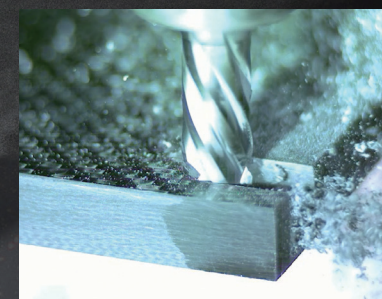
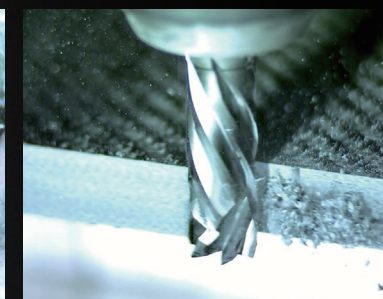


As a world leader of high quality End Mills manufacturing, cutting technology has always been the top priority of our research. YG-1 CFRP end mills (Routers) design and quality often determines the efficiency and quality of the machining process. Using the best-in-class carbide in the market, our tools are specifically designed and optimized for high efficiency in machining of CFRP parts and structures, speeding-up machining. We offer different geometries to cover all CFRP machining applications with highly innovative coating developed as a unique added value to enhance tool life and parts quality.

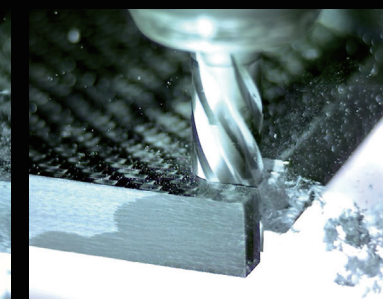
YG-1 composite routers variety is a result of CFRP expert team designing, manufacturing and testing all the best selected geometries to satisfy all market applications with the best global support on site.



Slotting



Side cutting



Full cutting

# END MILLS

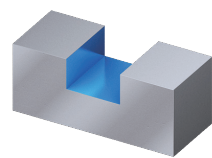


## Diamond Coated Chip Breaker Routers

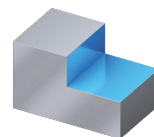
### Features

- The unique flute structure provides good surface finish, longer tool life and requires less cutting force
- Reduces delamination and uncut fibers
- Roughing and finishing processes
- Multiple flute end mills
- Diamond coating with excellent abrasion resistance
- Fine nick type

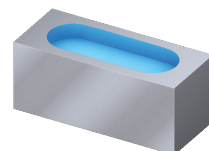
### Application



Slotting



Side Milling



Plunging, Pocketing

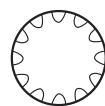


### Geometries

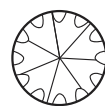
- The unique flute structure provides good surface finish, longer tool life, and requires less cutting force
- Multiple Flutes and Fine Nick reduce delamination and uncut fibers



### End Teeth Type



Type 1  
No End Cut



Type 2  
Burr End

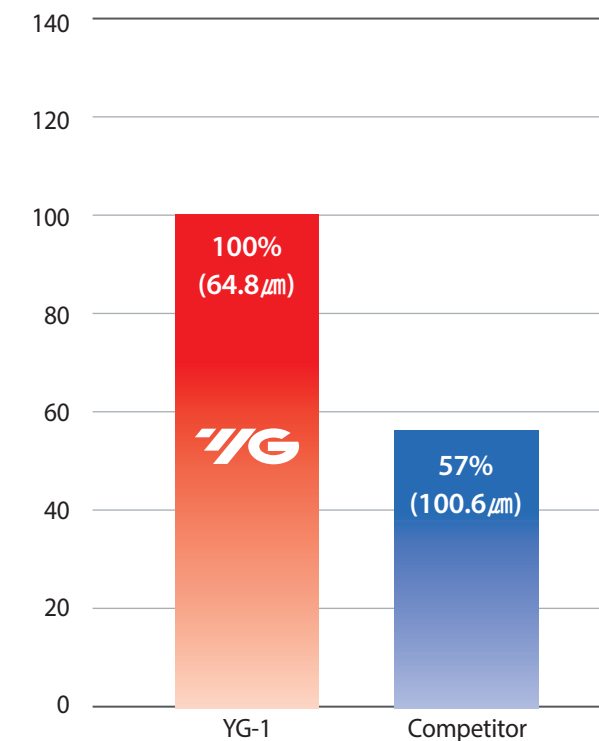


Type 3  
End Mill End



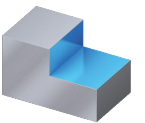
Type 4  
Drill End

### Ø10mm, CFRP – Trimming



**YG > Competitor**

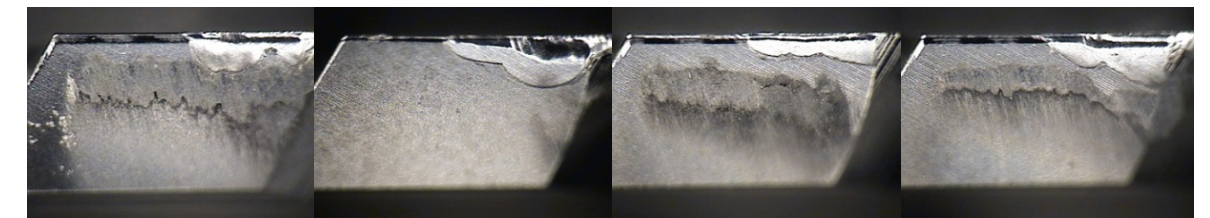
### Cutting Condition



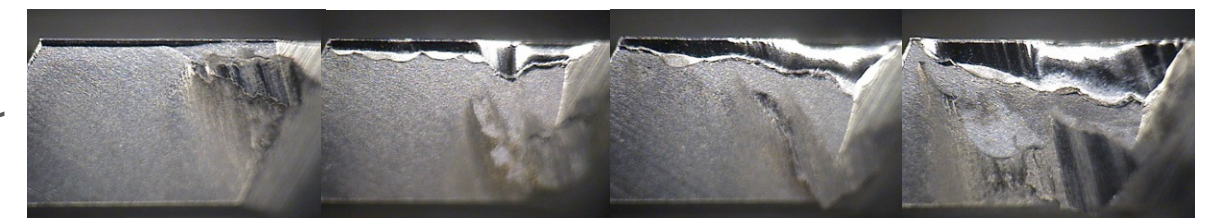
Tool	YG-1
Work Material	CFRP
RPM	8,000 rev/min
Feed	2,000 mm/min
Milling Depth	Axial : 15 mm Radial : 5 mm
Operation	Side Milling
Coolant	Air Blow
Machine	Machining Center
Holder	BT40

### Cutting Edges Total Milling Length = 32m

**YG**



**Competitor**



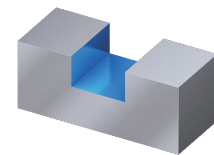
## Diamond Coated Compression Routers



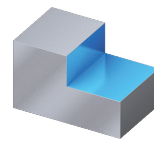
### Features

- The unique flute structure provides good surface finish, longer tool life and requires less cutting force
- Reduces delamination and fibers pullout
- Roughing and finishing processes
- Multiple flute end mills
- Diamond coating with excellent abrasion resistance

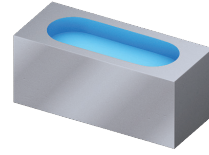
### Application



Slotting



Side Milling



Plunging, Pocketing

### CFRP Panel

- Material : CFRP(Thickness : 14mm)

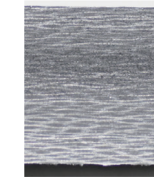
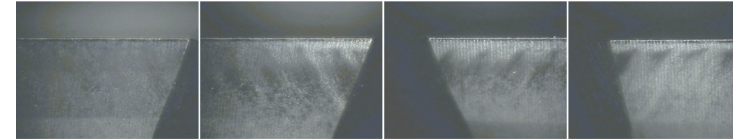
### CUTTING CONDITIONS

MATERIAL (CFRP) THICKNESS	OPERATION	SPINDLE SPEED	TABLE FEED	DEPTH OF CUT
0.5 - 0.75"	Side Milling (Profiling)	4500 RPM	40 IPM	HALF OF TOOL DIAMETER
0.5 - 0.75"	SLOTTING	3500 RPM	30 IPM	Dual Helix's crossing point in CFRP THICKNESS
0.5 - 0.75"	Trimming	3500 RPM	30 IPM	

### YG-1 New design Test Result (Side Milling Evaluation)

Diameter	LOC	OAL	Flute No.	Helix	Coating
0.5"	1"	3"	6	30	CVD
MATERIAL (CFRP) THICKNESS	OPERATION	SPINDLE SPEED	TABLE FEED	DEPTH OF CUT	
0.5 - 0.75"	SIDE MILLING	4500 RPM	40 IPM	HALF OF TOOL DIAMETER	

#### 1. Tooling pictures after Side Milling testing



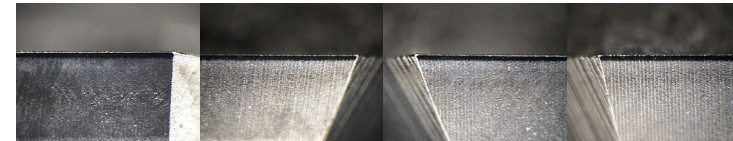
#### 2. CFRP Panel pictures

- Smooth surface finish
- No edge breakout on Side Milling part

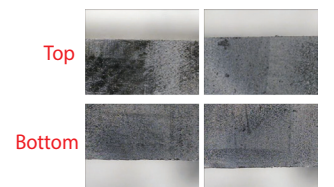
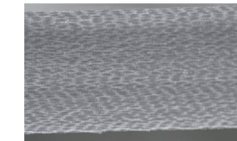
### YG-1 New design Test Result (Trimming Evaluation)

Diameter	LOC	OAL	Flute No.	Helix	Coating
0.5"	1"	3"	6	30	CVD
MATERIAL (CFRP) THICKNESS	OPERATION	SPINDLE SPEED	TABLE FEED	DEPTH OF CUT	
0.5 - 0.75"	Trimming	3500 RPM	30 IPM	Full	

#### 1. Tooling pictures after Trimming cutting testing



#### 2. CFRP Panel pictures



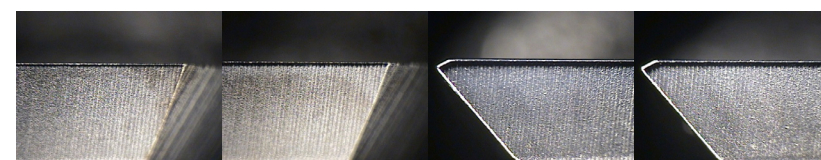
Top  
Bottom

- No edge breakout on trimmed part

### YG-1 New design Test Result (Slotting Evaluation)

Diameter	LOC	OAL	Flute No.	Helix	Coating
0.5"	1"	3"	6	30	CVD
MATERIAL (CFRP) THICKNESS	OPERATION	SPINDLE SPEED	TABLE FEED	DEPTH OF CUT	
0.5 - 0.75"	SLOTTING	3500 RPM	30 IPM	0.295"	

#### 1. Tooling pictures after Slotting testing





### COMPOSITE MILLING TOOLS INDEX

◎ : Excellent ○ : Good

INCH METRIC	MODEL	NO. OF FLUTES	HELIX ANGLE	DESCRIPTION	SIZE		PAGE
					INCH	METRIC	
URT5P1AA URT5P2AA		4 Flute	15°	Solid Carbide, CFRP Routers with Low Spiral Flute and CVD Coating for Graphite, Plastics, Bakelite and wood	1/8 ~ 1/2	3.0 ~ 12.0	20
URT5P1AB URT5P2AB		4-8 Flute	0°	Solid Carbide, CFRP Routers with Chip Breaker Straight Flutes and CVD Coating for CFRP roughing and one shot operation (Type 1-No End Cut)	1/8 ~ 1/2	3.0 ~ 12.0	21
URT5P1AC URT5P2AC		4-8 Flute	0°	Solid Carbide, CFRP Routers with Chip Breaker Straight Flutes and CVD Coating for CFRP roughing and one shot operation (Type 2-Burr End)	1/8 ~ 1/2	3.0 ~ 12.0	21
URT5P1AD URT5P2AD		4-8 Flute	0°	Solid Carbide, CFRP Routers with Chip Breaker Straight Flutes and CVD Coating for CFRP roughing and one shot operation (Type 3-End Mill End)	1/8 ~ 1/2	3.0 ~ 12.0	21
URT5P1AE URT5P2AE		4-8 Flute	0°	Solid Carbide, CFRP Routers with Chip Breaker Straight Flutes and CVD Coating for CFRP roughing and one shot operation (Type 4-Drill End)	1/8 ~ 1/2	3.0 ~ 12.0	21
URT5P1AF URT5P2AF		Multi Flute	15°	Solid carbide, CFRP Routers with Chip Breaker Helical Flutes and CVD Coating for CFRP roughing and one shot operation (Type 1-No End Cut)	1/8 ~ 1/2	3.0 ~ 12.0	22
URT5P1AG URT5P2AG		Multi Flute	15°	Solid carbide, CFRP Routers with Chip Breaker Helical Flutes and CVD Coating for CFRP roughing and one shot operation (Type 2-Burr End)	1/8 ~ 1/2	3.0 ~ 12.0	22
URT5P1AH URT5P2AH		Multi Flute	15°	Solid carbide, CFRP Routers with Chip Breaker Helical Flutes and CVD Coating for CFRP roughing and one shot operation (Type 3-End Mill End)	1/8 ~ 1/2	3.0 ~ 12.0	22
URT5P1AI URT5P2AI		Multi Flute	15°	Solid carbide, CFRP Routers with Chip Breaker Helical Flutes and CVD Coating for CFRP roughing and one shot operation (Type 4-Drill End)	1/8 ~ 1/2	3.0 ~ 12.0	22
URT5P1AN URT5P2AN		6 Flute	30° /30°	Solid Carbide, CFRP Compression Routers with CVD Coating for CFRP	1/4 ~ 1/2	6.0 ~ 12.0	23
URT5P1AO URT5P2AO		6 Flute	30° /30°	Solid Carbide, CFRP Compression Routers with chip breakers and CVD coating for CFRP	1/4 ~ 1/2	6.0 ~ 12.0	23
URT5P1AP URT5P2AP		8 Flute	15°	Solid Carbide, CFRP Finishing Routers with CVD Coating for CFRP	1/4 ~ 1/2	6.0 ~ 12.0	24
URT5A1AJ URT5A2AJ		Multi Flute	-	Solid Carbide, Fiberglass Routers For GFRP roughing and one shot operation (Type 1-No End Cut)	1/8 ~ 1/2	3.0 ~ 12.0	25
URT5A1AK URT5A2AK		Multi Flute	-	Solid Carbide, Fiberglass Routers For GFRP roughing and one shot operation (Type 2-Burr End)	1/8 ~ 1/2	3.0 ~ 12.0	25
URT5A1AL URT5A2AL		Multi Flute	-	Solid Carbide, Fiberglass Routers For GFRP roughing and one shot operation (Type 3-End Mill End)	1/8 ~ 1/2	3.0 ~ 12.0	25
URT5A1AM URT5A2AM		Multi Flute	-	Solid Carbide, Fiberglass Routers For GFRP roughing and one shot operation (Type 4-Drill End)	1/8 ~ 1/2	3.0 ~ 12.0	25
URT5A1AQ URT5A2AQ		2 Flute	-	Solid Carbide, Kevlar Routers for Kevlar composites	1/4 ~ 1/2	6.0 ~ 12.0	26
URT5A1AR URT5A2AR		Multi Flute	-	Solid Carbide, Honeycomb Routers for honeycomb core	1/4 ~ 1/2	6.0 ~ 12.0	27

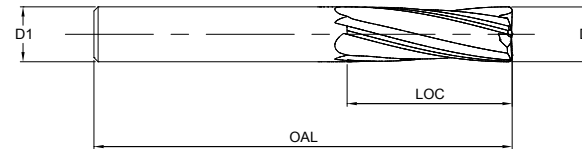
Working Material				Application				Machine Type	
CFRP	GFRP	Kevlar	HoneyComb	Roughing	Slotting	Full Cutting	Finishing	Gantry	Robot
◎	◎			◎	◎	◎	○	◎	◎
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### SOLID CARBIDE, CFRP ROUTERS WITH LOW SPIRAL FLUTES

High performance machining of CFRP, Graphite, Wood, Bakelite and Plastics  
YG-1 special CVD coating for extended tool life and better abrasion resistance



#### INCH SIZES

(Unit : inch)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	Fractional	Decimal				
<b>URT5P1AA0125</b>	1/8	.1250	1/8	1/2	3	4
<b>URT5P1AA0250</b>	1/4	.2500	1/4	1	3	4
<b>URT5P1AA0375</b>	3/8	.3750	3/8	1	3	4
<b>URT5P1AA0500</b>	1/2	.5000	1/2	1-1/2	4	4

#### METRIC SIZES

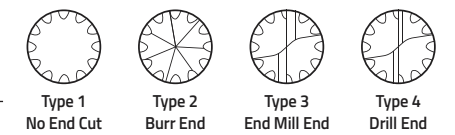
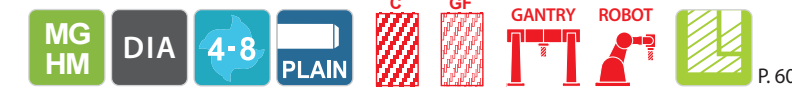
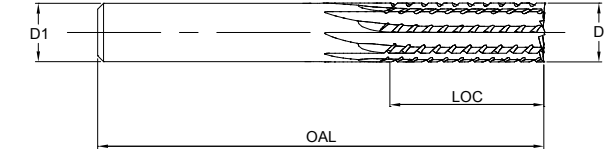
(Unit : mm)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	D1	LOC				
<b>URT5P2AA0300</b>	3	9	3	9	50	4
<b>URT5P2AA0600</b>	6	18	6	18	65	4
<b>URT5P2AA0800</b>	8	24	8	24	70	4
<b>URT5P2AA1000</b>	10	30	10	30	80	4
<b>URT5P2AA1200</b>	12	36	12	36	100	4

▶ Available as made to order

### SOLID CARBIDE, CFRP ROUTERS WITH CHIP BREAKER STRAIGHT FLUTES

High performance machining of CFRP, can be used as rougher or finisher  
YG-1 special CVD coating for extended tool life and better abrasion resistance



#### INCH SIZES

(Unit : inch)

EDP				Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	D					
				Fractional	Decimal				
<b>URT5P1AB0125</b>	<b>URT5P1AC0125</b>	<b>URT5P1AD0125</b>	<b>URT5P1AE0125</b>	1/8	.1250	1/8	1/2	3	4
<b>URT5P1AB0250</b>	<b>URT5P1AC0250</b>	<b>URT5P1AD0250</b>	<b>URT5P1AE0250</b>	1/4	.2500	1/4	1	3	6
<b>URT5P1AB0375</b>	<b>URT5P1AC0375</b>	<b>URT5P1AD0375</b>	<b>URT5P1AE0375</b>	3/8	.3750	3/8	1	3	8
<b>URT5P1AB0500</b>	<b>URT5P1AC0500</b>	<b>URT5P1AD0500</b>	<b>URT5P1AE0500</b>	1/2	.5000	1/2	1-1/2	4	8

#### METRIC SIZES

(Unit : mm)

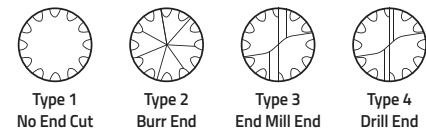
EDP				Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	D					
				D1	LOC				
<b>URT5P2AB0300</b>	<b>URT5P2AC0300</b>	<b>URT5P2AD0300</b>	<b>URT5P2AE0300</b>	3	9	3	9	50	4
<b>URT5P2AB0600</b>	<b>URT5P2AC0600</b>	<b>URT5P2AD0600</b>	<b>URT5P2AE0600</b>	6	18	6	18	65	6
<b>URT5P2AB0800</b>	<b>URT5P2AC0800</b>	<b>URT5P2AD0800</b>	<b>URT5P2AE0800</b>	8	24	8	24	70	8
<b>URT5P2AB1000</b>	<b>URT5P2AC1000</b>	<b>URT5P2AD1000</b>	<b>URT5P2AE1000</b>	10	30	10	30	80	8
<b>URT5P2AB1200</b>	<b>URT5P2AC1200</b>	<b>URT5P2AD1200</b>	<b>URT5P2AE1200</b>	12	36	12	36	100	8

▶ Available as made to order



## SOLID CARBIDE, CFRP ROUTERS WITH CHIP BREAKER HELICAL FLUTES

High performance machining of CFRP, can be used as rougher or finisher  
 YG-1 special CVD coating for extended tool life and better abrasion resistance



### INCH SIZES

(Unit : inch)

EDP				Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	D		D1	LOC	OAL	
				Fractional	Decimal				
URT5P1AF0125	URT5P1AG0125	URT5P1AH0125	URT5P1AI0125	1/8	.1250	1/8	1/2	3	Multi Flute
URT5P1AF0250	URT5P1AG0250	URT5P1AH0250	URT5P1AI0250	1/4	.2500	1/4	1	3	Multi Flute
URT5P1AF0375	URT5P1AG0375	URT5P1AH0375	URT5P1AI0375	3/8	.3750	3/8	1	3	Multi Flute
URT5P1AF0500	URT5P1AG0500	URT5P1AH0500	URT5P1AI0500	1/2	.5000	1/2	1-1/2	4	Multi Flute

### METRIC SIZES

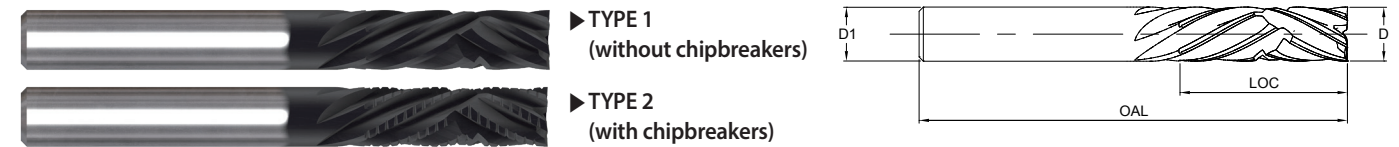
(Unit : mm)

EDP				Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	D	D1	LOC	OAL	
URT5P2AF0300	URT5P2AG0300	URT5P2AH0300	URT5P2AI0300	3	3	9	50	Multi Flute
URT5P2AF0600	URT5P2AG0600	URT5P2AH0600	URT5P2AI0600	6	6	18	65	Multi Flute
URT5P2AF0800	URT5P2AG0800	URT5P2AH0800	URT5P2AI0800	8	8	24	70	Multi Flute
URT5P2AF1000	URT5P2AG1000	URT5P2AH1000	URT5P2AI1000	10	10	30	80	Multi Flute
URT5P2AF1200	URT5P2AG1200	URT5P2AH1200	URT5P2AI1200	12	12	36	100	Multi Flute

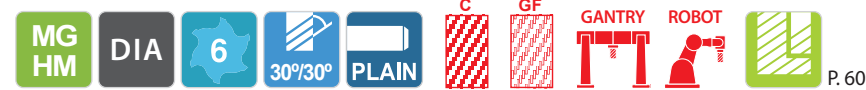
► Available as made to order

## SOLID CARBIDE, CFRP COMPRESSION ROUTERS WITH / WITHOUT CHIP BREAKERS

CFRP & GFRP compression routers for delamination-free cut  
 YG-1 special CVD coating for extended tool life and better abrasion resistance



► TYPE 1 (without chipbreakers)  
 ► TYPE 2 (with chipbreakers)



### INCH SIZES

(Unit : inch)

EDP		Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
Type 1 (without Chipbreakers)	Type 2 (with Chipbreakers)	D		D1	LOC	OAL	
		Fractional	Decimal				
URT5P1AN0250	URT5P1AO0250	1/4	.2500	1/4	1	3	6
URT5P1AN0375	URT5P1AO0375	3/8	.3750	3/8	1	3	6
URT5P1AN0500	URT5P1AO0500	1/2	.5000	1/2	1-1/2	4	6

### METRIC SIZES

(Unit : mm)

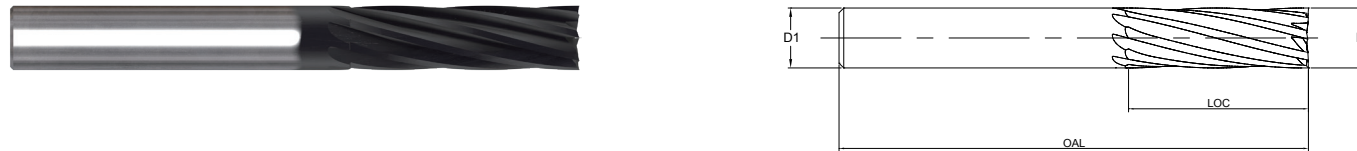
EDP		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flutes
Type 1 (without Chipbreakers)	Type 2 (with Chipbreakers)	D	D1	LOC	OAL	
URT5P2AN0600	URT5P2AO0600	6	6	18	65	6
URT5P2AN0800	URT5P2AO0800	8	8	24	70	6
URT5P2AN1000	URT5P2AO1000	10	10	30	80	6
URT5P2AN1200	URT5P2AO1200	12	12	36	100	6

► Available as made to order



## SOLID CARBIDE, CFRP FINISHING ROUTERS

CFRP & GFRP finishing routers for smooth surface  
YG-1 special CVD coating for extended tool life and better abrasion resistance



### INCH SIZES

(Unit : inch)

EDP	Mill Diameter D		Shank Diameter D1	Length of Cut LOC	Overall Length OAL	No. of Flutes
	Fractional	Decimal				
<b>URT5P1AP0250</b>	1/4	.2500	1/4	1	3	8
<b>URT5P1AP0375</b>	3/8	.3750	3/8	1	3	8
<b>URT5P1AP0500</b>	1/2	.5000	1/2	1-1/2	4	8

### METRIC SIZES

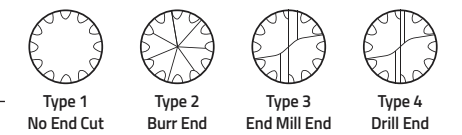
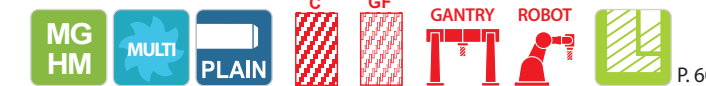
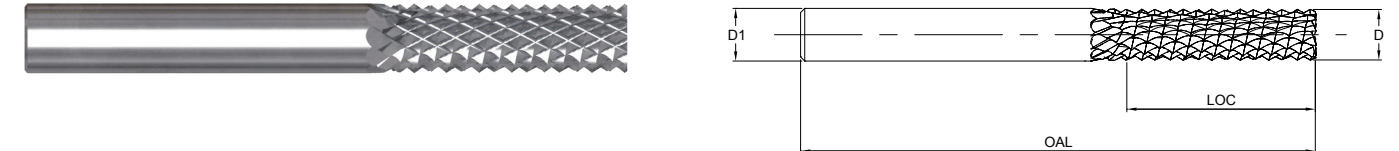
(Unit : mm)

EDP	Mill Diameter D		Shank Diameter D1	Length of Cut LOC	Overall Length OAL	No. of Flutes
	D	D1				
<b>URT5P2AP0600</b>	6	6	6	18	65	8
<b>URT5P2AP0800</b>	8	8	8	24	70	8
<b>URT5P2AP1000</b>	10	10	10	30	80	8
<b>URT5P2AP1200</b>	12	12	12	36	100	8

▶ Available as made to order

## SOLID CARBIDE, FIBERGLASS ROUTERS

CFRP & GFRP specially designed routers  
YG-1 special CVD coating and other coatings available for extended tool life and better abrasion resistance



### INCH SIZES

(Unit : inch)

EDP				Mill Diameter D		Shank Diameter D1	Length of Cut LOC	Overall Length OAL	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	Fractional	Decimal				
<b>URT5A1AJ0125</b>	<b>URT5A1AK0125</b>	<b>URT5A1AL0125</b>	<b>URT5A1AM0125</b>	1/8	.1250	1/8	1/2	3	Multi Flute
<b>URT5A1AJ0250</b>	<b>URT5A1AK0250</b>	<b>URT5A1AL0250</b>	<b>URT5A1AM0250</b>	1/4	.2500	1/4	1	3	Multi Flute
<b>URT5A1AJ0375</b>	<b>URT5A1AK0375</b>	<b>URT5A1AL0375</b>	<b>URT5A1AM0375</b>	3/8	.3750	3/8	1	3	Multi Flute
<b>URT5A1AJ0500</b>	<b>URT5A1AK0500</b>	<b>URT5A1AL0500</b>	<b>URT5A1AM0500</b>	1/2	.5000	1/2	1-1/2	4	Multi Flute

### METRIC SIZES

(Unit : mm)

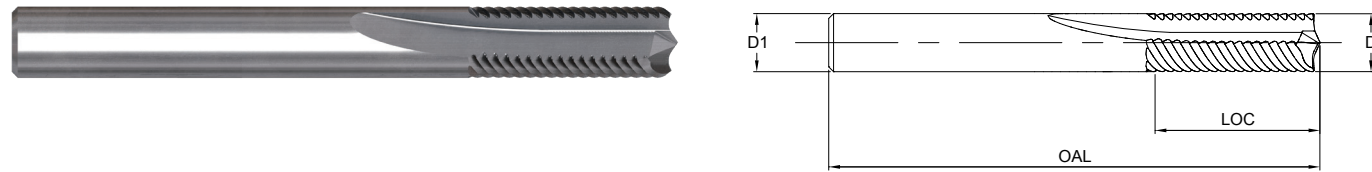
EDP				Mill Diameter D		Shank Diameter D1	Length of Cut LOC	Overall Length OAL	No. of Flutes
TYPE 1	TYPE 2	TYPE 3	TYPE 4	D	D1				
<b>URT5A2AJ0300</b>	<b>URT5A2AK0300</b>	<b>URT5A2AL0300</b>	<b>URT5A2AM0300</b>	3	3	3	9	50	Multi Flute
<b>URT5A2AJ0600</b>	<b>URT5A2AK0600</b>	<b>URT5A2AL0600</b>	<b>URT5A2AM0600</b>	6	6	6	18	65	Multi Flute
<b>URT5A2AJ0800</b>	<b>URT5A2AK0800</b>	<b>URT5A2AL0800</b>	<b>URT5A2AM0800</b>	8	8	8	24	70	Multi Flute
<b>URT5A2AJ1000</b>	<b>URT5A2AK1000</b>	<b>URT5A2AL1000</b>	<b>URT5A2AM1000</b>	10	10	10	30	80	Multi Flute
<b>URT5A2AJ1200</b>	<b>URT5A2AK1200</b>	<b>URT5A2AL1200</b>	<b>URT5A2AM1200</b>	12	12	12	36	100	Multi Flute

▶ CVD Diamond Coating and other coatings are available on Customer Request  
▶ Available as made to order



## SOLID CARBIDE, KEVLAR ROUTERS

KFRP routers with Scissor action to minimize fiber pullout and delamination  
YG-1 special design for plunging with free delamination



### INCH SIZES

(Unit : inch)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	Fractional	Decimal				
<b>URT5A1AQ0250</b>	1/4	.2500	1/4	1	3	2
<b>URT5A1AQ0375</b>	3/8	.3750	3/8	1	3	2
<b>URT5A1AQ0500</b>	1/2	.5000	1/2	1-1/2	4	2

### METRIC SIZES

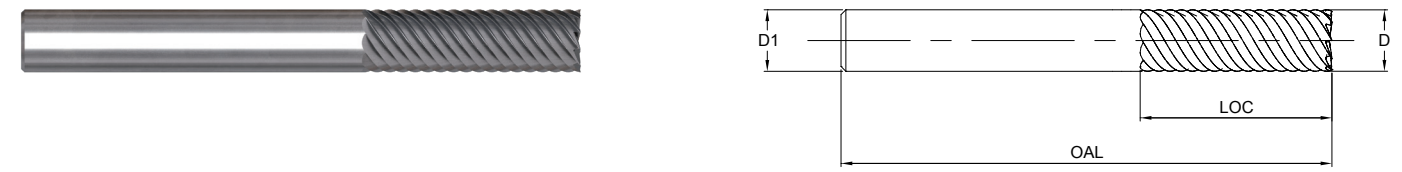
(Unit : mm)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	Fractional	Decimal				
<b>URT5A2AQ0600</b>	6	6	18	65	2	
<b>URT5A2AQ0800</b>	8	8	24	70	2	
<b>URT5A2AQ1000</b>	10	10	30	80	2	
<b>URT5A2AQ1200</b>	12	12	36	100	2	

- ▶ CVD Diamond Coating and other coatings are available on Customer Request
- ▶ Available as made to order

## SOLID CARBIDE, HONEYCOMB ROUTERS

Solid Carbide Routers designed for honeycomb core sizing and flatness  
YG-1 special CVD coating and other coatings available for extended tool life and better abrasion resistance



### INCH SIZES

(Unit : inch)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	Fractional	Decimal				
<b>URT5A1AR0250</b>	1/4	.2500	1/4	1	3	Multi Flute
<b>URT5A1AR0375</b>	3/8	.3750	3/8	1	3	Multi Flute
<b>URT5A1AR0500</b>	1/2	.5000	1/2	1-1/2	4	Multi Flute

### METRIC SIZES

(Unit : mm)

EDP	Mill Diameter		Shank Diameter	Length of Cut	Overall Length	No. of Flutes
	D					
	Fractional	Decimal				
<b>URT5A2AR0600</b>	6	6	18	65	Multi Flute	
<b>URT5A2AR0800</b>	8	8	24	70	Multi Flute	
<b>URT5A2AR1000</b>	10	10	30	80	Multi Flute	
<b>URT5A2AR1200</b>	12	12	36	100	Multi Flute	

- ▶ CVD Diamond Coating and other coatings are available on Customer Request
- ▶ Available as made to order