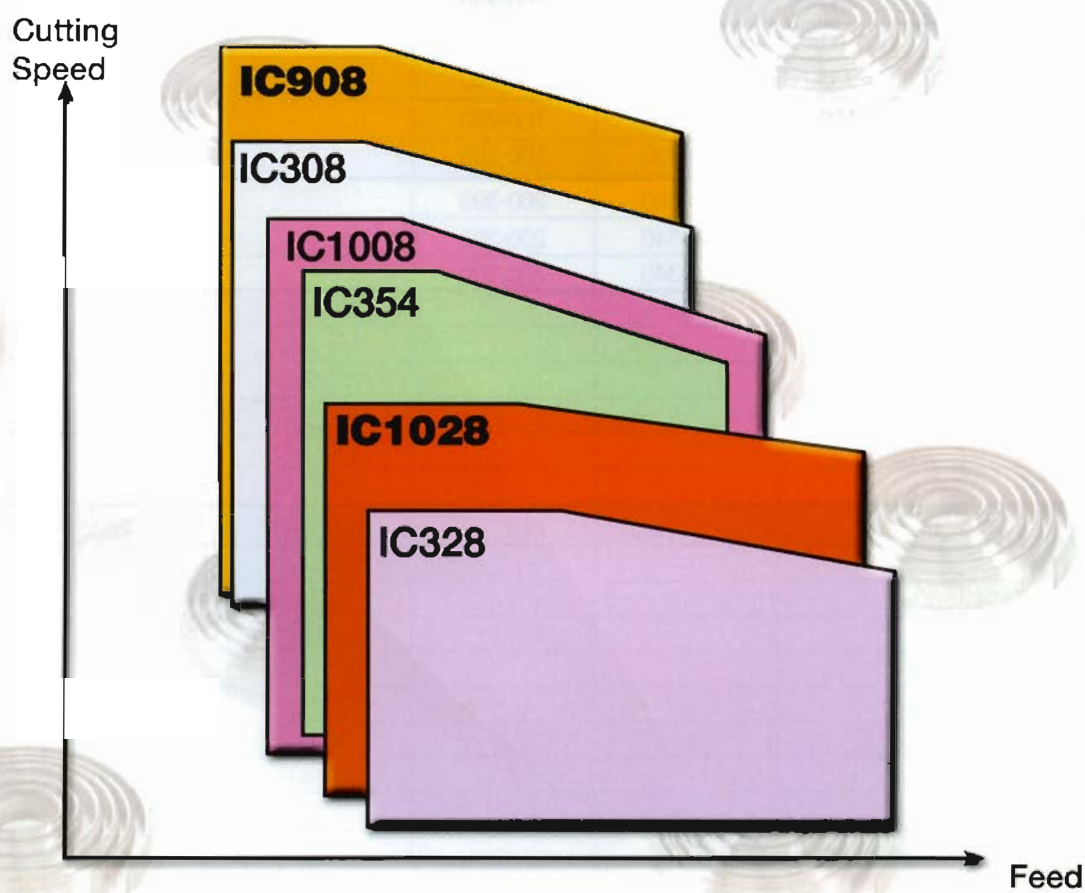
Machining Data

ISO	Material		Condition	Tensile Strength [Kpsi]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	61	125	1
		>= 0.25 %C	Annealed	94	190	2
		< 0.55 %C	Quenched and tempered	123	250	3
		>= 0.55 %C	Annealed	109	220	4
			Quenched and tempered	145	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	87	200	6
			Quenched and tempered	135	275	7
				145	300	8
				174	350	9
	High alloy steel, cast steel, and tool steel		Annealed	99	200	10
			Quenched and tempered	160	325	11
M	Stainless steel and cast steel		Ferritic/martensitic	99	200	12
			Martensitic	119	240	13
			Austenitic	87	180	14
K	Cast iron nodular (GGG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Grey cast iron (GG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium and Ti alloys			58		36
			Alpha+beta alloys cured	152		37
H	Hardened steel		Hardened		55 HRc	38
			Hardened		60 HRc	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRc	41

Coated				Uncoated		
IC308/908	IC354	IC1028	IC328	IC20	IC08	IC28
	Cutting Speed (SFM)					
460-820	360-560	300-460	260-390			
430-720	330-490	300-410	260-360			
300-660	300-460	260-340	230-300			
330-720	260-430	260-380	230-330			
230-560	160-260	150-160	130-230			
300-660	260-460	260-380	230-330			
260-560	260-430	180-260	160-230			
230-430	200-360	150-230	130-200			
160-390	160-330	110-180	100-160			
200-460	260-460	180-300	160-260			
160-230	200-330	110-230	100-200			
230-560	330-490	300-460	260-390			
200-490	260-390	230-340	200-300			
300-590	200-430	230-340	200-300			
390-820				200-280	180-260	
330-690				150-250	130-230	
330-750				200-260	180-250	
300-590				160-230	150-210	
620-980				230-330	210-300	
390-720				230-300	210-260	
				1640-8200	1570-7870	1350-6890
				820-1640	790-1570	660-1350
				1970-3280	1870-3120	1610-2690
				980-1970	920-1870	820-1610
				1310-2300	1250-2180	1080-1870
				590-980	560-940	490-820
				390-660	380-620	330-520
				330-490	310-460	260-410
130-230				110-160	110-160	100-130
100-160				80-130	80-130	70-110
100-130				70-100	70-100	50-80
50-80				50-70	50-70	30-50
50-100				50-70	50-70	30-50
300-620				490-660	460-620	390-520
100-200				160-260	150-250	130-210

Grade Application Range



Clamping Systems

DO-GRIP

- First choice for parting
- Double-ended insert
- Self-clamped for deep grooving and large diameters
- Screw-clamped for small diameters

See also HELI-GRIP, pages B7-B8

SELF-CLAMPED

SCREW-CLAMPED

F-Type

- Single-ended insert
- For deep grooving and large diameters
- With a stopper for high radial accuracy

F-TYPE

T-Type

- Single-ended insert
- The original SELF-GRIP design

T-TYPE

CUT-GRIP

- Single-ended insert
- Self and screw clamped options

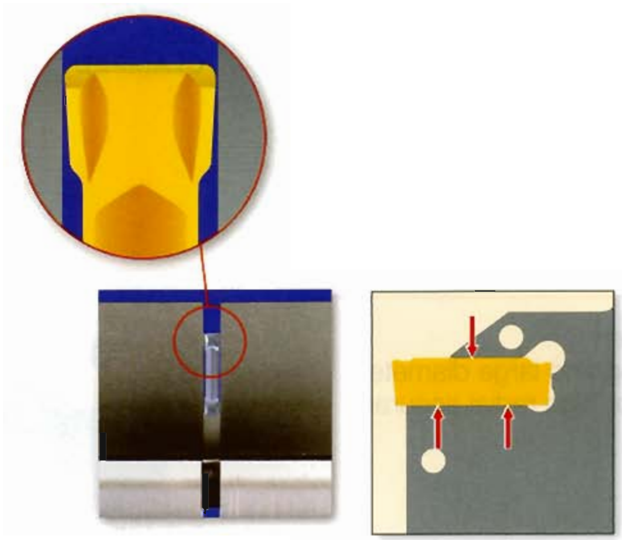
SCREW-CLAMPED

SELF-CLAMPED

The Twisted Insert

For Cut-off and Grooving Applications

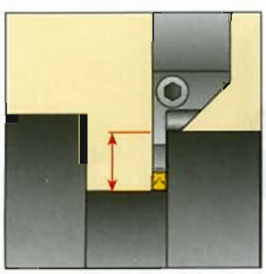
Machining depths longer than insert length is made possible with the double-ended, twisted insert body.
The rear edge is slanted in relation to the frontal edge so it does not come into contact with the machined groove surface when the tool penetrates deeply into the workpiece.



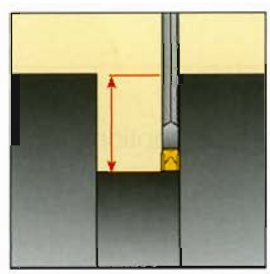
Insert Positioning

Clamping

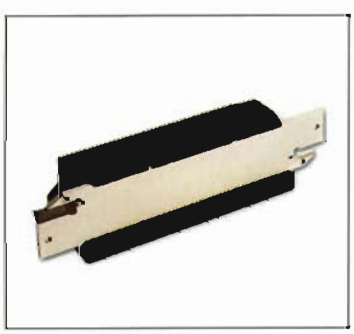
Extended, prismatic surfaces guarantee reliable, foolproof clamping even in unstable machining conditions.



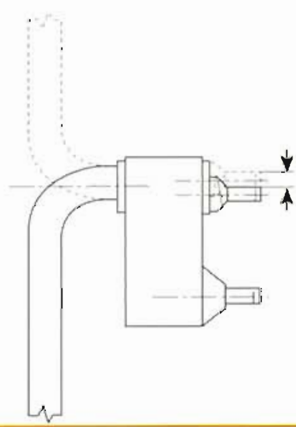
Screw-Clamping
Small diameters (D.O.C.) with screw-clamped Inserts



Self-Clamping
Large diameters (D.O.C.) with self-clamped Inserts

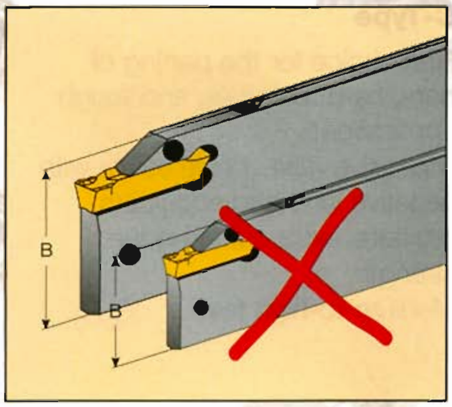


Extractor and Insert Replacement
The New Eccentric Extractor
Simple to operate; controlled rotation requires low force; guarantees limited upper jaw movement and secures maximum load on blade.



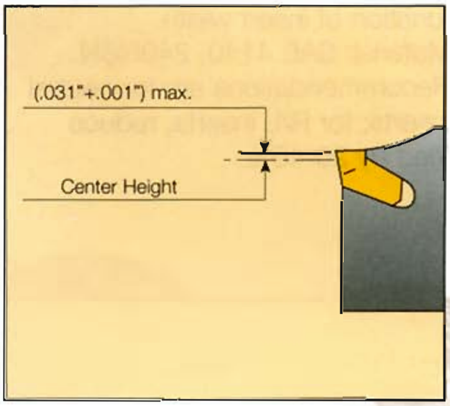
Selection Preference Priority

- Use insert with 0º lead angle.
- Tool up with largest blade size B.
- Smallest appropriate width of cut.



Setup

- The optimal cutting edge height above center of SELF-GRIP tools is up to .031+.001" WOC, an advantage when cutting solid bar to center.
- F-Type gives better accuracy and repeatability than T-type.
- Cut off as close to chuck as possible.
- On new applications, machine first in the low or middle range of recommended speeds and feeds.



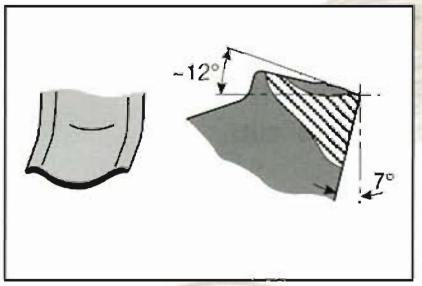
Machining

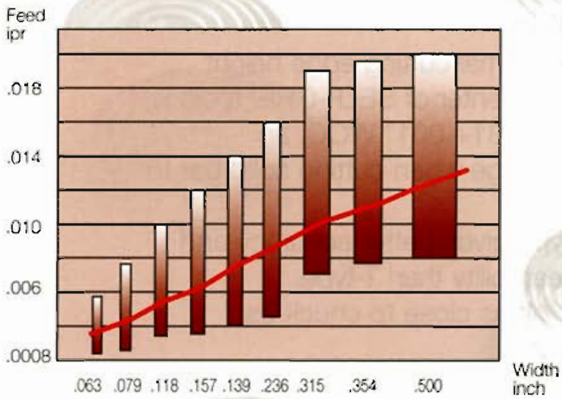
- Consistency of speed and feed improves performance.
- Apply coolant abundantly.
- Secure inserts into clean pockets.
- Cutting forces on soft workpiece materials may be insufficient to push insert well into pocket. Tap insert into place, using a plastic hammer.
- On a conventional lathe, lock the carriage to prevent axial motion during cut off.

Main Chipformers for Steel Parting and Grooving (ISO P)

C-Type

- First choice for the parting of bars, hard materials, and tough applications.
- A positive rake, single cavity with negative land and shoulders, provides extra cutting-edge strength.
- Medium-to-high feed.

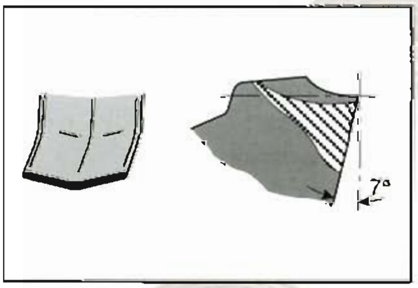


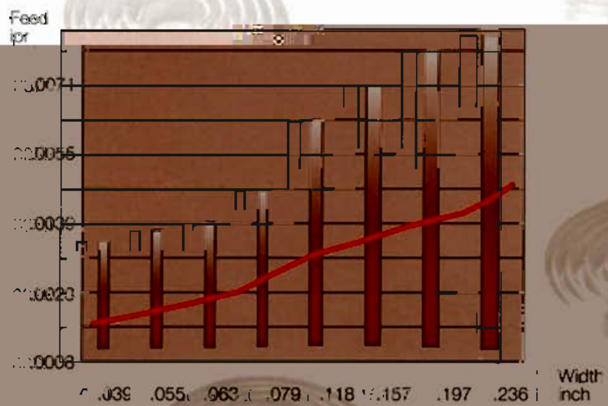


Recommended feed range as a function of insert width.
Material: SAE 4140, 240HBN.
Recommendations are for neutral inserts; for R/L inserts, reduce feed by 20-40%.

J-Type

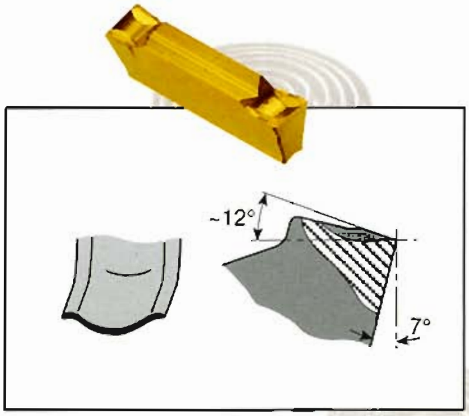
- First choice for soft materials, parting of tubes, small diameters and thin-walled parts.
- Cutting edge with positive rake.
- General application on low carbon steel, alloy steel, austenitic stainless steel.
- Low-to-medium feed.





Recommended feed range as a function of insert width.
Material: Austenitic stainless steel.
Recommendations are for neutral inserts; for R/L inserts, reduce feeds by 20-40%.

Additional Chipformers for Optimization

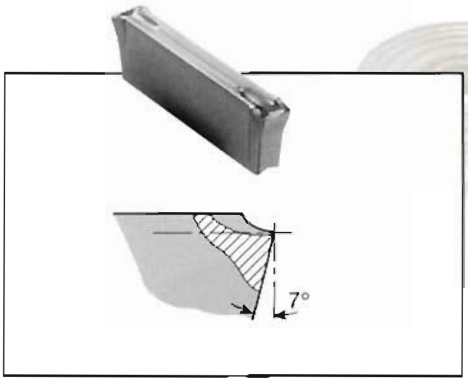


M-Type

- Similar to C-Type, but with modified edge.
- Improved chip control at medium feed.

W-Type

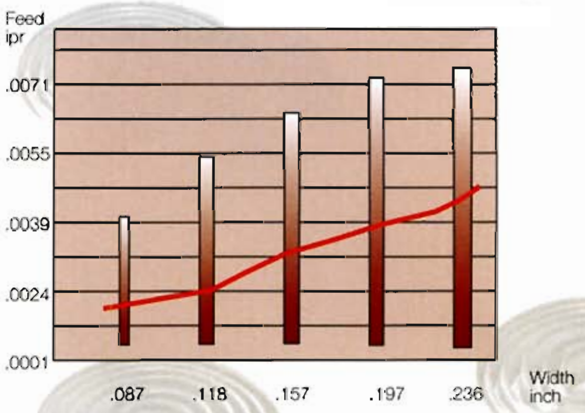
- Similar to C-Type, but with a central ridge that forms double cavities on the rake face and reinforces the frontal cutting edge. Used for interrupted cuts and unfavorable conditions.



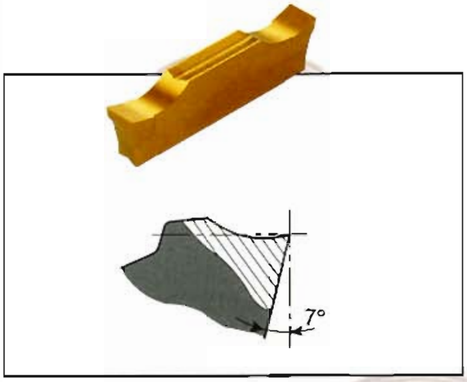
UA/UT Type[1]

- A chipformer for use at low feeds.
- Recommended for CrNi alloys and low carbon steel, especially in the bearing industry, and on similar, problematic materials.
- The narrow chipformer design ensures short, deformed chips, and gives improved performance.

[1] Recommended for bearing materials.

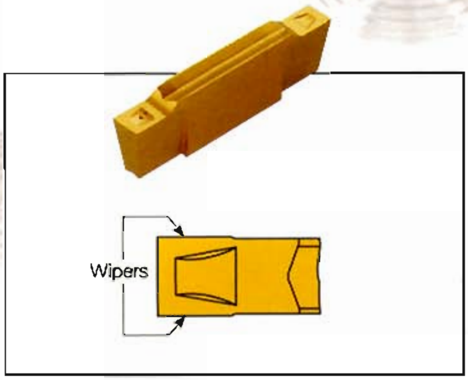


Additional Chipformers for Optimization



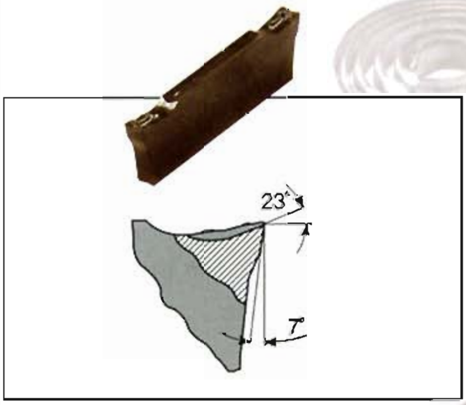
P-Chipformer

- Very positive rake inclination and sharp cutting edge.
- For soft materials, slim parts and general parting.



WP-Chipformer

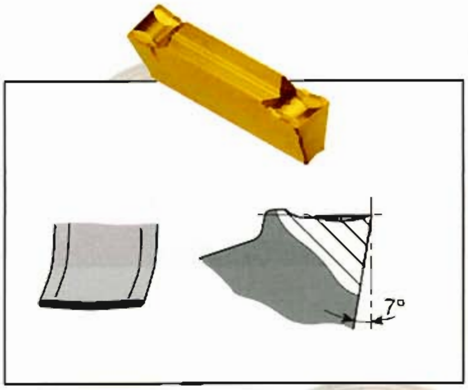
- Parallel wiper design for improved flatness and surface finish.
- Replaces existing HSS blades
- Low cutting force.
- For low to medium feed rates.



Z-Type

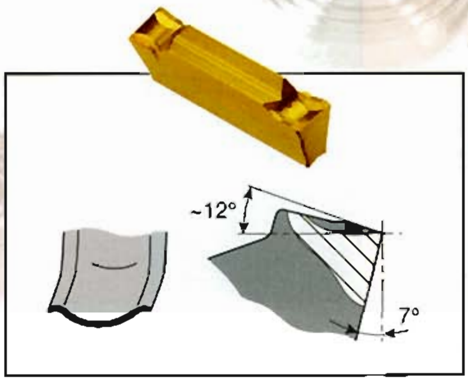
- Cutting edge with high positive rake, suitable for parting of tubes, thin walled arts and for small diameters.
- Suitable for soft materials.
- Excellent for cutting bearing steel and stainless steel.
- Low to medium feeds.

Chipformers for Parting Nonferrous Materials (ISO K)



C-Type

- Positive rake, sharp edge.
- First choice for nonferrous materials.
- Shallow grooving on high-temp alloys.
- Face grooving applications.
- In IC20 grades.

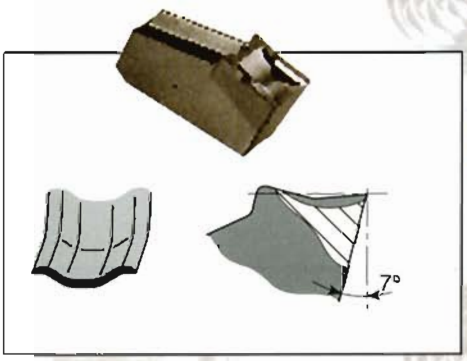


M-Type

- Strong cutting edge.
- First choice for high-temp alloys [Ni-based, inconel, etc].
- Medium-to-high feeds.
- Also for deep grooving.
- First choice for hard cast iron.

J-Type

- Positive rake, sharp edge.
- Effective chip control at low-to-medium feeds on high-temp alloys.
- First choice for titanium-based materials.



A-Type

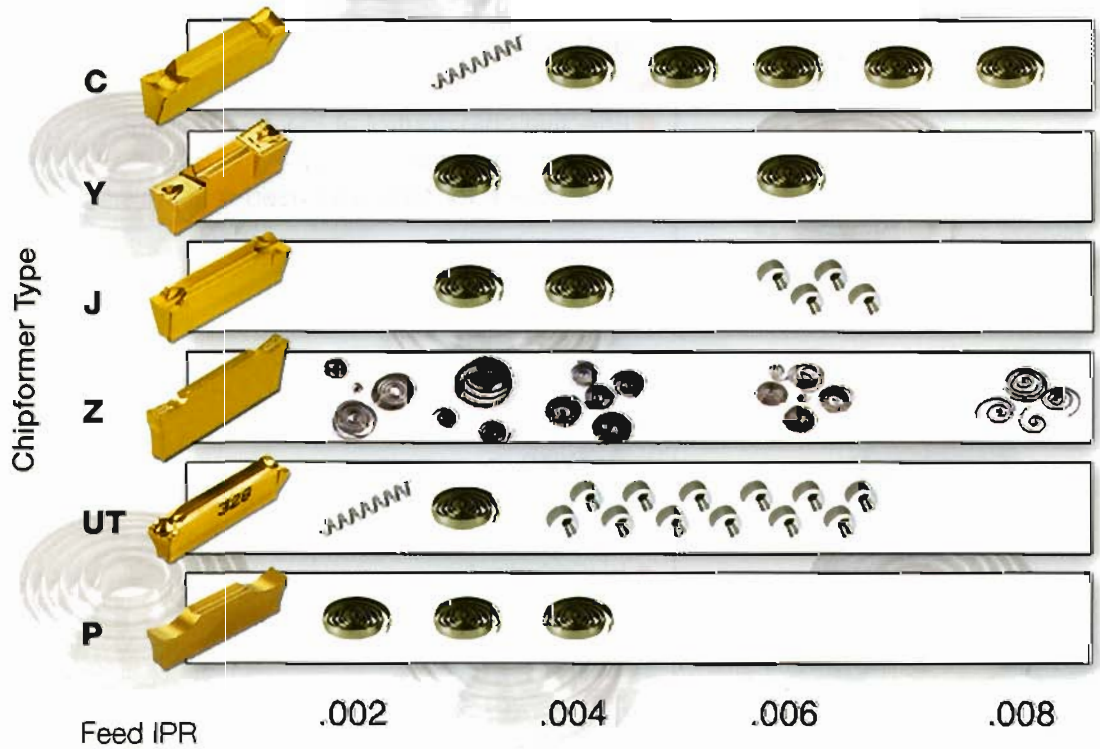
- Positive rake, sharp edge.
- For parting aluminum.
- In IC20 grades.

Selection of Chipformers

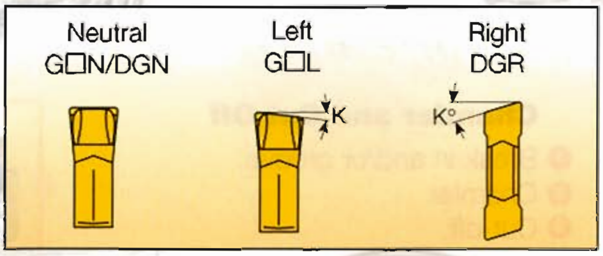
For various workpiece materials

Feed	Alloy Steel	Austenitic Stainless	High-Temp Alloys	Nonferrous Materials	Cast Iron
High	C	C	M Inconel	C Brass	C
	M	M	W	J Aluminum	M
	J	J	J Titanium	A Aluminum	
	Z	Z			
Low	U/UA		U/UA		

Various Chip Shapes as a Function of Feed

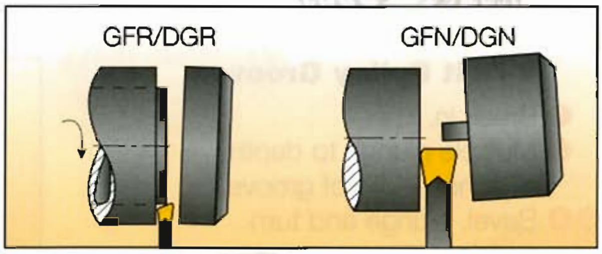


Lead angle (K) on cut-off inserts reduces size of burr remaining on workpiece. Increasing the lead angle reduces the burr, but also reduces possible feed rates and tool life. Therefore, neutral GFN inserts are recommended for parts on which a burr is tolerated.

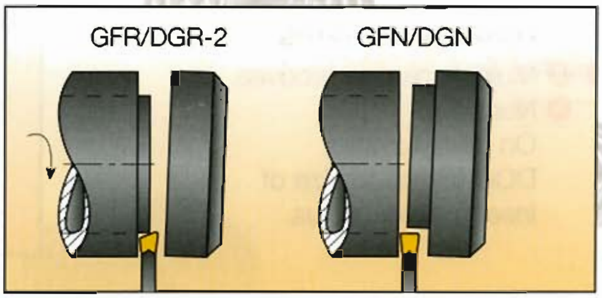


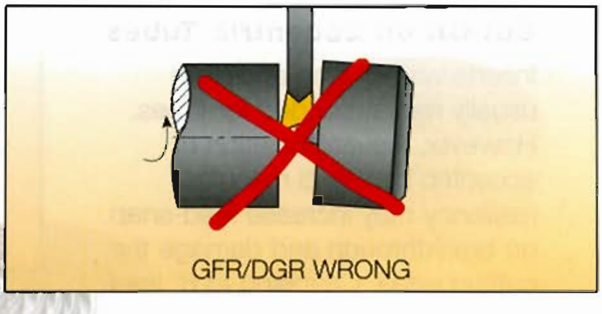
Lead Angle Applications

- 4° - Tubing and hollow bar
- 6° - Tubing and solid bar
- 8° - Solid bar
- 15° - Small diameter, easy-to-machine solid bar



Insert designations GFR (RH) and GFL (LH) comply with standard terms for turning direction. When looking toward the chuck from the workpiece, RH=counter clockwise (CC) rotation of workpiece and LH=clockwise (C) rotation of workpiece. CC requires right-hand inserts; C requires left-hand inserts.

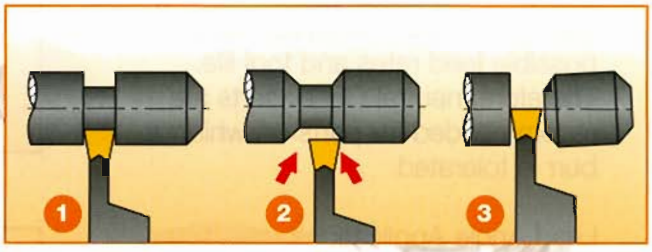




General Rules for Specific Applications

Chamfer and Cut-Off

1. Break in and/or groove.
2. Chamfer.
3. Cut-off.



V-Belt Pulley Grooves

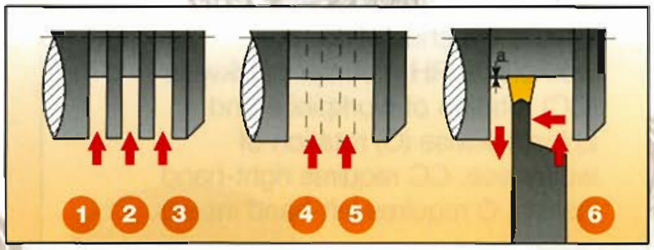
1. Break in.
2. Multiple plunge to depth, at minor width of groove.

3 4 Bevel, plunge and turn to minor diameter.

Neck Recessing

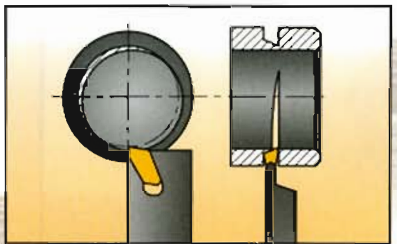
1-5 Multiple plunge grooves.

6 Necking. On neck turning, DOC (a)=up to size of insert corner radius.



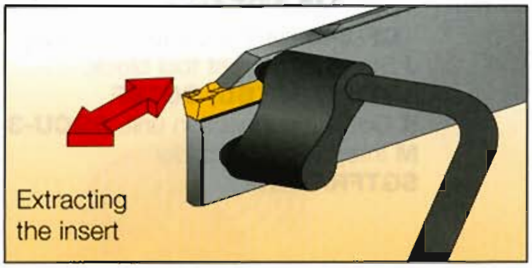
Cut-Off on Eccentric Tubes

Inserts with 4° lead angle are usually recommended for tubes. However, the combination of eccentric bore and machine resiliency may increase feed-snap on breakthrough and damage the cutting edge. Changing to 6° lead angle inserts will moderate breakthrough. Alternatively, inserts with an extra negative rake-land that strengthens the cutting edge are available on request.

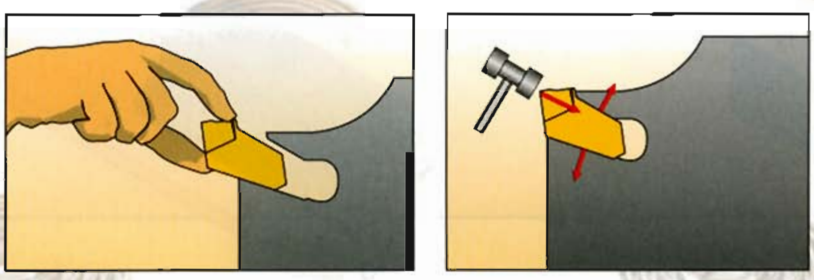


DO-GRIP - Insert Clamping

Extractor for DGN/R/L Double-Ended Inserts

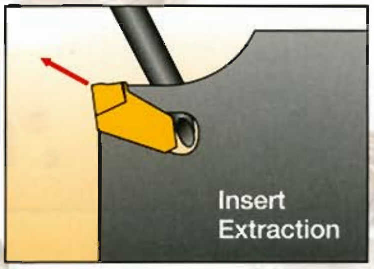


SELF-GRIP - Insert Clamping



A small plastic hammer should be used to tap the insert into its final position.

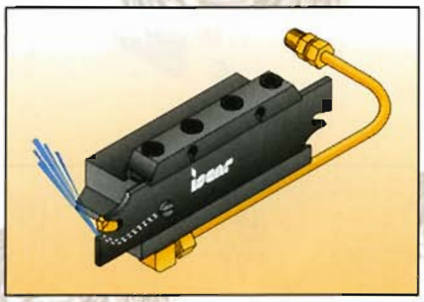
Extractor for GFN/R/L Single-Ended Inserts



Use ISCAR extractor for extracting insert in order to avoid tool damage.

Cutting Fluid

A copious supply of cutting fluid, directed exactly at the cutting edge, should be used while the insert is engaged and throughout the operation.
For tool blocks a coolant adapter can be mounted and the coolant supply connected from above or from either side. The adapter can be ordered as an optional extra and is supplied with an assembly screw.

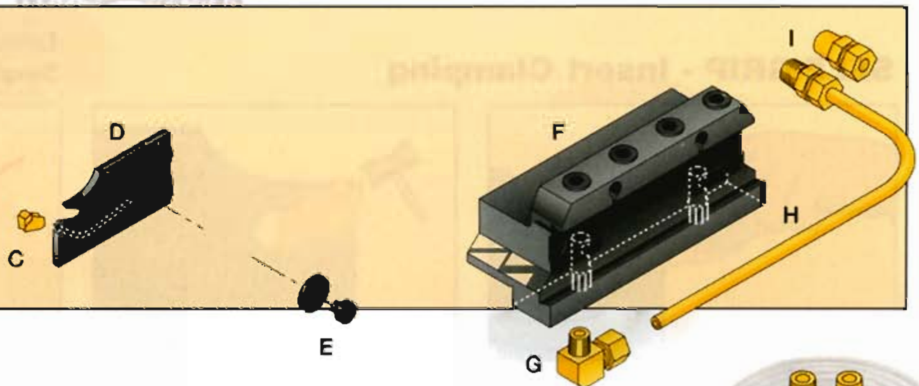


JET-CUT Assembly

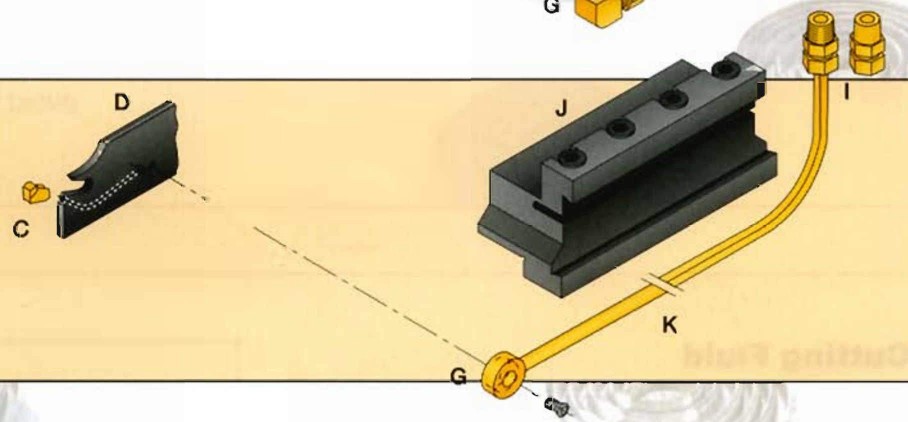
C Insert **GF□**
D Blade **SGFH□K-□**
E Cap **SGC 340** supplied with each blade. To be used only with Option 1.
F Tool block **SGTBU□C-□**
G Elbow-style connector unit supplied with each tool block. **SGCU-344.**
H 3/16" copper **tube 343** (length 9.84").
I Choice of connector sets:
- **CGM-343** (G1/8 external thread).
- **CGF-343** (G1/8 internal thread).
- **CM-343** (NPT 1/8 external thread).
- **CF-343** (NPT 1/8 internal thread).

J Standard current tool block. **SGTBN, SGTBU, SGTBF.**
K Coolant connection unit. **SGCU-341.**
M Integral shank holder **SGTFR/L□K-□**

Option 1:
Coolant supplied through the tool block.



Option 2:
Coolant supplied directly to the blade.



Option 3:
Coolant supplied directly to the integral shank tool.