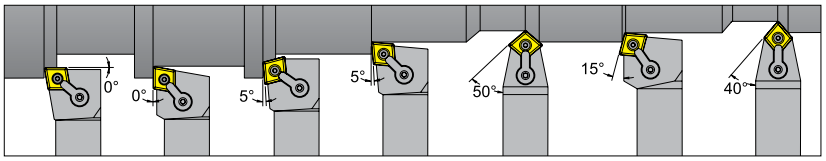
Minimum ←	Cutting Edge Strength	→ Maximum
Weaker ←	Insert Attitude	→ Stronger
Finishing ←	Turning Application	→ Roughing
Multi ←	Turning Operation	→ Single
Smooth ←	Surface Finishing	→ Vibration
Low ←	Cutting Force	→ High
High ←	Revolution Per Minute	→ Low
Low ←	Feed Per Revolution	→ High

Insert Versatility

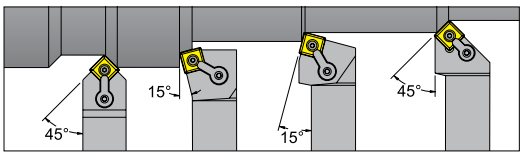
Triangle



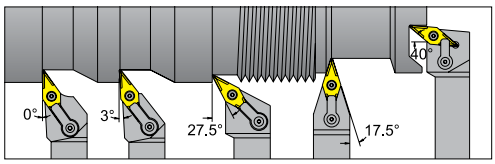
80º Diamond



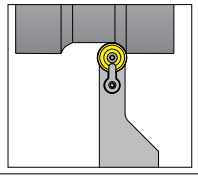
Square



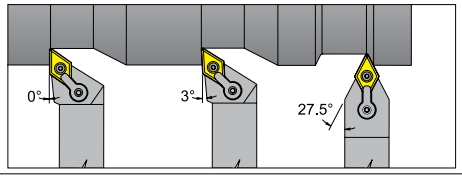
35º Diamond



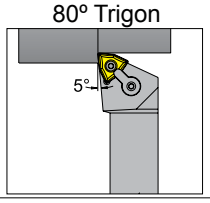
Round



55º Diamond



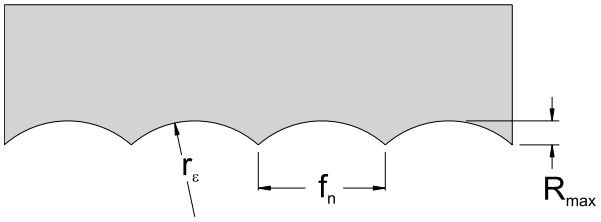
80º Trigon



R_{max} Conversion Chart

R_{max} µinch	R_{max} µm	$R_{a=CLA=AA}$ µinch	$R_{a=CLA=AA}$ µm	RMS µinch	RMS µm	Roughness Grade No.	Triangle Symbol
60	1,6	12.0	0,30	13.3	0,34	N5	
70	1,8	14.0	0,36	15.5	0,39		
80	2,0	16.0	0,41	17.8	0,45		
90	2,2	18.0	0,46	20.0	0,51	N6	
100	2,4	20.0	0,51	22.2	0,56		
110	2,8	22.2	0,56	24.4	0,62		
120	3,0	24.0	0,61	26.6	0,68		
140	3,5	28.0	0,71	31.1	0,79		
160	4,0	32.0	0,81	35.5	0,90		
180	4,5	36.0	0,91	40.0	1,0		
200	5,0	40.0	1,0	44.4	1,1	N7	
240	6,0	48.0	1,2	53.3	1,4		
280	7,0	56.0	1,4	62.2	1,6		
320	8,0	64.0	1,6	71.0	1,8		
360	9,0	72.0	2,8	79.9	2,0		
400	10,0	82.0	2,1	90.7	2,3	N8	
600	15,0	127.0	3,2	141.0	3,6		
800	20,0	177.0	4,5	196.0	5,0		
1000	25,0	230.0	5,8	255.0	6,5	N9	
1050	27,0	242.0	6,1	268.0	6,8		
1200	30,0	288.0	7,3	320.0	8,1		
1400	44,5	352.0	8,9	390.0	9,9	N10	
1600	53,5	421.0	10,7	467.0	11,9		
1800	63,0	497.0	12,6	552.0	14,0		
2000	74,0	582.0	14,8	646.0	16,4		

Finding R_{max}



R_{max} = profile depth in µinch/µmeter
r_ε = nose radius in inch/millimeter
f_n = feed in inch/millimeter per revolution

$$R_{max} = \frac{f_n^2 \times 10^6}{8r_\varepsilon}$$
Theoretical Surface Finish

$$f_n = \sqrt{\frac{R_{max} \times 8r_\varepsilon}{10^6}}$$
Feed Rate

$$r_\varepsilon = \frac{f_n^2 \times 10^6}{8 \times R_{max}}$$
Radius

Nose Radius and Feed

Insert Radius (re) inch	Insert Radius (re) mm	Maximum Feed FPR (fn) inch	Maximum Feed FPR (fn) mm	Minimum Depth of Cut	Minimum Rate
0.004	0,10	0.002	0,05		
0.008	0,20	0.004	0,10		
0.016	0,40	0.008	0,20		
0.032	0,80	0.016	0,40		
0.047	1,20	0.023	0,60		
0.062	1,6	0.031	0,80		
0.093	2,4	0.046	1,2		

Insert Nose Radius

Insert nose radius plays a major role in surface finish. In general, for a given feed rate, the larger the nose radius, the smoother the finish. To help ensure an acceptable finish, the chart at left gives the recommended maximum feed rates for selected insert nose radii.

Roughing Application

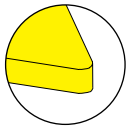
- Use the largest possible radius of the insert nose to allow for greater feed rates. This will result in better stability and lengthen the insert life.
- If vibration is a problem, use a smaller radius.
- The maximum feed rate (fn) should never exceed 1/2 of the insert nose radius.

Depth of Cut

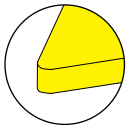
The minimum Depth of Cut should not be less than a half insert.

Finishing Application

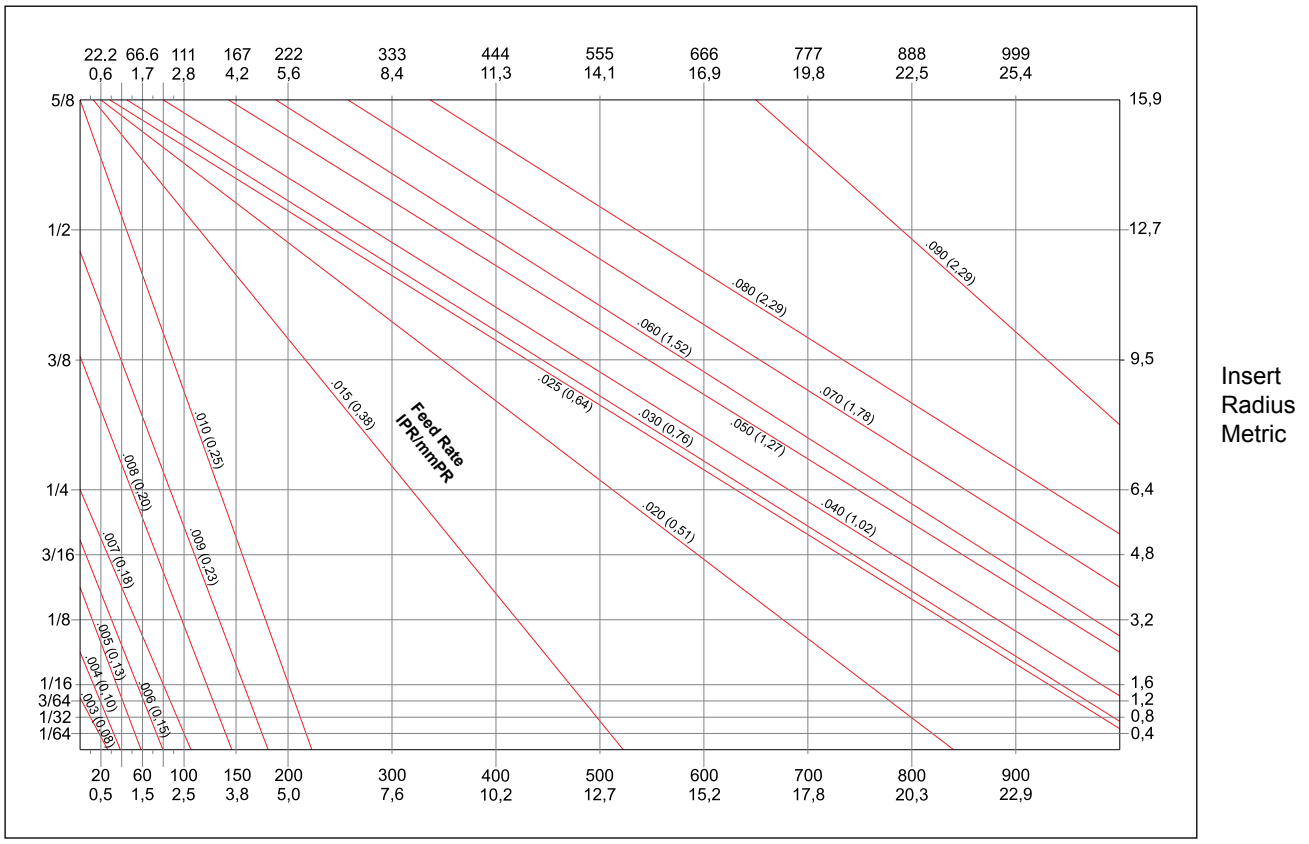
- Nose radius and feed along with workpiece stability and chucking rigidity are the major factors in surface finish and tolerance.
- To improve surface finish, use higher cutting speeds.
- Use a small radius insert in order to limit vibration. If vibration is still a problem, use a smaller radius.
- Choosing the correct insert grade is essential for a quality finish.



Insert Radius Selection Chart



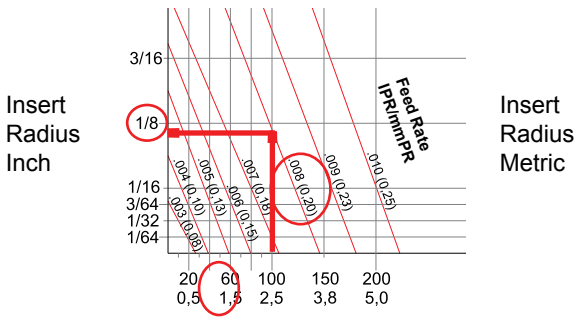
Theoretical Surface Finish AA



Theoretical Surface Finish RMS

Sample Radius Selection

Theoretical Surface Finish AA



Theoretical Surface Finish RMS

Using the Insert Radius Selection Chart

1. Select the desired surface finish, AA or RMS
   (Example to the left uses a surface finish of 100 RMS).

2. Draw a vertical line from the desired surface finish to the desired feed rate
(In the Example, .008 IPR).

3. Draw a horizontal line from the intersection of the surface finish and feed rate to find the recommended insert radius. If this line falls between two radii, chose the larger (1/8 in the example). If the recommended radius is larger than desired, choose a smaller feed rate and repeat step 3.

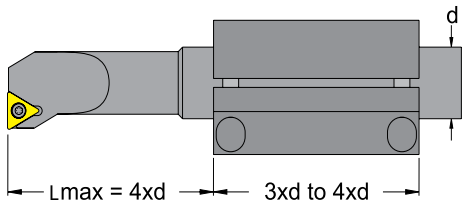
This chart may also be used to find a theoretical surface finish by simply using a known insert radius and feed rate.

Note: Information provided in this chart is to be used as a starting point only and may need to be adjusted to accommodate actual working conditions.

Guidelines for Utilizing The Boring Bar for Internal Work

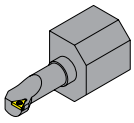
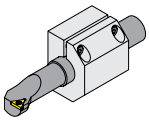
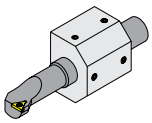
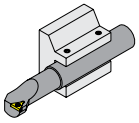
- When choosing a boring bar, always try to select the largest shank diameter that the application will allow.
- As a rule of thumb, never allow a boring bar to extend more than four times its diameter from the end of its clamping surface.
- Using boring bars with coolant through the shank can greatly enhance the removal of chips and improve surface finish on deep bores or blind holes.
- Be sure to use a stable, properly sized clamping method to secure a boring bar. Use the following information as a guide:

  Clamping Length: 3-4 x bar diameter
  Hole Tolerance: H8
  Surface Finish: 32μ in R_a
  Hardness: 45 HRC minimum

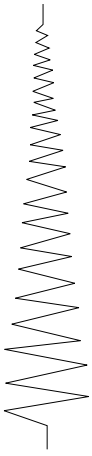
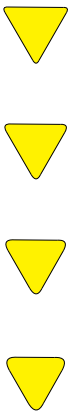
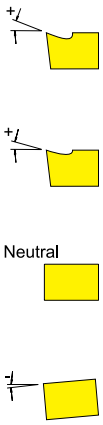


Note: This rule is for steel boring bars only. Carbide boring bars are effective with an overhang of up to seven times the bar diameter.

Boring Bar Clamping Selection

Best Collar Lock System	Better Screw Lock System	Good	Not Recommended
			
Integral bar or flange mounting. Most rigid, but not adjustable.	Split block holder. Provides maximum surface area for clamping.	Cylindrical holder with screws. Provides quick center line reference.	V-groove with screws. See cylindrical holder with screws.

Minimizing Vibration

Less Vibration	Insert Radius	Cutting Rake
	Use a smaller radius to limit vibration.	Use as positive cutting rake to limit vibration.
More Vibration		

Material Application	Best
Titanium Alloys, Inconel, Hastelloy, Waspaloy	●
Carbon-Graphite-Phenolic	●
Brass , Bronze, Copper	●
Aluminum	○
Carbon & Alloy Steel	●
Stainless Steel	●
Cast Iron	●

7° Positive

Precision ground insert
Precision ground Chip Breaker
Light Honed Cutting Edge
Uncoated & Coated
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DNU25GT
General Purpose Turning & Boring on smooth surface.
Low V_C, No interrupted cuts.

DUP25GT
Universal Turning & Boring, on smooth surface.
High V_C, No interrupted cuts.

DUP35RT
Unstable Turning & Boring working condition light uneven surface,
Medium V_C, Light Interrupted cuts.

Insert Chip Breaker

UEF High performance

The Precision Ground Chip Breaker, controls the length of the chips. Best for precise turning and boring application small holes with precise tolerances and high surface finish.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DNU25GT

First Choice: For general turning applications at a medium SFM (V_C). Uncoated, hard micro-grained substrate with a hard and tough cutting edge for light interrupted cuts. Best for Aluminum, Super Alloys, Plastic and all non Ferrous metals and materials.

DUP25GT

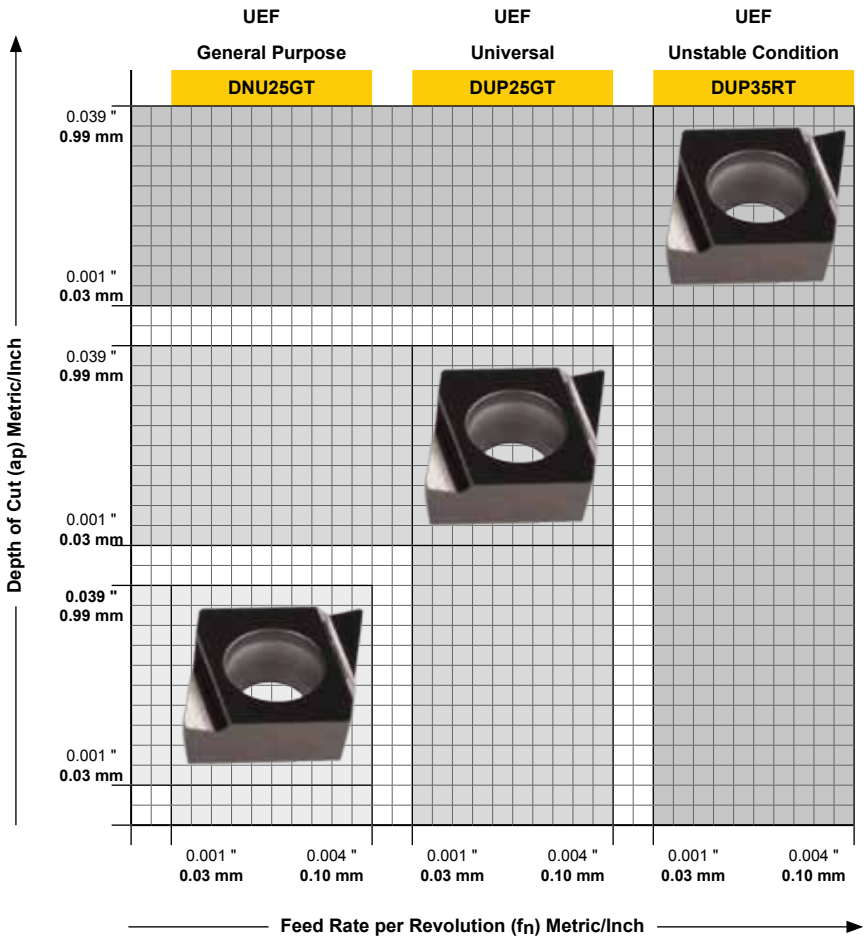
First Choice: For Universal turning applications at high SFM (V_C). Hard, tough, wear and abrasive resistant substrate the PVD TiN/TiAlN coating improves cutting performance and insert life.
For Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

DUP35RT

First Choice: For all around and unstable turning applications at a medium SFM (V_C). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C Coating improves cutting performance and insert life. (Light Interrupted Cuts) Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

Insert Application

High Precision Turning & Small Boring Application



Material Application	Best
Titanium Alloys, Inconel, Hastelloy, Waspaloy	●
Carbon & Alloy Steel	●
Stainless Steel	●
Malleable, Modular, and Gray Cast Iron	●
Brass , Bronze, Copper	●
Carbon-Graphite-Phenolic	●
Hardened Alloy Steel	●

7° Positive

Precision pressed insert
Ground Top, no Chip Breaker
Light Honed Cutting Edge
Coated
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DKU10HT
High performance Turning & Boring
High Vc, Light interrupted cuts.

DUP15VT
Universal Turning & Boring,
Medium V_C, for interrupted cuts

DUP35RT
General Turning & Boring,
Medium/High V_C, for interrupted cuts.

Insert Chip Breaker

KEU High performance

The precision ground periphery and top of the insert creates a sharp and precise cutting edge, best for small depth of cut, close working tolerances and high surface finish for turning and boring application.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition

SFM (V_C)
Value are given at minimum Feed Rate, Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

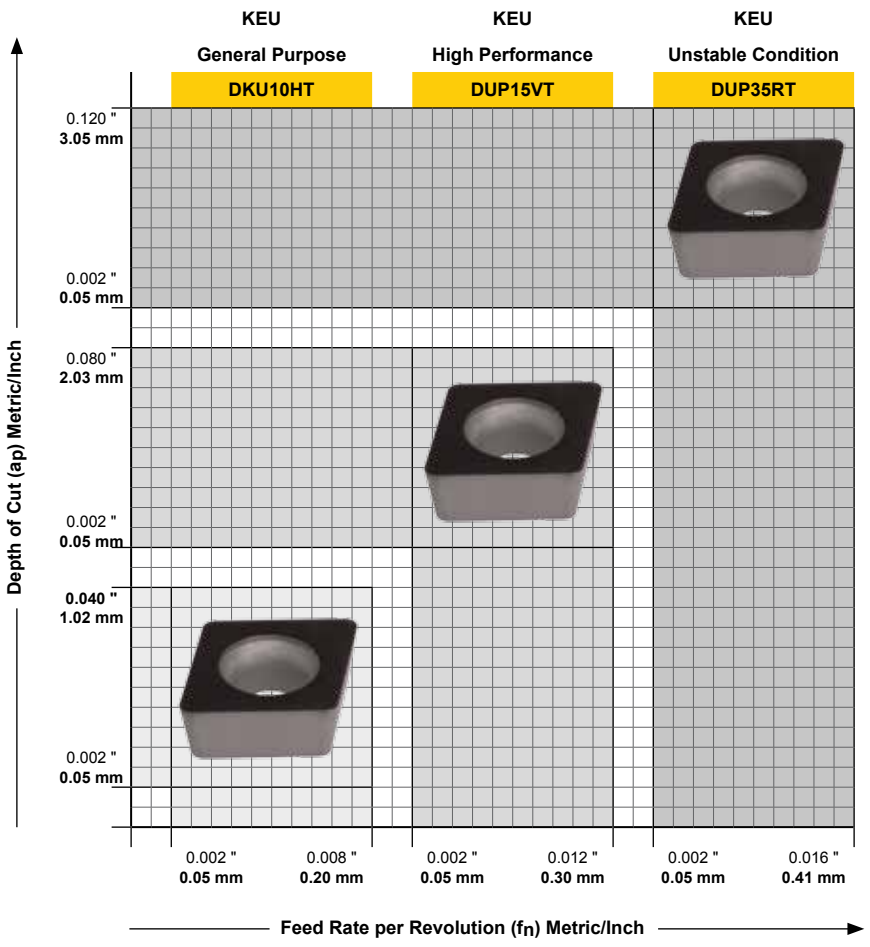
DKU10HT
First Choice: For general turning applications at Low to medium SFM (V_C). Wear and abrasive resistant uncoated substrate. (No Interrupted Cuts). Best for all non Ferrous materials including Gray Iron and Ductile Iron. Aluminum, Stainless Steel and Hardened Steel.

DUP15VT
First Choice: For High Performance in turning applications at a very high SFM (V_C). Very hard and wear resistant substrate, the PVD AlCrN hard coating minimize the cutting friction, with a better surface finish and a longer insert life. (No Interrupted cuts).
Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

DUP35RT
First Choice: For all around and unstable turning applications at a medium SFM (Vc). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C Coating improves cutting performance and insert life. (Light Interrupted Cuts).
Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

Insert Application

High Precision Turning & Boring Application



Material Application	Best
Titanium Alloys, Inconel, Hastelloy, Waspaloy	●
Carbon-Graphite-Phenolic	●
Brass , Bronze, Copper	●
Aluminum	○
Carbon & Alloy Steel	●
Stainless Steel	●
Cast Iron	●

7° Positive

Precision ground insert
Positive pressed Chip Breaker
Light honed Cutting Edge
Coated
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DUP15VT
High Performance Turning & Boring on smooth surface.
High V_C, No interrupted cuts.

DUP25GT
Universal Turning & Boring on smooth surface.
High V_C, No interrupted cuts

DUP35RT
Unstable Turning & Boring working condition light uneven surface,
Medium V_C, Light Interrupted cuts.

Insert Chip Breaker

UEU High performance

The precision ground periphery and pressed chip breaker of the insert, creates a sharp and precise cutting edge, best for small to medium depth of cut, close working tolerances and high surface finish for general turning and boring application.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition.
Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate.
Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DUP15VT

First Choice: For High Performance in turning applications at a very high SFM (V_C). Very hard and wear resistant substrate, the PVD AlCrN hard coating minimize the cutting friction, with a better surface finish and a longer insert life. (No Interupted Cuts).
Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

DUP25GT

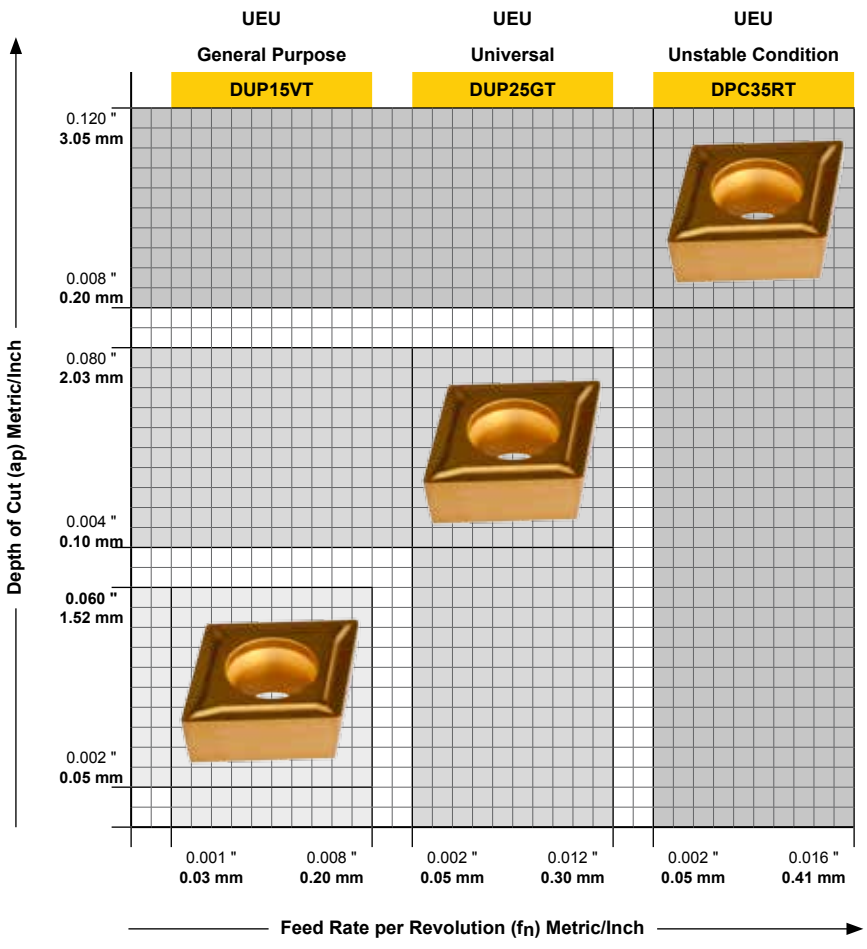
First Choice: For Universal turning applications at high SFM (V_C).
Hard, tough, wear and abrasive resistant substrate the PVD TiN/TiAlN coating improves cutting performance and insert life. (No Interupted Cuts)
Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

DPC35RT

First Choice: For all around and unstable turning applications at a medium SFM (Vc). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C Coating improves cutting performance and insert life. (Light Interrupted Cuts)
Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

Insert Application

High Precision Turning & Boring Application



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	●
Gray Cast Iron	●

7° Positive

Precision pressed insert
Positive chip breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface.
High V_c, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface.
Medium V_c, Ligth interrupted cut.

DPC35RT
Tough & Impact Resistant, from Roughing to Finishing on rough surface.
Low V_c, interrupted cut.

Insert Chip Breaker

PEF Finishing
The sharp cutting edge (light honed) and the small Chip Beaker, will machine small Depth of Cut at low Feed Rate, with precise machining repeatability, good surface finish, and breaking the chips in short length.

PEM Light Roughing to Finishing
The medium honed cutting edge and the medium Chip Beaker, will allow to machine with a wide range of cutting depths, Feed Rates and a good chip control.

PEU Multi Application
The honed cutting edge and the medium Chip Beaker, allows a multi turning and boring application, with good machining tolerances, surface finish and chip control.

Insert Attitude

Cutting Condition: Wet

SFM (V_c)
Value are given in wet cutting condition. Reduced V_c 20% when cutting in dry condition.

SFM (V_c)
Value are given at minimum Feed Rate. Reduced V_c from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DPC15HT

First Choice: From finishing to roughing turning applications at a high SFM (V_c). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

DPC25UT

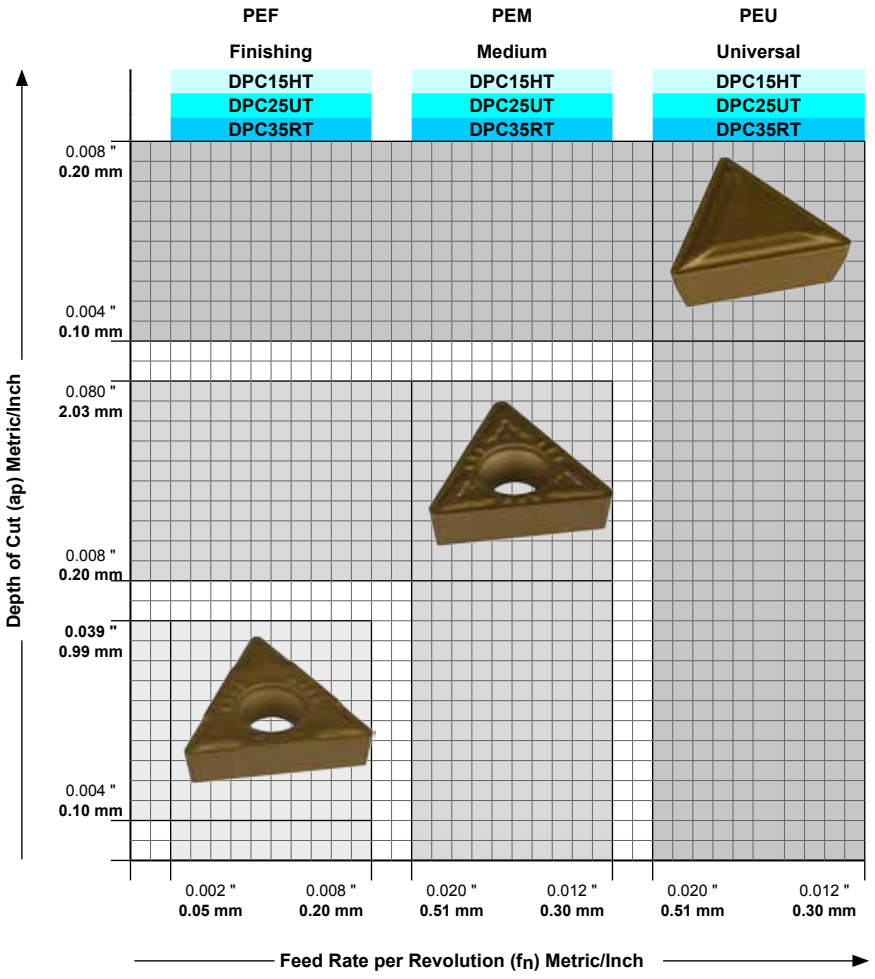
First Choice: For universal turning applications at a medium SFM (V_c). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating, (medium interrupted cut) for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT

First Choice: For casting, forging and uneven surface turning applications at a low SFM (V_c). Tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating, (for interrupetd cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

Insert Application

General Turning & Boring Application



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	●
Gray Cast Iron	●

7° Positive Insert

Precision ground insert
High Positive pressed Chip Breaker
Light honed Cutting Edge
Uncoated & Coated
Multi geometry
High Presicion Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard and Wear Resistant, from Roughing to Finishing on smooth surface,
High V_C no interrupted cut.

DPC25UT
Hard and tough, from Roughing to Finishing on uneven surface,
Medium V_C, Light interrupted cut.

DPC35RT
Tough and Impact Resistant, from Roughing to Finishing on rough surface, Low V_C, interrupted cut.

DMC30UT
Universal Turning & Boring,
Medium V_C, for interrupted cuts.

Insert Chip Breaker

UEX High performance

The High Positive and large Chip Breaker allows large material removal and free Chip Evacuation in multi Depth of Cut. The precise ground periphery of the insert and the sharp cutting edge, makes the best insert for turning and boring thin wall tubing and deep boring applications.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DPC15HT
From finishing to roughing turning applications at a high SFM (V_C).
Hard wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating (not for interrupted cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

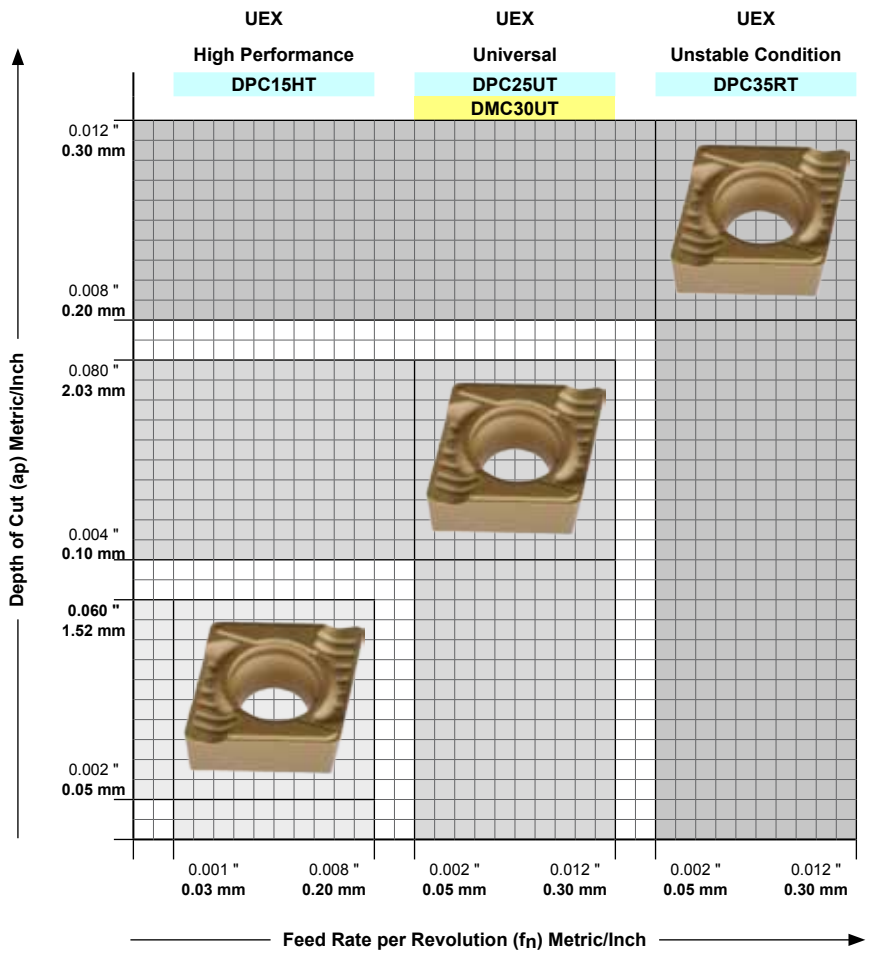
DPC25UT
First Choice: For Universal turning applications at a medium SFM (V_C).
Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating. (medium interrupted cut).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT
First Choice: For casting, forging and uneven surface turning applications at a low SFM (V_C). Tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating. (for interrupted cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

DMC30UT
First Choice: For universal turning applications at a medium SFM (V_C).
Hard, tough, impact and thermal shock resistant substrate with a CVD TiCN/TiN coating. Best for 300, 400, and PH series Austenitic Stainless Steel.

Insert Application

Thin Wall Tubing & Deep Boring Application



Material Application	Best
300 Series Stainless Steel	●
430 Series Stainless Steel	●
17-4 PH Series Stainless Steel	●
Austenitic-Ferritic Duplex	●

Insert Grade Technology

DMC20HT

First Choice: For High Performance in turning applications at a very high SFM (V_C). Heat Resistant, High stability against plastic deformation, CVD TiCN/TiN coating to improves cutting performance and insert life.
Best for 300, 400 and PH series Austenitic Stainless Steel.

DMC30UT

First Choice: For universal turning applications at a medium SMF (V_C). Hard, tough, impact and thermal shock resistant substrate. CVD TiCN/TiN coating to improves cutting performance and insert life.
Best for 300, 400 and PH series Austenitic Stainless Steel.

Insert Application

High Performance Turning & Boring Application

Positive Insert

Precision pressed insert
Positive pressed Chip Breaker
Ligh Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DMC20HT
High Performance Turning & Boring, High V_C, Light interrupted cuts.

DMC30UT
Universal Turning & Boring, Medium V_C, for interrupted cuts.

Insert Chip Breaker

MEH High Performance
Stainless steel chip breaker, engineered specifically for turning and boring all types of stainless steel and operation, with a variable depth of cut (ap) and feed rate (fn).

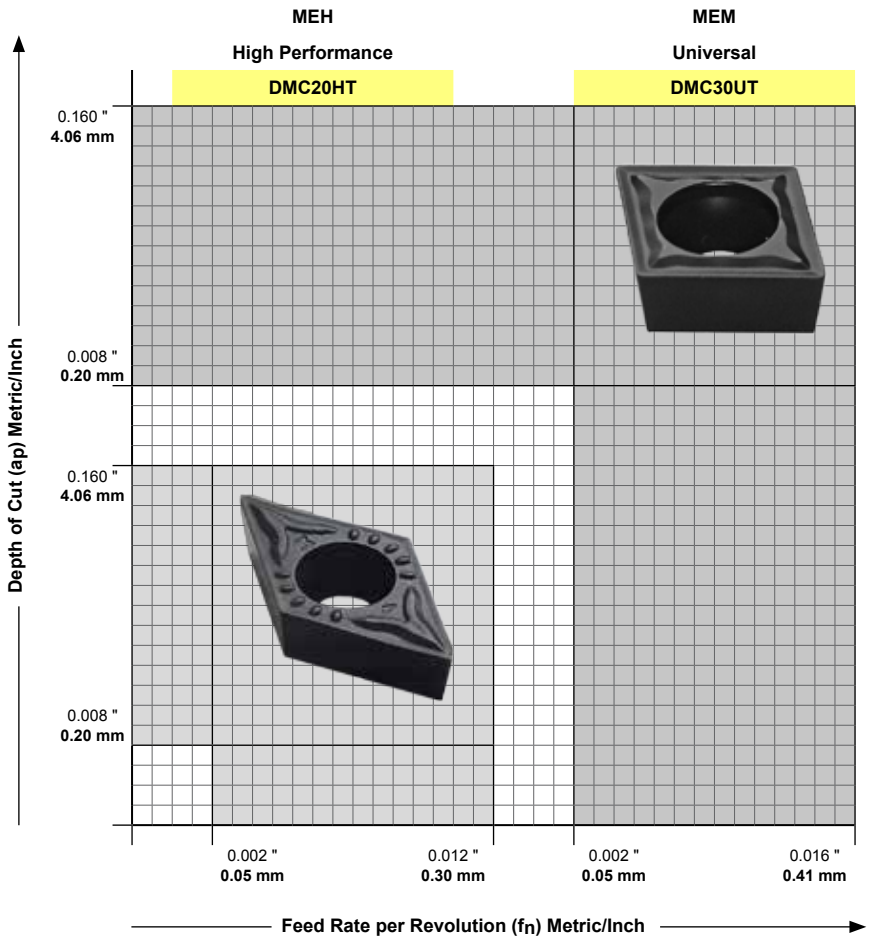
MEM For General Application
Medium Chip Breaker, positive rake angle and honed cutting edge, for chip control and free evacuation in medium Depth of Cut and feed cutting speed.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Material Application	Best
Gray Cast Iron	●
Modular Cast Iron	●
Malleable Cast Iron	●
Hardened Alloy Steel	●

Insert Grade Technology

DKC15RT
First Choice: For roughing and finishing uneven surface and interrupted cuts applications at medium SFM (Vc). Wear and impact resistant substrate and cutting edge. CVD TiN/Al2 O3/ TiCN coating improve performance and insert life. Best for turning Modular Cast Iron, Ductile Iron

Insert Application

High Performance Turning & Boring

7° Positive

Precision pressed insert
Positive Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DKC15RT
Tough & Impact Resistant, from Roughing to Finishing on rough surface and castings Low V_c, interrupted cuts.

Insert Chip Breaker

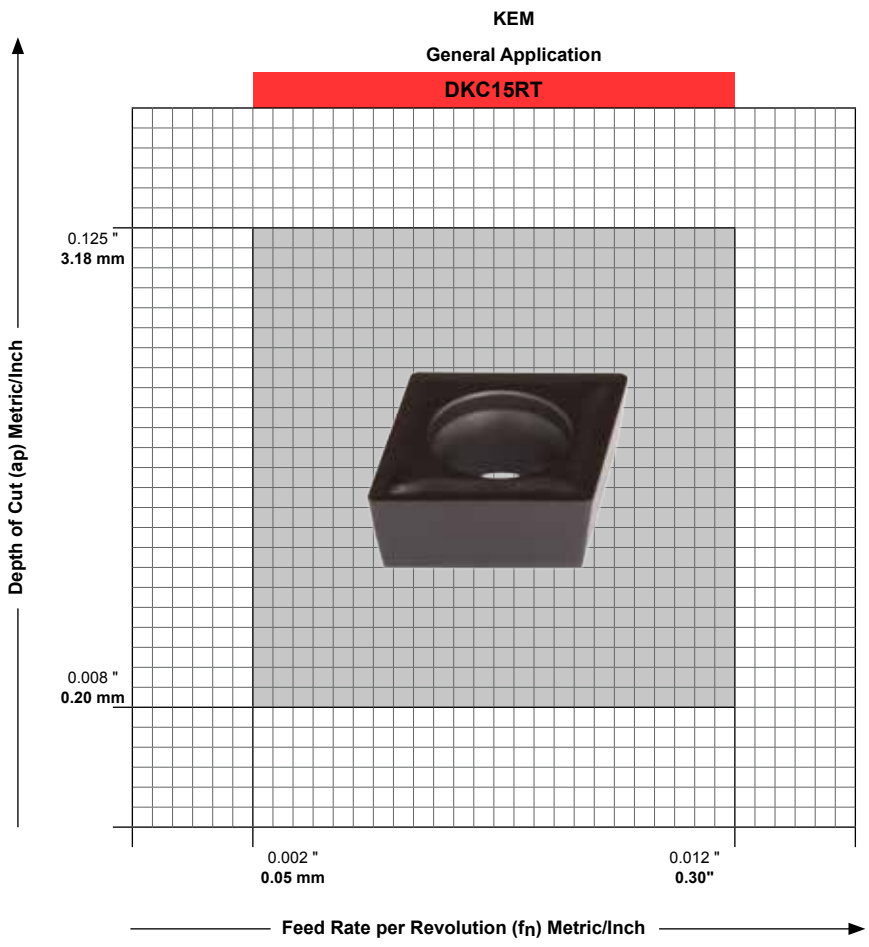
KEM Medium
Ground Surface, no Chip Breaker, Negative Rake Angle, and Medium Honed Cutting Edge, medium depth of cut and feed rate.

Insert Attitude

Cutting Condition: Wet

SFM (V_c)
Value are given in wet cutting condition. Reduced V_c 20% when cutting in dry condition.

SFM (V_c)
Value are given at minimum Feed Rate. Reduced V_c from 10% to 50% when increase Feed Rate.



Material Application	Best
Aluminum	●
Magnesium - Zinc	●
Brass , Bronze, Copper	●
Super Alloy	●
Carbon-Graphite-Phenolics	●
Carbon & Alloy Steel	●
Stainless Steel	●

7° Positive

Precision Ground insert
High Positive Chip Breaker
High Polished Chip Breaker
Sharp Cutting Edge
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DNU10GT
For general Turning & Boring applications at a SMF V_C, no interrupted cuts.

DNX10UT
For Universal Turning & Boring application at a very High SFM V_C, no interrupted cuts.

Insert Chip Breaker

NFU High Performance

The High Positive, large and polished Chip Breaker allows large depth of cut, high rate of material removal and free chip evacuation with little cutting pressure.
The precise ground periphery of the insert and the sharp cutting edge, makes the best for small depth of cut, close working tolerances and high surface finish.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

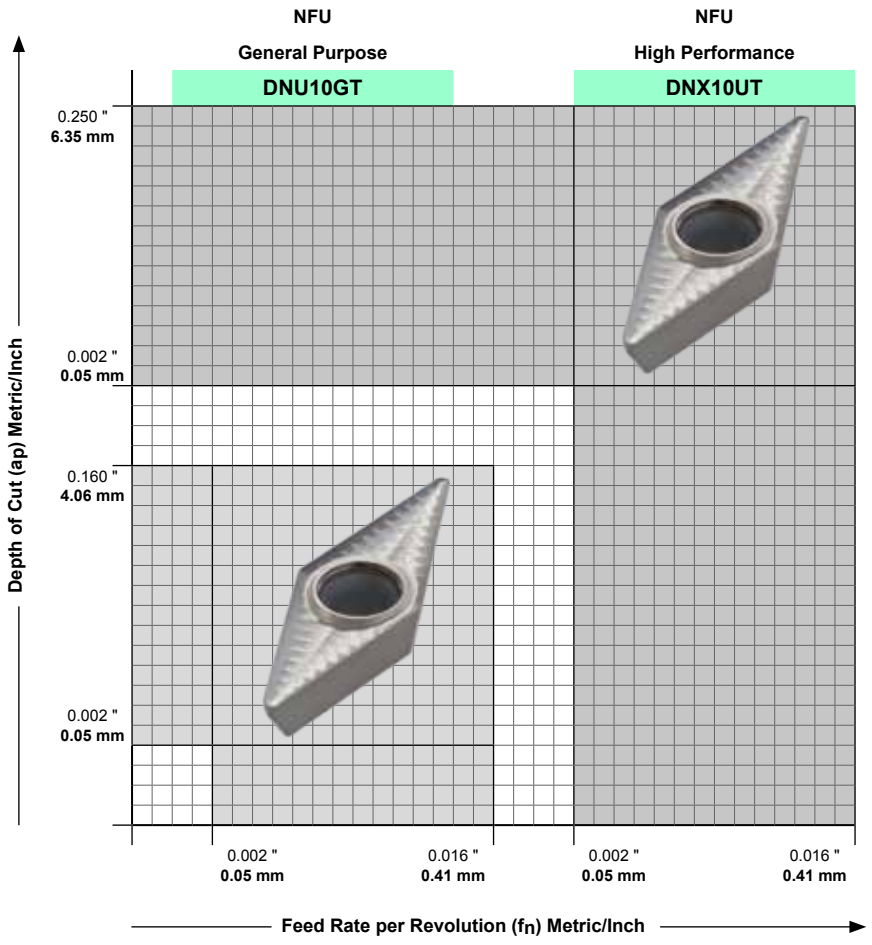
Insert Grade Technology

DNU10GT
First Choice: For general turning and boring applications at a high SFM (V_C). Hard, abrasive and wear resistant micro-grained uncoated substrate, for a hard and sharp cutting edge, (not for interrupted cuts). Best for Aluminum, Supper Alloys, Plastic and all non Ferrous metals and materials.

DNX10UT
First Choice: For universal turning at a very high SFM (V_C). Hard, abrasive and high resistant substrate with a microplus® plasma TiAlN coating to improve cutting edge hardness, wear and heat resistant, and better chip flow. Best for Aluminum, Plastic, Super Alloys and low Silicone Aerospace Aluminum.

Insert Application

For High Performance and Precision Turning & Boring Application



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	○
Gray Cast Iron	○

Insert Grade Technology

DPC15HT
From finishing to roughing turning applications at a high SFM (V_C). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

DPC25UT
First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating, (medium interrupted cut) for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT
First Choice: For casting, forging and uneven surface turning applications at a low SFM (V_C). Tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating, (for interrupetd cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

Insert Application

High Performance Turning & Boring Application

Negative Insert

Precision pressed insert
Positive Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface.
High V_C, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface.
Medium V_C, Ligth interrupted cut.

DPC35RT
Tough & Impact Resistant, from Roughing to Finishing on rough surface.
Low V_C, interrupted cut.

Insert Chip Breaker

PEF Finishing
The sharp cutting edge (light honed) and the small Chip Beaker, will machine small Depth of Cut at low Feed Rate, with precise machining repeatability, good surface finish, and breaking the chips in short length.

PEM Light Roughing to Finishing
The medium honed cutting edge and the medium Chip Beaker, will allow to machine with a wide range of cutting depths, Feed Rates and a good chip control.

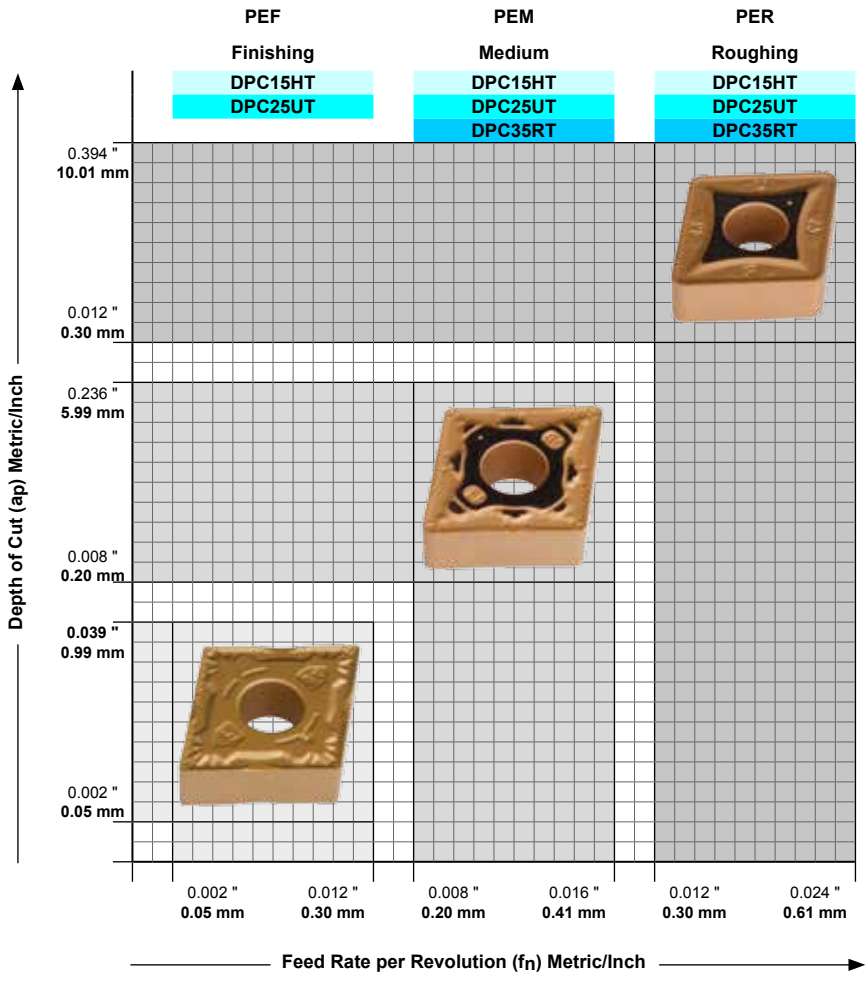
PER Roughing
Large Chip Breaker, positive rake angle and large honed cutting edge for better Chip control and evacuation in large Depth of Cut and high material removal.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

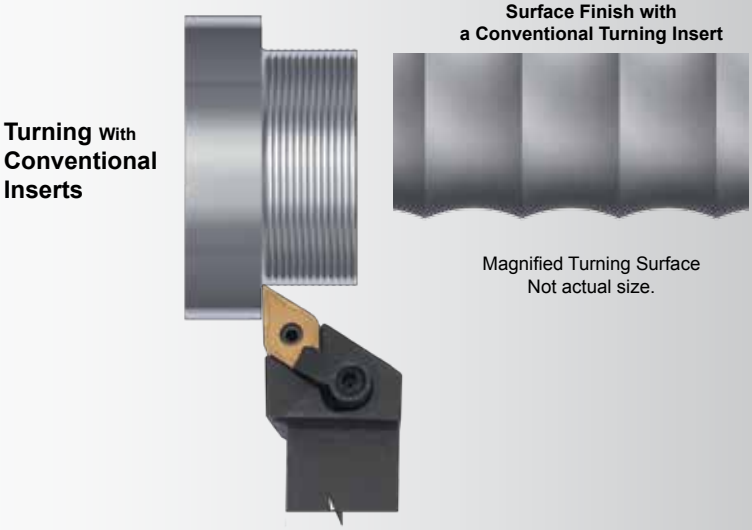


PEX Style Chipbreaker Technology

Wiper Insert Technology for High Performance Turning Applications

- **High Material Removal**
- **High Surface Finish**
- **Close Cutting Tolerance**

  (± .0002", ± .005mm)



Wiper Insert Technology

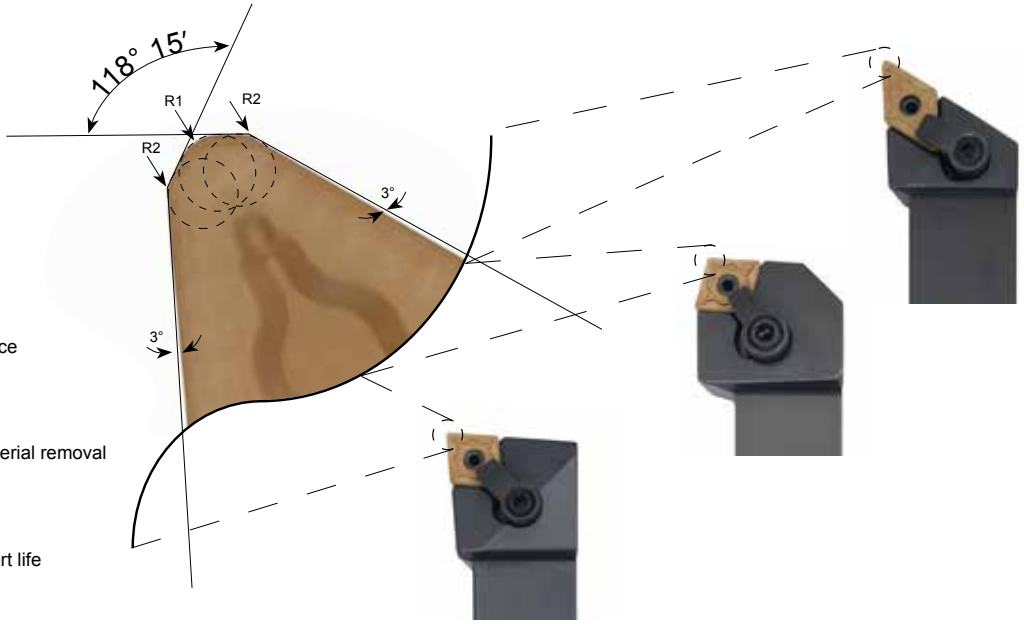
Double Leading Angle
To maximize insert cutting edge strength

Triple Nose Radius
To minimize cutting friction

Wiper Angle
For high surface finish and close turning tolerance

Rake Angle
For chip control evacuation and high rate of material removal

Cutting Edge Preparation
To minimize cutting pressure and maximize insert life



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	○
Gray Cast Iron	○

Insert Grade Technology

DPC15HT
From finishing to roughing turning applications at a high SFM (V_C). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/ TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

DPC25UT
First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/ TiCN coating, (medium interrupted cut) for cutting Carbon and Alloy Steel, good for Stainless Steel.

Insert Application

High Surface Finish in Turning & Boring Appplication

Negative Insert

Precision pressed insert
Positive chip breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface.
High V_C, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface.
Medium V_C, Ligth interrupted cut.

Insert Chip Breaker

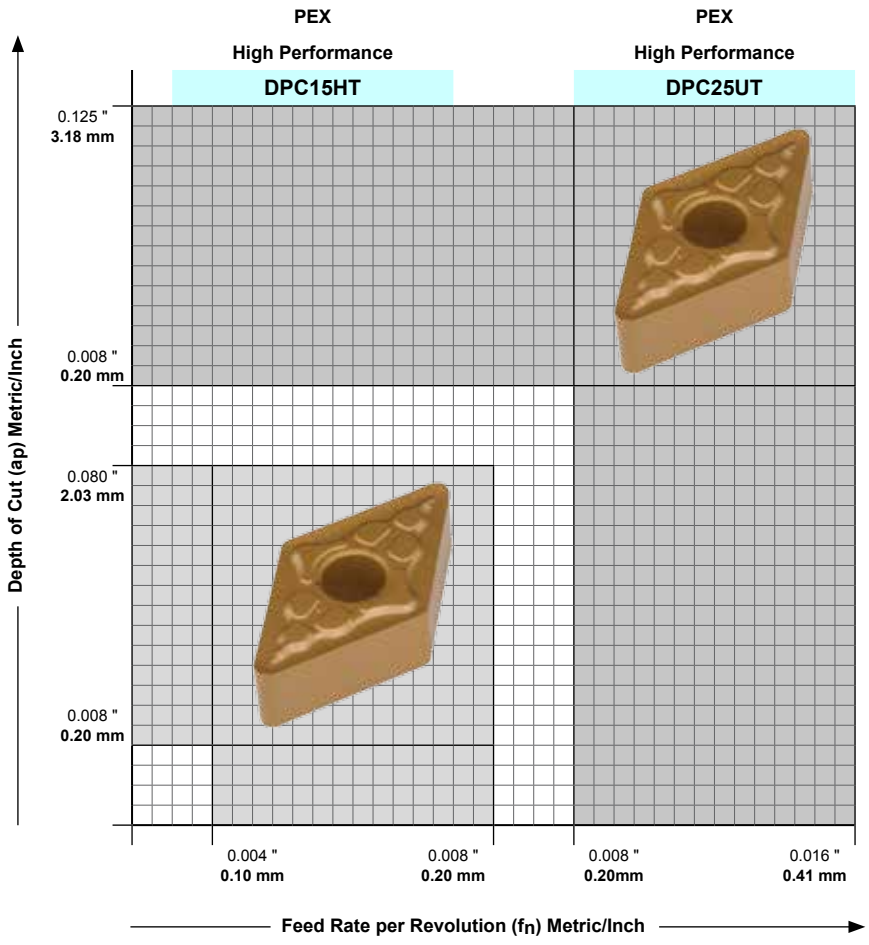
PEX High Surface Finish and Close Tolerance
Wiper nose Technology, the double leading angle, the Positive Chip Breaker and rake angle, with the Honed Cutting Edge, for high surface Finish and Close working Tolerance in Turning and Boring Application. at Medium Depth of Cut (ap) and High Feed Rate

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Negative Turning Insert Grade & Cutting Data

Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	○
Gray Cast Iron	○

Insert Grade Technology

DPC15HT
First Choice: From finishing to roughing turning applications at a high SFM (V_C). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/ Al_2O_3/TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

DPC25UT
First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/ TiCN coating, (medium interrupted cut) Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT
Firt Choice: For casting, forging and uneven surface turning appplication at a low SFM (V_C). Tough and impact resistant substrate with a CVD Al_2O_3/TiCN/ Al_2O_3/TiCN coating, (for interrupted cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

Insert Application

Light Roughing and Precision Finishing Turning & Boring Operation

Negative Insert

Precision pressed insert
Positive Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface, High V_C, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface, Medium V_C, Ligth interrupted cut.

DPC35RT
Tough & Impact Resistant, from Roughing to Finishing on rough surface, Low V_C, interrupted cut.

Insert Chip Breaker

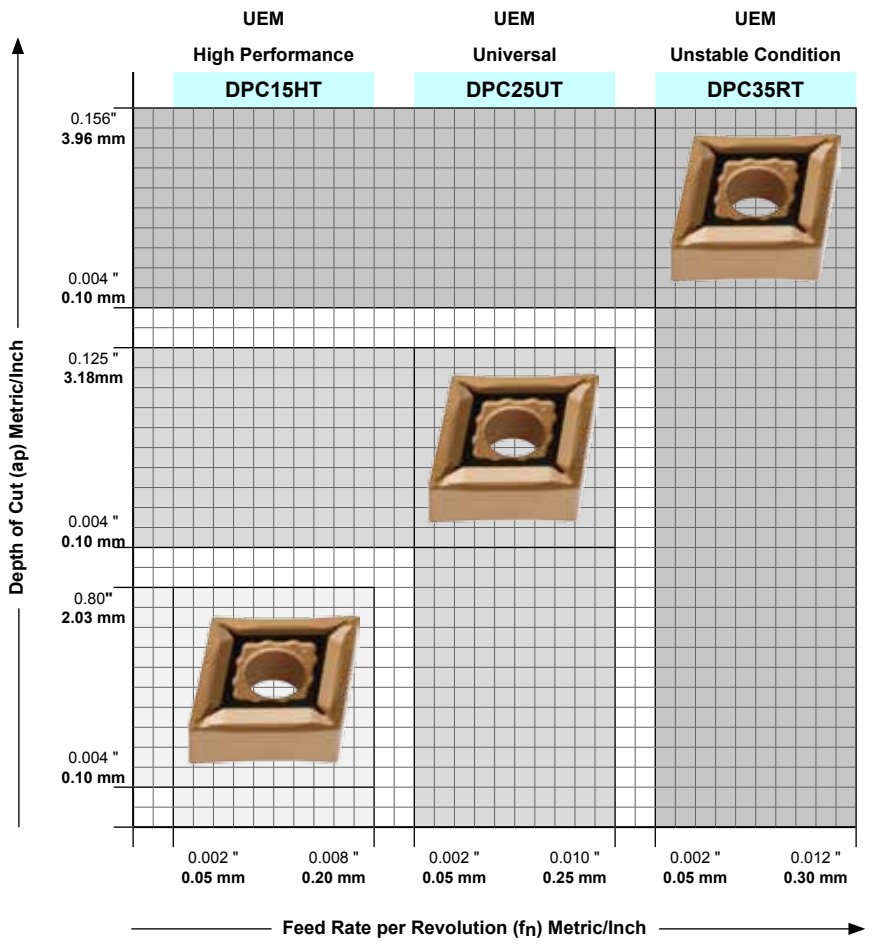
UEM Precision Finishing to Light Roughing
Medium pressed Chip Breaker, positive rake angle and small honed cutting edge, to control the length of chips in small Depth of Cut and free flow over the cutting edge.
Light Roughing to Precision Turning and Boring Application. Low cutting pressure for turning and boring thin wall tubing and deep hole boring.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	○
Gray Cast Iron	○

Negative Insert

Precision ground insert
High Positive pressed Chip Breaker
Light Honed Cutting Edge
Coated & Uncoated
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface,
High V_C, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface,
Medium V_C, Ligth interrupted cut.

DPC35RT
Tough & Impact Resistant, from Roughing to Finishing on rough surface,
Low V_C, interrupted cut.

DMC30UT
Universal Turning & Boring
Medium V_C for interrupted cuts.

Insert Chip Breaker

UEX High Performance
The High Positive and large Chip Breaker allows large material removal and free chip evacuation in multi depth of cut and low cutting pressure. The precise periphery of the insert, and the sharp cutting edge, makes the best insert for turning and boring thin wall tubing and deep boring applications.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DPC15HT
From finishing to roughing turning applications at a high SFM (V_C). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

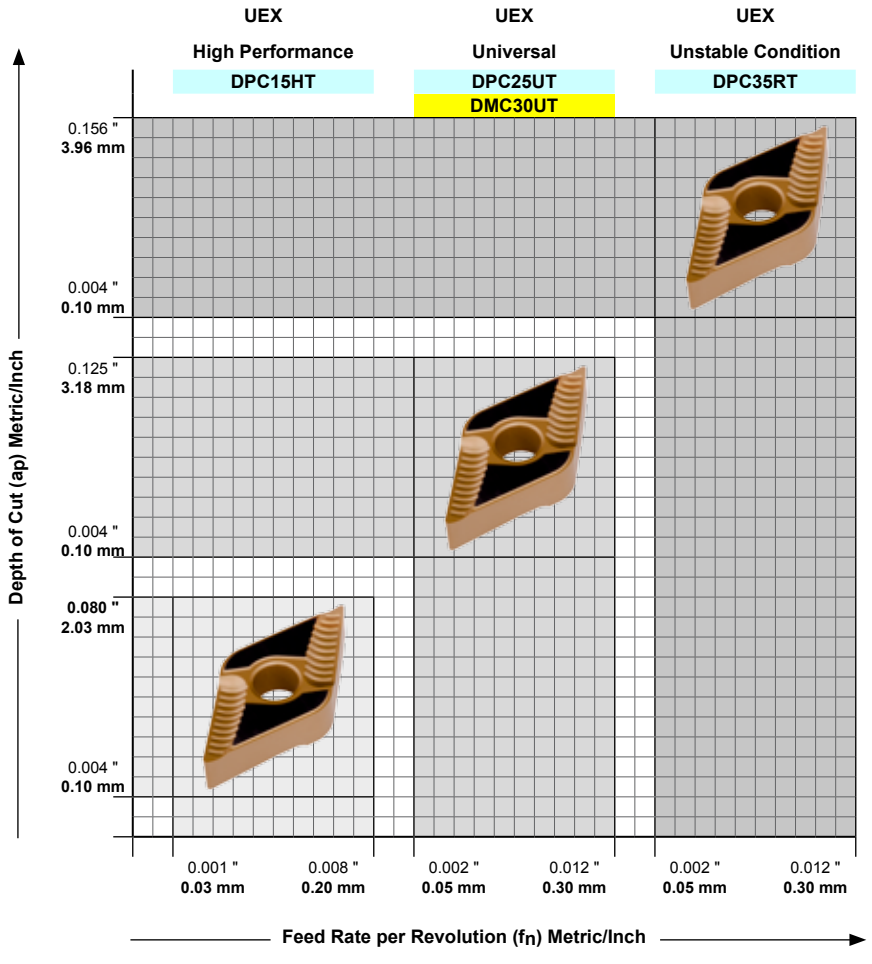
DPC25UT
First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating, (medium interrupted cut, for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT
For casting, forging and uneven surface turning applications at a Low SFM (V_C). Ttough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating,(for interrupted cut) Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

DMC30UT
First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough, impact and thermal shock resistant substrate with a CVD TiCN/TiN coating. Best for 300, 400 and PH series Austenic Stainless Steel.

Insert Application

For Thin Wall Tubing & Deep Boring Application



Material Application	Best
Carbon Steel Annealed	●
Alloy Steel Annealed	●
Alloy Steel Heat Treated	●
Stainless Steel	○
Gray Cast Iron	○

Negative Insert

Precision pressed insert
Positive Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DPC15HT
Hard & Wear Resistant, from Roughing to Finishing on smooth surface,
High V_c, no interrupted cut.

DPC25UT
Hard & Tough, from Roughing to Finishing on uneven surface,
Medium V_c, Light interrupted cut.

DPC35RT
Tough & Impact Resisant, from Roughing to Finishing on rough surface,
Low V_c, interrupted cut.

Insert Chip Breaker

PSH Roughing
Large single sided pressed Chip Breaker, positive rake angle, negative land and Honed Cutting Edge, for roughing, large Depth of Cuts, high rate of material removal in turning and boring straight and interrupted cuts.

PSS Heavy Roughing
Large single sided pressed Chip Breaker, positive rake angle, negative land and heavy Honed Cutting Edge. For heavy duty roughing, large Depth of Cuts, high rate of material in turning and boring Bar Stock, Castings and Forgings.

PST X-Heavy Roughing
Large Single Sided Pressed Chip Breaker insert, Positive Rake Angle, Negative Land and Heavy Honed Cutting Edge. Engineered for X heavy duty roughing large, depth of cuts, high rate of material in turning and boring Bar Stock, Castings and Forgings

Insert Attitude

Cutting Condition: Wet

SFM (V_c)
Value are given in wet cutting condition. Reduced V_c 20% when cutting in dry condition.

SFM (V_c)
Value are given at minimum Feed Rate. Reduced V_c from 10% to 50% when increase Feed Rate.

Insert Grade Technology

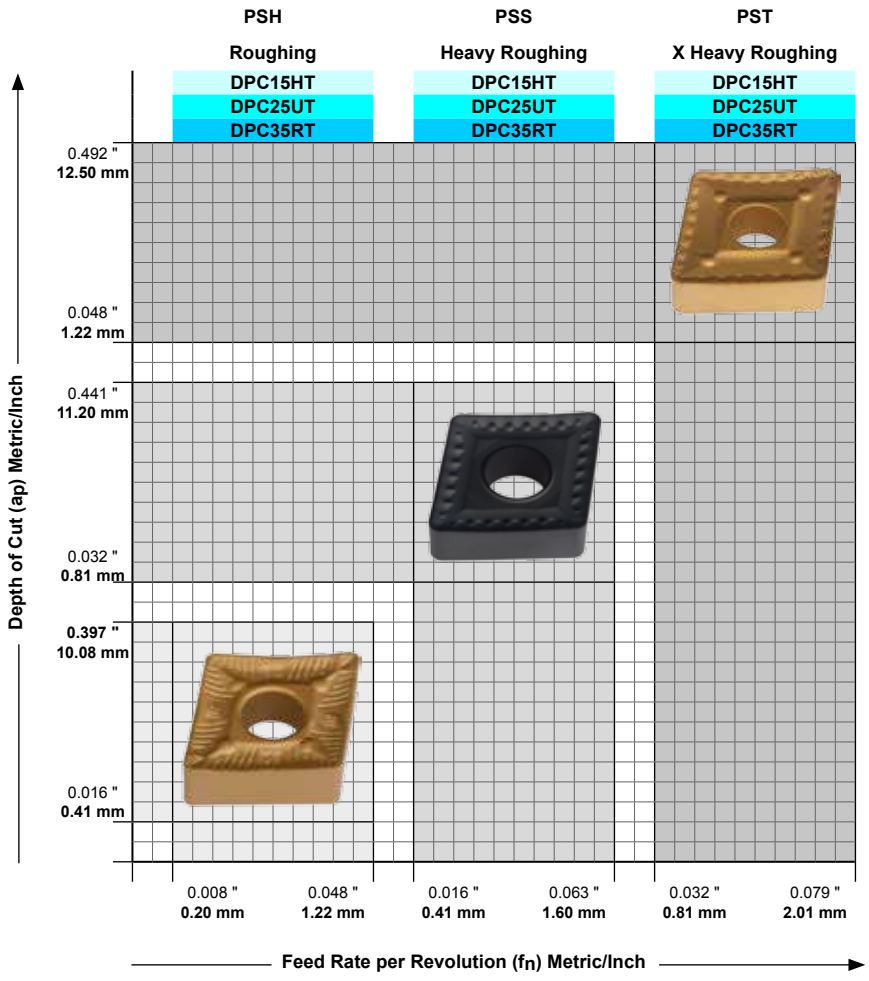
DPC15HT
First Choice: From finishing to roughing turning applications at a high SFM (V_c). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/ Al_2O_3/TiCN coating (not for interrupted cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel and Cast Iron.

DPC25UT
First Choice: For universal turning applications at a medium SFM (V_c). Hard, tough and impact resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/ TiCN coating, (medium interrupted cut)
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

DPC35RT
First Choice: For casting, forging and uneven surface turning applications at a low SFM (V_c). Tough and impact resistant substrate with a CVD Al_2O_3/TiCN/ Al_2O_3/TiCN coating, (for interrupetd cuts).
Best for cutting Carbon and Alloy Steel, good for Stainless Steel.

Insert Application

For Heavy Roughing Application of Bar Stock, Forging & Casting.



Material Application	Best
300 Series Stainless Steel	●
Alloy Steel Annealed	●
17-4 PH Series Stainless Steel	●
Austenitic-Ferritic Duplex	●

Insert Grade Technology

DMC20HT
First Choice: For High Performance turning applications at a very high SFM (V_C). Heat resistant, high stability against deformation CVD TiCN/TiN coating to improves cutting performance and insert life.
Best for 300, 400 and PH series Austenitic Stainless Steel.

Insert Application

High Performance Turning & Boring Application

Negative Insert

Precision pressed insert
Positive preseed Chip Breaker
Light Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DMC20HT
High Performance Turning & Boring Application
High V_C, Ligh interrupted cuts.

Insert Chip Breaker

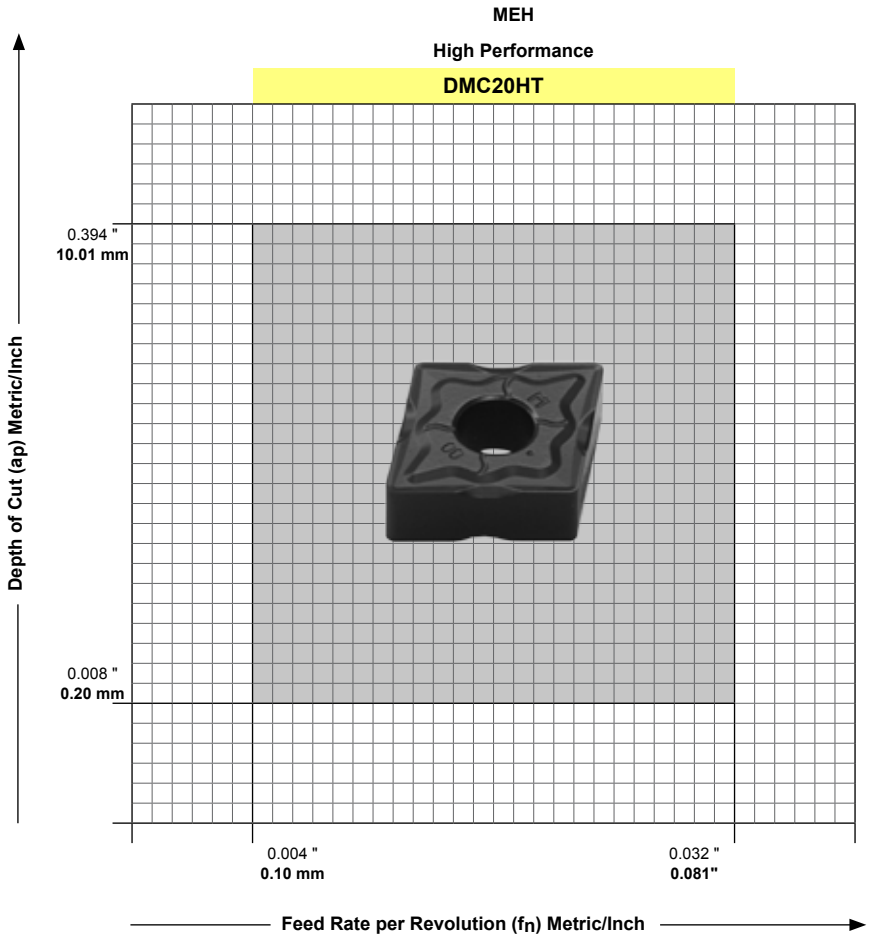
MEH High Performance
Stainless steel chip breaker, engineered specifically for turning and boring all types of stainless steel and operation, with a variable depth of cut (ap) and feed rate (fn).

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Material Application	Best
300 Series Stainless Steel	●
Alloy Steel Annealed	●
17-4 PH Series Stainless Steel	●
Austenitic-Ferritic Duplex	●

Insert Grade Technology

DMC30UT
First Choice: For universal turning applications at a medium SFM (V_C).
Hard, tough, impact and thermal shock resistant substrate. CVD TiCN/TiN coating to improves cutting performance and insert life.
Best for 300, 400 and PH series Austenitic Stainless Steel.

Insert Application

General Universal Turning & Boring Application

Negative Insert

Precision pressed insert
Positive pressed Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DMC30UT
Universal Turning & Boring,
Medium V_C, for interrupted cuts.

Insert Chip Breaker

MEF Finishing
Small pressed Chip Breaker with positive rake angle and small Honed Cutting Edge, for chip control in a small depth of cut. For Finishing Turning Application.

MEM Medium
Medium pressed Chip Breaker, positive rake angle and medium Honed Cutting Edge, for chip control and free evacuation in medium Depth of Cut and feed.

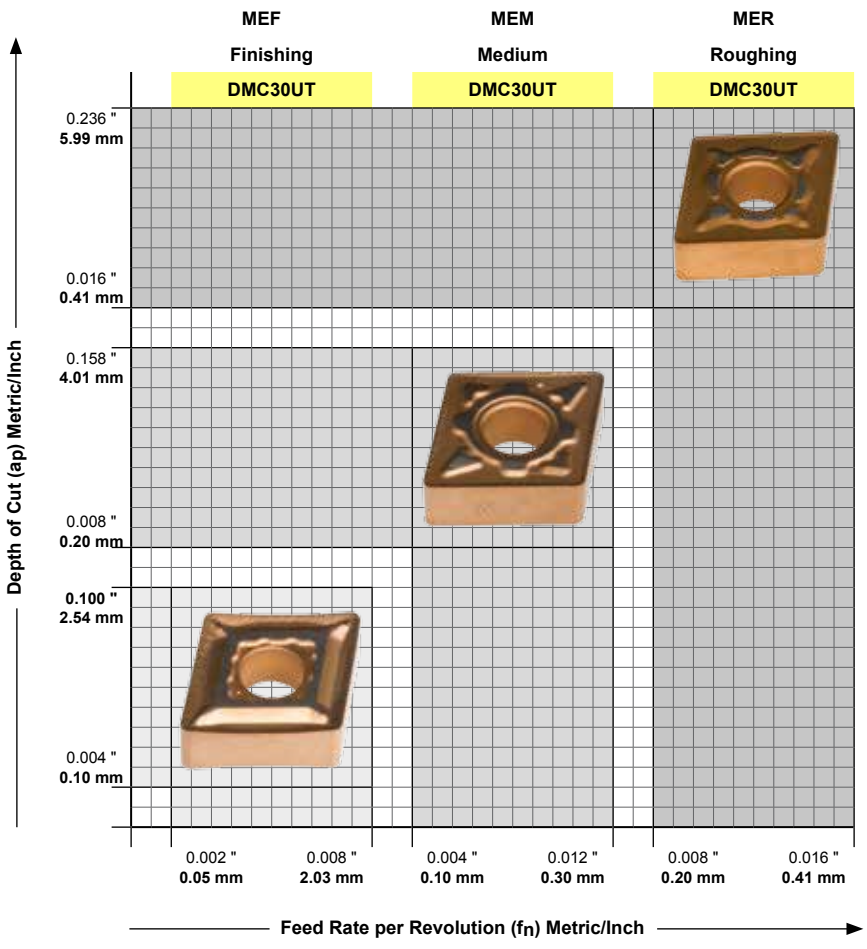
MER Roughing
Large pressed Chip Breaker, positive rake angle and heavy Honed Cutting Edge, for better chip control in large Depth of Cut and high feed rate.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Material Application	Best
Gray Cast Iron	●
Modular Cast Iron	●
Malleable Cast Iron	●
Hardened Alloy Steel	●

Negative Insert

Precision pressed insert
Positive Chip Breaker
Honed Cutting Edge
Coated
Multi geometry
Precise Insert Indexing Repeatability

Insert Grade

DKC10UT
Hard & Tough, from Roughing to Finishing on uneven surface,
Medium V_C , Light interrupted cut.

DKC15RT
Tough and Impact Resistant, from Roughing to Finishing on rough surface, Low V_C, for interrupted cuts.

Insert Chip Breaker

KEF Finishing
Small pressed Chip Breaker with positive rake angle and small Honed Cutting Edge, to control the length of chips in small depth of cut.

KEU Medium
Ground surface, no Chip Breaker, negative rake angle, and medium Honed Cutting Edge, medium Depth of Cut and feed rate

KER Roughing
Large pressed Chip breaker geometry, positive rake angle and large Honed Cutting Edge, for large Depth of Cut and feed rate.

Insert Attitude

Cutting

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition

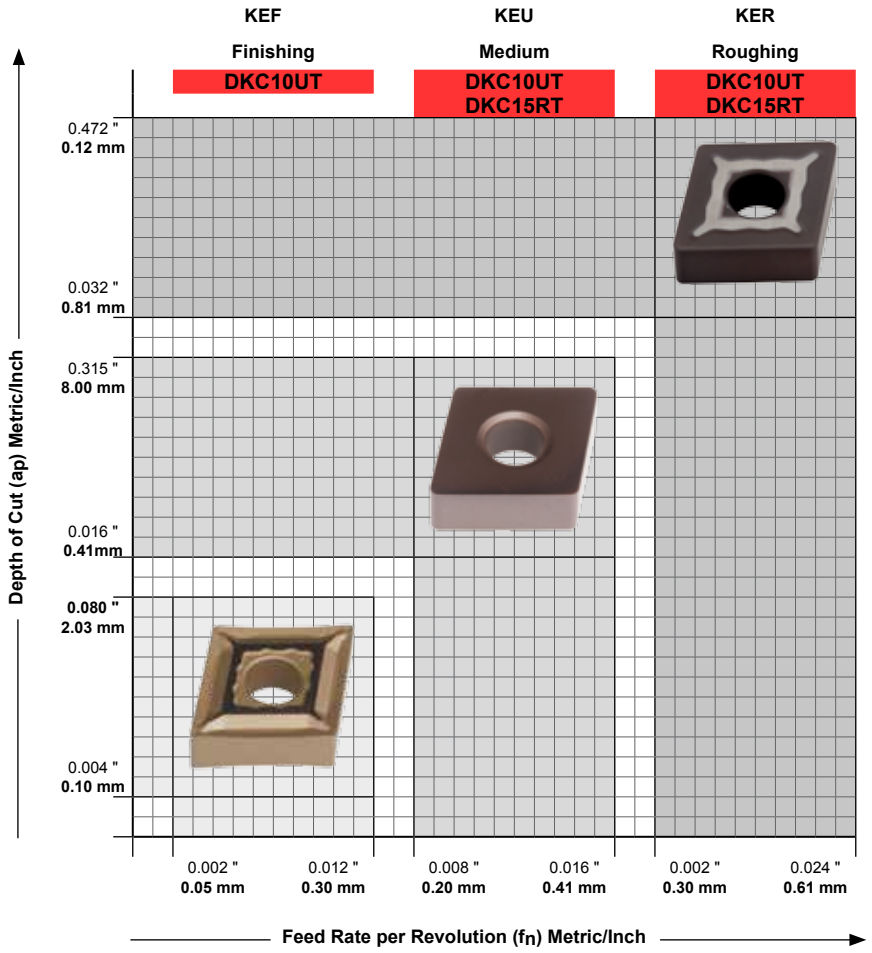
SFM (V_C)
Value are given at minimum Feed Rate, Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DKC10UT
First Choice: For general turning applications at a medium to High SFM (V_C). High thermal deformative wear resistant substrate and cutting edge. CVD TiN/Al_2O_3/TiCN coating improve performance and insert life. Best for Modular Cast Iron, Ductile Iron. For light interrupted cuts.

DKC15RT
First Choice: For Roughing and Finishing uneven surface and interrupted cuts applications at medium SMF (V_C). Wear and impact resistant substrate and cutting edge. CVD TiN/Al_2O_3/TiCN coating improve performance and insert life. Best for turning Modular Cast Iron, Ductile Iron.

Insert Application



Material Application	Best
Titanium Alloys	●
Inconel, Hastelloy, Waspaloy	●

Insert Grade Technology

DSP10HT
First Choice: For finishing, medium and light roughing turning and boring applications at high SFM (V_C). Hard and abrasive micro-grain substrate. Heat and plastic deformation resistant TiBN CVD Plasma coating.
Best for turning and boring application for all the Titanium Alloys, non Ferrous Material

DSP20HT
First Choice: For finishing, medium and light roughing turning and boring applications at medium SFM (V_C). Hard, abrasive and impact resistant micro-grain substrate . TiAlN PVD coating to minimize friction and maximize chip flow.
Best for turning all the Super Alloys; Discaloy, Incoloy, Astralloy, Hastelloy, Inconel and non Ferrous Material.

Insert Application

High Performance Turning & Boring Application

Negative Insert

Precision pressed insert
Positive pressed Chip Breaker
Ligh Honed Cutting Edge
Coated
Multi geometry

Insert Grade

DSP10HT Universal for Tutanium Alloys
High Performance Grade for finishing, medium and light roughing turning and boring applications at high SFM (V_C).

DSP20HT Universal for Super Alloys
Astralloy, Discaloy, Hastelloy, Incoloy, Inconel.

High Performance grade for finishing, medium and light roughing turning and boring applications at medium SFM (V_C).

Insert Chip Breaker

SEH High Performance

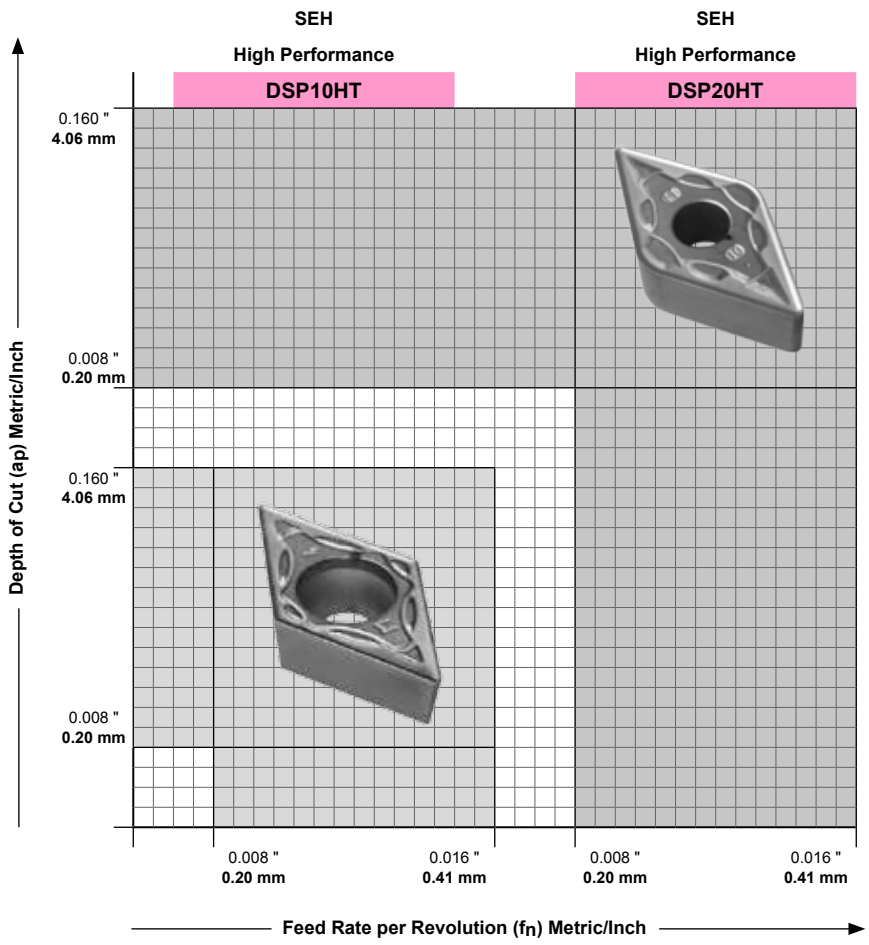
Super Alloy chip breaker, scientific engineered and developed for turning and boring all types of Super Alloys materials and operation, from Roughing to Finishing with variable Depth of Cut (ap) and feed rate (fn).

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.



Material Application	Best
Titanium Alloys, Inconel, Hastelloy, Waspaloy	●
Carbon-Graphite-Phenolic	●
Brass , Bronze, Copper	●
Aluminum	○
Carbon & Alloy Steel	●
Stainless Steel	●
Cast Iron	●

Negative Insert

Precision ground insert
Precision ground Chip Breaker
Light Honed Cutting Edge
Uncoated & Coated
Multi geometry
High Precision Insert Indexing Repeatability

Insert Grade

DPS15HT
Unstable Turning & Boring working condition, light uneven surface.
Medium V_C, Light interrupted cuts.

Insert Chip Breaker

SEF Finishing
The precision ground periphery of the Insert with a small pressed positive and polished Chip Breaker and a small Honed Cutting Edge, controls and evacuates the chip precisely and freely in small Depth (ap) of Cut and Feed Rate.

SEM Finishing to Light Roughing
The precision ground periphery of the Insert with a Medium pressed positive and polished Chip Breaker and a small Honed Cutting Edge, controls and evacuates the chip precisely and freely in small to Medium Depth (ap) of Cut and Feed Rate.

SER Roughing
Large pressed positive Chip Breaker, with positive rake angle and Medium Honed Cutting Edge, for precise chips control and free evacuation at larger Depth (ap) of Cut and Feed Rate.

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

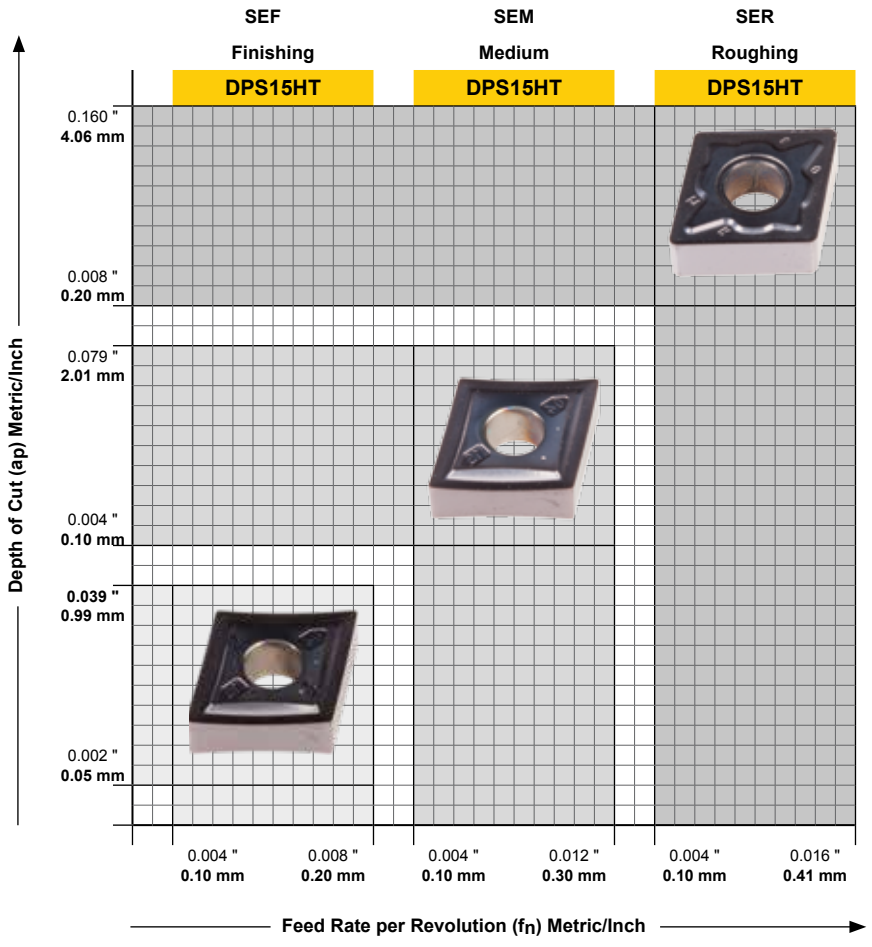
SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Insert Grade Technology

DPS15HT
First Choice: For all around and unstable turning applications at a medium SFM (V_C). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C Coating improves cutting performance and insert life. (Light Interrupted Cuts) Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

Insert Application

High Performance Turning & Boring Application

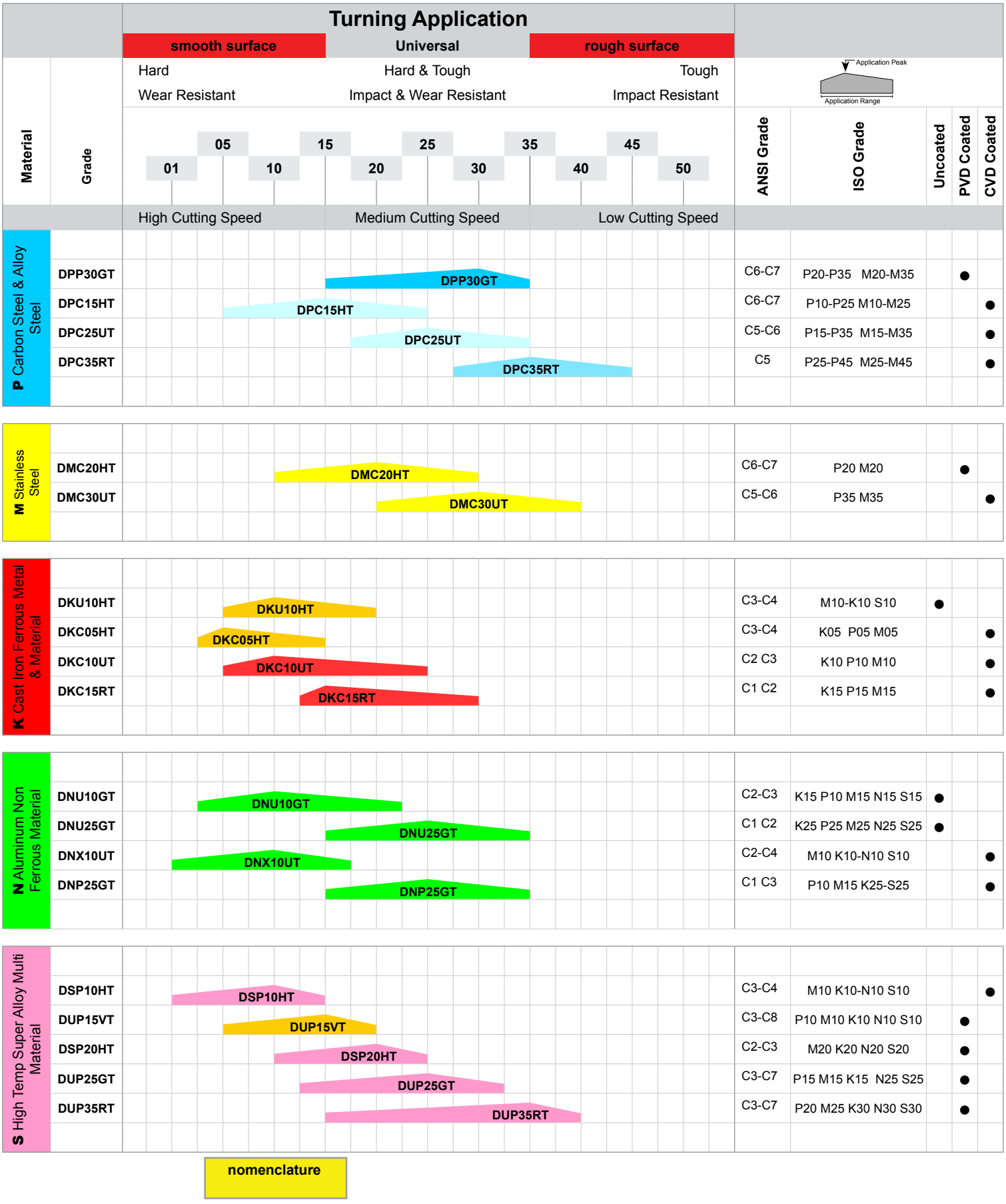


NOTES:

At Dorian Tool we constantly search new methods to improve performance and reduce insert failure.
The type of insert wear will suggest the problem how it directly relates to a correcting procedure to improve tool life and cutting performance. Listed below are the types of insert failure modes we have tested along with a cause and solution.

Type of Failure	Cause	Solution
 **Edge Wear**	• Cutting speed too high • Insufficient wear resistance	• Increase feed • Reduce speed • Use insert with a more wear resistance grade • Apply coolant at a constant rate
 **Thermal Cracking**	• Temperature Change • Intermittent machining • Varying coolant supply	• Constant Temperature • Reduce speed and feed • Apply coolant at a constant rate
 **Chipping**	• Sharp cutting edge • Excessive load • Cutting speed too high • Insufficient wear resistance	• Change edge preparation • Check rigidity of the insert • Reduce speed • Use insert with a more wear resistance grade • Apply coolant at a constant rate
 **Edge Build Up**	• Poor lubricity • Cutting temperature too low • Low cutting speed • Negative cutting geometry	• Increase feed • Increase speed • Apply coolant at a constant rate • PVD coated insert
 **Depth of Cut Notching**	• Hard surface material • Excessive load • Cutting speed too high • Insufficient wear resistance • Cutting feed too high	• Change lead angle • Use different grade • Adjust feed rate • Apply coolant at a constant rate
 **Heat Deformation**	• Cutting temperature too high • Pressure too high	• Reduce speed and feed • Apply coolant at a constant rate • Reduce depth of cut
 **Crater**	• Interrupted cut • Cutting temperatures on the insert rake face too high	• Reduce speed and feed • Apply coolant at a constant rate
 **Insert Breakage**	• Grade too brittle • Excessive load • Weak insert geometry • Insert too small • Low cutting speed	• Reduce depth of cut • Increase speed • Reduce cutting feed • Apply coolant at a constant rate • Check rigidity of the insert • Use stronger insert geometry

Insert Grade Chart



Insert Best Performance

1. If inserts wear, reduce Spindle Speed RPM (n) increase Feed (fn) or change to a harder insert grade.
2. If inserts chip, increase Spindle Speed (n), decrease Feed (fn), and or heavier honed edge, or change to tougher insert grade.
3. For smooth surface and hard material, use hard and wear resistant insert with larger nose radius (not for interrupted cuts).
4. For forgings, castings and interrupted cuts, use tough and impact resistant insert with large nose radius.

DPP30GT First Choice: For general turning applications at a medium SFM (V_C). Use inserts to cut Alloy Steel and Stainless Steel. Inserts have a thermal deformative and abrasive resistant substrate with a single layer PVD TiN coating.

DPC15HT For finishing to roughing turning applications at a high SFM (V_C). Hard, wear and abrasive resistant substrate with a CVD Al_2O_3/TiCN/Al_2O_3/TiCN coating (not for interrupted cuts). Best for cutting Carbon and Alloy Steel, Good for Stainless Steel and Cast Iron.

DPC25UT First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough and impact resistant substrate with a CVD Al_2O_3 /TiCN/Al_2O_3/TiCN coating. (medium interrupted cut). For cutting Carbon and Alloy Steel. Good for Stainless Steel.

DPC35RT First Choice: For casting, forging and uneven surface turning applications at a Low SFM (V_C). Tough and impact resistant substrate with a CVD Al_2O_3 /TiCN/Al_2O_3/TiCN coating. (for interrupted cuts). Best for cutting Carbon and Alloy Steel. Good for Stainless Steel.

DMC20HT First Choice: For high performance turning applications at a high SFM (V_C). Heat Resistant, High stability against plastic deformation, CVD TiCN/TiN coating to improve cutting performance and insert life. Best for 300, 400 and PH series Austenitic Stainless Steel.

DMC30UT First Choice: For universal turning applications at a medium SFM (V_C). Hard, tough impact, and thermal shock resistant substrate. CVD TiCN/TiN coating to improve cutting performance and insert life. Best for turning 300, 400 and PH series Austenitic Stainless Steel.

DKU10HT First Choice: For general turning applications at Low to medium SFM (V_C). Wear and abrasive resistant uncoated substrate. (Not for interrupted Cuts). Best for all Non Ferrous materials including Gray Iron and Ductile Iron. Aluminum, Stainless Steel and Hardened Steel.

DKC10UT First Choice: For general turning applications at a medium to high SFM (V_C). High thermal deformative wear resistant substrate and cutting edge. CVD TiN/Al_2O_3/TiCN coating improve performance and insert life. Best for Modular Cast Iron, Ductile Iron. For light interrupted cuts.

DKC15RT First Choice: For roughing and finishing uneven surface and interrupted cuts applications at medium SFM (V_C). Wear and impact resisant substrate and cutting edge. CVD TiN/Al_2O_3/TiCN coating improve performance and insert life. Best for turning Modular Cast Iron, Ductile Iron.

DNU10GT First Choice: For general turning applications at a high SFM (V_C). Hard, abrasive and wear resistant micro-grained uncoated substrate, for a hard and sharp cutting edge (not for interrupted cuts). Best for Aluminum, Super Alloys, Plastic and all Non Ferrous metals and materials.

DNU25GT First Choice: For general turning applications at a medium SFM (V_C). Uncoated, hard micro-grained substrate with a hard and tough cutting edge for light interrupted cuts. Best for Aluminum, Super Alloys, Plastic and all Non Ferrous metals and materials.

DNX10UT First Choice: For universal turning at a very high SFM (V_C). Hard, abrasive and high resistant substrate with a microplus® plasma TiAlN coating to improve cutting edge hardness, wear and heat resistant, and better chip flow. Best for Aluminum, Plastic, Super Alloys and low Silicone Aerospace Aluminum.

DNP25GT First Choice: For general turning applications at a high SFM (V_C). Hard, tough and shock resistant micro-grained substrate. PVD TiN coated, with a hard and tough cutting edge for light interrupted cuts. Best for Aluminum, Super Alloys, Plastic and all Non Ferrous metals and materials.

DSP10HT First Choice: For finishing, medium and light roughing turning and boring applications at a high SFM (V_C). Hard and abrasive micro-grained substrate. Heat and plastic deformation resistant TiBN CVD Plasma coating. Best for turning and boring application for all the Titanium Alloys, Non Ferrous material.

DSP20HT First Choice: For finishing medium and light roughing turning and boring applications at a medium SFM (V_C). Hard, abrasive and impact resistant micro-grained substrate. TiAlN PVD coating to minimize friction and maximize chip flow. Best for turning all the Super Alloys; Discaloy, Incoloy, Hastelloy, Inconel and Non Ferrous materials.

DUP15VT First Choice: For high performance in turning applications at a very high SMF (V_C). Very hard and wear resistant substrate, the PVD AlCrN hard coating minimize the cutting friction, with a better surface finish and a longer insert life. (No interrupted Cuts). Best for Super Alloys, Aluminum, Ferrous and non Ferrous Materials.

DUP25GT First Choice: For universal turning applications at a high SMF (V_C). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C Coating improves cutting performance and insert life. (Life Interrupted Cuts) Best for Super Alloys, Aluminum, Ferrous and Non Ferrous materials.

DUP35RT First Choice: For all around and unstable turning applications at a medium SMF (V_C). Tough, hard and impact resistant substrate, the PVD TiAlN/WC/C coating improves cutting performance and insert life. (Life Interrupted Cuts) Best for Super Alloys, Aluminum, Ferrous and Non Ferrous materials.

Insert Cutting Formula - Inch

a_p	= Depth of cut (DOC)	Inch	k_c	= Specific cutting force	Lb/Inch^2
D_m	= Diameter of part (DIA)	Inch	n	= Spindle speed (RPM)	Rev/Min
f_n	= Feed per revolution (FEED)	Inch/Rev	v_c	= Cutting speed (SFM)	Feet/Min
l_m	= Machined length (LEN)	Inch	T_c	= Cutting time (TIM)	Min
Q	= Metal removal rate (MMR)	Inch^3/Min	R_{max}	= Profile depth	µInch
P_c	= Power requirements (POW)	Hp	r_ε	= Insert nose radius	inch

Cutting Speed Surface Feet per Minute

$$v_c = \frac{\pi \times D_m \times n}{12}$$

Example: Determine the cutting speed (v_c) required for turning a 2-1/2" diameter part with a spindle speed of 600 RPM.

$$v_c = \frac{\pi \times 2.5 \times 600}{12} = 392.70 \text{ Feet/Min}$$

Spindle Speed Revolution Per Minute

$$n = \frac{v_c \times 12}{\pi \times D_m}$$

Example: Determine the spindle speed (n) required for turning a 2-1/2" diameter part with a cutting speed of 400 SFM.

$$n = \frac{400 \times 12}{\pi \times 2.5} = 611.15 \text{ Rev/Min}$$

Metal Removal Rate Inch^3/Min

$$Q = v_c \times a_p \times f_n \times 12$$

Example: Determine the metal removal rate (Q) required for cutting with a depth of .062 with a cutting speed of 400 SFM and feed rate of .015 IPR.

$Q = 400 \times .062 \times .015 \times 12 = 4.464$ inch^3/min

Power Requirement Horsepower

$$P_c = \frac{v_c \times a_p \times f_n \times k_c}{33{,}000}$$

Example: Determine the power requirement (P_c) for turning a material with a cutting force of 181,750, a depth of .062, a cutting speed of 400 SFM, and feed rate of .015 IPR.

$$P_c = \frac{400 \times .062 \times .015 \times 181{,}750}{33{,}000} = 2.05 \text{ HP}$$

Cutting Time Minute

$$T_c = \frac{l_m}{f_n \times n}$$

Example: Determine the amount of time required to machine a 6" long part with a spindle speed of 600 RPM and feed rate of .015 IPR.

$$T_c = \frac{6}{.015 \times 600} = .67 \text{ Min (40 Sec)}$$

Profile Depth (µinch)

$$R_{max} = \frac{f_n^2 \times 10^6}{8 r_\varepsilon}$$

Example: Determine the profile depth (R_{max}) of a surface machined using an insert with a nose radius of .032 and a feed rate of .015 IPR.

$$R_{max} = \frac{.015^2 \times 10^6}{8 \times .032} = 879 \text{ µinch}$$

Insert Cutting Formula - Metric

a_p	= Depth of cut	mm	k_c	= Specific cutting force	Nm
D_m	= Diameter of part	mm	n	= Spindle speed	Rev/Min
f_n	= Feed per revolution	mm/Rev	v_c	= Cutting speed	m/Min
l_m	= Machined length	mm	T_c	= Cutting time	Min
Q	= Metal removal rate	mm^3/Min	R_{max}	= Profile depth	µm
P_c	= Power requirements	kW	r_ε	= Insert nose radius	mm

Cutting Speed Surface Meters per Minute

$$v_c = \frac{\pi \times D_m \times n}{1000}$$

Example: Determine the cutting speed (v_c) required for turning a 50mm diameter part with a spindle speed of 600 RPM.

$$v_c = \frac{\pi \times 50 \times 600}{1000} = 94{,}25 \text{ m/Min}$$

Spindle Speed Revolution Per Minute

$$n = \frac{v_c \times 1000}{\pi \times D_m}$$

Example: Determine the spindle speed (n) required for turning a 32mm diameter part with a cutting speed of 100 m/Min.

$$n = \frac{100 \times 1000}{\pi \times 32} = 994{,}72 \text{ Rev/Min}$$

Metal Removal Rate mm^3/Min

$$Q = v_c \times a_p \times f_n \times 1000$$

Example: Determine the metal removal rate (Q) required for cutting with a depth of 1,5 with a cutting speed of 200 m/Min and feed rate of 0,4 mmPR.

$Q = 200 \times 1{,}5 \times 0{,}4 \times 1000 = 120.000 \ mm^3/min$

Power Requirement Kilowatts

$$P_c = \frac{v_c \times a_p \times f_n \times k_c}{1.460.000}$$

Example: Determine the power requirement (P_c) for turning a material with a specific cutting force of 20.500, a depth of 1,5, a cutting speed of 200 m/Min, and feed rate of 0,4 mmPR.

$$P_c = \frac{200 \times 1{,}5 \times 0{,}4 \times 20.500}{1.460.000} = 1{,}68 \text{ kW}$$

Cutting Time Minute

$$T_c = \frac{l_m}{f_n \times n}$$

Example: Determine the amount of time required to machine a 200mm long part with a spindle speed of 600 RPM and feed rate of 0,4 mmPR.

$$T_c = \frac{200}{0{,}4 \times 600} = {,}83 \text{ Min (50 Sec)}$$

Profile Depth (µinch)

$$R_{max} = \frac{f_n^2 \times 10^6}{8 r_\varepsilon}$$

Example: Determine the profile depth (R_{max}) of a surface machined using an insert with a nose radius of 0,8 and a feed rate of 0,4 mmPR.

$$R_{max} = \frac{0{,}4^2 \times 10^6}{8 \times 0{,}8} = 25 \ \mu m$$

Material	Material Characteristics	
Low Carbon Steel: Under 0.03% Carbon **Alloy Steel, AISI:** 1008, 1010, 1018, 10201026,10L18,10L45, 10L50, 1108,1117, 1141, 11L44, 1214, 12L14	**Low Carbon** • Soft and gummy • Difficult chip control • Rough finish • Burrs and sharp edge • Poor surface finish • Poor tolerance • Difficult to machine close tolerance	**Free Machining** • Easy to machine • High speed machining • High depth of cut • Poor surface finish • Good tolerance • Semi-difficult chip control

Material	Material Characteristics
Carbon Steel, Alloy Steel, and Tool Steel Under 36 HRC: **Medium and High Carbon Steel, AISI:** 1035, 1040, 1045, 1050, 1080, **Alloy Steel, AISI Series:** 1300, 200, 3000, 4000, 5000, 6000, 7000, 8000, 9000 **Tool Steel and High Speed Steel, SAE Classes:** A, D, M, O, T, and S **High and Low Carbon Alloy:** W1, W2, L2, P1, P6, and P20	• Higher carbon content • Higher chrome, nickel, and moly content • Tough material to machine • Low machining speed • Difficult to break and control the chip flow • The material surface will harden when machined at high speed • Good surface finish

Material	Material Characteristics
Carbon Steel, Alloy Steel and Tool Steel 36-48 HRC: **Alloy Steel, AISI Series:** 1335, 4130, 4135, 4140,4150, 4330, 4340, 5046, 5140, 5210, 8625, 8640 **Tool Steel and High Speed Steel, SAE Classes:** A, D, M, O, T, and S **High and Low Carbon Alloy:** W1, W2, L2, P1, P6, and P20	• Higher carbon content • Higher chrome, nickel, and moly content • Tough material to machine • Abrasive • Difficult to break and control the chip flow • The material surface will harden when machined at high speed • Good surface finish

NEGATIVE - Best Turning and Boring Performance of Carbon and Alloy Steel

Material Shape	Roughing			Universal			Finish		
	Grade	Chip Breaker	Radius	Grade	Chip Breaker	Radius	Grade	Chip Breaker	Radius
Casting or Forging	DPC35RT	PER-PSH-PSS-PST	Large	DPC35RT	PEM	Large	DPC25UT DPC35RT	PEF	Large
Interrupted Cut	DPC35RT	PER-PSH-PSS-PST	Large	DPC25UT DPC35RT	PEM	Large	DPC25UT	PEF	Large
Light Interrupted Cut	DPC25UT	PER-PSH-PSS-PST	Large	DPC25UT	PEM	Large	DPC25UT	PEF	Large
Smooth Surface	DPC15UT	PER-PSH-PSS-PST	Large	DPC15HT	PEM-UEM	Large	DPC15HT DUP35RT	PEF-SEF	Large

Note: For better insert performance and surface finish, use a large radius insert if the workpiece is solid material, and the cutting conditions are stable and rigid.
Use a small insert radius if cutting thin wall tubing or with unstable working conditions (like poor holding ridigity of the workpiece or undersize toolholder or boring bar).

Material	Material Characteristics
Austenitic Stainless Steel: **200 series , ANSI:** 200, 209, 219 **300 series , ANSI:** 302, 303, 304, 304l, 310, 316, 316L, 312, 329, 347, 384 **Duplex, AS TM :** XM-1, XM5, XM7, XM21, C F -8M	• Becomes gummy under machining operations due to nickel content • Very difficult to machine in soft conditions • Very difficult to machine at a small depth of cut • Develops a tough string of chips that are difficult to control. Forms a build-up on the insert tip • Low thermal conductivity results in excess heat at the insert tip • Material surface will harden due to high chromium content

Material	Material Characteristics
Ferritic, Martensitic, and PH Stainless Steel under 48 HRC: **400 series AISI:** 410, 416, 416Se, 420F, 440, 440C **500 series AISI:** 502, 504 **PH series (precipitation hardening):** 17-4PH, PH 13-8 Mo, 15-5 PH	• Brittle • Stringy chips • High cutting force • The material will harden when machined at high speed.

Material	Material Characteristics
Ductile and Malleable Cast Iron: **Ductile Cast Iron, Ferritic-Pearlitic ASTM:** 60-40-18, 65-45-12, 80-55-06, 100-70-03 **SAE J 434:** D4018, D4512, D5506, D7003 **Malleable Cast Iron, Pearlitic-Martensitic ASTM A47:** 32510, 35018 **SAE J 148:** M3210, M4504, M5003	• Very difficult to machine • Small depth of cut • Spherical form graphite makes machining difficult • The carbide concentration creates hard spots • The material structure is not uniform • The crater wear and flank of the insert makes machining difficult • The insert tool life is less than gray cast iron

Material	Material Characteristics
Gray Cast Iron: **AS TM A48:** Class 20B , 25B , 30B , 35B , 40B , 45B , 50B , 56B **SAE J 431:** G1800, G3000, G3500, G4000	• Flake form of graphite makes machining easy • Contains scale, inclusions and sand in the surface • The material will break easily on the end of the cut • Tendency to chatter and vibrate on thin wall section • Chucking and rigidity of the workpiece is extremely important to minimize distortion, to achieve a good finish and close tolerance

Material	Material Characteristics	
Aluminum: **Free Machining Aluminum:** AA; 2024-T4, 2014-T6, 2001-T3, 6061-t6 **Low-Silicon Aluminum Alloy <12.2% Si** **High-Silicon Aluminum Alloy >12.2% Si**	**Low-Silicon Aluminum Alloy <12.2% Si** • Easy to machine at high surface speed • Soft and gummy with a low melting temperature; tendency to stick to cutting tool • Edge build up will cause surface finish problems • Develops a string of chips that are difficult to control. Forms a build-up on the insert tip • Low coefficient of elasticity, high ductility • Greater tendency to yield under pressure of the cutting tool	**High-Silicon Aluminum Alloy >12.2% Si** • The high silicon content makes it difficult to machine at a high surface speed • The high silicon content makes the material very abrasive and hard on the insert causing rapid tool wear • High cutting forces are generated to overcome the abrasiveness resulting from the high silicon content.

Material	Material Characteristics	
Non Ferrous **Copper**	• Mildly abrasive and gummy alloy • Easy to machine • Develops a string of chips that are difficult to control especially in internal boring operations. • Use a high Positive Turning Insert with a honed edge for roughing and a sharp edge for finishing. Choose a hard grade like **DUP15VT, DUP25GT or DUP35RT**.	
Non Ferrous **Brass , Bronze** **Lead Alloys, Zinc**	• Abrasive and tougher alloys than copper • Easy to machine and good chip control. • Use a high Positive Turning Insert with a honed edge for finishing, using a hard grade like **DUP15VT, DUP25GT or DUP35RT.** For roughing castings , use **SER** chipbreaker.	
Non Ferrous **Magnesium**	• Tougher material than aluminum • Fire hazard present when machined at high speeds • Use oil base coolant with good ventilation • High depth of cut is possible with a high feed rate and good chip control • Use a high Positive Turning Insert with a honed edge for roughing, and sharp edge for finishing. Choose a hard grade like **DUP15VT, DUP25GT or DUP35RT** .	
Non Ferrous **Nylon, Plastic , Rubber**	• Mildly abrasive • Extremely soft and gummy materials with a very low melting temperature • Easy to machine at high surface speeds • Develops a long and soft string of chips • Difficult to achieve high surface-finish and maintain close tolerances • Use a high Positive Turning Insert with a honed edge for roughing, and sharp edge for finishing. Choose a hard grade like **DNU10GT or DKU10HT.**	
Non Ferrous **Carbon and Graphite** **Phenolics , Resins**	• Very abrasive, soft and porous materials • Difficult to machine • Material will break easy on the end of the cut, and chips will develop in the form of dust • Machining this material is very hard on the inserts • Use a high Positive Turning Insert with a honed edge for roughing, and a sharp edge for finishing. Choose a hard grade like **DUP15VT, DUP25GT or DUP35RT.**	

Material	Material Characteristics
Iron-Base, High Temp Super Alloys Under 34 HRC: **Wrought:** A-286, Discaloy, Incoloy 801, N-155,16-25-6, 19-9 DL **Cast: AS TM:** A297, A351, A608, A567	• Very difficult to machine small depth of cut • Insert tool life is relatively poor • Material surface will harden rapidly • Material is abrasive • Cast material is more difficult to machine than wrought • Develops tough, stringy chips that are difficult to control and form a build-up on the insert tip

Material	Material Characteristics
Nickel-Base, High Temp Super Alloys Under 48 HRC: **Astroloy, Has telloy, B /C /C -276/X, Inconel:** 601, 617,625, 700, 706, 718 IN100, Incoloy 901, Mar-M200, Nimonic, Rene 41, Udimet, Waspaloy, Monel **Cobalt-Base, High Temper Alloys Under 45 HRC Wrought:** AiResist 213, Haynes 25 (L605), Haynes 188, J -1570, Stellite **Cast:** AiResist 13, Haynes 21, Mar-M302, Mar-M509, Nasa CO-W-R E , Wi-52	• Very difficult to machine a small depth of cut • Insert tool life is relatively poor • Material surface will harden rapidly • Material is abrasive • Cast material is more difficult to machine than wrought • High cutting force • Excessive heat at the insert tip • Insert failure by plastic deformation tends to result at high speeds

Material	Material Characteristics
Titanium and Titanium Alloys Under 48 HRC: **Alloyed:** TiAl2.5Sn, Ti-6Al-4V, Ti6AlSn-4Zr-2Mo, Ti3Al-8V-6Cr-4Mo-4Zr, Ti10V-2Fe-3Al, Ti-13V-11Cr-3Al	• Insert tool life is relatively poor • Produces abrasive, tough, and stringy chips • Low thermal conductivity results in excess heat at the insert tip • Low coefficient of elasticity • Material surface will harden rapidly • High chemical reactivity causes chips to gall and weld to the cutting edge

Problem	Cause	Solution
Poor surface finish	Material machinability	Use the correct grade for the proper material
	Depth of cut	Reduce depth of cut
	Feed rate	Increase feed rate
	RPM	Increase RPM
	Insert nose radius	Use insert with a larger nose radius
Surface Glazing	RPM	Decrease RPM
	Cutting parameter	Decrease VC (SFM)
	Depth of cut	Depth of cut to be .005 under the hard surface
	Insert chipbreaker	Change to a free cutting chipbreaker
	Insert nose radius	Use insert with a smaller nose radius
	Insert edge prep	Change to a sharper insert cutting edge
	Insert grade	Change to a harder and a wear resistant grade
Sharp edge burrs	RPM	Increase RPM
	Feed rate	Decrease feed rate
	Insert chipbreaker	Change to a free cutting chipbreaker
	Insert wearing	Change to a new insert
Chips don't break	Insert chipbreaker	Use insert with a small chipbreaker
	Feed rate	Increase feed rate
	Depth of cut	Increase depth of cut
	Nose radius	Use insert with a smaller nose radius
	Coolant pressure	Increase coolant pressure
Interrupted Cut	Rigidity of the workpiece	Workpiece must be held rigid
	Rigidity of the tool holder	Tool holder must to be rigid
	Feed rate	Decrease Feed rate
	RPM	Increase RPM
	Insert grade	Change a tougher and impact resistant grade
	Insert radius	Use insert with a larger nose radius
	Insert edge prep	Use a heavier honed cutting edge
Insert edge wear	RPM	Reduce RPM
	Feed rate	Increase feed rate
	Depth of cut	Increase depth of cut
	Coolant	Increase coolant pressure
	Insert Grade	Change to a harder and a wear resistant grade
Insert Chipping	Rigidity of the workpiece	Workpiece must be held rigid
	Rigidity of the tool holder	Tool holder must to be rigid
	Interrupt cut	If permissible cut under an even surface
	RPM	Increase RPM
	Feed rate	Decrease feed rate
	Insert grade	Change to a tougher and impact resistant grade
	Insert radius	Change to an insert with a larger nose radius
	Insert edge prep	Change to a heavier honed cutting edge
Insert Built-up edge	Dull cutting edge	Replace with a new insert
	Insert edge prep	Change to a sharper insert cutting edge
	Insert Coating	Use a PVD insert coating
	Coolant	Increase coolant pressure
Depth of Cut Notch	Feed rate	Increase feed rate
	Depth of cut	Depth of cut to be .005 under the hard surface
	Insert geometry	Change to a stronger permissible insert geometry
	Insert grade	Change to a harder and a wear resistant grade

Turning Cutting Speed Recommendation

Materials				Negative and Positive Inserts Cutting Speed Recommendation							
		Dorian Insert Grade		DPP30GT		DPC15VT		DPC25UT		DPC35RT	
	Best	Insert Coating		PVD Coated		CVD Coated		CVD Coated		CVD Coated	
P-Steel Alloy Steel	●			Wear Resistant		Wear Resistant		Medium		Impact Resistant	
M-Stainless Steel	○			Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
K- Cast Iron	○	Depth of Cut a_p		0.004 - 0.157	0.10 - 4.00	0.004 - 0.039	0.10 - 1.00	0.008 0.079	0.20 2.00	0.016 0.394	0.40 10.00
		Feed per Rev. f_n		0.002 - 0.002	0.05 - 0.04	0.002 - 0.031	0.05 - 0.80	0.004 0.020	0.10 0.50	0.008 0.039	0.20 1.00
				Surface Feed per Min. (Vc)		Surface Feed per Min. (Vc)		Surface Feed per Min. (Vc)		Surface Feed per Min. (Vc)	
		Brinell	HRC	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
Unalloyed Carbon Steel				90%		0%		85%		50%	
C=0.1-0-0.25%	Annealed	**125**		1069 416	324 126	1188 462	360 140	1010 393	306 119	594 231	180 70
C=0.25-0.55%	Annealed	**150**		950 327	288 99	1056 363	320 110	898 309	272 94	528 182	160 55
C=0.55-0.80%	Annealed	**170**	**8**	891 297	270 90	990 330	300 100	842 281	255 85	495 165	150 50
Low Alloy Steel ≤ 5%											
Annealed		**180**	**10**	891 297	270 90	990 330	300 100	842 281	255 85	495 165	150 50
Ball Bearing Steel		**210**	**17**	624 297	189 90	693 330	210 100	589 281	179 85	347 165	105 50
Hardened & Tempered		**275**	**28**	594 297	180 90	660 330	200 100	561 281	170 85	330 165	100 50
Hardened & Tempered		**350**	**38**	535 297	162 90	594 330	180 100	505 281	153 85	297 165	90 50
High Alloy Steel >5%											
Annealed		**200**	**15**	505 297	153 90	561 330	170 100	477 281	145 85	281 165	85 50
Hardened Tool Steel		**325**	**35**	475 238	144 72	528 264	160 80	449 224	136 68	264 132	80 40
Steel Castings											
Unalloyed Carbon Steel		**180**	**10**	594 356	180 108	660 396	200 120	561 337	170 102	330 198	100 60
Low Alloy Steel ≤ 5%		**200**	**15**	535 327	162 99	594 363	180 110	505 309	153 94	297 182	90 55
High Alloy Steel > 5%		**225**	**20**	416 267	126 81	462 297	140 90	393 252	119 77	231 149	70 45
Stainless Steel											
Austenitic 200 & 300 Series		**180**	**10**	772 297	234 90	858 330	260 100	729 281	221 85	429 165	130 50
Stainless Steel											
Ferritic/Martensitic 400 Series		**200**	**15**	624 297	189 90	693 330	210 100	589 281	179 85	347 165	105 50
Gray Cast Iron											
Low Tensile Strength		**180**	**10**	950 297	288 90	1056 330	320 100				
High Tensile Strength		**220**	**20**	535 267	162 81	594 297	180 90				
Modular Graphite Cast Iron											
Ferritic		**160**	**6**	624 297	189 90	693 330	210 100				
Pearlitic		**250**	**24**	535 267	162 81	594 297	180 90				
Martensitic		**360**	**39**	505 238	153 72	561 264	170 80				
Malleable Cast Iron											
Ferritic (Short Chips)		**130**		624 267	189 81	693 297	210 90				
Pearlitic (Long Chips)		**230**	**20**	535 267	162 81	594 297	180 90				

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Materials		Negative and Positive Inserts Cutting Speed Recommendation							
		Dorian Insert Grade			DMC20HT			DMC30UT	
	Best	Insert Coating			CVD Coated			CVD Coated	
M-Stainless Steel	●				Wear Resistant			Impact & Wear Resistant	
					Inch	Metric		Inch	Metric
		Depth of Cut a_p			0.012 - 0.394	0.30 - 10.00		0.008 - 0.236	0.20 - 6.00
		Feed per Rev. f_n			0.004 - 0.031	0.10 - 0.80		0.002 - 0.024	0.05 - 0.60
					Surface Feed per Min. (Vc)			Surface Feed per Min. (Vc)	
			Brinell	HRC	Inch	Metric		Inch	Metric
Stainless Steel Austenitic Bars 200 & 300 Series					130%			0%	
Bars & Forged Austenitic 303			**180**	**10**	759 429	230 130		594 330	180 100
Bars & Forged Austenitic 302-304-316			**200**	**15**	759 309	230 94		594 330	180 100
Bars & Forged Austenitic PH-Hardened			**330**	**35**	759 309	230 94		594 330	180 100
Stainless Steel Austenitic Cast 200 & 300 Series									
Casting Austenitic 303			**180**	**10**	759 429	230 130		594 211	180 64
Casting Austenitic 302-304-316			**200**	**15**	759 262	230 79		594 201	180 61
Casting Austenitic PH-Hardened			**330**	**35**	759 4	230 1		594 3	180 1
Stainless Steel Ferritic/Martensitic Bars, 400 Series, 17-4 PH									
Bars & Forged Ferritic/Martensitic 400 Series			**180**	**10**	759 429	230 130		528 211	160 64
Bars & Forged Ferritic/Martensitic 400 Series			**330**	**15**	759 262	230 79		528 201	160 61
Bars & Forged Martensitic PH-Hardened			**330**	**35**	759 4	230 1		528 3	160 1
Stainless Steel Ferritic/Martensitic Cast, 400 Series, 17-4 PH									
Casting Ferritic/Martensitic 400 Series			**180**	**10**	759 429	230 130		528 211	160 64
Casting Ferritic/Martensitic 400 Series			**200**	**15**	759 262	230 79		528 201	160 61
Casting Martensitic PH-Hardened			**330**	**35**	759 262	230 79		528 201	160 61
Stainless Steel Austenitic-Ferritic Duplex									
Stainless Steel Austenitic-Ferritic Duplex 2304					759 429	230 130		528 201	160 61
Stainless Steel Austenitic-Ferritic Duplex 2305					759 245	230 74		528 188	160 57
Stainless Steel Austenitic-Ferritic Duplex 2307					759 232	230 70		528 178	160 54

Insert Attitude

Cutting Condition: Wet

SFM (V_C)
Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C)
Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Materials		Negative and Positive Inserts Cutting Speed Recommendation									
		Dorian Insert Grade		DKU10H		DKC10U			DKC15R		
		Insert Coating		Uncoated		CVD Coated TiN/Al_2O_3/TiCN			CVD Coated TiN/Al_2O_3/TiCN		
	Best			C2-C3		C2-C3			C1-C2		
K - Cast Iron	●			Wear Resistant		Medium			Impact Resistant		
H - Hardened Material	●			Inch	Metric	Inch		Metric	Inch	Metric	
		Depth of Cut a_p		0.008 - 0.157	0.20 - 4.00	0.008	0.157	0.20 - 4.00	0.016 - 0.236	0.40 - 6.00	
		Feed per Rev. f_n		0.004 - 0.016	0.10 - 0.40	0.004	0.024	0.10 - 0.60	0.008 - 0.031	0.20 - 0.80	
				Surface Feed per Min. (Vc)		Surface Feed per Min. (Vc)			Surface Feed per Min. (Vc)		
		Brinell	HRC	Inch	Metric	Inch		Metric	Inch	Metric	
Cast Iron				50%		50%			-70%		
Gray Cast Iron											
Low Tensile Strength		**180**	**10**	637 382	193 116	891 446		270 135	743 371	225 113	
High Tensile Strength		**220**	**20**	414 248	125 75	752 376		228 114	627 314	190 95	
Modular Graphite Cast Iron											
Low Tensile Strength		**160**	**6**	594 330	180 100	851 426		258 129	710 355	215 108	
Low Tensile Strength		**250**	**24**	396 231	120 70	772 386		234 117	644 322	195 98	
Low Tensile Strength		**360**	**39**	342 205	104 62	594 297		180 90	495 248	150 75	
Malleable Cast Iron											
Hardened and Tempered		**130**		515 309	156 94	792 396		240 120	660 330	200 100	
Pearlitic (Long Chips)		**230**	**20**	433 260	131 79	752 376		228 114	627 314	190 95	
Hardened Materials											
Hardened and Tempered Allow Steel		**45 HRC**		74 44	22 13	129 77		39 23	99 69	30 21	
		50 HRC		69 41	21 13	120 72		36 22	92 65	28 20	
		55 HRC		62 37	19 11	107 64		33 20	83 58	25 18	
		60 HRC		57 34	17 10	99 59		30 18	76 53	23 16	
		65 HRC		47 28	14 9	82 49		25 15	63 44	19 13	

Cutting Condition: Wet
SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.
SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Materials				Negative and Positive Inserts Cutting Speed Recommendation							
			Dorian Insert Grade	DKU10HT		DKU25GT		DKP10HT		DUC25UT	
			Insert Coating	Uncoated		Uncoated		PVD Coated		CVD Coated	
						TiN/Al_2O_3/TiCN		TiN/Al_2O_3/TiCN		TiN/Al_2O_3/TiCN	
	Best			C2-C3		C3-C4		C2-C3		C1-C2	
P - Alloy Steel	●			Wear Resistant		Impact Resistant		Wear Resistant		Impact & Wear Resistant	
M - Stainless Steel	●			Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
K - Cast Iron	●		Depth of Cut a_p	0.004 - 0.118	0.10 - 3.00	0.004 - 0.118	0.10 - 3.00	0.004 - 0.118	0.10 - 3.00	0.020 - 0.118	0.50 - 3.00
N - Aluminum Alloys	●		Feed per Rev. f_n	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80
U - Multi Materials	●			Medium SFM (Vc)		High SFM (Vc)		High SFM (Vc)		High SFM (Vc)	
		Brinell	HRC	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
Free Machining Low Carbon Steel											
C=0.1-0.25%	Annealed	**125**						1122 528	340 160	1010 403	306 122
Alloy Steel > 5%								495 248	150 75	446 178	135 54
Hardened & Tempered	Heat -treated	**275**	**28**					396 198	120 60	356 143	108 43
Hardened & Tempered	Heat -treated	**350**	**38**								
Stainless Steel											
Austenitic 200 & 300 Series		**180**	**10**	495 248	150 75	396 198	120 60	644 322	195 98	644 257	195 78
Ferretic/Martensitic 400 Series		**200**	**15**	545 272	165 83	436 218	132 66	708 354	215 107	762 381	231 116
Gray Cast Iron											
Low Tensile Strength		**180**	**10**	594 330	180 100	475 238	144 72	832 429	252 130	713 356	216 108
High Tensile Strength		**220**	**20**	396 231	120 70	317 158	96 48	554 300	168 91	475 238	144 72
Aluminum Alloys											
Forged	Annealed	50	70	3135 1568	950 475	2195 878	665 266				
Forged	Hardened	90	100	2244 1122	680 340	1571 628	476 190				
Cast	Annealed	70	80	1782 891	540 270	1247 499	378 151				
Cast	Hardened	80	100	1353 677	410 205	947 379	287 115				
Copper & Copper Alloys											
Free cutting Copper Alloy		90	110	1145 573	347 174	802 401	243 121	1489 744	451 226	1260 630	382 191
Unleaded Copper		90	110	743 371	225 113	520 260	158 79	965 483	293 146	817 408	248 124
Electrolytic Copper		90	110	693 347	210 105	485 243	147 74	901 450	273 137	762 381	231 116
Brass and Bronze		80	100	825 413	250 125	578 289	175 88	1073 536	325 163	908 454	275 138
Brass											
Unleaded Bronze		80	100	858 429	260 130	601 300	182 91	1115 558	338 169	944 472	286 143
Leaded Bronze		90	110	891 446	270 135	624 312	189 95	1158 579	351 176	980 490	297 149
Magnesium-Zinc	Annealed	80	100	2261 1130	685 343	1582 791	480 240	2939 1469	891 445		
Nylon- Plastic & Rubber				2244 1122	680 340	1571 785	476 238	2917 1459	884 442		
Carbon-Graphite-Phenolics				228 139	69 42	159 80	48 24	296 180	90 55		

Cutting Condition: Wet
SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.
SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Materials				Negative and Positive Inserts Cutting Speed Recommendation							
			Dorian Insert Grade	DNU10GT		DNU25GT		DNX10UT		DNP25GT	
			Insert Coating	Uncoated		Uncoated		PVD Coated		PVD Coated	
Best											
P - Alloy Steel ●				Hard & Wear Resistant		Impact Resistant		Hard & Abrasive Resistant		Impact & Wear Resistant	
				Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
M - Stainless Steel ●			Depth of Cut a_p	0.002 - 0.118	0.05 - 3.00	0.004 - 0.118	0.10 - 3.00	0.004 - 0.118	0.10 - 3.00	0.004 - 0.118	0.10 - 3.00
K - Cast Iron ●			Feed per Rev. f_n	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80	0.002 - 0.031	0.05 - 0.80
U - Multi Materials ○				Medium SFM (Vc)		High SFM (Vc)		High SFM (Vc)		High SFM (Vc)	
		Brinell	HRC	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric
Free Machining Low Carbon Steel											
C=0.1-0.25%	Annealed	**125**						1122 528	340 160	1010 403	306 122
Alloy Steel > 5%								495 248	150 75	446 178	135 54
Hardened & Tempered	Heat -treated	**275**	**28**					396 198	120 60	356 143	108 43
Hardened & Tempered	Heat -treated	**350**	**38**								
Stainless Steel											
Austenitic 200 & 300 Series		**180**	**10**	495 248	150 75	396 198	120 60	644 322	195 98	644 257	195 78
Ferretic/Martensitic 400 Series		**200**	**15**	545 272	165 83	436 218	132 66	708 354	215 107	762 381	231 116
Gray Cast Iron											
Low Tensile Strength		**180**	**10**	594 330	180 100	475 238	144 72	950 429	288 130	713 356	216 108
High Tensile Strength		**220**	**20**	396 231	120 70	317 158	96 48	634 300	192 91	475 238	144 72
Aluminum Alloys											
Forged	**Annealed**	**50**	**70**	6353 1271	1925 385	4447 1779	1348 539	7623 1525	2310 462		
Forged	Hardened	**90**	**110**	5280 528	1600 160	3696 1478	1120 448	6336 634	1920 192		
Cast	**Annealed**	**70**	**80**	3960 1056	1200 320	2772 1109	840 336	4752 1267	1440 384		
Cast	Hardened	80	100	3135 792	950 240	2195 878	665 266	3762 950	1140 288		
Copper & Copper Alloys											
Free cutting Copper Alloy		90	110	1145 573	347 174	802 401	243 121	1489 744	451 226	1260 630	382 191
Unleaded Copper		**90**	**110**	743 371	225 113	520 260	158 79	965 483	293 146	817 408	248 124
Electrolytic Copper		**90**	**110**	693 347	210 105	485 243	147 74	901 450	273 137	762 381	231 116
Brass and Bronze											
Brass		80	100	825 413	250 125	578 289	175 88	1073 536	325 163	908 454	275 138
Unleaded Bronze		80	100	858 429	260 130	601 300	182 91	1115 558	338 169	944 472	286 143
Leaded Bronze		90	110	891 446	270 135	624 312	189 95	1158 579	351 176	980 490	297 149
Magnesium-Zinc	Anneled	80	100	2261 1130	685 343	1582 791	480 240	2939 1469	891 445		
Nylon- Plastic & Rubber				2244 1122	680 340	1571 785	476 238	2917 1459	884 442		
Carbon-Graphite-Phenolics				228 139	69 42	159 80	48 24	296 180	90 55		
Super Alloy											
Heat Resistant Super Alloy Iron Base											
Discaloy, Incoloy 801, N-155, 16-25-6, 19-9L, A-286											
Cast:ASTM A297, A351, A608, A567											
Annealed		**200**	**15**	149 89	45 27	135 81	41 25	176 106	53 32	162 97	49 30
Aged or Solution Treated and Aged		**280**	**29**	109 65	33 20	99 59	30 18	129 77	39 23	119 71	36 22
Heat Resistant Super Alloy Nickel Base											
Astrloy, Hastelloy B/C/C-276/X,											
Inconel 601, 617, 625, 700, 706, 713, 718											
Incoloy 901, Monel, Nimonic, Rene41,											
Udimet, Wasploy, IN 102, MAR-M200											
Annealed or Solution Treated		**250**	**25**	116 70	35 21	106 63	32 19	137 82	42 25	127 76	38 23
Aged or Solution Treated and Aged		**350**	**37**	91 54	28 17	83 50	25 15	107 64	33 20	99 59	30 18
Cast and Aged		**320**	**34**	58 35	18 11	53 32	16 10	69 41	21 12	63 38	19 12
Heat Resistant Super Alloy Cobalt Base											
AiResist213, Haynes25, (605) Haynes 188, J-1570, Stellite											
Cast:AiResist 13, Haynes21, MAR-M509, NASA Co-W_Re, WI-52											
Annealed or Solution Treated		**200**	**15**	116 70	35 21	106 63	32 19	137 82	42 25	127 76	38 23
Solution Treated and Aged		**300**	**32**	91 54	28 17	83 50	25 15	107 64	33 20	99 59	30 18
Cast and Aged		**320**	**34**	58 35	18 11	53 32	16 10	69 41	21 12	63 38	19 12
Titanium Alloys											
Pure Titanium: Ti98.8, Ti99.9,											
Alloyed: Ti-5Al-2.5Sn, Ti-6l-4v, Ti-6Al-2Sn-4Zr-2Mo, 3Al											
Ti-3Al-8V-Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al											
Commercial pure (99.5%)		**400**		330 198	100 60	300 180	91 55	390 234	118 71	360 216	109 66
Alloys Annealed		**950**		142 85	43 26	129 77	39 23	167 100	51 30	154 93	47 28
Alloys In Aged condition		**1050**		102 61	31 18	92 55	28 17	120 72	36 22	111 67	34 20

Materials		Negative & Positive Inserts Cutting Speed Recommendation									
		Dorian Insert Grade			DSP10HT		DSP20HT		DUP35RT		
		Insert Coating			PVD Coated		PVD Coated		PVD Coated		
	Best				Hard & Wear Resistant		Hard & Tough		Tougher & Impact		
P - Alloy Steel	○				Inch	Metric	Inch	Metric	Inch	Metric	
M - Stainless Steel	○	Depth of Cut ap			0.002 - 0.157	0.05 - 4.00	0.002 - 0.157	0.05 - 4.00	0.002 - 0.157	0.05 - 4.00	
K - Cast Iron	○	Feed per Rev. f_n			0.002 - 0.016	0.05 - 0.40	0.002 - 0.016	0.05 - 0.40	0.002 - 0.016	0.05 - 0.40	
N - Aluminum Alloys	●				Medium SFM (Vc)		High SFM (Vc)		High SFM (Vc)		
S - High Temp Alloy	●		Brinell	HRC	Inch	Metric	Inch	Metric	Inch	Metric	
H-Hardened Steel	●	**Unalloyed Carbon Steel**									
U - Multi Materials	●	C=0.1-0.25%	Annealed	125	1372 686	416 208	1247 624	378 189	1067 480	323 145	
		C=0.25-0.55%	Annealed	150	1241 621	376 188	1129 564	342 171	965 434	292 132	
		C=0.55-0.80%	Annealed	170 8	1176 588	356 178	1069 535	324 162	914 411	277 125	
		Low Alloy Steel ≤ 5%									
		Annealed		180 10	1078 539	327 163	980 490	297 149	838 377	254 114	
		Ball Bearing Steel		210 17	1209 604	366 183	1099 549	333 167	940 423	285 128	
		Hardened & Tempered		275 28	1045 523	317 158	950 475	288 144	813 366	246 111	
		Hardened & Tempered		350 38	784 392	238 119	713 356	216 108	609 274	185 83	
		High Alloy Steel > 5%									
		Annealed		200 15	849 425	257 129	772 386	234 117	660 297	200 90	
		Hardened Tool Steel		325 35	751 376	228 114	683 342	207 104	584 263	177 80	
		Steel Castings									
		Unalloyed Carbon Steel		180 10	915 457	277 139	832 416	252 126	711 320	215 97	
		Low Alloy Steel ≤ 5%		200 15	849 425	257 129	772 386	234 117	660 297	200 90	
		High Alloy Steel > 5%		225 20	784 392	238 119	713 356	216 108	609 274	185 83	
		Stainless Steel Austenitic Bars 200 & 300 Series									
		Bars & Forged Austenitic 303		180 10	817 408	248 124	743 371	225 113	635 286	192 87	
		Bars & Forged Austenitic 302-304-316		200 15	670 335	203 101	609 304	185 92	521 234	158 71	
		Bars & Forged Austenitic PH-Hardened		330 35	555 278	168 84	505 252	153 77	432 194	131 59	
		Stainless Steel Austenitic Cast 200 & 300 Series									
		Casting Austenitic 303		180 10	719 359	218 109	653 327	198 99	559 251	169 76	
		Casting Austenitic 302-304-316		200 15	588 294	178 89	535 267	162 81	457 206	139 62	
		Casting Austenitic PH-Hardened		330 35	490 245	149 74	446 223	135 68	381 171	115 52	
		Stainless Steel Ferritic/ Martensitic Bars, 400 Series, 17-4 PH									
		Casting Ferritic/Martensitic 400 Series		180 10	866 433	262 131	787 394	239 119	673 303	204 92	
		Casting Ferritic/Martensitic 400 Series		200 15	539 270	163 82	490 245	149 74	419 189	127 57	
		Casting Martensitic PH-Hardened		330 35	506 253	153 77	460 230	140 70	394 177	119 54	
		Stainless Steel Austenitic-Ferretic Duplex									
		Stainless Steel Austenitic-Ferretic Duplex 2304		180 10	800 400	243 121	728 364	221 110	622 280	189 85	
		Stainless Steel Austenitic-Ferretic Duplex 2205		200 15	490 245	149 74	446 223	135 68	381 171	115 52	
		Stainless Steel Austenitic-Ferretic Duplex 2207		330 35	441 221	134 67	401 200	122 61	343 154	104 47	
		Stainless Steel Austenitic-Ferretic Duplex									
		Stainless Steel Austenitic-Ferretic Duplex 2304		180 10	572 286	173 87	520 260	158 79	444 200	135 61	
		Stainless Steel Austenitic-Ferretic Duplex 2205		200 15	441 221	134 67	401 200	122 61	343 154	104 47	
		Stainless Steel Austenitic-Ferretic Duplex 2207		330 35	252 126	76 38	229 114	69 35	196 88	59 27	

Cutting Condition: Wet
SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.
SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Turning Cutting Speed Recommendation

Gray Cast Iron															
Low Tensile Strength		**180**	**10**	882	441	267	134	802	401	243	122	686	309	208	93
High Tensile Strength		**220**	**20**	702	351	213	106	639	319	194	97	546	246	165	74
Modular Graphite Cast Iron															
Ferritic		**160**	**6**	702	351	213	106	639	319	194	97	546	246	165	74
Pearlitic		**250**	**24**	621	310	188	94	564	282	171	86	482	217	146	66
Martensitic		**360**	**39**	490	245	149	74	446	223	135	68	381	171	115	52
Malleable Cast Iron															
Ferritic (Short Chips)		**130**		751	376	228	114	683	342	207	104	584	263	177	80
Pearlitic (Long Chips)		**230**	**20**	621	310	188	94	564	282	171	86	482	217	146	66
Aluminum Alloys															
Forged	Annealed	50	70									6348	2857	1924	866
Forged	Hardened	90	110									2638	1187	799	360
Cast	Annealed	70	80									2638	1187	799	360
Cast	Hardened	80	100									1792	806	543	244
Copper and Copper Alloys															
Free cutting Copper Alloy		90	110	1898	949	575	288	1726	863	523	261	1476	664	447	201
Unleaded Copper		90	110	1062	531	322	161	965	483	293	146	825	371	250	113
Electrolytic Copper		90	110	1147	573	347	174	1042	521	316	158	891	401	270	122
Brass and Bronze		80	100	1895	947	574	287	1723	861	522	261	1473	663	446	201
Brass		80	100	817	408	248	124	743	371	225	113	635	286	192	87
Unleaded Bronze		90	110	882	441	267	134	802	401	243	122	686	309	208	93
Leaded Bronze															
Magnesium-Zinc															
Annealed		80	100	1503	751	455	228	1366	683	414	207	1168	526	354	159
Nylon- Plastic & Rubber				2222	1111	673	337	2020	1010	612	306	1727	777	523	235
Carbon-Graphite-Phenolics				261	131	79	40	238	119	72	36	203	91	62	28
Super Alloys															
Heat Resistant Super Alloy Iron Base															
Discaloy, Incoloy 801, N-155, 16-25-6, 19-9L, A-286															
Cast:ASTM A297, A351, A608, A567															
Annealed		200	15	245	123	74	37	223	111	68	34	190	86	58	26
Aged or Solution Treated and Aged		280	29	180	90	54	27	163	82	50	25	140	63	42	19
Heat Resistant Super Alloy Nickel Base															
Astrloy, Hastelloy B/C/C-276/X, Inconel 601, 617, 625, 700, 706, 713, 718															
Incoloy 901, Monel, Nimonic, Rene41, Udimet, Wasploy, IN 102, MAR-M200															
Annealed or Solution Treated		250	25	147	74	45	22	134	67	41	20	114	51	35	16
Aged or Solution Treated and Aged		350	37	114	57	35	17	104	52	32	16	89	40	27	12
Cast and Aged		320	34	75	38	23	11	68	34	21	10	58	26	18	8
Heat Resistant Super Alloy Cobalt Base															
AiResist213, Haynes25, (605) Haynes 188, J-1570, Stellite															
Cast:AiResist 13, Haynes21, MAR-M509, NASA Co-W_Re, WI-52															
Annealed or Solution Treated		200	15	147	74	45	22	134	67	41	20	114	51	35	16
Solution Treated and Aged		300	32	114	57	35	17	104	52	32	16	89	40	27	12
Cast and Aged		320	34	75	38	23	11	68	34	21	10	58	26	18	8
Titanium Alloys															
Pure: Ti98.8, Ti99.9, Alloyed: Ti-5Al-2.5Sn, Ti-6l-4v, Ti-6Al-2Sn-4Zr-2Mo, 3Al															
Ti-3Al-8V-Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al															
Commercial pure (99.5%)		400		425	212	129	64	386	193	117	59	330	149	100	45
Alloys Annealed		950		180	90	54	27	163	82	50	25	140	63	42	19
Alloys In Aged condition		1050		131	65	40	20	119	59	36	18	102	46	31	14

Cutting Condition: Wet

SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.

SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Materials				Positive Inserts Cutting Speed Recommendation							
			Dorian Insert Grade	DUP15VT		DUP25UT		DUP35RT	
			Insert Coating	PVD Coated		PVD Coated		PVD Coated	
	Best			Hard & Wear Resistant		Hard & Tough		Tougher & Impact	
P - Alloy Steel	●			Inch	Metric	Inch	Metric	Inch	Metric
M - Stainless Steel	●		Depth of Cut a_p	0.002 - 0.157	0.05 - 4.00	0.002 - 0.157	0.05 - 4.00	0.002 - 0.157	0.05 - 4.00
K - Cast Iron	●		Feed per Rev. f_n	0.002 - 0.016	0.05 - 0.40	0.002 - 0.016	0.05 - 0.40	0.002 - 0.016	0.05 - 0.40
S - High Temp Alloy	○			Medium SFM (Vc)		High SFM (Vc)		High SFM (Vc)	
H-Hardened Steel	○			Inch	Metric	Inch	Metric	Inch	Metric
U - Multi Materials	○	Brinell	HRC						
Unalloyed Carbon Steel									
C=0.1-0.25%	Annealed	**125**		1403	631 425 191	1123	505 340 153	1067	480 323 145
C=0.25-0.55%	Annealed	**150**		1270	571 385 173	1016	457 308 139	965	434 292 132
C=0.55-0.80%	Annealed	**170**	**8**	1203	541 365 164	962	433 292 131	914	411 277 125
Low Alloy Steel ≤ 5%									
Annealed		**180**	**10**	1103	496 334 150	882	397 267 120	838	377 254 114
Ball Bearing Steel		**210**	**17**	1236	556 375 169	989	445 300 135	940	423 285 128
Hardened & Tempered		**275**	**28**	1069	481 324 146	855	385 259 117	813	366 246 111
Hardened & Tempered		**350**	**38**	802	361 243 109	642	289 194 87	609	274 185 83
High Alloy Steel > 5%									
Annealed		**200**	**15**	869	391 263 118	695	313 211 95	660	297 200 90
Hardened Tool Steel		**325**	**35**	768	346 233 105	615	277 186 84	584	263 177 80
Steel Castings									
Unalloyed Carbon Steel		**180**	**10**	936	421 284 128	748	337 227 102	711	320 215 97
Low Alloy Steel ≤ 5%		**200**	**15**	869	391 263 118	695	313 211 95	660	297 200 90
High Alloy Steel > 5%		**225**	**20**	802	361 243 109	642	289 194 87	609	274 185 83
Stainless Steel Austenitic Bars 200 & 300 Series									
Bars & Forged Austenitic 303		**180**	**10**	835	376 253 114	668	301 203 91	635	286 192 87
Bars & Forged Austenitic 302-304-316		**200**	**15**	685	308 208 93	548	247 166 75	521	234 158 71
Bars & Forged Austenitic PH-Hardened		**330**	**35**	568	256 172 77	454	204 138 62	432	194 131 59
Stainless Steel Austenitic Cast 200 & 300 Series									
Casting Austenitic 303		**180**	**10**	735	331 223 100	588	265 178 80	559	251 169 76
Casting Austenitic 302-304-316		**200**	**15**	601	271 182 82	481	217 146 66	457	206 139 62
Casting Austenitic PH-Hardened		**330**	**35**	501	226 152 68	401	180 122 55	381	171 115 52
Stainless Steel Ferritic/ Martensitic Bars, 400 Series, 17-4 PH									
Bars & Forged Ferritic/Martensitic 400 Series		**180**	**10**	885	398 268 121	708	319 215 97	673	303 204 92
Bars & Forged Ferritic/Martensitic 400 Series		**200**	**15**	551	248 167 75	441	198 134 60	419	189 127 57
Bars & Forged Martensitic PH-Hardened		**330**	**35**	518	233 157 71	414	186 126 56	394	177 119 54
Stainless Steel Ferritic/ Martensitic Bars, 400 Series, 17-4 PH									
Casting Ferritic/Martensitic 400 Series		**180**	**10**	819	368 248 112	655	295 198 89	622	280 189 85
Casting Ferritic/Martensitic 400 Series		**200**	**15**	501	226 152 68	401	180 122 55	381	171 115 52
Casting Martensitic PH-Hardened		**330**	**35**	451	203 137 62	361	162 109 49	343	154 104 47
Stainless Steel Austenitic-Ferretic Duplex									
Stainless Steel Austenitic-Ferretic Duplex 2304		**180**	**10**	585	263 177 80	468	210 142 64	444	200 135 61
Stainless Steel Austenitic-Ferretic Duplex 2205		**200**	**15**	451	203 137 62	361	162 109 49	343	154 104 47
Stainless Steel Austenitic-Ferretic Duplex 2207		**330**	**35**	257	116 78 35	206	93 62 28	196	88 59 27

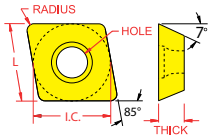
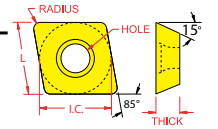
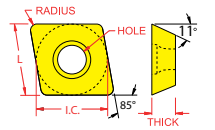
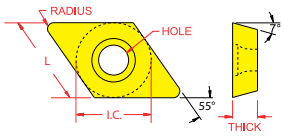
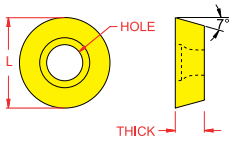
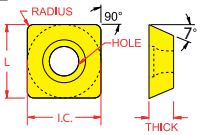
Cutting Condition: Wet
SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.
SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

Turning Cutting Speed Recommendation

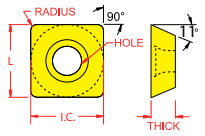
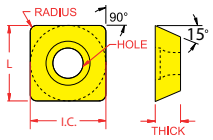
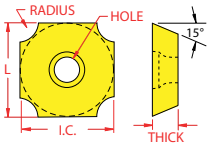
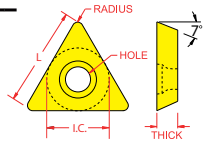
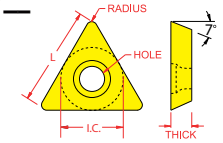
Gray Cast Iron															
Low Tensile Strength		**180**	**10**	902	406	273	123	722	325	219	98	686	309	208	93
High Tensile Strength		**220**	**20**	718	323	218	98	575	259	174	78	546	246	165	74
Modular Graphite Cast Iron															
Ferritic		**160**	**6**	718	323	218	98	575	259	174	78	546	246	165	74
Pearlitic		**250**	**24**	635	286	192	87	508	229	154	69	482	217	146	66
Martensitic		**360**	**39**	501	226	152	68	401	180	122	55	381	171	115	52
Malleable Cast Iron															
Ferritic (Short Chips)		**130**		768	346	233	105	615	277	186	84	584	263	177	80
Pearlitic (Long Chips)		**230**	**20**	635	286	192	87	508	229	154	69	482	217	146	66
Aluminum Alloys															
Forged	Annealed	50	70	8353	3759	2531	1139	6683	3007	2025	911	6348	2857	1924	866
Forged	Hardened	90	110	3471	1562	1052	473	2777	1250	842	379	2638	1187	799	360
Cast	Annealed	70	80	3471	1562	1052	473	2777	1250	842	379	2638	1187	799	360
Cast	Hardened	80	100	2357	1061	714	321	1886	849	572	257	1792	806	543	244
Copper and Copper Alloys															
Free cutting Copper Alloy		90	110	1942	874	588	265	1553	699	471	212	1476	664	447	201
Unleaded Copper		90	110	1086	489	329	148	869	391	263	118	825	371	250	113
Electrolytic Copper		90	110	1173	528	355	160	938	422	284	128	891	401	270	122
Brass and Bronze		80	100	1938	872	587	264	1550	698	470	211	1473	663	446	201
Brass		80	100	835	376	253	114	668	301	203	91	635	286	192	87
Unleaded Bronze		90	110	902	406	273	123	722	325	219	98	686	309	208	93
Leaded Bronze															
Magnesium-Zinc															
Annealed		80	100	1537	692	466	210	1230	553	373	168	1168	526	354	159
Nylon- Plastic & Rubber				2272	1022	689	310	1818	818	551	248	1727	777	523	235
Carbon-Graphite-Phenolics				267	120	81	36	214	96	65	29	203	91	62	28
Super Alloys															
Heat Resistant Super Alloy Iron Base															
Discaloy, Incoloy 801, N-155, 16-25-6, 19-9L, A-286															
Cast:ASTM A297, A351, A608, A567															
Annealed		200	15	251	113	76	34	200	90	61	27	190	86	58	26
Aged or Solution Treated and Aged		280	29	184	83	56	25	147	66	45	20	140	63	42	19
Heat Resistant Super Alloy Nickel Base															
Astrloy, Hastelloy B/C/C-276/X, Inconel 601, 617, 625, 700, 706, 713, 718															
Annealed or Solution Treated		250	25	150	68	46	21	120	54	36	16	114	51	35	16
Aged or Solution Treated and Aged		350	37	117	53	35	16	94	42	28	13	89	40	27	12
Cast and Aged		320	34	77	35	23	10	61	28	19	8	58	26	18	8
Heat Resistant Super Alloy Cobalt Base															
AiResist213, Haynes25, (605) Haynes 188, J-1570, Stellite															
Cast:AiResist 13, Haynes21, MAR-M509, NASA Co-W_Re, WI-52															
Annealed or Solution Treated		200	15	150	68	46	21	120	54	36	16	114	51	35	16
Solution Treated and Aged		300	32	117	53	35	16	94	42	28	13	89	40	27	12
Cast and Aged		320	34	77	35	23	10	61	28	19	8	58	26	18	8
Titanium Alloys															
Pure: Ti98.8, Ti99.9, Alloyed: Ti-5Al-2.5Sn, Ti-6l-4v, Ti-6Al-2Sn-4Zr-2Mo, 3Al															
Ti-3Al-8V-Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al															
Commercial pure (99.5%)		400		434	195	132	59	347	156	105	47	330	149	100	45
Alloys Annealed		950		184	83	56	25	147	66	45	20	140	63	42	19
Alloys In Aged condition		1050		134	60	41	18	107	48	32	15	102	46	31	14

Cutting Condition: Wet
SFM (V_C): Value are given in wet cutting condition. Reduced V_C 20% when cutting in dry condition.
SFM (V_C): Value are given at minimum Feed Rate. Reduced V_C from 10% to 50% when increase Feed Rate.

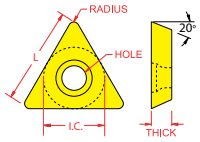
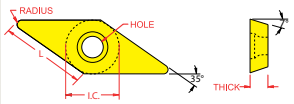
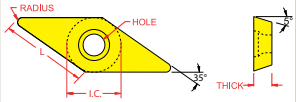
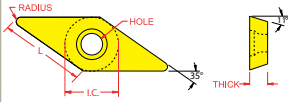
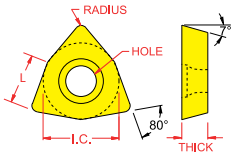
Positive Turning Insert ANSI - ISO Crossover Chart

Geometry	ANSI (Inch) Description	ANSI (Inch) Dimensions I.C.	Thick	Radius (± .004)	Hole Diameter	ISO (mm) Description	ISO (mm) Dimensions L	Thick	Radius (± 0,1)	Hole Diameter
CC__ 	CC__ -21.50.5	.2500	.0937	.0080	.107	CC__ -060202	6,35	2,38	0,2	2,7
	CC__ -21.51	.2500	.0937	.0156	.107	CC__ -060204	6,35	2,38	0,4	2,7
	CC__ -21.52	.2500	.0937	.0312	.107	CC__ -060208	6,35	2,38	0,8	2,7
	CC__ -32.50.5	.3750	.1562	.0080	.178	CC__ -09T302	9,52	3,97	0,2	4,5
	CC__ -32.51	.3750	.1562	.0156	.178	CC__ -09T304	9,52	3,97	0,4	4,5
	CC__ -32.52	.3750	.1562	.0312	.178	CC__ -09T308	9,52	3,97	0,8	4,5
	CC__ -431	.5000	.1875	.0156	.220	CC__ -120404	12,70	4,76	0,4	5,6
	CC__ -432	.5000	.1875	.0312	.220	CC__ -120408	12,70	4,76	0,8	5,6
	CC__ -433	.5000	.1875	.0468	.220	CC__ -120412	12,70	4,76	0,2	5,6
CD__ 	CD__ -1.20.60.2	.1563	.0400	.0040	.084	CD__ -S4T001	3,97	1,00	0,1	2,1
	CD__ -1.20.60.5	.1563	.0400	.0080	.084	CD__ -S4T002	3,97	1,00	0,2	2,1
	CD__ -1.510.5	.1875	.0625	.0080	.084	CD__ -040102	4,76	1,59	0,2	2,1
	CD__ -1.511	.1875	.0625	.0156	.084	CD__ -040104	4,76	1,59	0,4	2,1
CP__ 	CP__ -1.81.20.5	.2188	.075	.0080	.084	CP__ -05T102	5,56	1,98	0,2	2,1
	CP__ -1.81.21	.2188	.075	.0156	.084	CP__ -05T104	5,56	1,98	0,4	2,1
	CP__ -21.50.5	.2500	.0937	.0080	.107	CP__ -060202	6,53	2,38	0,2	2,7
	CP__ -21.51	.2500	.0937	.0156	.107	CP__ -060204	6,53	2,38	0,4	2,7
	CP__ -32.51	.3750	.1562	.0156	.178	CP__ -09T304	9,53	3,97	0,4	4,5
	CP__ -32.52	.3750	.1562	.0312	.178	CP__ -09T308	9,53	3,97	0,8	4,5
DC__ 	DC__ -21.50.2	.2500	.0937	.0040	.107	DC__ -070201	6,35	2,38	0,1	2,7
	DC__ -21.50.5	.2500	.0937	.0080	.107	DC__ -070202	6,35	2,38	0,2	2,7
	DC__ -21.51	.2500	.0937	.0156	.107	DC__ -070204	6,35	2,38	0,4	2,7
	DC__ -21.52	.2500	.0937	.0312	.107	DC__ -070208	6,35	2,38	0,8	2,7
	DC__ -32.50.5	.3750	.1562	.0080	.178	DC__ -11T302	11,00	3,97	0,2	4,5
	DC__ -32.51	.3750	.1562	.0156	.178	DC__ -11T304	11,00	3,97	0,4	4,5
	DC__ -32.52	.3750	.1562	.0312	.178	DC__ -11T308	11,00	3,97	0,8	4,5
	DC__ -431	.5000	.1875	.0156	.220	DC__ -150404	15,88	4,76	0,4	5,6
	DC__ -432	.5000	.1875	.0312	.220	DC__ -150408	15,88	4,76	0,8	5,6
RC__ 	N/A					RC__ -0602MO	6.00	2,38	N/A	2,7
						RC__ -0803MO	8.00	3,18	N/A	3,4
						RC__ -1003MO	10.00	3,18	N/A	4,5
						RC__ -1204MO	12.00	4,76	N/A	4,5
						RC__ -1606MO	16.00	6,35	N/A	5,6
						RC__ -2006MO	20.00	6,35	N/A	5,6
						RC__ -3209MO	32.00	9,52	N/A	5,6
SC__ 	SC__ -32.51	.375	.1562	.0156	.178	SC__ -09T304	9,53	3,97	0,4	4,5
	SC__ -32.52	.375	.1562	.0312	.178	SC__ -09T308	9,53	3,97	0,8	4,5
	SC__ -431	.500	.1875	.0156	.220	SC__ -120404	12,70	4,76	0,4	5,6
	SC__ -432	.500	.1875	.0312	.220	SC__ -120408	12,70	4,76	0,8	5,6
	SC__ -433	.500	.1875	.0468	.220	SC__ -120412	12,70	4,76	1,2	5,6

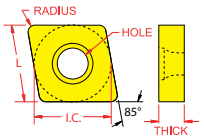
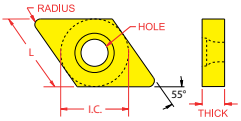
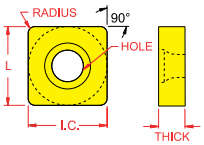
Positive Turning Insert ANSI - ISO Crossover Chart

Geometry	ANSI (Inch) Description	ANSI (Inch) Dimensions I.C.	Thick	Radius (± .004)	Hole Diameter	ISO (mm) Description	ISO (mm) Dimensions L	Thick	Radius (± 0,1)	Hole Diameter
SP__ 	SP__ -321	.3750	.1250	.0156	.178	SP__ -090304	9,53	3,18	0,4	4,5
	SP__ -322	.3750	.1250	.0312	.178	SP__ -090308	9,53	3,18	0,8	4,5
	SP__ -422	.5000	.1250	.0312	.220	SP__ -120308	12,70	3,18	0,8	5,6
	SP__ -432	.5000	.1875	.0312	.220	SP__ -120408	12,70	7,6	0,8	5,6
SD__ 	SD__ -322	.3750	.1250	.0312	.158	SD__ -090308	9,53	3,18	0,8	4,5
	SD__ -422	.5000	.1250	.0312	.178	SD__ -120308	12,70	3,18	0,8	4,5
	SD__ -532	.6250	.1875	.0312	.203	SD__ -150408	15,88	4,76	0,8	5,2
	SD__ -09C01	.3750	.1563	.0156	.178	SD__ -09T3C04	9,53	3,97	0,4	4,5
	SD__ -09C02	.3750	.1563	.0312	.178	SD__ -09T3C08	9,53	3,97	0,8	4,5
	SD__ -09C03	.3750	.1563	.0468	.178	SD__ -09T3C12	9,53	3,97	1,2	4,5
	SD__ -09C04	.3750	.1563	.0625	.178	SD__ -09T3C16	9,53	3,97	1,6	4,5
	SD__ -19C05	.7500	.1875	.0781	.220	SD__ -1904C20	19,05	4,76	2,0	5,6
	SD__ -19C06	.7500	.1875	.0937	.220	SD__ -1904C24	19,05	4,76	2,4	5,6
	SD__ -19C07	.7500	.1875	.1094	.220	SD__ -1904C28	19,05	4,76	2,8	5,6
	SD__ -19C08	.7500	.1875	.1250	.220	SD__ -1904C32	19,05	4,76	3,2	5,6
	SD__ -19C09	.7500	.1875	.1406	.220	SD__ -1904C36	19,05	4,76	3,6	5,6
	SD__ -19C10	.7500	.1875	.1562	.220	SD__ -1904C40	19,05	4,76	4,0	5,6
	SD__ -19C11	.7500	.1875	.1719	.220	SD__ -1904C44	19,05	4,76	4,4	5,6
	SD__ -19C12	.7500	.1875	.1875	.220	SD__ -1904C48	19,05	4,76	4,8	5,6
	SD__ -19C13	.7500	.1875	.2031	.220	SD__ -1904C52	19,05	4,76	5,2	5,6
	SD__ -19C14	.7500	.1875	.2187	.220	SD__ -1904C56	19,05	4,76	5,6	5,6
	SD__ -19C15	.7500	.1875	.2344	.220	SD__ -1904C60	19,05	4,76	6,0	5,6
	SD__ -19C16	.7500	.1875	.2500	.220	SD__ -1904C64	19,05	4,76	6,4	5,6
TC__ 	TC__ -1.21.20.2	.1563	.0750	.0040		TC__ -06T101	6,53	1,98	0,1	
	TC__ -21.50.2	.2500	.0937	.0040	.107	TC__ -110201	11,00	2,38	0,1	2,7
	TC__ -21.50.5	.2500	.0937	.0080	.107	TC__ -110202	11,00	2,38	0,2	2,7
	TC__ -21.51	.2500	.0937	.0156	.107	TC__ -110204	11,00	2,38	0,4	2,7
	TC__ -21.52	.2500	.0937	.0312	.107	TC__ -110208	11,00	2,38	0,8	2,7
	TC__ -32.51	.3750	.1562	.0156	.178	TC__ -16T304	16,50	3,97	0,4	4,5
	TC__ -32.52	.3750	.1562	.0312	.178	TC__ -16T308	16,50	3,97	0,8	4,5
TP__ 	TP__ -21.50.5	.2500	.0937	.0080	.107	TP__ -110202	11,00	2,38	0,2	2,7
	TP__ -21.51	.2500	.0937	.0312	.107	TP__ -110204	11,00	2,38	0,4	2,7
	TP__ -21.52	.2500	.0938	.0313	.107	TP__ -110208	11,00	2,38	0,8	2,7
	TP__ -221	.2500	.1250	.0156	.107	TP__ -110304	11,00	3,18	0,4	2,7
	TP__ -222	.2500	.1250	.0312	.107	TP__ -110308	11,00	3,18	0,8	2,7
	TP__ -321	.3750	.1250	.0156	.178	TP__ -160304	16,50	3,18	0,4	4,5
	TP__ -322	.3750	.1250	.0313	.178	TP__ -160308	16,50	3,18	0,8	4,5
	TP__ -32.51	.3750	.1562	.0156	.178	TP__ -16T304	16,50	3,97	0,4	4,5
	TP__ -32.52	.3750	.1562	.0312	.178	TP__ -16T308	16,50	3,97	0,8	4,5
	TP__ -431	.5000	.1875	.0156	.220	TP__ -220404	22,00	4,76	0,4	5,6
	TP__ -432	.5000	.1875	.0312	.320	TP__ -220408	22,00	4,76	0,8	5,6

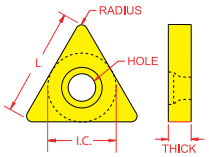
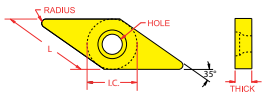
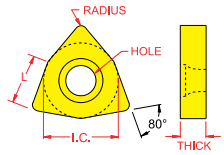
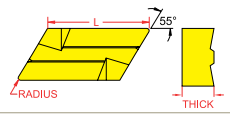
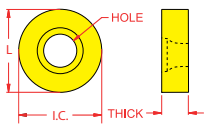
Positive Turning Insert ANSI - ISO Crossover Chart

Geometry	ANSI (Inch)					ISO (mm)				
	Description	Dimensions				Description	Dimensions			
		I.C.	Thick	Radius (± .004)	Hole Diameter		L	Thick	Radius (± 0,1)	Hole Diameter
TE__ 	TE__ -1.81.51	.2188	.0937	.100204	.104	TE__ -100404	6,93	2,38	0,4	2,7
VC__ 	VC__ -220.5	.2500	.1250	.0080	.107	VC__ -110302	11,00	3,18	0,2	2,7
	VC__ -220.5	.2500	.1250	.0080	.107	VC__ -110302	11,00	3,18	0,2	2,7
	VC__ -221	.2500	.1250	.0156	.107	VC__ -110304	11,00	3,18	0,4	2,7
	VC__ -330.5	.3750	.1875	.0080	.178	VC__ -160402	16,50	4,76	0,2	4,5
	VC__ -331	.3750	.1875	.0156	.178	VC__ -160404	16,50	4,76	0,4	4,5
	VC__ -332	.3750	.1875	.0312	.178	VC__ -160408	16,50	4,76	0,8	4,5
	VC__ -333	.3750	.1875	.0468	.178	VC__ -160412	16,50	4,76	1,2	4,5
	VC__ -448	.5000	.2500	.1250	.220	VC__ -220530	22,00	5,56	3,0	5,6
VB__ 	VB__ -221	.2500	.1250	.0156	.107	VB__ -110304	11,00	3,18	0,4	2,7
	VB__ -330.5	.3750	.1875	.0080	.178	VB__ -160402	16,50	4,76	0,2	4,5
	VB__ -331	.3750	.1875	.0156	.178	VB__ -160404	16,50	4,76	0,4	4,5
	VB__ -332	.3750	.1875	.0312	.178	VB__ -160408	16,50	4,76	0,8	4,5
	VB__ -333	.3750	.1875	.0468	.178	VB__ -160412	16,50	4,76	1,2	4,5
VP__ 	VP__ -221	.2500	.1250	.0156	.107	VP__ -110304	11,00	3,18	0,4	2,7
	VP__ -333	.3750	.1875	.0468	.178	VP__ -160412	16,50	4,76	1,2	4,5
	VP__ -444	.5000	.2500	.0625	.220	VP__ -220516	22,00	5,56	1,6	5,6
WC__ 	WC__ -1.210.2	.1563	.0625	.0040	.084	WC__ -S20101	3,55	1,59	0,1	2,1
	WC__ -1.51.50.2	.1875	.0937	.0040	.084	WC__ -S30201	4,34	2,38	0,1	2,1
	WC__ -1.51.50.5	.1875	.0937	.0080	.084	WC__ -S30202	4,34	2,38	0,2	2,1
	WC__ -21.51	.2500	.0937	.0156	.107	WC__ -040204	4,34	2,38	0,4	2,7
	WC__ -32.50.5	.3750	.1562	.0080	.178	WC__ -06T302	6,52	3,97	0,2	4,5
	WC__ -32.51	.3750	.1562	.0156	.178	WC__ -06T304	6,52	3,97	0,4	4,5
	WC__ -32.52	.3750	.1562	.0312	.178	WC__ -06T308	6,52	3,97	0,8	4,5
	WC__ -431	.5000	.1875	.0156	.220	WC__ -080404	8,69	4,76	0,4	5,6
	WC__ -432	.5000	.1875	.0312	.220	WC__ -080408	8,69	4,76	0,8	5,6

Negative Turning Insert ANSI - ISO Crossover Chart

Geometry	ANSI (Inch)					ISO (mm)				
	Description	Dimensions				Description	Dimensions			
		I.C.	Thick	Radius (± .004)	Hole Diameter		L	Thick	Radius (± 0,1)	Hole Diameter
CN__ 	CN__ -321	.3750	.1250	.0156	.150	CN__ -090304	9,5	3,18	0,4	3,8
	CN__ -322	.3750	.1250	.0312	.150	CN__ -090308	9,5	3,18	0,8	3,8
	CN__ -431	.5000	.1875	.0156	.203	CN__ -120404	12,7	4,76	0,4	5,2
	CN__ -432	.5000	.1875	.0312	.203	CN__ -120408	12,7	4,76	0,8	5,2
	CN__ -433	.5000	.1875	.0468	.203	CN__ -120412	12,7	4,76	1,2	5,2
	CN__ -434	.5000	.1875	.0625	.203	CN__ -120416	12,7	4,76	1,6	5,2
	CN__ -542	.6250	.2500	.0312	.250	CN__ -160608	16,5	6,35	0,8	6,4
	CN__ -543	.6250	.2500	.0468	.250	CN__ -160612	16,5	6,35	1,2	6,4
	CN__ -544	.6250	.2500	.0625	.250	CN__ -160616	16,5	6,35	1,6	6,4
	CN__ -643	.7500	.2500	.0468	.312	CN__ -190612	19,05	6,35	1,2	7,9
	CN__ -644	.7500	.2500	.0625	.312	CN__ -190616	19,05	6,35	1,6	7,9
	CN__ -646	.7500	.2500	.0937	.312	CN__ -190624	19,05	6,35	2,4	7,9
	CN__ -856	1.0000	.3125	.0937	.359	CN__ -250724	25,40	7,94	2,4	9,1
	CN__ -866	1.0000	.3750	.0937	.359	CN__ -250924	25,40	9,52	2,4	9,1
DN__ 	DN__ -331	.3750	.1875	.0156	.150	DN__ -110404	11,00	4,76	0,4	3,8
	DN__ -332	.3750	.1875	.0312	.150	DN__ -110408	11,00	4,76	0,8	3,8
	DN__ -431	.5000	.1875	.0156	.203	DN__ -150404	15,88	4,76	0,4	5,2
	DN__ -432	.5000	.1875	.0312	.203	DN__ -150408	15,88	4,76	0,8	5,2
	DN__ -433	.5000	.1875	.0468	.203	DN__ -150612	15,88	6,35	1,2	5,2
	DN__ -441	.5000	.2500	.0156	.203	DN__ -150604	15,88	4,76	0,4	5,2
	DN__ -442	.5000	.2500	.0312	.203	DN__ -150608	15,88	6,35	0,8	5,2
	DN__ -443	.5000	.2500	.0468	.203	DN__ -150612	15,88	4,76	1,2	5,2
	DN__ -444	.5000	.2500	.0625	.203	DN__ -150616	15,88	6,35	1,6	5,2
SN__ 	SN__ -321	.3750	.1250	.0156	.150	SN__ -090304	9,53	3,18	0,4	3,8
	SN__ -322	.3750	.1250	.0312	.150	SN__ -090308	9,53	3,18	0,8	3,8
	SN__ -431	.5000	.1875	.0156	.203	SN__ -120404	12,70	4,76	0,4	5,2
	SN__ -432	.5000	.1875	.0312	.203	SN__ -120408	12,70	4,76	0,8	5,2
	SN__ -433	.5000	.1875	.0469	.203	SN__ -120412	12,70	4,76	1,2	5,2
	SN__ -434	.5000	.1875	.0625	.203	SN__ -120416	12,70	4,76	1,6	5,2
	SN__ -542	.6250	.2500	.0312	.250	SN__ -150608	15,88	6,35	0,8	6,4
	SN__ -543	.6250	.2500	.0468	.250	SN__ -150612	15,88	6,35	1,2	6,4
	SN__ -544	.6250	.2500	.0625	.250	SN__ -150616	15,88	6,35	1,6	6,4
	SN__ -633	.7500	.1875	.0468	.312	SN__ -190412	19,05	4,76	1,2	7,9
	SN__ -643	.7500	.2500	.0468	.312	SN__ -190612	19,05	6,35	1,2	7,9
	SN__ -644	.7500	.2500	.0625	.312	SN__ -190616	19,05	6,35	1,6	7,9
	SN__ -646	.7500	.2500	.0937	.312	SN__ -190624	19,05	6,35	2,4	7,9
	SN__ -648	.7500	.2500	.1250	.312	SN__ -190632	19,05	6,35	3,2	7,9
	SN__ -856	1.0000	.3125	.0937	.359	SN__ -250724	25,40	7,94	2,4	9,1
	SN__ -866	1.0000	.3750	.0937	.359	SN__ -250924	25,40	9,52	2,4	9,1

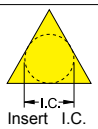
Negative Turning Insert ANSI - ISO Crossover Chart

Geometry	ANSI (Inch)					ISO (mm)				
	Description	Dimensions				Description	Dimensions			
		I.C.	Thick	Radius (± .004)	Hole Diameter		L	Thick	Radius (± 0,1)	Hole Diameter
TN__ 	TN_ -221	.2500	.1250	.0156	.089	TN_ -110304	11,00	3,18	0,4	2,3
	TN_ -222	.2500	.1250	.0312	.089	TN_ -110308	11,00	3,18	0,8	2,3
	TN_ -321	.3750	.1250	.0156	.150	TN_ -160304	16,50	3,18	0,4	3,8
	TN_ -322	.3750	.1250	.0312	.150	TN_ -160408	16,50	4,76	0,8	3,8
	TN_ -331	.3750	.1875	.0156	.150	TN_ -160404	16,50	4,76	0,4	3,8
	TN_ -332	.3750	.1875	.0312	.150	TN_ -160408	16,50	4,76	0,8	3,8
	TN_ -333	.3750	.1875	.0468	.150	TN_ -160412	16,50	4,76	1,2	3,8
	TN_ -431	.5000	.1875	.0156	.203	TN_ -220404	22,00	4,76	0,4	5,2
	TN_ -432	.5000	.1875	.0312	.203	TN_ -220408	22,00	4,76	0,8	5,2
	TN_ -433	.5000	.1875	.0468	.203	TN_ -220412	22,00	4,76	1,2	5,2
	TN_ -434	.5000	.1875	.0625	.203	TN_ -220416	22,00	4,76	1,6	5,2
VN__ 	VN_ -331	.3750	.1875	.0156	.150	VN_ -160404	16,50	4,76	0,4	3,8
	VN_ -332	.3750	.1875	.0312	.150	VN_ -160408	16,50	4,76	0,8	3,8
	VN_ -333	.3750	.1875	.0468	.150	VN_ -160412	16,50	4,76	1,2	3,8
	VN_ -432	.5000	.1875	.0312	.203	VN_ -220408	22,00	4,76	0,8	5,2
	VN_ -433	.5000	.1875	.0469	.203	VN_ -220412	22,00	4,76	1,2	5,2
WN__ 	WN__ -331	.3750	.1875	.0156	.150	WN__ -060404	6,52	4,76	0,4	3,8
	WN__ -332	.3750	.1875	.0312	.150	WN__ -060408	6,85	4,76	0,8	3,8
	WN__ -431	.5000	.1875	.0156	.203	WN__ -080404	8,69	4,76	0,4	3,8
	WN__ -432	.5000	.1875	.0313	.203	WN__ -080408	8,69	4,76	0,8	5,2
	WN__ -433	.5000	.1875	.0468	.203	WN__ -080412	8,69	4,76	1,2	5,2
	WN__ -434	.5000	.1875	.0625	.203	WN__ -080416	8,69	4,76	1,6	5,2
KNUX 	N/A									
						KNUX -160405	16,50	4,76	0,5	N/A
						KNUX -160410	16,50	4,76	1,0	N/A
RN__ 	RN__ -32	.3750	.1250	.1875	.150	RN__ -090300	9,53	3,18	3,76	3,8
	RN__ -43	.5000	.1875	.2500	.203	RN__ -120400	12,70	4,76	6,35	5,2
	RN__ -54	.6250	.2500	.3125	.250	RN__ -150600	15,88	6,43	7,93	6,4
	RN__ -64	.7500	.2500	.3750	.312	RN__ -190600	19,05	6,35	9,52	7,9
	RN__ -84	1.0000	.2500	.5000	.359	RN__ -250600	25,40	6,35	12,7	9,1

Turning Insert Identification System

5. Size

Inch

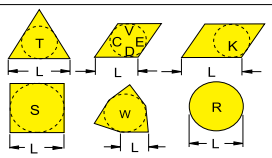


Insert I.C. (Inscribed Circle): Measures surface in 1/8" increments, **1 unit = 1/8"**
EX: 4 units (4 x 1/8") = 1/2"

Unit	I.C. inch	I.C. mm	C	D	R	S	T	V	W	K
1.2(5)	5/32	03,97	04	04	03	03	06	–	02	–
1.5(6)	3/16	04,76	04	05	04	04	08	08	S3	08
1.8(7)	7/32	05,56	05	–	–	–	10	–	03	–
2	1/4	06,35	06	07	06	–	11	11	04	–
2.5	5/16	08,00	–	–	08	–	–	–	–	–
3	3/8	09,53	09	11	09	09	16	16	06	16
–	3/8	10,00	–	–	10	–	–	–	–	–
4	1/2	12,70	12	15	12	12	22	22	08	–
5	5/8	15,88	16	19	15	15	27	–	–	–
6	3/4	19,05	19	–	19	19	33	–	–	–
7	7/8	22,22	22	27	22	22	38	38	15	38
–	.984	25,00	–	–	25	–	–	–	–	–
8	1.0	25,40	25	–	25	25	–	–	–	–
–	1.260	32,00	–	–	32	–	–	–	–	–

Note: Old A.N.S.I. standards shown in parenthesis for I.C.s under 1/4"

Metric



Cutting Edge Length (L) by **Shape** (mm) designated with an insert shape symbol

6. Thickness

Inch

Insert "T" (Thickness): Measures width, expressed in units, **1 unit = 1/16"**
EX: *3 units (3 x 1/16") = 3/16"*

Metric

Insert "T" (Thickness): Meaures width, expressed in 1mm increments. Single integers preceded by a 0.

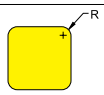
Symbol	Thickness		Symbol
.5(1)	1/32	0,79	-
.6	.040	1,00	T0
1(2)	1/16	1,59	01
1.2	5/64	1,98	T1
1.5(3)	3/32	2,38	02
2	1/8	3,18	03
2.5	5/32	3,97	T3
3	3/16	4,76	04
3.5	7/32	5,56	05
4	1/4	6,35	06
5	5/16	7,94	07
6	3/8	9,52	09
7	7/16	11,11	11
8	1/2	12,70	12

7. Radius

Inch

Insert "R" (Radius): Measures radius, expressed in units, **1 unit = 1/64"**
EX: *3 units (3 x 1/16") = 3/16"*

Metric



Insert "R" (Radius): Measures radius, expressed in 1/10mm increments.

Symbol	Corner Radius		Symbol
X0	.0015	.04	X0
.2	.004	0,1	01
.5	.008	0,2	02
1	1/64	0,4	04
2	1/32	0,8	08
3	3/64	1,2	12
4	1/16	1,6	16
5	5/64	2,0	20
6	3/32	2,4	24
7	7/64	2,8	28
8	1/8	3,2	32
-	round insert (inch)		00
-	round insert (mm)		M0

Insert Style

1	2	3	4		5	6	7	
T	N	M	G	-	4	3	3	ANSI
					22	04	12	ISO

Insert Size

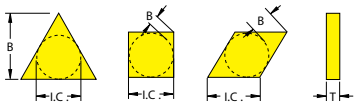
1. Geometry

- **C** 80° Diamond
- **D** 55° Diamond
- **R** Round
- **S** Square
- **T** Triangle
- **W** 80° Trigon
- **V** 35° Diamond
- **K** 55° Parallelogram

2. Clearance Angle

- 3° **A** Positive
- 5° **B** Positive
- 7° **C** Positive
- 15° **D** Positive
- 20° **E** Positive
- 25° **F** Positive
- 30° **G** Positive
- 0° **N** Negative
- 11° **P** Positive
- 10° **T** Positive

3. Tolerances



Tolerance on Dimensions

	"I.C." Inch	"I.C." Metric	"B" Inch	"B" Metric	"T" Inch	"T" Metric
C	±.0010	±0,025	±.0005	±0,013	±.001	±0,025
E	±.0010	±0,025	±.0010	±0,025	±.001	±0,025
G	±.0010	±0,025	±.0010	±0,025	±.005	±0,13
H	±.0005	±0,013	±.0005	±0,013	±.001	±0,025
M*	*	*	*	*	±.005	±0,13
U*	*	*	*	*	±.005	±0,13

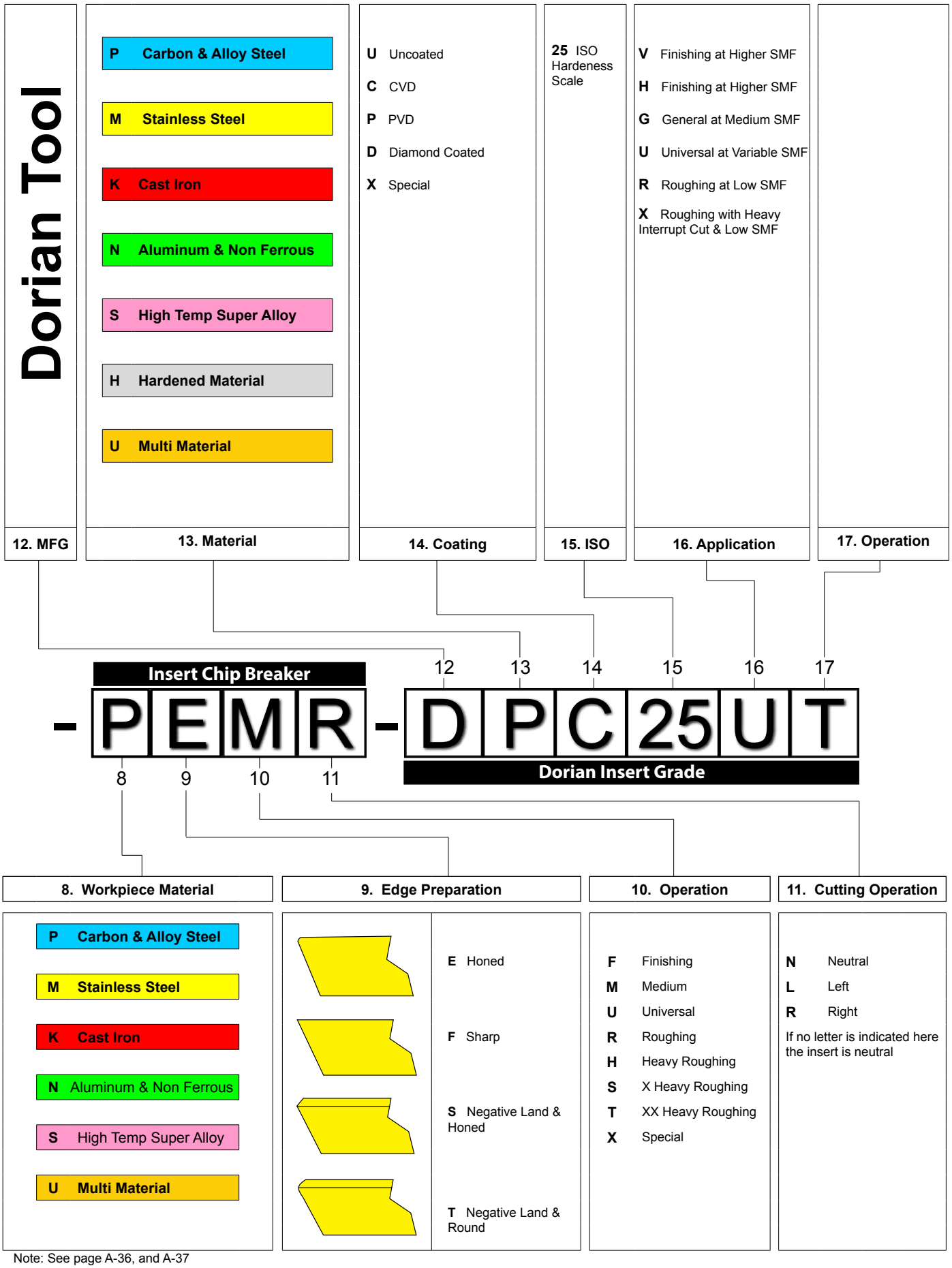
* see chart to the right

Tolerance on Dimensions

I.C. inch	I.C. mm	M* inch	M* mm	U* inch	U* mm
5/32	3,97				
3/16	4,76				
7/32	5,56	.002	0,05	.003	0,06
1/4	6,35				
5/16	7,94				
3/8	9,52				
7/16	11,11				
1/2	12,70	.003	0,06	.005	0,13
9/16	14,29				
5/8	15,88				
11/16	17,46	.004	0,10		
3/4	19,05				
7/8	22,22	.005	0,13	.007	0,18
1	25,40				
1 1/4	31,75	.006	0,15	.010	0,25

4. Type

- **A** Hole, no Chipbreaker
- **B** Hole, 1 Sided Countersink
- **F** No Hole, 2 Sided Chipbreaker
- **G** Hole, 2 Sided Chipbreaker
- **H** Hole, 1 Sided Chipbreaker and 70°- 90° Countersink
- **M** Hole, 1 Sided Chipbreaker
- **N** No Hole, No Chipbreaker
- **P** Hole, 2 Sided Chipbreaker
- **R** No Hole, 1 Sided Chipbreaker
- **S** Hole, 1 Sided Chipbreaker
- **T** Hole, 1 Sided Chipbreaker 40°-60° ISO Countersink
- **W** Hole, 1 Sided 40°-60° ISO Countersink
- **X** Special



Note: See page A-36, and A-37

Insert Chip Breaker UEF — Turning Application

Material	Insert Grades						General Purpose	Universal	Unstable Condition
	DNU25GT		DUP25GT		DUP35RT		Grade	Grade	Grade
Application Best	SFM (V_C)						DNU25GT	DUP25GT	DUP35RT
Carbon & Alloy Steel ○			**1123**	**286**	**1066**	**274**	M25 N25 K25 S25	P15 M15 K15 N25 S25	P20 M25 K30 N30 S30
Metric			340	87	323	83	C1-C2	C3-C7	C3-C7
Stainless Steel ○	**545**	**272**	**708**	**93**	**634**	**89**	Wear Resistant	Wear & Impact Resistant	Hard & Tough
Metric	165	82	215	28	192	27	**Chip Breaker**	**Chip Breaker**	**Chip Breaker**
Cast Iron ●	**475**	**158**	**722**	**180**	**686**	**172**	**UEF**	**UEF**	**UEF**
Metric	144	48	219	55	208	52	**Coating**	**Coating**	**Coating**
Aluminum ○	**3812**	**379**	**6683**	**849**	**6349**	**805**	**Uncoated**	**PVD**	**PVD**
Metric	1155	115	2025	257	1924	244		TiN/TiAiN	TiAlN/WC/C
Brass, Bronze, Copper ●	**802**	**243**	**1726**	**863**	**1475**	**287**	**Depth of Cut a_p**	**Depth of Cut a_p**	**Depth of Cut a_p**
Metric	243	74	523	261	447	87	Inch / Metric	Inch / Metric	Inch / Metric
Inconel, Hastelloy, Waspaloy ●	**244**	**36**	**200**	**28**	**191**	**26**	.002-.039 / .05-1.0	.002-.039 / .05-1.0	.002-.039 / .05-1.0
Metric	74	11	61	8	58	8	**Feed per Revolution f_n**	**Feed per Revolution f_n**	**Feed per Revolution f_n**
Titanium Alloys ●	**196**	**78**	**347**	**28**	**330**	**46**	Inch / Metric	Inch / Metric	Inch / Metric
Metric	59	24	105	8	100	14	.002-.008 / .05-.20	.002-.008 / .05-.20	.002-.008 / .05-.20
Carbon-Graphite-Phenolics ●	**175**	**83**	**215**	**96**	**205**	**92**	**Cutting Condition**	**Cutting Condition**	**Cutting Condition**
Metric	53	25	65	29	62	28	**Wet**	**Wet**	**Wet**
For complete Cutting Data see page							Low SFM (Vc)	High SFM (Vc)	Medium SFM (Vc)

Description	ANSI	ISO	Grade DNU25GT UPC 733101-	Grade DUP25GT UPC 733101-	Grade DUP35RT UPC 733101-
CDGX-UEFR 80° Diamond Universal 	CDGX-1.510.5-UEFR	CDGX-040102-UEFR	68562	68563	68564
	CDGX-1.511-UEFR	CDGX-040104-UEFR	68572	68573	68574
CDGX-UEFL 80° Diamond Universal 	CDGX-1.20.60.2-UEFL	CDGX-S4T001-UEFL	68547	68548	68549
	CDGX-1.510.5-UEFL	CDGX-040102-UEFL	68567	68568	68569
	CDGX-1.511-UEFL	CDGX-040104-UEFL	68577	68578	68579
CCGX-UEFR 80° Diamond Universal 	CCGX-21.51-UEFR	CCGX-060204-UEFR	68592	68593	68594
CCGX-UEFL 80° Diamond Universal 	CCGX-21.51-UEFL	CCGX-060204-UEFL	68597	68598	68599
CPGX-UEFL 80° Diamond Universal 	CPGX-1.81.20.5-UEFL	CPGX-05T102-UEFL	68637	68638	68639
	CPGX-21.50.5-UEFL	CPGX-060202-UEFL	68657	68658	68659
DCGX-UEFR 55° Diamond Universal 	DCGX-21.51-UEFR	DCGX-060204-UEFR	68712	68713	68714

Turning Application		
General Purpose	Universal	Unstable Condition
UEF	UEF	UEF

Description	ANSI	ISO	Grade DNU25GT	Grade DUP25GT	Grade DUP35RT
			UPC 733101-	UPC 733101-	UPC 733101-
DCGX-UEFL 55° Diamond Universal 	DCGX-21.51-UEFL	DCGX-070204-UEFL	68717	68718	68719
TCGX-UEFR 60° Triangle Universal 	TCGX-21.50.5-UEFR	TCGX-110202-UEFR	68762	68763	68764
	TCGX-21.51-UEFR	TCGX-110204-UEFR	68772	68773	68774
VBGX-UEFR 35° Diamond Universal 	VBGX-221-UEFR	VBGX-110304-UEFR	68902	68903	68904
VBGX-UEFL 35° Diamond Universal 	VBGX-221-UEFL	VBGX-110304-UEFL	68907	68908	68909
VCGX-UEFR 35° Diamond Universal 	VCGX-221-UEFR	VCGX-110304-UEFR	68962	68963	68964
VCGX-UEFL 35° Diamond Universal 	VCGX-2215-UEFL	VCGX-110304-UEFL	68967	68968	68969

Cutting Material	Finishing Applications				Medium Applications				Roughing Applications			
	Chipbreaker	a_p	f_n	V_c	Chipbreaker	a_p	f_n	V_c	Chipbreaker	a_p	f_n	V_c
Carbon & AlloySteel	Positive	Small	Low	High	Negative	Medium	Medium	Medium	Negative	Large	High	Low
Stainless Steel	Positive	Small	Low	High	Positive	Medium	Medium	Medium	Positive	Large	High	Low
Cast Iron	Positive	Small	Low	High	Negative	Medium	Medium	Medium	Negative	Large	High	Low
Non Ferrous	Positive	Small	Low	High	Positive	Medium	Medium	Medium	Positive	Large	High	Low
Aluminum & Plastic	Positive	Small	Low	High	Positive	Medium	Medium	Medium	Positive	Large	High	Low

Insert Chip Breaker UEU				Turning Application		
Material	**Insert Grades**			**General Purpose**	**Universal**	**Unstable Condition**
	DUP15VT	**DUP25GT**	**DUP35RT**	**Grade**	**Grade**	**Grade**
Application **Best**	**SFM (V_C)**			**DUP15VT**	**DUP25GT**	**DUP35RT**
Carbon & Alloy Steel ○	**1403 361**	**1123 286**	**1066 274**	P10 M10 K10 N10 S10	P15 M15 K15 N25 S25	P20 M25 K30 N30 S30
Metric	425 109	340 87	323 83	C3-C8	C3-C7	C3-C7
Stainless Steel ○	**885 116**	**708 93**	**634 89**	High Wear Resistant	Wear & Impact Resistant	Hard & Tough
Metric	268 35	215 28	192 27	**Chip Breaker**	**Chip Breaker**	**Chip Breaker**
Cast Iron ○	**902 226**	**722 180**	**686 172**	**UEU**	**UEU**	**UEU**
Metric	273 68	219 55	208 52	**Coating**	**Coating**	**Coating**
Aluminum ○	**8353 1061**	**6683 849**	**6349 805**	**PVD**	**PVD**	**PVD**
Metric	2531 322	2025 257	1924 244	AlCrN	TiN/TiAiN	TiAlN/WC/C
Brass, Bronze, Copper ●	**1942 376**	**1726 863**	**1475 287**	**Depth of Cut a_p**	**Depth of Cut a_p**	**Depth of Cut a_p**
Metric	588 114	523 261	447 87	Inch Metric	Inch Metric	Inch Metric
Inconel, Hastelloy, Waspaloy ●	**251 35**	**200 28**	**191 26**	.002-.039 .05-1.0	.002-.039 .05-1.0	.002-.039 .05-1.0
Metric	76 11	61 8	58 8	**Feed per Revolution f_n**	**Feed per Revolution f_n**	**Feed per Revolution f_n**
Titanium Alloys ●	**434 78**	**347 28**	**330 46**	Inch Metric	Inch Metric	Inch Metric
Metric	132 24	105 8	100 14	.002-.008 .05-.20	.002-.008 .05-.20	.002-.008 .05-.20
Carbon-Graphite-Phenolics ●	**267 119**	**215 96**	**205 92**	**Cutting Condition**	**Cutting Condition**	**Cutting Condition**
Metric	81 36	65 29	62 28	**Wet**	**Wet**	**Wet**
For complete Cutting Data see page				Low SFM (Vc)	High SFM (Vc)	Medium SFM (Vc)

Description	ANSI	ISO	Grade DUP15VT	Grade DUP25GT	Grade DUP35RT
			UPC 733101-	**UPC 733101-**	**UPC 733101-**
CCGT-UEU 80° Diamond Universal 	CCGT-21.50.2-UEU	CCGT-060201-UEU	79451		
	CCGT-21.50.5-UEU	CCGT-060202-UEU		79453	79454
	CCGT-21.51-UEU	CCGT-060204-UEU	79456	79458	79459
	CCGT-32.50.5-UEU	CCGT-09T302-UEU		79463	79464
	CCGT-32.51-UEU	CCGT-09T304-UEU	79466	79468	79469
	CCGT-431-UEU	CCGT-120404-UEU	79476	79478	79479
	CCGT-432-UEU	CCGT-120408-UEU	79481	79483	79484
CPGT-UEU 80° Diamond Universal 	CPGT-1.81.20.5 -UEU	CPGT-05T102-UEU	79486	79488	79489
	CPGT-1.81.21-UEU	CPGT-05T104-UEU	79491	79493	79494
	CPGT-21.50.2-UEU	CPGT-060201-UEU		79518	79519
	CPGT-21.50.5-UEU	CPGT-060202-UEU	79496	79498	79499
	CPGT-32.50.5-UEU	CCGT-09T302-UEU		79508	79509
	CPGT-32.51-UEU	CCGT-09T304-UEU	79511	79513	79514
DCGT-UEU 55° Diamond Universal 	DCGT-21.50.2-UEU	DCGT-070201-UEU	79531		
	DCGT-21.50.5-UEU	DCGT-070202-UEU		79533	79534
	DCGT-21.51-UEU	DCGT-070204-UEU	79536	79538	79539
	DCGT-32.50.2-UEU	DCGT-11T301-UEU	79541		
	DCGT-32.50.5-UEU	DCGT-11T302-UEU		79543	79544
	DCGT-32.51-UEU	DCGT-11T304-UEU	79546	79548	79549
	DCGT-431-UEU	DCGT-150404-UEU	79556	79558	79559
	DCGT-432-UEU	DCGT-150408-UEU	79561	79563	79564
SCGT-UEU Square Universal 	SCGT-32.51-UEU	SCGT-09T304-UEU	79566	79568	79569
	SCGT-32.52-UEU	SCGT-09T308-UEU	79571	79573	79574
	SCGT-431-UEU	SCGT-120404-UEU	79576	79578	79579
	SCGT-432-UEU	SCGT-120408-UEU	79581	79583	79584
TCGT-UEU 60° Triangle Universal 	TCGT-21.50.2-UEU	TCGT-110201-UEU	79586	79588	79589
	TCGT-21.50.5-UEU	TCGT-110202-UEU		79593	79594
	TCGT-21.51-UEU	TCGT-110204-UEU	79596	79598	79599
	TCGT-32.50.5-UEU	TCGT-16T302-UEU		79608	79609
	TCGT-32.51-UEU	TCGT-16T304-UEU	79611	79613	79614
	TCGT-32.52-UEU	TCGT-16T308-UEU	79616	79618	79619
TPGT-UEU 60° Triangle Universal 	TPGT-21.50.2-UEU	TPGT-110201-UEU		79623	79624
	TPGT-21.50.5-UEU	TPGT-110202-UEU		79628	79629
	TPGT-21.51-UEU	TPGT-110204-UEU	79631	79633	79634
	TPGT-32.50.5-UEU	TPGT-16T302-UEU		79643	79644
	TPGT-32.51-UEU	TPGT-16T304-UEU	79646	79648	79649
	TPGT-32.52-UEU	TPGT-16T308-UEU	79651	79653	79654

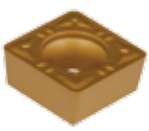
Turning Application		
General Purpose	Universal	Unstable Condition
UEU	UEU	UEU

Description	ANSI	ISO	Grade DUP15VT	Grade DUP25GT	Grade DUP35RT
			UPC 733101-	UPC 733101-	UPC 733101-
VBGT-UEU 35° Diamond Universal 	VBGT-221-UEU	VBGT-110304-UEU	79661	79663	79664
	VBGT-331-UEU	VBGT-160404-UEU	79671	79673	79674
	VBGT-332-UEU	VBGT-160408-UEU	79676	79678	79679
VCGT-UEU 35° Diamond Universal 	VCGT-220.2-UEU	VCGT-110301-UEU	79681		
	VCGT-220.5-UEU	VCGT-110302-UEU		79683	79684
	VCGT-221-UEU	VCGT-110304-UEU	79686	79688	79689
	VCGT-331-UEU	VCGT-160404-UEU	79701	79703	79704
	VCGT-332-UEU	VCGT-160408-UEU	79706	79708	79709
WCGT-UEU 80° Trigon Universal 	WCGT-1.51.50.2-UEU	WCGT-S30201-UEU	79711	79713	79714
	WCGT-1.51.50.5-UEU	WCGT-S30202-UEU	79716	79718	79719
	WCGT-21.51-UEU	WCGT-040204-UEU	79726	79728	79729
	WCGT-32.51-UEU	WCGT-06T304-UEU	79736	79738	79739
	WCGT-32.52-UEU	WCGT-06T308-UEU	79741	79743	79744

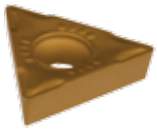
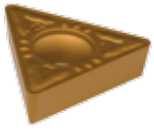
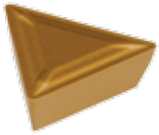
Insert Performance

Material	Roughing Operation	Universal Operation	Finishing Operation
Cold Rolled Bar Stock **Even surface** **No interrupted Cuts**	Use a hard and wear resistant coated insert grade, with a large nose radius, honed cutting edge, and a large positive chipbreaker. Cut with medium to high SFM (Vc), large depth of cut (ap) and high feed rate (fn).	Use a hard and wear resistant coated insert grade, with a large nose radius, honed cutting edge, and a medium positive chipbreaker. Cut with medium to high SFM (Vc), medium to large depth of cut (ap) and medium to high feed rate (fn).	Use a hard and wear resistant coated insert grade, with a small nose radius for unstable workpiece and thin wall tubing, large nose radius for stable workpiece, small honed cutting edge, and a small positive chipbreaker. Cut with high SFM (Vc), small depth of cut (ap), and low feed rate (fn).
Hot Rolled Bar Stock **Uneven surface** **Small interrupted cuts**	Use a hard, tough and wear resistant coated insert grade, with a large nose radius, honed cutting edge, and a large positive chipbreaker. Cut with medium SFM (Vc), medium depth of cut (ap) and low feed rate (fn).	Use a hard, tough and wear resistant coated insert grade, with a large nose radius, honed cutting edge, and a medium positive chipbreaker. Cut with medium SFM (Vc), medium depth of cut (ap), and medium feed rate (fn).	Use a hard, tough and wear resistant coated insert grade, with a small nose radius for stable work piece, small honed cutting edge, and a small positive chipbreaker. Cut with medium SFM (Vc), small depth of cut (ap), and low feed rate (fn).
Castings **Forgings** **Large Interrupted Cuts**	Use a tough and impact resistant coated insert grade, with a large honed to a negative land cutting edge, and a large positive chipbreaker. Cut with low SFM (Vc), depth of cut (ap), and low feed rate (fn).	Use a tough and impact resistant coated insert grade, with a large nose radius, large honed cutting edge, and a medium positive chipbreaker. Cut with low SFM (Vc), small depth of cut (ap), and low feed rate (fn).	Use a tough and impact resistant coated insert grade, with a large nose radius, honed cutting edge, and a small positive chipbreaker. Cut with medium to low SFM (Vc), small depth of cut (ap), and low feed rate (fn).
Coolant **Coolant Statement** **Jet-Stream**			

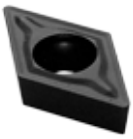
Insert Chip Breaker PEF PEM PEU									Turning Application								
Material		Insert Grades							Finishing			Medium			Universal		
		DPC15HT		DPC25UT		DPC35RT			Grade			Grade			Grade		
Application	Best	SFM (V_c)							DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT
Carbon Steel Annealed	●	1188	462	1010	393	594	231		P10-P25	P15-P35	P25-P45	P10-25	P15-P35	P25-P45	P10-25	P15-P35	P25-P45
Metric		360	140	306	119	180	70		C6-C7	C5-C6	C5	C6-C7	C5-C6	C5	C6-C7	C5-C6	C5
Alloy Steel Annealed	●	990	330	842	281	495	165		Harder	Tough & Hard	Tougher	Harder	Tough & Hard	Tougher	Harder	Tough & Hard	Tougher
Metric		300	100	255	85	150	50		Chip Breaker			Chip Breaker			Chip Breaker		
Alloy Steel Heat Treated	●	561	330	477	281	281	165		PEF			PEM			PEU		
Metric		170	100	145	85	85	50		Coating			Coating			Coating		
Stainless Steel	○	858	330	729	281	429	165		CVD			CVD			CVD		
Metric		260	100	221	85	130	50		TiN/ Al_2O_3 /TiCN			TiN/ Al_2O_3 /TiCN			TiN/ Al_2O_3 /TiCN		
Gray Cast Iron	○	1056	330						Depth of Cut a_p			Depth of Cut a_p			Depth of Cut a_p		
Metric		320	100						Inch	Metric		Inch	Metric		Inch	Metric	
									.002-.039	.05-1.0		.008-.080	.20-2.0		.002-.080	.05-2.0	
									Feed per Revolution f_n			Feed per Revolution f_n			Feed per Revolution f_n		
									Inch	Metric		Inch	Metric		Inch	Metric	
									.002-.008	.05-.20		.002-.012	.05-.30		.002-.008	.05-.20	
									Cutting Condition			Cutting Condition			Cutting Condition		
									Wet			Wet			Wet		
For complete Cutting Data see page									High V_c	Medium V_c	Low V_c	High V_c	Medium V_c	Low V_c	High V_c	Medium V_c	Low V_c

Description		ANSI	ISO	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT
				UPC 733101-			UPC 733101-			UPC 733101-		
CCMT-PEF 80° Diamond Finishing		CCMT-21.51-PEF	CCMT-060204-PEF	71877	71878							
		CCMT-21.52-PEF	CCMT-060208-PEF	71879	71880							
		CCMT-32.51-PEF	CCMT-09T304-PEF	71883	71884							
		CCMT-32.52-PEF	CCMT-09T308-PEF	71885	71886							
		CCMT-431-PEF	CCMT-120404-PEF	71889	71890							
CCMT-PEM 80° Diamond Medium		CCMT-21.50.5-PEM	CCMT-060202-PEM				71875	71876				
		CCMT-21.51-PEM	CCMT-060204-PEM				71933	71934				
		CCMT-21.52-PEM	CCMT-060208-PEM				71881	71882				
		CCMT-32.51-PEM	CCMT-09T304-PEM				71935	71936				
		CCMT-32.52-PEM	CCMT-09T308-PEM				71887	71888				
		CCMT-431-PEM	CCMT-120404-PEM				71937	71938				
		CCMT-432-PEM	CCMT-120408-PEM				71891	71892				
DCMT-PEF 55° Diamond Finishing		DCMT-21.51-PEF	DCMT-070204-PEF	71893	71894							
		DCMT-32.51-PEF	DCMT-11T304-PEF	71897	71898							
DCMT-PEM 55° Diamond Medium		DCMT-21.51-PEM	DCMT-070204-PEM				71895	71896				
		DCMT 32.51-PEM	DCMT-11T304-PEM				71899	71900				
		DCMT 32.52-PEM	DCMT-11T308-PEM				71901	71902				
SCMT-PEF Square Finishing		SCMT-32.51-PEF	SCMT-09T304-PEF	71903	71904							
SCMT-PEM Square Medium		SCMT-32.52-PEM	SCMT-09T308-PEM				71905	71906				
		SCMT-432-PEM	SCMT-120408-PEM				71907	71908				
		SCMT-433-PEM	SCMT-120412-PEM				71939	71940				

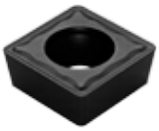
Turning Application		
Finishing	Medium	Universal
PEF	PEM	PEU

Description	ANSI	ISO	Grade DPC15HT	DPC25UT	DPC35RT	Grade DPC15HT	DPC25UT	DPC35RT	Grade DPC15HT	DPC25UT	DPC35RT
			UPC 733101-			UPC 733101-			UPC 733101-		
TCMT-PEF 60° Triangle Finishing 	TCMT-1.21.20.5-PEF	TCMT-06T102-PEF		80249							
	TCMT-520-PEF	TCMT-02T101-PEF	80245	80246							
	TCMT-21.50.5-PEF	TCMT-110202-PEF	71909	71910							
	TCMT-21.51-PEF	TCMT-110204-PEF	71911	71912							
TCMT-PEM 60° Triangle Medium 	TCMT-21.51-PEM	TCMT-110204-PEM				71941	71942				
	TCMT-21.52-PEM	TCMT-110208-PEM				71913	71914				
	TCMT-32.51-PEM	TCMT-16T304-PEM				71915	71916				
	TCMT-32.52-PEM	TCMT-16T308-PEM				71917	71918				
TPMR-PEU 60° Triangle Medium 	TPMR-221-PEU	TPMR-110304-PEU							71945	71946	71947
	TPMR-222-PEU	TPMR-110308-PEU							71948	71949	71950
	TPMR-321-PEU	TPMR-160304-PEU							71951	71952	71953
	TPMR-322-PEU	TPMR-160308-PEU							71954	71955	71956
VBMT-PEF 35° Diamond Finishing 	VBMT-331-PEF	VBMT-160404-PEF	71919	71920							
	VBMT-332-PEF	VBMT-160408-PEF	71921	71922							
	VBMT-333-PEF	VBMT-160412-PEF	71923	71924							
VCMT-PEF 35° Diamond Finishing 	VCMT-221-PEF	VCMT-110304-PEF	71925	71926							
	VCMT331-PEF	VCMT-160404-PEF	71927	71928							
	VCMT332-PEF	VCMT-160408-PEF	71931	71932							
VCMT-PEM 35° Diamond Medium 	VCMT-331-PEM	VCMT-160404-PEM				71943	71944				
	VCMT-332-PEM	VCMT-160408-PEM				71929	71930				
WCMT-PEF 80° Trigon Finishing 	WCMT-520-PEF	WCMT-020102-PEF	80254	80255							

Insert Chip Breaker MEH MEM KEM					Turning Application		
Material	**Insert Grades**				**High Performance**	**Universal**	**General**
	DMC20HT	**DMC30UT**	**DKC15RT**		**Grade**	**Grade**	**Grade**
Application **Best**	**SFM (V_C)**				**DMC20HT**	**DMC30UT**	**DKC15RT**
300 Series Stainless Steel ●	**759 429**	**594 238**			M15-M20	M25-M35	K15 P15 M15
Metric	230 130	180 72			C6-C7	C5-C6	C1-C2
400 Series Stainless Steel ●	**759 429**	**594 238**			High & Wear Resistant	Impact & Wear Resistant	High & Wear Resistant
Metric	230 130	180 72			**Chip Breaker**	**Chip Breaker**	**Chip Breaker**
17-4 PH Series Stainless Steel ●	**759 429**	**594 238**			**MEH**	**MEM**	**KEM**
Metric	230 130	180 72			**Coating**	**Coating**	**Coating**
Austenitic-Ferritic Duplex ●	**759 429**	**594 238**			**CVD**	**PVD**	**PVD**
Metric	230 130	180 72			TiCN/TiN	TiCN/TiN	TiCN/TiN
Gray Cast Iron ●			**477 281**		**Depth of Cut a_p**	**Depth of Cut a_p**	**Depth of Cut a_p**
Metric			225 95		Inch Metric	Inch Metric	Inch Metric
Modular Cast Iron ●			**729 281**		.012-394 .30-10.0	.004-.125 .10-3.0	.008-.125 .20-3.0
Metric			215 72		**Feed per Revolution f_n**	**Feed per Revolution f_n**	**Feed per Revolution f_n**
					Inch Metric	Inch Metric	Inch Metric
					.004-.032 .10-.80	.002-.012 .05-.30	.002-.012 .05-.30
					Cutting Condition	**Cutting Condition**	**Cutting Condition**
					Wet	**Wet**	**Wet**
For complete Cutting Data see page					High V_C	Medium V_C	High V_C

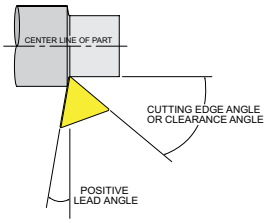
Description	ANSI	ISO	Grade DMC20HT	Grade DMC30UT	Grade DKC15RT
			UPC 733101-	**UPC 733101-**	**UPC 733101-**
CCMT-MEM 80° Diamond Finishing/Medium 	CCMT-32.51-MEM	CCMT-09T304-MEM		70750	
	CCMT-32.52-MEM	CCMT-09T308-MEM		70751	
	CCMT-431-MEM	CCMT-120404-MEM		70752	
CCMT-MEH 80° Diamond High Performance 	CCMT-31.51-MEH	CCMT-09T304-MEH	70786		
	CCMT-31.52-MEH	CCMT-09T308-MEH	70787		
CCMT-KEM 80° Diamond Finishing/Medium 	CCMT-32.51-KEM	CCMT-09T304-KEM			70753
	CCMT-32.52-KEM	CCMT-09T308-KEM			70754
	CCMT-432-KEM	CCMT-120408-KEM			70755
DCMT-MEM 55° Diamond Finishing / Medium 	DCMT-32.51-MEM	DCMT-11T304-MEM		70760	
	DCMT-32.52-MEM	DCMT-11T308-MEM		70761	
DCMT-MEH 55° Diamond High Performance 	DCMT-32.51-MEH	DCMT-11T304-MEH	70788		
	DCMT-32.52-MEH	DCMT-11T308-MEH	70789		
DCMT-KEM 55° Diamond Finishing/Medium 	DCMT-21.51-KEM	DCMT-070204-KEM			70763
	DCMT-21.52-KEM	DCMT-070208-KEM			70765
	DCMT-32.51-KEM	DCMT-11T304-KEM			70767
	DCMT-32.52-KEM	DCMT-11T308-KEM			70769

Turning Application		Turning Application
High Performance	Universal	General
MEH	MEM	KEM

Description	ANSI	ISO	Grade DMC20HT	Grade DMC30UT	Grade DKC15RT
			UPC 733101-	UPC 733101-	UPC 733101-
SCMT-MEM Square Medium 	SCMT-432-MEM	SCMT-120408-MEM		70772	
SCMT-KEM Square Medium 	SCMT-432-KEM	SCMT-120408-KEM			70773
TCMT-MEM 60° Triangle Medium 	TCMT-21.51-MEM	TCMT-110204-MEM		70776	
	TCMT-21.52-MEM	TCMT-110208-MEM		70777	
	TCMT-32.51-MEM	TCMT-16T304-MEM		70778	
	TCMT-32.52-MEM	TCMT-16T308-MEM		70779	
VCMT-MEM 35° Diamond Medium 	VCMT-331-MEM	VCMT-160404-MEM		70783	
	VCMT-332-MEM	VCMT-160408-MEM		70784	
	VCMT-333-MEM	VCMT-160412-MEM		70785	

Insert Cutting Angles

LEAD and **CLEARANCE** ANGLE - Positive

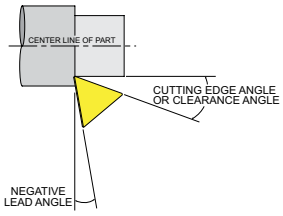


Lead Angle - The angle formed by the side flank of the insert cutting side and the line perpendicular to the workpiece centerline.

A **positive** lead angle moves the cutting side flank ahead of the cutting line.

Clearance Angle (Cutting Edge Angle) - The angle formed by the trailing end flank of the insert.

LEAD and **CLEARANCE** ANGLE - Negative

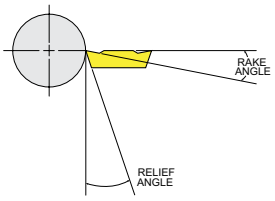


Lead Angle - The angle formed by the side flank of the insert cutting side and the line perpendicular to the workpiece centerline.

A **negative** lead angle moves the cutting side flank behind the cutting line.

Clearance Angle (Cutting Edge Angle) - The angle formed by the trailing end flank of the insert.

RAKE and **RELIEF** ANGLE

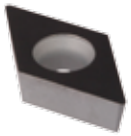
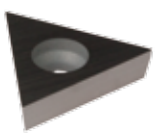
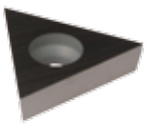


Rake Angle - The angle formed on the insert from the top surface area and the bottom of the insert chip flow area when parallel to the floor.

Relief Angle - The angle measured from the line perpendicular to the cutting edge of the insert and the cutting face of the insert.

Insert Chip Breaker KEU — Turning Application

Material	Insert Grades						General Purpose	High Performance	Unstable Condition
	DKU10HT		DUP15VT		DUP35RT		Grade	Grade	Grade
Application Best	SFM (V_c)						DKU10HT	DUP15VT	DUP35RT
Carbon & Alloy Steel ●			1403	360	1066	274	K10 N10 S10	P10 M10 K10 N10 S10	P20 M25 K30 N30 S30
Metric			425	109	323	83	C2-C3	C3-C8	C3-C7
Stainless Steel ●			884	116	634	89	High Wear Resistant	High Wear Resistant	Tough & Hard
Metric			268	35	192	27	Chip Breaker	Chip Breaker	Chip Breaker
Modular Malleable Cast Iron ●	515	261	769	287	584	218	KEU	KEU	KEU
Metric	156	79	233	87	177	66	Coating	Coating	Coating
Brass , Bronze, Copper ●	1145	347	1942	376	1475	287	Uncoated	PVD	PVD
Metric	347	105	588	114	447	87		AlCrN	TiAlN/WC/C
Carbon-Graphite ●	188	79	267	119	205	92	Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p
Metric	57	24	81	36	62	28	Inch / Metric	Inch / Metric	Inch / Metric
Hardened Alloy Steel ●	73	30	129	77	106	56	.002-.040 / .05-1.0	.002-.080 / .05-2.0	.002-.120 / .05-3.0
Metric	22	9	39	23	32	17	23	Feed per Revolution f_n	Feed per Revolution f_n
							Inch / Metric	Inch / Metric	Inch / Metric
							.002-.008 / .05-.20	.002-.012 / .05-.20	.002-.016 / .05-.20
							Cutting Condition	Cutting Condition	Cutting Condition
							Wet	Wet	Wet
For complete Cutting Data see page							Low V_c	Low V_c	Medium V_c

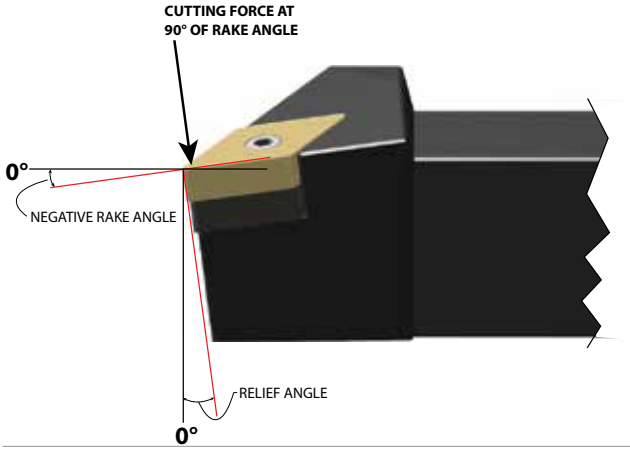
Description		ANSI	ISO	Grade DKU10HT	Grade DUP15VT	Grade DUP35RT
				UPC 733101-	UPC 733101-	UPC 733101-
CDGW-KEU 80° Diamond Universal		CDGW-1.20.60.2-KEU	CCDGW-S4T001-KEU	79340	79341	79343
		CDGW-1.20.60.5-KEU	CCDGW-S4T002-KEU	79344	79345	79347
		CDGW-1.510.5-KEU	CDGW-040102-KEU	79348	79349	79351
		CDGW-1.511-KEU	CDGW-040104-KEU	79352	79353	79355
CCGW-KEU **CCMW-KEU** 80° Diamond Universal		CCGW-21.51-KEU	CCGW-060204-KEU	79356	79357	79359
		CCGW-32.52-KEU	CCGW-09T308-KEU	79364	79365	79367
CPGW-KEU 80° Diamond Universal		CPGW-1.81.20.5-KEU	CPGW-05T102-KEU	79368	79369	79371
		CPGW-1.81.21-KEU	CPGW-05T104-KEU	79372	79373	79375
		CPGW-21.51-KEU	CPGW-060204-KEU	79376	79377	79379
		CPGW-32.51-KEU	CPGW-09T304-KEU	79380	79381	79383
		CPGW-32.52-KEU	CPGW-09T308-KEU	79384	79385	79387
DCGW-KEU **DCMW-KEU** 55° Diamond Universal		DCGW-21.51-KEU	DCGW-070204-KEU	79388	79389	79391
		DCMW-32.51-KEU	DCMW-11T304-KEU	70770	79392	
		DCMW-32.52-KEU	DCMW-11T308-KEU	70771	79393	
TCGW-KEU **TCMW-KEU** 60° Triangle Universal		TCGW-21.51-KEU	TCGW-110204-KEU	79400	79401	79403
		TCGW-32.52-KEU	TCGW-16T308-KEU	79408	79409	79411
TPGW-KEU 60° Triangle Universal		TPGW-21.51-KEU	TPGW-110204-KEU	79412	79413	79415
		TPGW-32.51-KEU	TPGW-16T304-KEU	79416	79417	79419
		TPGW-32.52-KEU	TPGW-16T308-KEU	79420	79421	79423

Turning Application		
General Purpose KEU	General Purpose KEU	General Purpose KEU

Description	ANSI	ISO	Grade DKU10HT	Grade DUP15VT	Grade DUP35RT
			UPC 733101-	UPC 733101-	UPC 733101-
VBGW-KEU 35° Diamond Universal 	VBGW-221-KEU	VBGW-110304-KEU	79424	79425	79427
	VBGW-331-KEU	VBGW-160404-KEU	79428	79429	79431
	VBGW-332-KEU	VBGW-160408-KEU	79432	79433	79435
VCGW-KEU 35° Diamond Universal 	VCGW-221-KEU	VCGW-110304-KEU	79436	79437	79439
	VCGW-331-KEU	VCGW-160404-KEU	79440	79441	79443
	VCGW-332-KEU	VCGW-160408-KEU	79444	79445	79447

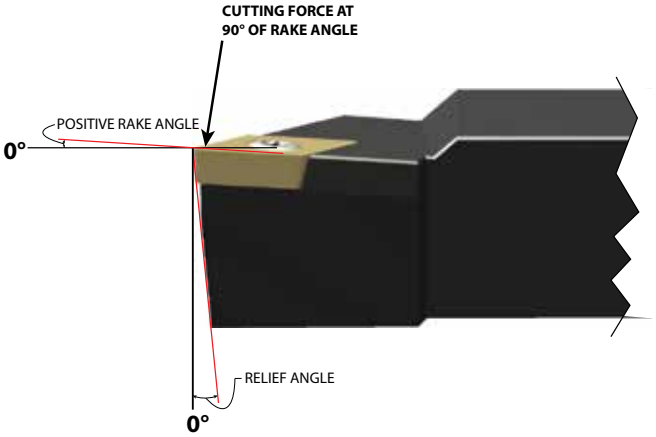
Insert Cutting Force Aptitude and Application

Negative Turning Inserts



Aptitude	Application
Double Sided Cutting Edge	High Material Removal Rate
Stronger Cutting Edge	Heavy Roughing & Interrupt Cuts
Larger Body Mass	Large and Solid Workpiece
Multi Geometry	Large and Shallow Boring
Molded & Precision Ground	Multi Turning
Multi Chip Breaker & Rake Angle	
0° Relief Angle	
Higher Cutting Force	

Positive Inserts



Aptitude	Application
Single Side Cutting Edge	Low Material Removal Rate
Weaker Cutting Edge	Light Roughing and Smooth Cuts
Smaller Body Mass	Small and Thin Wall Workpiece
Multi Geometry	Small and Deep Boring
Molded & Precision Ground	High Surface Finish
Multi Chip Breaker & Rake Angle	
Multi Relief Angle	
Lower Cutting Force	

Insert Chip Breaker NFU					Turning Application	
Material		Insert Grades			General Purpose	General Purpose
		DNU10GT		DNX10UT	Grade	Grade
Application	Best	SFM (V_c)			DNU10GT	DNX10UT
Aluminum	●	6353	792	7623 950	K10 N10 S10	P10 M10 K10 N10 S10
Metric		1925	240	2310 288	C2-C3	C2-C4
Magnesium - Zinc	●	2261	1132	2940 1469	High Wear Resistant	High Wear & Abrasive Resistant
Metric		685	343	891 445	Chip Breaker	Chip Breaker
Brass , Bronze, Copper	●	1145	446	1488 581	NFU	NFU
Metric		347	135	451 176	Coating	Coating
Super Alloy	●	330	36	389 40	Uncoated	PVD
Metric		100	11	118 12		Micropuls® Plasma
Carbon-Graphite-Phenolics	●	228	139	297 182	Depth of Cut a_p	Depth of Cut a_p
Metric		69	42	90 55	Inch Metric	Inch Metric
Nylon-Plastic & Rubber	●	2244	1122	2917 1459	.002-.156 .05-4.0	.002-.156 .05-4.0
Metric		680	340	884 442	Feed per Revolution f_n	Feed per Revolution f_n
Carbon & Alloy Steel	○			1122 198	Inch Metric	Inch Metric
Metric				340 60	.002-.016 .05-.40	.002-.016 .05-.40
					Cutting Condition	Cutting Condition
					Wet	Wet
For complete Cutting Data see page					Medium V_c	High V_c

Description		ANSI	ISO	Grade DNU10GT	Grade DNX10UT
				UPC 733101-	UPC 733101-
CCGT-NFU 80° Diamond Universal		CCGT-21.50.5-NFU	CCGT-060202-NFU	80020	80021
		CCGT-21.51-NFU	CCGT-060204-NFU	80024	80025
		CCGT-32.50.5-NFU	CCGT-09T302-NFU	80028	80029
		CCGT-32.51-NFU	CCGT-09T304-NFU	80032	80033
		CCGT-32.52-NFU	CCGT-09T308-NFU	80036	80037
		CCGT-431-NFU	CCGT-120404-NFU	80040	80041
		CCGT-432-NFU	CCGT-120408-NFU	80044	80045
DCGT-NFU 55° Diamond Universal		DCGT-21.50.5-NFU	DCGT-070202-NFU	80048	80049
		DCGT-21.51-NFU	DCGT-070204-NFU	80052	80053
		DCGT-32.50.5-NFU	DCGT-11T302-NFU	80056	80057
		DCGT-32.51-NFU	DCGT-11T304-NFU	80060	80061
		DCGT-32.52-NFU	DCGT-11T308-NFU	80064	80065
RCMT-NFU Round Universal		RCMT-0602MO-NFU	RCMT-0602MO-NFU	70798	
RCGT-NFU Round Universal		RCGT-0602MO-NFU	RCGT-0602MO-NFU	80068	80069
		RCGT-0803MO-NFU	RCGT-0803MO-NFU	80072	80073
		RCGT-1003MO-NFU	RCGT-1003MO-NFU	80076	80077
SCGT-NFU Square Universal		SCGT-432-NFU	SCGT-120408-NFU	80084	80085
TCGT-NFU 60° Triangle Universal		TCGT-21.51-NFU	TCGT-110204-NFU	80089	80090
		TCGT-32.51-NFU	TCGT-16T304-NFU	80093	80094

Turning Application	
General Purpose NFU	General Purpose NFU

Description	ANSI	ISO	Grade DNU10GT	Grade DNX10UT
			UPC 733101-	UPC 733101-
VCGT-NFU 35° Triangle Universal 	VCGT-220.5-NFU	VCGT-110302-NFU	80098	80099
	VCGT-221-NFU	VCGT-110304-NFU	80103	80104
	VCGT-330.5-NFU	VCGT-160402-NFU	80107	80108
	VCGT-331-NFU	VCGT-160404-NFU	80111	80112
	VCGT-332-NFU	VCGT-160408-NFU	80115	80116
	VCGT-333-NFU	VCGT-160412-NFU	80119	80120
	VCGT-448-NFU	VCGT-220530-NFU	80123	80124
VPGT-NFU 35° Triangle Universal 	VPGT-221-NFU	VPGT-110304-NFU	80127	80128
	VPGT-333-NFU	VPGT-160412-NFU	80131	80133
	VPGT-444-NFU	VPGT-220516-NFU	80135	80136
WCGT-NFU 80° Trigon Universal 	WCGT-32.50.5-NFU	WCGT-06T302-NFU	80140	80141
	WCGT-32.51-NFU	WCGT-06T304-NFU	80144	80145
	WCGT-32.52-NFU	WCGT-06T308-NFU	80148	80149
	WCGT-431-NFU	WCGT-080404-NFU	80152	80153
	WCGT-432-NFU	WCGT-080408-NFU	80156	80157

Insert Application Guide

Finishing

- Hard and Wear resistant
- PVD and CVD Coating
- Small Nose radius
- Light Honed Edge
- Small Chipbreaker

Universal

- Wear Resistant and Tough
- PVD and CVD Coating
- Medium Nose Radius
- Medium Honed Cutting Edge
- Medium Chipbreaker

Roughing

- Tough and Impact Resistant
- PVD and CVD Coating
- Large Nose Radius
- Heavy Honed Cutting Edge
- Large Chip Breaker

Cutting Data

- Small Depth of cut (a_p)
- Small Feed per Revolution (f_n)
- High Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

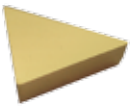
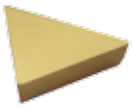
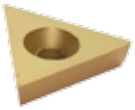
Cutting Data

- Medium Depth of cut (a_p)
- Medium Feed per Revolution (f_n)
- Medium Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

Cutting Data

- Large Depth of cut (a_p)
- High Feed per Revolution (f_n)
- Low Surface Cutting Speed (Vc)
- Use Coolant if Insert Allows

Insert Chip Breaker UEN							Turning Application		
Material		Insert Grades					General Purpose	General Purpose	General Purpose
		DNU25GT		DNP25GT		DPP30GT	Grade	Grade	Grade
Application	Best	SFM (V_c)					DNU25GT	DNP25GT	DPP30GT
Carbon & Alloy Steel	●	1010	143	798	230		K25 P25 M25 N25 S25	P10 M15 K25-S25	P20-P35 M20-M35
Metric		306	43	242	70		C1-C2	C1-C3	C3-C7
Stainless Steel 300 Series	○	624	232	695	299	875	325	Tough & Wear Resistant	Hard & Wear Resistant	Tough & Wear Resistant
Metric		189	70	211	91	265	98	Chip Breaker	Chip Breaker	Chip Breaker
Cast Iron	○	772	273	927	328	543	259	UEN	UEN	UEN
Metric		234	83	281	99	165	78	Coating	Coating	Coating
Aluminum	○	5717	582					Uncoated	PVD	PVD
Metric		1732	176						TiN/TiAiN	TiAlN/WC/C
Brass , Bronze, Copper	●	1328	297	1593	385			Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p
Metric		402	90	483	117			Inch Metric	Inch Metric	Inch Metric
Super Alloy	●	135	32	360	67			.002-.156 .05-3.0	.002-.156 .05-3.0	.002-.156 .05-3.0
		41	10	109	20			Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n
Carbon-Graphite	●	356	143	428	171			Inch Metric	Inch Metric	Inch Metric
Metric		108	43	130	52			.002-.016 .05-.30	.002-.016 .05-.30	.002-.016 .05-.30
Hardened Alloy Steel	●							Cutting Condition	Cutting Condition	Cutting Condition
Metric								Wet	Wet	Wet
For complete Cutting Data see page								Low V_c	High V_c	Medium V_c

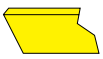
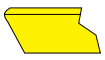
Description		ANSI	ISO	Grade DNU25GT	Grade DNP25GT	Grade DPP30GT
				UPC 733101-	UPC 733101-	UPC 733101-
SDP-UEN Square General Purpose		SDP-322-UEN	SDP-090308-UEN	71541	71543	71544
		SDP-422-UEN	SDP-120308-UEN	71547	71549	71550
		SDP-532-UEN	SDP-150408-UEN	71553	71555	71556
SPG-UEN Square General Purpose		SPG-321-UEN	SPG-090304-UEN	71559	71561	71562
		SPG-322-UEN	SPG-090308-UEN	71565	71567	71568
		SPG-422-UEN	SPG-120308-UEN	71571	71573	71574
		SPG-432-UEN	SPG-120408-UEN		71577	71579
TEGE/TPG-UEN 60° Triangle General Purpose		TEGE-1.81.51-UEN	CTEGE-100204-UEN	71600	71601	
		TPG-221-UEN	TPG-110304-UEN	71605	71607	71608
		TPG-222-UEN	TPG-110308-UEN	71611	71613	71614
		TPG-321-UEN	TPG-160304-UEN	71617	71619	71620
		TPG-322-UEN	TPG-160308-UEN	71623	71625	71626
TEGE/TPG-UEN 60° Triangle General Purpose		TPG-431-UEN	TPG-220404-UEN	71629	71631	71632
		TPG-432-UEN	TPG-220408-UEN	71635	71637	71638
		TPG-542-UEN	TPG-270608-UEN			71644
		TPG-543-UEN	TPG-270612-UEN			71650
TPGB-UEN 60° Triangle General Purpose		TPGB-21.51-UEN	TPGB-110204-UEN	71652		71654
		TPGB-21.52-UEN	TPGB-110208-UEN	71655		71657
		TPGB-321-UEN	TPGB-160404-UEN	71659		71661
		TPGB-322-UEN	TPGB-160408-UEN	71662		71664
		TPGB-431-UEN	TPGB-220404-UEN	71673		71675
		TPGB-432-UEN	TPGB-220408-UEN	71676		71678
TPGH-UEN 60° Triangle General Purpose		TPGH-21.52-UEN	TPGH-110208-UEN	71706	71709	71708
		TPGH-321-UEN	TPGH-160304-UEN	71712	71716	71715
		TPGH-322-UEN	TPGH-160308-UEN	71718	71720	71722
		TPGH-431-UEN	TPGH-220404-UEN	71726	71728	71730
		TPGH-432-UEN	TPGH-220408-UEN	71734	71737	71736

	Turning Application		
	General Purpose UEN	General Purpose UEN	General Purpose UEN

Description	ANSI	ISO	Grade DNU25GT	Grade DNP25GT	Grade DPP30GT
TPHT-UEN 60° Triangle GeneralPurpose 	TPHT-32.51-UEN	TPHT-16T304-UEN	71748	71750	71751
	TPHT-32.52-UEN	TPHT-16T308-UEN	71753	71755	71756

Insert Edge Preparation

The process used to prepare the insert's edge cutting condition for specific application and material. Achieved by honing, chamfering, "T" land or any combination there of.

Symbol	Edge Preparation	Material	Application
F 	Sharp	Aluminum Nylon Plastics	Roughing - Medium - Finishing
E 	Honed Light	Carbon Steel Alloy Steel Stainless Steel Cast Iron High Temp Super Alloy All non Ferrous Metals	Finishing
E 	Honed Medium	Carbon Steel Alloy Steel Stainless Steel Cast Iron High Temp Super Alloy All non Ferrous Metals	Roughing - Medium
S 	Negative Land and Honed	Carbon Steel Alloy Steel Stainless Steel Cast Iron	Heavy Roughing with Interrupted Cuts
T 	Negative Land and Round	Carbon Steel Alloy Steel Stainless Steel Cast Iron	Extra Heavy Roughing in Forging and Casting with Heavy Interrupted Cuts

Insert Chip Breaker UEX — Turning Application

Material	Insert Grades						Universal	Universal	Universal	Universal
	DPC15HT		DPC25UT		DPC35RT		Grade	Grade	Grade	Grade
Application / Best	SFM (V_C)						DPC15HT	DPC25UT	DPC35RT	DMC30UT
Carbon Steel Annealed ●	1188	462	1010	393	594	231	P10-P25	P15-P35	P25-P45	M30-M35
Metric	360	140	306	119	180	70	C6-C7	C5-C6	C5	C5-C6
Alloy Steel Annealed ●	990	330	842	281	495	165	Wear Resistant	Tough & Hard	Impact Resistant	Tough & Hard
Metric	300	100	255	85	150	50	Chip Breaker	Chip Breaker	Chip Breaker	Chip Breaker
Alloy Steel Heat Treated ●	561	330	477	281	281	165	UEX	UEX	UEX	UEX
Metric	170	100	145	85	85	50	Coating	Coating	Coating	
Stainless Steel ◌	858	330	729	281	429	165	CVD	CVD	CVD	PVD
Metric	260	100	221	85	130	50	TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN	TiAlN/WC/C
Gray Cast Iron ◌	1056	330					Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p	
Metric	320	100					Inch / Metric	Inch / Metric	Inch / Metric	Inch / Metric
							.004-.039 / .05-2.0	.008-.125 / .20-3.0	.012-.156 / .30-4.0	.004-.125 / .01-3.0
Stainless Steel ●					DUP35RT		Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n
Metric					594	330	Inch / Metric	Inch / Metric	Inch / Metric	Inch / Metric
					180	100	.002-.008 / .05-.20	.002-.008 / .05-.20	.002-.008 / .05-.20	.002-.008 / .05-.20
							Cutting Condition	Cutting Condition	Cutting Condition	Cutting Condition
							Wet	Wet	Wet	Wet
For complete Cutting Data see page							High V_C	Medium V_C	Low V_C	Medium V_C

Description	ANSI	ISO	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT	Grade DMC30UT
			UPC 733101-	UPC 733101-	UPC 733101-	UPC 733101-
CCGT-UEXL 80° Diamond Universal 	CCGT-21.51 UEXL	CCGT-060204 UEXL		70676	70677	70678
	CCGT-21.52 UEXL	CCGT-060208 UEXL		70682	70683	70684
	CCGT-32.51 UEXL	CCGT-09T304 UEXL		70688	70689	70690
	CCGT-32.52 UEXL	CCGT-09T308 UEXL		70694	70695	70696
	CCGT-432 UEXL	CCGT-120408 UEXL		70700	70701	70702
	CCGT-433 UEXL	CCGT-120412 UEXL		70706	70707	70708
CCGT-UEXR 80° Diamond Universal 	CCGT-21.51 UEXR	CCGT-060204 UEXR		70679	70680	70681
	CCGT-21.52 UEXR	CCGT-060208 UEXR		70685	70686	70687
	CCGT-31.51 UEXR	CCGT-09T304 UEXR		70691	70692	70693
	CCGT-31.52 UEXR	CCGT-09T308 UEXR		70697	70698	70699
	CCGT-432 UEXR	CCGT-120408 UEXR		70703	70704	70705
	CCGT-433 UEXR	CCGT-120412 UEXR		70709	70710	70711
DCGT-UEXL 55° Diamond Medium 	DCGT-21.51 UEXL	DCGT-070204 UEXL		70712	70713	70714
	DCGT-32.51 UEXL	DCGT-11T304 UEXL		70718	70719	70720
	DCGT-32.52 UEXL	DCGT-11T308 UEXL	70724	70725	70726	70727
DCGT-UEXR 55° Diamond Roughing 	DCGT-21.51 UEXR	DCGT-070204 UEXR		70715	70716	70717
	DCGT-32.51 UEXR	DCGT-11T304 UEXR		70721	70722	70723
	DCGT-32.52 UEXR	DCGT-11T308 UEXR	70728	70729	70730	70731
RCMX-UEX 55° Round Roughing 	RCMX-1003MO-UEX	RCMX-1003MO-UEX			71957	
	RCMX-1204MO-UEX	RCMX-1204MO-UEX		71958	71959	
	RCMX-1606MO-UEX	RCMX-1606MO-UEX	71961	71962	71963	
	RCMX-2006MO-UEX	RCMX-2006MO-UEX	71966	71967	71968	
	RCMX-2507MO-UEX	RCMX-2507MO-UEX	71971	71972	71973	
	RCMX-3209MO-UEX	RCMX-3209MO-UEX		71976	71977	
TCGT-UEXL 60° Triangle Universal 	TCGT-21.51 UEXL	TCGT-110204 UEXL		70732	70733	70734
	TCGT-32.51 UEXL	TCGT-16T304 UEXL		70738	70739	70740
	TCGT-32.52 UEXL	TCGT-16T308 UEXL		70744	70745	70746

			Turning Application			
			Universal UEX	Universal UEX	Universal UEX	Universal UEX
Description	ANSI	ISO	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT	Grade DMC30UT
			UPC 733101-	UPC 733101-	UPC 733101-	
TCGT-UEXR 60° Triangle Finishing/Medium 	TCGT-21.51 UEXR	TCGT-110204 UEXR		70735	70736	70737
	TCGT-32.51 UEXR	TCGT-16T304 UEXR		70741	70742	70743
	TCGT-32.52 UEXR	TCGT-16T308 UEXR		70747	70748	70749

Technical Support

Chipbreaker:

The formed groove or recess along the cutting edge of the insert that breaks chips into small manageable lengths, allowing the chips to flow freely over the insert, removing heat away from the cutting edge and avoiding edge build up.

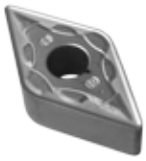
How to Select a Chipbreaker:

Choose **The Insert Chipbreaker** according to the cutting material, turning application and depth of cut.

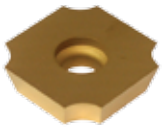
Cutting Material	Finishing Applications	General Applications	Roughing Applications
Carbon & Alloy Steel	Use a negative or Positive Turning Insert with a light honed cutting edge, small and high positive rake angle and molded chipbreaker.	Use a negative or Positive Turning Insert with a small honed cutting edge, medium and positive rake angle and molded chipbreaker.	Use a negative or Positive Turning Insert with a negative and heavy honed cutting edge, wide and positive rake angle and molded chipbreaker.
Stainless Steel	Use a negative or Positive Turning Insert with a light honed cutting edge, small and high positive rake angle, and molded or ground chipbreaker.	Use a negative or Positive Turning Insert with a small honed cutting edge, medium and high positive rake angle and molded or ground chipbreaker.	Use a negative or Positive Turning Insert with a honed cutting edge, a wide and high positive rake angle and molded or ground chipbreaker.
Aluminum & Plastic	Use a Positive Turning Insert with a sharp cutting edge, medium and high positive rake angle, and molded or ground high polished chipbreaker. **To avoid edge build up and Poor Surface Finish:** Always use coolant.		

Insert Chip Breaker SEH					Turning Application	
Material		Insert Grades			High Performance	High Performance
		DSP10HT		DSP20HT	Grade	Grade
Application	Best	SFM (V_C)			DSP10HT	DSP20HT
Supper Alloy Iron Base	●	**245**	**90**	**223**	**98**	S5-S15 / C3-C4
Metric		74	27	68	30	Abrasive Resistant / Impact Resistant
Supper Alloy Nickel Base	●	**147**	**36**	**134**	**40**	Chip Breaker: SEH
Metric		45	11	41	12	Coating: Plasma CVD: TiBN
Supper Alloy Cobalt Base	●	**147**	**36**	134	**40**	Depth of Cut a_p: Inch .008-.160 / Metric .20-4.0
Metric		45	11	41	12	Feed per Revolution f_n: Inch .004-.0016 / Metric .10-.40
Titanium Alloys	●	**425**	**66**	**386**	**73**	Cutting Condition: Wet: High V_C / Lower V_C
Metric		129	20	117	22	

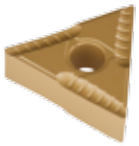
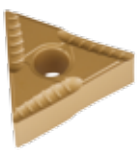
For complete Cutting Data see page

Description	ANSI	ISO	Grade DSP10HT UPC 733101-	Grade DSP20HT UPC 733101-
CCMT-SEH 80° Diamond Universal 	CCMT-32.51-SEH	CCMT-093T04-SEH	69725	69722
CNMG-SEH 80° Diamond Universal 	CNMG-432-SEH	CNMG-120408-SEH	69726	69727
DCMT-SEH 55° Diamond Universal 	DCMT-32.51-SEH	DCMT-11T04-SEH	69728	69729
DNMG-SEH 55° Diamond Universal 	DNMG-442-SEH	DNMG-150608-SEH	69730	69731
RCMT-SEH Round Roughing 	RCMT-1606MO-SEH	RCMT-1606-MO-SEH	69732	
	RCMT-2006MO-SEH	RCMT-2006-MO-SEH	69734	
WNMG-SEH 80° Trigon Universal 	WNGG-432-SEH	WNGG-080408-SEH	69736	69737

Insert Chip Breaker SDGX					Turning Application	
Material	Insert Grades				Radius Forming	Radius Forming
	DNU25GT		DUP25GT		Grade	Grade
Application Best	SFM (V_C)				DNU25GT	DUP25GT
Carbon Steel Annealed ●			1010	143	K25 P25 M25 N25 S25	P10 M15 K25-S25
Metric			306	43	C1-C2	C1-C3
Stainless Steel ●	624	232	695	299	Tough & Wear Resistant	Hard & Wear Resistant
Metric	189	70	211	91		
Cast Iron ●	772	273	927	328	Chip Breaker	Chip Breaker
Metric	234	83	281	99	SDGX	SDGX
Aluminum ○	5717	582			Coating	
Metric	1732	176			Uncoated	PVD
Brass, Bronze, Copper ●	1328	297	1593	385		TiN/TiAlN
	402	90	483	117	Depth of Cut a_p	
Super Alloy Iron Base ●	135	32	360	67	Inch Metric	Inch Metric
Metric	41	10	109	20	Full Radius Full Radius	Full Radius Full Radius
Carbon-Graphite ●	129	76	168	99	Feed per Revolution f_n	Feed per Revolution f_n
Metric	39	23	51	30	Inch Metric	Inch Metric
					.001-.004 .02-.10	.001-.006 .02-.12
					Cutting Condition	Cutting Condition
					Wet	Wet
For complete Cutting Data see page					Low V_C	High V_C

Description	ANSI	ISO	Grade DNU25GT	Grade DUP25GT
			UPC 733101-	UPC 733101-
SDGX-UEN 3/8" Square Convex Radius 	SDGX-09C01-E	SDGX-09T3C04-E	95297	95299
	SDGX-09C02-E	SDGX-09T3.C08-E	95301	95303
	SDGX-09C03-E	SDGX-09T3C12-E	95305	95307
	SDGX-09C04-E	SDGX-09T3C16-E	95309	95311
SDGX-UEXL 60° Triangle Universal 	SDGX-19C05-E	SDGX-1904C05-E	95249	95250
	SDGX-19C06-E	SDGX-1904C06-E	95253	95254
	SDGX-19C07-E	SDGX-1904C07-E	95257	95258
	SDGX-19C08-E	SDGX-1904C08-E	95261	95262
	SDGX-19C09-E	SDGX-1904C09-E	95265	95266
	SDGX-19C10-E	SDGX-1904C10-E	95269	95270
	SDGX-19C11-E	SDGX-1904C11-E	95273	95274
	SDGX-19C12-E	SDGX-1904C12-E	95277	95278
	SDGX-19C13-E	SDGX-1904C13-E	95281	95282
	SDGX-19C14-E	SDGX-1904C14-E	95285	95286
	SDGX-19C15-E	SDGX-1904C15-E	95289	95290
	SDGX-19C16-E	SDGX-1904C16-E	95293	95294

Insert Chip Breaker UEX				Turning Application			
Material	**Insert Grades**			**Universal**	**Universal**	**Universal**	**Universal**
	DPC15HT	**DPC25UT**	**DPC35RT**	**Grade**	**Grade**	**Grade**	**Grade**
Application **Best**	**SFM (V_c)**			**DPC15HT**	**DPC25UT**	**DPC35RT**	**DMC30UT**
Carbon Steel Annealed ●	**1188 462**	**1010 393**	**594 231**	P10-P25	P15-P35	P25-P45	M30-M35
Metric	360 140	306 119	180 70	C6-C7	C5-C6	C5	C5-C6
Alloy Steel Annealed ●	**990 330**	**842 281**	**495 165**	Wear Resistant	Tough & Hard	Impact Resistant	Tough & Hard
Metric	300 100	255 85	150 50	**Chip Breaker**	**Chip Breaker**	**Chip Breaker**	**Chip Breaker**
Alloy Steel Heat Treated ●	**561 330**	**477 281**	**281 165**	**UEX**	**UEX**	**UEX**	**UEX**
Metric	170 100	145 85	85 50	**Coating**	**Coating**	**Coating**	**Coating**
Stainless Steel ○	**858 330**	**729 281**	**429 165**	**CVD**	**CVD**	**CVD**	**CVD**
Metric	260 100	221 85	130 50	$TiN/Al_2O_3/TiCN$	$TiN/Al_2O_3/TiCN$	$TiN/Al_2O_3/TiCN$	TiAlN/WC/C
Gray Cast Iron ○	**1056 330**			**Depth of Cut a_p**	**Depth of Cut a_p**	**Depth of Cut a_p**	**Depth of Cut a_p**
Metric	320 100			Inch Metric	Inch Metric	Inch Metric	Inch Metric
			DUP35RT	.004 - 0.39 .05 - 2.0	.008 - 125 .20 - 3.0	.012 - 156 .30 - 4.0	.004 - .125 .01 - 3.0
Stainless Steel ●			**594 330**	**Feed per Revolution f_n**	**Feed per Revolution f_n**	**Feed per Revolution f_n**	**Feed per Revolution f_n**
Metric			180 100	Inch Metric	Inch Metric	Inch Metric	Inch Metric
				.002 - .008 .05 - .20	.002 - .008 .05 - .20	.002 - .008 .05 - .20	.002 - .008 .05 - .20
				Cutting Condition	**Cutting Condition**	**Cutting Condition**	**Cutting Condition**
				Wet	**Wet**	**Wet**	**Wet**
For complete Cutting Data see page				Higher V_c	Medium V_c	Low V_c	Medium V_c

Description		ANSI	ISO	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT	Grade DMC30UT
				UPC 733101-	**UPC 733101-**	**UPC 733101-**	**UPC 733101-**
CNMX-UEXL 80° Diamond Universal		CNMX-431-UEXL	CNMX-120404-UEXL		69411	69412	69413
		CNMX-432-UEXL	CNMX-120408-UEXL		69417	69418	69419
CNMX-UEXR 80° Diamond Universal		CNMX-431-UEXR	CNMX-120404-UEXR		69414	69415	69416
		CNMX-432-UEXR	CNMX-120408-UEXR		69420	69421	69422
		CNMX-433-UEXR	CNMX-120412-UEXR				
DNMX-UEXL 55° Diamond Medium		DNMX-331-UEXL	DNMX-110404-UEXL	69429	69430	69431	
		DNMX-332-UEXL	DNMX-110408-UEXL	69435	69436	69437	
		DNMX-431-UEXL	DNMX-150404-UEXL		69441		
		DNMX-432-UEXL	DNMX-150408-UEXL		69447		
		DNMX-441-UEXL	DNMX-150604-UEXL	69453	69454	69455	69456
		DNMX-442-UEXL	DNMX-150608-UEXL	69461	69462	69463	69464
DNMX-UEXR 55° Diamond Roughing		DNMX-331-UEXR	DNMX-110404-UEXR	69432	69433	69434	
		DNMX-332-UEXR	DNMX-110408-UEXR	69438	69439	69440	
		DNMX-431-UEXR	DNMX-150404-UEXR		69444		
		DNMX-432-UEXR	DNMX-150408-UEXR		69450		
		DNMX-441-UEXR	DNMX-150604-UEXR	69457	69458	69459	69460
		DNMX-442-UEXR	DNMX-150608-UEXR	69465	69466	69467	69468
TNMX-UEL 60° Triangle Universal		TNMX-321-UEXL	TNMX-160404-UEXL	69469	69470	69471	69472
		TNMX-322-UEXL	TNMX-160408-UEXL	69477	69478	69479	69480
TNMX-UEXR 60° Triangle Universal		TNMX-321-UEXR	TNMX-160404-UEXR	69473	69474	69475	69476
		TNMX-322-UEXR	TNMX-160408-UEXR	69481	69482	69483	69484

Insert Chip Breaker PEX					Turning Application	
Material		Insert Grades			Finishing	Medium
		DPC15HT		DPC25UT	Grade	Grade
Application	Best	SFM (V_C)			DPC15HT	DPC25UT
Carbon Steel Annealed	●	1188	462	1010 393	P10-P25	P15-P35
Metric		360	140	306 119	C6-C7	C5-C6
Alloy Steel Annealed	●	990	330	842 281	Harder & Abrasive Resistant	Tough & Hard
Metric		300	100	255 85	Chip Breaker	Chip Breaker
Alloy Steel Heat Treated	●	561	330	477 281	PEX	PEX
Metric		170	100	145 85	Coating	Coating
Stainless Steel	○	858	330	729 281	CVD	CVD
Metric		260	100	221 85	$TiN/Al_2O_3/TiCN$	$TiN/Al_2O_3/TiCN$
Gray Cast Iron	○	1056	330		Depth of Cut a_p	Depth of Cut a_p
Metric		320	100		Inch Metric	Inch Metric
					.004 - .079 .1 - 2.0	.008 - .125 .20 - 3.0
					Feed per Revolution f_n	Feed per Revolution f_n
					Inch Metric	Inch Metric
					.002 - .008 .05 - .20	.002 - .008 .05 - .20
					Cutting Condition	Cutting Condition
					Wet	Wet
For complete Cutting Data see page					High V_C	Medium V_C

Description		ANSI	ISO	Grade DPC15HT	Grade DPC25UT
				UPC 733101-	UPC 733101-
CNMG-PEX 80° Diamond High Performance		CNMG-432-PEX	CNMG-120408-PEX	69485	69486
		CNMG-433-PEX	CNMG-120412-PEX	69489	69490
DNMG-PEX 55° Diamond High Performance		DNMG-443-PEX	DNMG-150612-PEX	69487	69488

High Performance Wiper Insert Technology

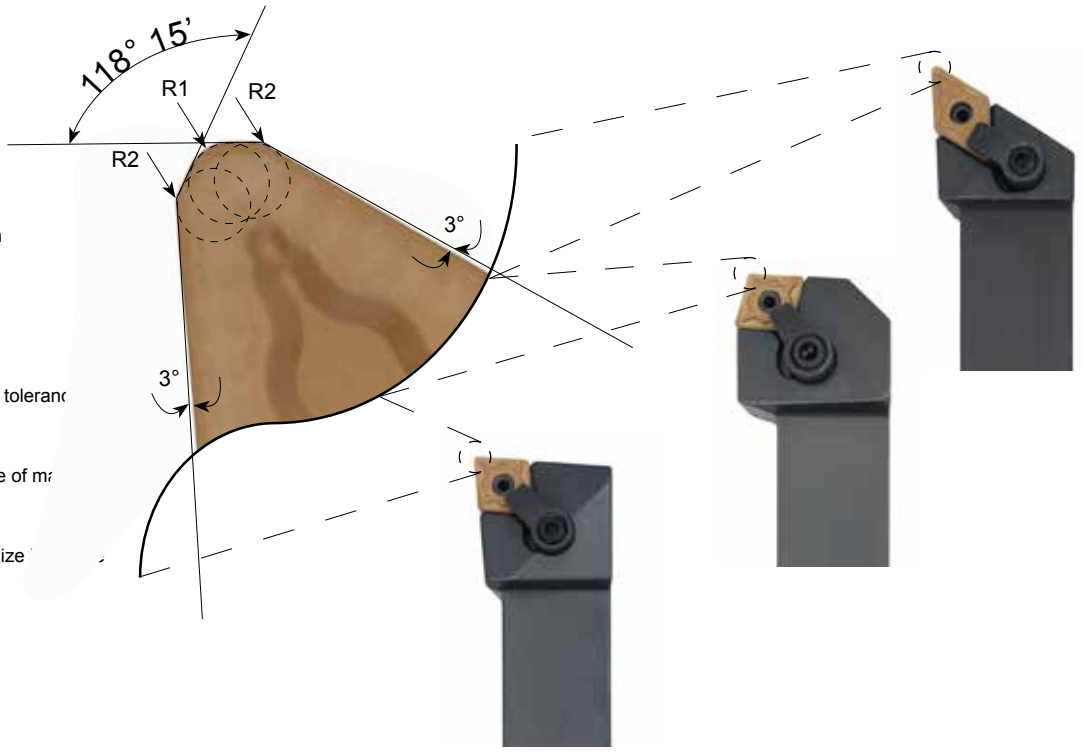
Double Leading Angle
To maximize insert cutting edge strength

Triple Nose Radius
To minimize cutting friction

Wiper Angle
For high surface finish and close turning toleranc

Rake Angle
For chip control evacuation and high rate of ma

Cutting Edge Preparation
To minimize cutting pressure and maximize



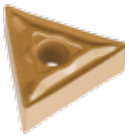
Insert Chip Breaker PEF PEM PER							Turning Application								
Material		Insert Grades					Finishing			Medium			Roughing		
		DPC15HT		DPC25UT		DPC35RT	Grade			Grade			Grade		
Application	Best	SFM (V_C)					DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT
Carbon Steel Annealed	●	1188	462	1010	393	594 231	P10-25	P15-P35	P25-P45	P10-25	P15-P35	P25-P45	P10-25	P15-P35	P25-P45
Metric		360	140	306	119	180 70	C6-C7	C5-C6	C5	C6-C7	C5-C6	C5	C6-C7	C5-C6	C5
Alloy Steel Annealed	●	990	330	842	281	495 165	Harder	Tough & Hard	Tougher	Harder	Tough & Hard	Tougher	Harder	Tough & Hard	Tougher
Metric		300	100	255	85	150 50	Chip Breaker			Chip Breaker			Chip Breaker		
Alloy Steel Heat Treated	●	561	330	477	281	281 165	PEF			PEM			PER		
Metric		170	100	145	85	85 50	Coating			Coating			Coating		
Stainless Steel	○	858	330	729	281	429 165	CVD			CVD			CVD		
Metric		260	100	221	85	130 50	TiN/ Al_2O_3 /TiCN			TiN/ Al_2O_3 /TiCN			TiN/ Al_2O_3 /TiCN		
Gray Cast Iron	○	1056	330				Depth of Cut a_p			Depth of Cut a_p			Depth of Cut a_p		
Metric		320	100				Inch	Metric		Inch	Metric		Inch	Metric	
							.002 - .039	.05 - 1.0		.016 - .236	.40 - 6.0		.032 - .394	.80 - 10.0	
							Feed per Revolution f_n			Feed per Revolution f_n			Feed per Revolution f_n		
							Inch	Metric		Inch	Metric		Inch	Metric	
							.002 - .012	.05 - .30		.008 - .016	.20 - .40		.012 - .024	.03 - .60	
							Cutting Condition			Cutting Condition			Cutting Condition		
							Wet			Wet			Wet		
For complete Cutting Data see page							High V_C	Medium V_C	Low V_C	High V_C	Medium V_C	Low V_C	High V_C	Medium V_C	Low V_C

Description		ANSI	ISO	Grade			Grade			Grade		
				DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT
				UPC 733101-			UPC 733101-			UPC 733101-		
CNMG-PEF 80° Diamond Finishing		CNMG-431-PEF	CNMG-120404-PEF	69250	69251							
		CNMG-432-PEF	CNMG-120408-PEF	69252	69253							
CNMG-PEM 80° Diamond Medium		CNMG-322-PEM	CNMG-090308-PEM				69491	69276	69277			
		CNMG-432-PEM	CNMG-120408-PEM				69408	69278	69279			
		CNMG-433-PEM	CNMG-120412-PEM				69280	69281	69282			
		CNMG-542-PEM	CNMG-160608-PEM				69283	69284	69285			
		CNMG-543-PEM	CNMG-160612-PEM				69286	69287	69288			
		CNMG-544-PEM	CNMG-160616-PEM				69492	69289	69290			
		CNMG-643-PEM	CNMG-190612-PEM				69409	69291	69292			
		CNMG-644-PEM	CNMG-190616-PEM				69410	69293	69294			
CNMG-PER 80° Diamond Roughing		CNMG-432-PER	CNMG-120408-PER							69351	69352	69353
		CNMG-433-PER	CNMG-120412-PER							69354	69355	69356
		CNMG-542-PER	CNMG-160608-PER							69357	69358	69359
		CNMG-543-PER	CNMG-160612-PER							69360	69361	69362
		-544-PER	CNMG-160616-PER							69363	69364	69365
		CNMG-643-PER	CNMG-190612-PER							69366	69367	69368
		CNMG-644-PER	CNMG-190616-PER							69369	69370	69371
		CNMG-646-PER	CNMG-190624-PER							69372	69373	69374
DNMG-PEF 55° Diamond Finishing		DNMG-331-PEF	DNMG-110404-PEF	69254	69255							
		DNMG-332-PEF	DNMG-110408-PEF	69256	69257							
		DNMG-431-PEF	DNMG-150404-PEF	69258	69259							
		DNMG-432-PEF	DNMG-150408-PEF	69260	69261							
		DNMG-441-PEF	DNMG-150604-PEF	69262	69263							
		DNMG-442-PEF	DNMG-150608-PEF	69264	69265							
DNMG-PEM 55° Diamond Medium		DNMG-332-PEM	DNMG-110408-PEM				69295	69296	69297			
		DNMG-432-PEM	DNMG-150408-PEM				69298	69299	69300			
		DNMG-433-PEM	DNMG-150412-PEM				69301	69302	69303			
		DNMG-442-PEM	DNMG-150608-PEM				69304	69305	69306			
		DNMG-443-PEM	DNMG-150612-PEM				69307	69308	69309			
		DNMG-444-PEM	DNMG-150616-PEM				69310	69311	69312			
DNMG-PER 55° Diamond Roughing		DNMG-432-PER	DNMG-150408-PER							69375	69376	69377
		DNMG-433-PER	DNMG-150412-PER							69378	69379	69380
		DNMG-442-PER	DNMG-150608-PER							69381	69382	69383
		DNMG-443-PER	DNMG-150612-PER							69384	69385	69386
		DNMG-444-PER	DNMG-150616-PER							69387	69388	69389

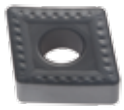
Turning Application		
Finishing	Medium	Roughing
PEF	PEM	PER

Description	ANSI	ISO	Grade DPC15HT DPC25UT DPC35RT UPC 733101-			Grade DPC15HT DPC25UT DPC35RT UPC 733101-			Grade DPC15HT DPC25UT DPC35RT UPC 733101-		
SNMG-PEF Square Finishing 	SNMG-431-PEF	SNMG-120404-PEF	69266	69267							
SNMG-PEM Square Medium 	SNMG-432-PEM	SNMG-120408-PEM				69313	69314	69315			
	SNMG-433-PEM	SNMG-120412-PEM				69316	69317	69318			
	SNMG-542-PEM	SNMG-150608-PEM				69319	69320	69321			
	SNMG-643-PEM	SNMG-190612-PEM				69322	69323	69324			
SNMG-PER Square Roughing 	SNMG-432-PER	SNMG-120408-PER							69390	69391	69392
	SNMG-433-PER	SNMG-120412-PER							69393	69394	69395
	SNMG-643-PER	SNMG 190612-PER							69396	69397	69398
	SNMG-644-PER	SNMG-190616-PER							69399	69400	69401
TNMG-PEF 60° Triangle Finishing 	TNMG-331-PEF	TNMG-160404-PEF	69268	69269							
	TNMG-332-PEF	TNMG-160408-PEF	69270	69271							
TNMG-PEM 60° Triangle Medium 	TNMG-332-PEM	TNMG-160408-PEM				69325	69326	69327			
	TNMG-333-PEM	TNMG-160412-PEM				69328	69329	69330			
	TNMG-432-PEM	TNMG-220408-PEM				69331	69332	69333			
	TNMG-433-PEM	TNMG-220412-PEM				69334	69335				
VNMG-PEF 35° Diamond Finishing 	VNMG-331-PEF	VNMG-160404-PEF	69272	69273							
	VNMG-332-PEF	VNMG-160408-PEF	69274	69275							
VNMG-PEM 35° Diamond Finishing 	VNMG-332-PEM	VNMG-160408-PEM				69336	69337	69338			
	VNMG-333-PEM	VNMG-160412-PEM				69339	69340	69341			
WNMG-PEM 80° Trigon Medium 	WNMG-332-PEM	WNMG-060408-PEM				69342	69343	69344			
	WNMG-432-PEM	WNMG-080408-PEM				69345	69346	69347			
	WNMG-433-PEM	WNMG-080412-PEM				69348	69349	69350			
WNMG-PER 80° Trigon Roughing 	WNMG-432-PER	WNMG-080408-PER							69402	69403	69404
	WNMG-433-PER	WNMG-080412-PER							69405	69406	69407

Insert Chip Breaker UEM						Turning Application		
Material		Insert Grades				Finishing to Medium	Finishing to Medium	Finishing to Medium
		DPC15HT		DPC25UT	DPC35RT	Grade	Grade	Grade
Application	Best	SFM (V_C)						
Carbon Steel Annealed	●	1188	462	1010 393	594 231	DPC15HT	DPC25UT	DPC35RT
Metric		360	140	306 119	180 70	P10-P25	P15-P35	P25-P45
Alloy Steel Annealed	●	990	330	842 281	495 165	C6-C7	C5-C6	C5
Metric		300	100	255 85	150 50	Wear Resistant	Tough & Hard	Impact Resistant
Alloy Steel Heat Treated	●	561	330	477 281	281 165	Chip Breaker	Chip Breaker	Chip Breaker
Metric		170	100	145 85	85 50	UEM	UEM	UEM
Stainless Steel	○	858	330	729 281	429 165	Coating	Coating	Coating
Metric		260	100	221 85	130 50	CVD	CVD	CVD
Gray Cast Iron	○	1056	330			TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN
Metric		320	100			Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p
						Inch Metric	Inch Metric	Inch Metric
						.004 - .079 .1 - 2.0	.008 - .125 .20 - 3.0	.012 - .156 .30 - 4.0
						Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n
						Inch Metric	Inch Metric	Inch Metric
						.002 - .008 .05 - .20	.002 - .008 .05 - .20	.002 - .008 .05 - .20
						Cutting Condition	Cutting Condition	Cutting Condition
						Wet	Wet	Wet
For complete Cutting Data see page						High V_C Medium V_C Low V_C	High V_C Medium V_C Low V_C	High V_C Medium V_C Low V_C

Description		ANSI	ISO	Grade DPC15HT	Grade DPC25UT	Grade DPC35RT
				UPC 733101-	UPC 733101-	UPC 733101-
CNMG-UEM 80° Diamond Universal		CNMG-431-UEM	CNMG-120404-UEM	69826	69828	69829
		CNMG-432-UEM	CNMG-120408-UEM	69832	69833	69834
DNMG-UEM 55° Diamond Universal		DNMG-331-UEM	DNMG-110404-UEM	69835	69836	69837
		DNMG-332-UEM	DNMG-110408-UEM	69840	69841	
		DNMG-432-UEM	DNMG-150408-UEM		69844	
		DNMG-441-UEM	DNMG-150604-UEM	69845	69846	69847
		DNMG-442-UEM	DNMG-150608-UEM	69848	69849	69850
SNMG-UEM Square Universal		SNMG-321-UEM	SNMG-090304-UEM	69851	69852	
TNMG-UEM 60° Triangle Universal		TNMG-331-UEM	TNMG-160404-UEM	69853	69854	69855
		TNMG-332-UEM	TNMG-160408-UEM	69856	69857	69858
VNMG-UEM 35° Diamond Universal		VNMG-332-UEM	VNMG-160408-UEM	69859	69860	
WNMG-UEM 80° Trigon Universal		WNMG-331-UEM	WNMG-060404-UEM	69861	69862	69863
		WNMG-332-UEM	WNMG-060408-UEM	69864	69865	69866
		WNMG-431-UEM	WNMG-080404-UEM	69867	69868	69869
		WNMG-432-UEM	WNMG 080408-UEM	69870	69871	69872
		WNMG-433-UEM	WNMG 080412-UEM		69873	

Insert Chip Breaker PHS PSS PST	Turning Application								
Material	**Insert Grades**						**High Performance**	**Universal**	**Unstable Condition**
	DPC15HT		**DPC25UT**		**DPC35RT**		**Grade**	**Grade**	**Grade**
Application	**Best**		**SFM (V_C)**				**DPC15HT DPC25UT DPC35RT**	**DPC15HT DPC25UT DPC35RT**	**DPC15HT DPC25UT DPC35RT**
Carbon Steel Annealed	●	**1188 462**		**1010 393**		**594 231**	P10-P25 P15-P35 P25-P45	P10-25 P15-P35 P25-P45	P10-25 P15-P35 P25-P45
Metric		360 140		306 119		180 70	C6-C7 C5-C6 C5	C6-C7 C5-C6 C5	C6-C7 C5-C6 C5
Alloy Steel Annealed	●	**990 330**		**842 281**		**495 165**	Harder Tough & Hard Tougher	Harder Tough & Hard Tougher	Harder Tough & Hard Tougher
Metric		300 100		255 85		150 50			
Alloy Steel Heat Treated	●	**561 330**		**477 281**		**281 165**	**Chip Breaker**	**Chip Breaker**	**Chip Breaker**
Metric		170 100		145 85		85 50	**PSH**	**PST**	**PSS**
Stainless Steel	○	858 330		729 281		**429 165**	**Coating**	**Coating**	**Coating**
Metric		260 100		221 85		130 50	**CVD**	**CVD**	**CVD**
Gray Cast Iron	○	**1056 330**					TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN	TiN/ Al_2O_3 /TiCN
Metric		320 100					**Depth of Cut ap**	**Depth of Cut ap**	**Depth of Cut ap**
							Inch Metric	Inch Metric	Inch Metric
							.039 - .397 1.0 - 10.0	.079 - .441 2.0 - 11.20	.098 - .492 2.50 - 12.50
							Feed per Revolution f_n	**Feed per Revolution f_n**	**Feed per Revolution f_n**
							Inch Metric	Inch Metric	Inch Metric
							.008 - .048 .20 - 1.2	.016 - .063 .40 - 1.6	.032 - .079 .80 - 2.0
							Cutting Condition	**Cutting Condition**	**Cutting Condition**
							Wet	**Wet**	**Wet**
For complete Cutting Data see page							High V_C Medium V_C Low V_C	High V_C Medium V_C Low V_C	High V_C Medium V_C Low V_C

Description		ANSI	ISO	Grade			Grade			Grade		
				DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT	DPC15HT	DPC25UT	DPC35RT
				UPC 733101-			UPC 733101-			UPC 733101-		
CNMM-PSH 80° Diamond Roughing		CNMM-432-PSH	CNMM-120408-PSH	70160	70161	70162						
		CNMM-433-PSH	CNMM-120412-PSH	70163	70164	70165						
		CNMM-543-PSH	CNMM-160612-PSH	70166	70167	70168						
		CNMM-544-PSH	CNMM-160616-PSH	70169	70170	70171						
		CNMM-643-PSH	CNMM-190612-PSH	70172	70173	70174						
		CNMM-644-PSH	CNMM-190616-PSH	70175	70176	70177						
		CNMM-646-PSH	CNMM-190624-PSH	70178	70179	70180						
CNMM-PSS 80° Diamond Heavy Roughing		CNMM-644-PSS	CNMM-190616-PSS	70205	70206	70207						
CNMM-PST 80° Diamond X Heavy Roughing		CNMM-856-PST	CNMM-250724-PST							70216	70217	70218
		CNMM-866-PST	CNMM 250924-PST							70220	70221	70222
SNMM-PHS Square Roughing		SNMM-432-PSH	SNMM-120408-PSH	70181	70182	70183						
		SNMM-433-PSH	SNMM-120412-PSH	70184	70185	70186						
		SNMM-543-PSH	SNMM-150612-PSH	70187	70188	70189						
		SNMM-544-PSH	SNMM-150616-PSH	70190	70191	70192						
		SNMM-643-PSH	SNMM-190612-PSH	70193	70194	70195						
		SNMM-644-PSH	SNMM-190616-PSH	70196	70197	70198						
		SNMM-646-PSH	SNMM-190624-PSH	70199	70200	70201						
		SNMM-648-PSH	SNMM-190632-PSH	70202	70203	70204						
SNMM-PSS Square Heavy Roughing		SNMM-644-PSS	SNMM-190616-PSS				70210	70211	70212			
		SNMM-646-PSS	SNMM-190624-PSS				70213	70214	70215			
SNMM-PST Square X Heavy Roughing		SNMM-856-PST	SNMM-250724-PST							70224	70225	70226
		SNMM-866-PST	SNMM-250924-PST							70228	70229	70230

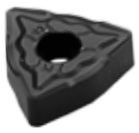
Insert Chip Breaker MEH MEF MEM MER — Turning Application

Material	Insert Grades	High Performance	Finishing	Medium	Roughing
	DMC20HT DCM30UT	Grade	Grade	Grade	Grade
Application Best	SFM (V_C)	DMC20HT	DMC30UT	DMC30UT	DMC30UT
300 Series Stainless Steel ●	759 429 594 238	M-15 M-20	M25-M35	M25-M35	M25-M35
Metric	230 130 180 72	C6-C7	C5-C6	C5-C6	C5-C6
400 Series Stainless Steel ●	759 429 594 238	High & Resistant	Impact & Wear Resistant	Impact & Wear Resistant	Impact & Wear Resistant
Metric	230 130 180 72	Chip Breaker	Chip Breaker	Chip Breaker	Chip Breaker
17-4 PH Series Stainless Steel ●	759 429 594 238	MEH	MEF	MEM	MER
Metric	230 130 180 72	Coating	Coating	Coating	Coating
Austenitic-Ferritic Duplex ●	759 429 594 238	CVD	CVD	CVD	CVD
Metric	230 130 180 72	TiCN/TiN	TiCN/TiN	TiCN/TiN	TiCN/TiN
		Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p	Depth of Cut a_p
		Inch Metric	Inch Metric	Inch Metric	Inch Metric
		.012 - 394 .30 - 10.0	.004 - .125 .20 - 3.0	.008 - .160 .20 - 4.0	.016 - .236 .40 - 6.0
		Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n	Feed per Revolution f_n
		Inch Metric	Inch Metric	Inch Metric	Inch Metric
		.004 - .032 .10 - .80	.002 - .012 .05 - .30	.004 - .016 .1 - .40	.008 - .024 .20 - .60
		Cutting Condition	Cutting Condition	Cutting Condition	Cutting Condition
		Wet	Wet	Wet	Wet
		Higher V_C	Medium/High V_C	Medium V_C	Low V_C

For complete Cutting Data see page

Description	ANSI	ISO	Grade DMC20HT UPC 733101-	Grade DMC30UT UPC 733101-	Grade DMC30UT UPC 733101-	Grade DMC30UT UPC 733101-
CNMG-MEF 80° Diamond Finishing 	CNMG-321-MEF	CNMG-090304-MEF		69964		
	CNMG-431-MEF	CNMG-120404-MEF		69965		
	CNMG-432-MEF	CNMG-120408-MEF		69966		
	CNMG-433-MEF	CNMG-120412-MEF		69967		
CNMG-MEM 80° Diamond Medium 	CNMG-432-MEM	CNMG-120408-MEM		69968		
	CNMG-433-MEM	CNMG-120412-MEM		69969		
CNMG-MEH 80° Diamond High Performance 	CNMG-432-MEH	CNMG-120408-MEH	70020			
	CNMG-433-MEH	CNMG-120412-MEH	70021			
	CNMG-543-MEH	CNMG-160612-MEH	70022			
	CNMG-544-MEH	CNMG-160616-MEH	70023			
	CNMG-643-MEH	CNMG-190612-MEH	70024			
	CNMG-644-MEH	CNMG-190616-MEH	70028			
CNMG-MER 80° Diamond Roughing 	CNMG-433-MER	CNMG-120412-MER				69970
	CNMG-543-MER	CNMG-160612-MER				69971
	CNMG-643-MER	CNMG-190612-MER				69972
DNMG-MEF 55° Diamond Finishing 	DNMG-331-MEF	DNMG-110404-MEF		69973		
	DNMG-441-MEF	DNMG-150604-MEF		69974		
	DNMG-442-MEF	DNMG-150608-MEF		69975		
DNMG-MEM 55° Diamond Medium 	DNMG-332-MEM	DNMG-110408-MEM			69976	
	DNMG-432-MEM	DNMG-150408-MEM			69977	
	DNMG-442-MEM	DNMG-150608-MEM			69978	
	DNMG-443-MEM	DNMG-150612-MEM			69979	

Turning Application			
High Performance	Finishing	Medium	Roughing
MEH	MEF	MEM	MER

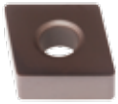
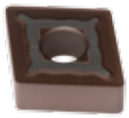
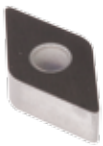
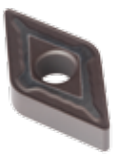
Description	ANSI	ISO	Grade DMC20HT	Grade DMC30UT	Grade DMC30UT	Grade DMC30UT
			UPC 733101-	UPC 733101-	UPC 733101-	UPC 733101-
DNMG-MEH 55° Diamond High Performance 	DNMG-442-MEH	DNMG-150608-MEH	70037			
	DNMG-443-MEH	DNMG-150612-MEH	70038			
DNMG-MER 55° Diamond Medium 	DNMG-442-MER	DNMG-150608-MER				69980
	DNMG-443-MER	DNMG-150612-MER				69981
SNMG-MEF Square Finishing 	SNMG-321-MEF	SNMG-090304-MEF		69982		
SNMG-MEH Square High Performance 	SNMG-543-MEH	SNMG-150612-MEH	70041			
	SNMG-544-MEH	SNMG-150616-MEH	70044			
	SNMG-643-MEH	SNMG-190612-MEH	70052			
	SNMG-644-MEH	SNMG-190616-MEH	70053			
SNMG-MER Square Roughing 	SNMG-432-MER	SNMG-120408-MER				69983
	SNMG-433-MER	SNMG-120412-MER				69984
	SNMG-643-MER	SNMG-190612-MER				69985
TNMG-MEM 60° Triangle Medium 	TNMG-332-MEM	TNMG-160408-MEM			69986	
	TNMG-432-MEM	TNMG-220408-MEM			69987	
	TNMG-433-MEM	TNMG-220412-MEM			69988	
WNMG-MEF 80° Trigon Finishing 	WNMG-331-MEF	WNMG-060404-MEF		69989		
	WNMG-431-MEF	WNMG-080404-MEF		69990		
	WNMG-432-MEF	WNMG-080408-MEF		69991		
WNMG-MEH 80° Trigon High Performance 	WNMG-432-MEH	WNMG-080412-MEH	70056			
WNMG-MEM 80° Trigon Medium 	WNMG-332-MEM	WNMG-060408-MEM			69992	
	WNMG-432-MEM	WNMG-080408-MEM			69993	
	WNMG-433-MEM	WNMG-080412-MEM			69994	
	WNMG-434-MEM	WNMG-080416-MEM			69995	
WNMG-MER 80° Trigon Roughing 	WNMG-432-MER	WNMG-080408-MER				69996
	WNMG-433-MER	WNMG-080412-MER				69997

Insert Chip Breaker KEF KEM KER

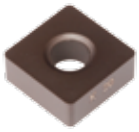
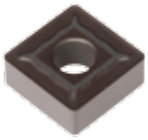
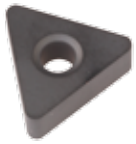
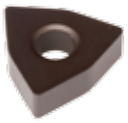
Material		Insert Grades					
		DKC05HT		DKC10UT		DKC15RT	
Application	Best	SFM (V_C)					
Gray Cast Iron	●	**1069**	**452**	**891**	**376**	**743**	**314**
Metric		324	137	270	114	225	95
Modular Cast Iron	●	**1023**	**356**	**851**	**297**	**710**	**248**
Metric		310	108	258	90	215	75
Malleable Cast Iron	●	**950**	**452**	**792**	**376**	**660**	**314**
Metric		288	137	240	114	200	95
Hardened Alloy Steel	◌	168	99	129	76	**99**	**59**
Metric		51	30	39	23	30	18

For complete Cutting Data see page

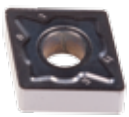
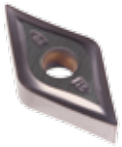
Universal			Roughing		
Grade			Grade		
DKC05HT	DKC10UT	DKC15RT	DKC05HT	DKC10UT	DKC15RT
K5	K10	K15	K5	K10	K15
C3-C4	C2-C3	C1-C2	C3-C4	C2-C3	C1-C2
Harder	Tough & Hard	Tougher	Harder	Tough & Hard	Tougher
Chip Breaker			Chip Breaker		
KEM			KER		
Coating			Coating		
CVD			CVD		
TiN/ Al_2O_3 /TiCN			TiN/ Al_2O_3 /TiCN		
Depth of Cut a_p			Depth of Cut a_p		
Inch	Metric		Inch	Metric	
.016 - .315	.40 - 8.0		.032 - .472	.80 - 12	
Feed per Revolution f_n			Feed per Revolution f_n		
Inch	Metric		Inch	Metric	
.008 - .032	.20 - .80		.012 - .024	.03 - .60	
Cutting Condition			Cutting Condition		
Wet			Wet		
High V_C	Medium V_C	Low V_C	High V_C	Medium V_C	Low V_C

Description	ANSI	ISO	Grade DKC10UT	Grade DKC15RT
			UPC 733101-	UPC 733101-
CNMG-KEF 80° Diamond Finishing 	CNMG-431-KEF	CNMG-120404-KEF	67052	67053
CNMA-KEU 80° Diamond General Purpose 	CNMA-432-KEU	CNMA-120408-KEU	69874	69875
	CNMA-433-KEU	CNMA-120412-KEU	69876	69877
	CNMA-644-KEU	CNMA-190616-KEU		69878
	CNMA-866-KEU	CNMA-250924-KEU		69879
CNMG-KER 80° Diamond Roughing 	CNMG-432-KER	CNMG-120408-KER	69904	69905
	CNMG-433-KER	CNMG-120412-KER	69906	69907
	CNMG-434-KER	CNMG-120416-KER	69908	69909
	CNMG-543-KER	CNMG-160612-KER	69910	69911
	CNMG-544-KER	CNMG-160616-KER	69912	69913
DNMG-KEF 55° Diamond Finishing 	DNMG-331-KEF	DNMG-110404-KEF	67054	67055
	DNMG-332-KEF	DNMG-110408-KEF	67056	
DNMA-KEU 55° Diamond General Purpose 	DNMA-442-KEU	DNMA-150608-KEU		69880
DNMG-KER 55° Diamond Roughing 	DNMG-432-KER	DNMG-150408-KER	69914	69915
	DNMG-433-KER	DNMG-150412-KER	69916	69917
	DNMG-442-KER	DNMG-150608-KER	69918	69919
	DNMG-443-KER	DNMG-150612-KER	69920	69921

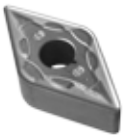
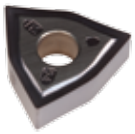
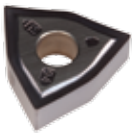
	Universal	Roughing
	KEM	KER

Description	ANSI	ISO	Grade DKC10UT	Grade DKC15RT
			UPC 733101-	UPC 733101-
SNMA-KEU Square General Purpose 	SNMA-432-KEU	SNMA-120408-KEU	69882	69883
	SNMA-433-KEU	SNMA-120412-KEU	69884	69885
	SNMA-434-KEU	SNMA-120416-KEU	69886	69887
	SNMA-664-KEU	SNMA-190616-KEU		69888
	SNMA-856-KEU	SNMA-250724-KEU		69889
SNMG-KER Square Roughing 	SNMG-432-KER	SNMG-120408-KER	69922	69923
	SNMG-433-KER	SNMG-120412-KER	69924	69925
	SNMG-643-KER	SNMG-190612-KER		69926
	SNMG-644-KER	SNMG-190616-KER	69927	69928
TNMA-KEU Triangle General Purpose 	TNMA-332-KEU	TNMA-160408-KEU	69890	69891
	TNMA-333-KEU	TNMA-160412-KEU	69892	69893
	TNMA-434-KEU	TNMA-220416-KEU	69894	69895
WNMA-KEU 80° Trigon General Purpose 	WNMA-432-KEU	WNMA-080408-KEU	69896	69897
	WNMA-433-KEU	WNMA-080412-KEU	69898	69899
WNMA-KER 80° Trigon Roughing 	WNMG-432-KER	WNMG-080408-KER	69929	69930
	WNMG-433-KER	WNMG-080412-KER		69931

Insert Chip Breaker SEH SEF SEM SER					Turning Application							
Material	Insert Grades				High Performance		Finishing		Medium		Roughing	
	DSP10HT		DSP20HT		Grade		Grade		Grade		Grade	
Application Best	SFM (V_c)				DSP10HT	DSP20HT	DSP15HT		DSP15HT		DSP15HT	
Carbon & Alloy Steel ○	1373	376	1247	343	1066	274	S5-S15	S10-S25	S20-S35		S20-S35	
Metric	416	114	378	104	323	83	C3-C4	C1-C2	C3-C7		C3-C7	
Stainless Steel ○	865	125	789	116	634	89	Abrasive Resistant	Impact Resistant	Hard & Tough		Hard & Tough	
Metric	262	38	239	35	192	27	Chip Breaker		Chip Breaker		Chip Breaker	
Cast Iron ●	881	244	802	224	686	172	SEH		SEF		SEM	SER
Metric	267	74	243	68	208	52	Coating		Coating		Coating	
Aluminum ○					6349	805	PVD		PVD		PVD	
Metric					1924	244	TiCN/TiN		TiCN/TiN		TiCN/TiN	
Brass, Bronze, Copper ●	1894	574	1723	521	1475	287	Depth of Cut a_p		Depth of Cut a_p		Depth of Cut a_p	
Metric	574	174	522	158	447	87	Inch	Metric	Inch	Metric	Inch	Metric
Inconel, Hastelloy, Waspaloy ●	244	36	224	33	191	26	.008 - .160	.20 - 4.0	.002 - .039	.05 - 1.0	.004 - .079	.10 - 2.0
Metric	74	11	68	10	58	8	Feed per Revolution f_n		Feed per Revolution f_n		Feed per Revolution f_n	
Titanium Alloys ●	426	66	386	33	330	46	Inch	Metric	Inch	Metric	Inch	Metric
Metric	129	20	117	10	100	14	.004 - .0016	.10 - .40	.002 - .008	.05 - .20	.002 - .012	.05 - .30
Carbon-Graphite-Phenolics ●					205	92	Cutting Condition		Cutting Condition		Cutting Condition	
Metric					62	28	Wet		Wet		Wet	
For complete Cutting Data see page					Higher V_c	Lower V_c	Medium/High V_c		Medium/High V_c		Medium/High V_c	

Description	ANSI	ISO	Grade DSP10HT	Grade DSP20HT	Grade DSP15HT	Grade DSP15HT	Grade DSP15HT
			UPC 733101-		UPC 733101-	UPC 733101-	UPC 733101-
CNGG-SEF 80° Diamond Finishing 	CNGG-431-SEF	CNGG-120404-SEF			69932		
	CNGG-432-SEF	CNGG-120408-SEF			69933		
	CNGG-433-SEF	CNGG-120412-SEF			69934		
CNM/GG-SEM 80° Diamond Medium 	CNGG-431-SEM	CNGG-120404-SEM				69935	
	CNGG-432-SEM	CNGG-120408-SEM				69936	
	CNGG-433-SEM	CNGG-120412-SEM				69937	
	CNMG-431-SEM	CNMG-120404-SEM				69938	
	CNMG-432-SEM	CNMG-120408-SEM				69939	
CNGG-SER 80° Diamond Roughing 	CNGG-432-SER	CNGG-120408-SER					69940
	CNGG-433-SER	CNGG-120412-SER					69941
CNMG-SEH 80° Diamond Universal 	CNMG-432-SEH	CNMG-120408-SEH	69726	69727			
DNGG-SEF 55° Diamond Finishing 	DNGG-431-SEF	DNGG-150404-SEF			69942		
	DNGG-432-SEF	DNGG-150408-SEF			69943		
	DNGG-433-SEF	DNGG-150412-SEF			69944		
	DNGG-441-SEF	DNGG-150604-SEF			69945		
	DNGG-442-SEF	DNGG-150608-SEF			69946		
	DNGG-443-SEF	DNGG-150612-SEF			69947		
DNMG-SEM 55° Diamond Medium 	DNMG-431-SEM	DNMG-150404-SEM				69948	
	DNMG-432-SEM	DNMG-150408-SEM				69949	
	DNMG-433-SEM	DNMG-150412-SEM				69950	
	DNMG-441-SEM	DNMG-150604-SEM				69951	
	DNMG-442-SEM	DNMG-150608-SEM				69952	
	DNMG-443-SEM	DNMG-150612-SEM				69953	

Turning Application			
High Performance	**Finishing**	**Medium**	**Roughing**
SEH	SEF	SEM	SER

Description	ANSI	ISO	Grade DSP10HT	Grade DSP20HT	Grade DSP15HT	Grade DSP15HT	Grade DSP15HT
			UPC 733101-		UPC 733101-	UPC 733101-	UPC 733101-
DNMG-SEH 55º Diamond Universal 	DNMG-442-SEH	DNMG- 150608-SEH	69730	69731			
VNMG-SEF 35º Diamond Finishing 	VNMG-331-SEF	VNMG-160404-SEF			69954		
	VNMG-332-SEF	VNMG-160408-SEF			69955		
WNGG-SEF 80º Trigon Finishing 	WNGG-431-SEF	WNGG-080404-SEF			69956		
	WNGG-432-SEF	WNGG-080408-SEF			69957		
	WNGG-433-SEF	WNGG-080412-SEF			69958		
WNM/GG-SEM 80º Trigon Medium 	WNGG-431-SEM	WNGG-080404-SEM				69959	
	WNGG-432-SEM	WNGG-080408-SEM				69960	
	WNMG-431-SEM	WNNG-080404-SEM				69961	
	WNMG-432-SEM	WNMG-080408-SEM				69962	
	WNMG-433-SEM	WNMG-080412-SEM				69963	
WNMG-SEH 80º Trigon Universal 	WNGG-432-SEH	WNGG-080408-SEH	69736	69737			

The Insert Nose Radius (r_e) on the insert will determine:		
The Depth of Cut a_p, Feed Rate f_n, Surface Finish and the best performance in the turning operations.		
Depth of Cut:		
Surface Feed:		
The nose radius controls the:	• Surface finish • Breaking and Size of Chip	• Strength of Insert • Metal Removal Rate
Use a small nose radius for:	• Finishing application • Small Depths of Cut• High Surface Feeds	• To Reduces Vibration • To Reduce Radial Forces • Weak Cutting Edges
Use a large nose radius for:	• Roughing application • Large depths of Cut• High Feed Rates	• High Surface Finish • Increase Radial forces • Strong Cutting Edge

NOTES: