



# CUTTING TOOLS FOR SOFT MATERIALS

SPECIFICALLY FOR PLASTICS, ALUMINUM,  
WOOD, COMPOSITES, ETC...





**F**or almost 70 years, Diager Industrie has operated as a specialised French designer and manufacturer of rotary carbide cutting tools. Located in Poligny in the Jura region of eastern France, the company develops special and standard, single-piece cutting tools. Diager Industrie draws on all the synergies generated by a group structure to design high-quality tools for manufacturers. The company has fostered strong partnerships with leading players in the engineering, aeronautics, space and automotive industries and focuses its expertise on a range of high quality products.

## **RESEARCH & DEVELOPMENT: TAKING THE COMPANY TO THE NEXT LEVEL**

We invest heavily in research, development and innovation. Our ambition is to be able to resolve the machining problems you face. Our investments enable us to develop comprehensive and innovative solutions for these problems. For all your drilling, milling and boring operations, our experts develop not only cutting tools but also the optimal process for your application since we are, first and foremost, a supplier of solutions.

To facilitate this, we have set up: a team tasked with finding solutions that optimise your manufacturing strategy and industrial logistics; and testing platforms designed to be compatible with customers' equipment that enables us to

validate our machining processes in real-life conditions. These resources enable us to accurately measure the productivity achievable with our cutting tools and thus provide you with a complete picture of the costs associated with our solutions and the production times they allow. Consequently, we can meet, very precisely, the most demanding requirements specifications and guarantee the performance of our cutting tools.

Our pool of 135 machining tools, 45 of which are numerically controlled, gives us total control over our processes and tools, to make them even more efficient.

# A MOTIVATED AND COMMITTED COMPANY

Diager Industrie's ethos is founded on the excellent customer service and on ensuring the high quality of its products. Thanks to modern technologies and a significant investment from our staff, we do everything we can to reduce our impact on the environment. By adhering to a comprehensive environmental policy, we can guarantee that we control our activities and products. Caring for the environment is a constant priority, and informs all the activities performed by the company.



## PROCEDURES AND ACCREDITATIONS:



ISO 9001  
and 14001  
certified



Quality



Compliance  
with standards,  
respect for the  
environment



Awarded  
CRS (ISO) 26000  
by AFNOR and  
certified at the  
"CONFIRMED" level.

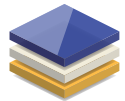


Our approach to CSR is a philosophy which drives our actions and guides our strategy. Our commitment to CSR indicates that our organisation takes responsibility for the impacts of its decisions and of its duties with regard to the sustainable development of its activities. We are proud of our certification which recognises our commitments to the well-being of our staff, our respect for the environment and product quality.

**Diager Industrie solutions come with the additional benefits of comprehensive support and optimal technical follow-up. Our teams are ready to work with you to ensure your success.**



# MATERIALS



THERMOSETTING  
PLASTICS

## THERMOSETTING PLASTICS

(PUR, Epoxy, DAP, PI, PF)



THERMO-  
PLASTICS

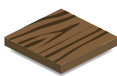
## THERMOPLASTICS

(PMMA, PE, PP, ABS, PC,  
POM, PET, PEEK, PS, PA)



EXPANDED  
PVC

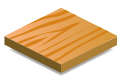
## EXPANDED PVC



HARD  
WOOD

## HARDWOODS

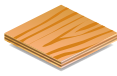
(Oak, beech, chestnut, elm, acacia, etc.)



SOFT  
WOOD

## SOFTWOODS

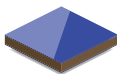
(Pine, birch, larch, spruce, etc.)



COMPOSITE  
WOODS

## COMPOSITE WOOD PRODUCTS

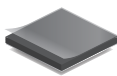
(MDF, melamine, plywood, etc.)



HIGH PRESSURE  
LAMINATES

## COMPACT LAMINATES

(TRESPA®, FunderMAX®, ...)



PHENOLIC  
MATERIALS

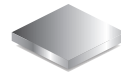
## PHENOLIC MATERIALS



NON-FERROUS  
MATERIALS

## NON-FERROUS METALS

(Aluminium, brass)



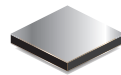
STEEL

## STEEL



STAINLESS  
STEEL

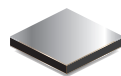
## STAINLESS STEEL



ALUMINUM LAYERS  
COMPOSITE PANELS

## ALUMINIUM-FACED COMPOSITE PANELS

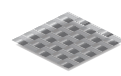
(Dibond®, Alucobond®)



STEEL LAYERS  
COMPOSITE PANELS

## STEEL-FACED COMPOSITE PANELS

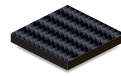
(Steelbond®)



GLASS FIBER  
REINFORCED PLASTICS

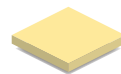
## GLASS-FILLED PLASTICS

(<40% glass fibres)



KEVLAR

## KEVLAR



FOAM

## FOAMED MATERIALS



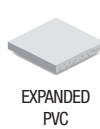
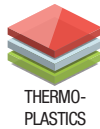
# APPLICATIONS

**IN-STORE  
ADVERTISING  
SIGNAGE  
FACADES  
JOINERY ITEMS  
ACCESSORIES  
STANDS**

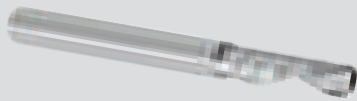


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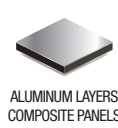
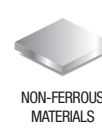
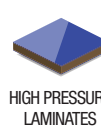
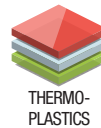
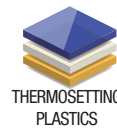
## 4013 ONE-FLUTE UPCUT CUTTERS P. 10



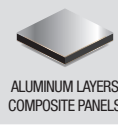
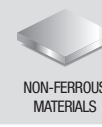
## 4012 ONE-FLUTE DOWNCUT CUTTERS P. 11



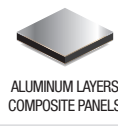
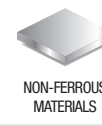
## 4053 ONE-FLUTE, HIGH-EFFICIENCY CUTTERS P. 13



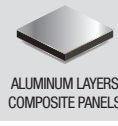
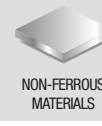
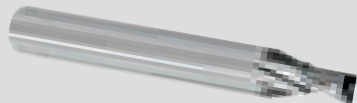
## 4023 ONE-FLUTE UPCUT CUTTERS FOR ALUMINIUM P. 14



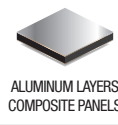
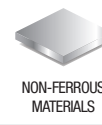
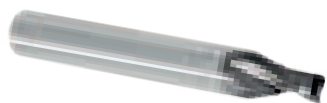
## 4022 ONE-FLUTE DOWNCUT CUTTERS FOR ALUMINIUM P. 15



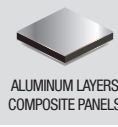
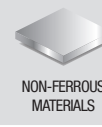
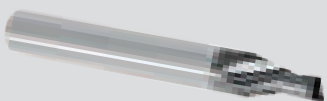
## 4001 SHORT ONE-FLUTE CUTTER FOR ALUMINIUM P. 16



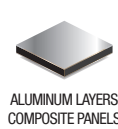
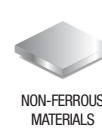
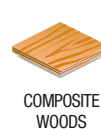
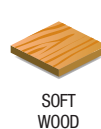
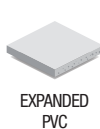
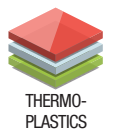
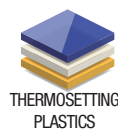
## 4001X SHORT, COATED ONE-FLUTE UPCUT CUTTER FOR ALUMINIUM P. 17



## 4002 SHORT, COATED ONE-FLUTE DOWNCUT CUTTER FOR ALUMINIUM P. 18



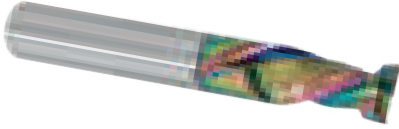
## 4202 ONE-FLUTE CUTTERS WITH CHAMFER FOR PLASTICS P. 20



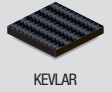
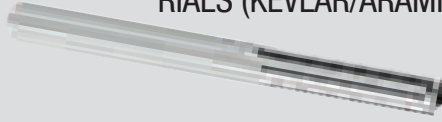
4203	ONE-FLUTE CUTTERS WITH CHAMFER FOR ALUMINIUM	   <p>NON-FERROUS MATERIALS ALUMINUM LAYERS COMPOSITE PANELS</p>
4015	TWO-FLUTE UPCUT CUTTERS	      <p>EXPANDED PVC HARD WOOD SOFT WOOD COMPOSITE WOODS FOAM</p>
4014	TWO-FLUTE DOWNCUT CUTTERS	      <p>EXPANDED PVC HARD WOOD SOFT WOOD COMPOSITE WOODS FOAM</p>
4120	STRAIGHT, TWO-FLUTE CUTTERS	     <p>EXPANDED PVC HARD WOOD SOFT WOOD COMPOSITE WOODS</p>
4003	TWO-FLUTE SLOT-CUTTING CUTTERS FOR NON-FERROUS METALS	  <p>NON-FERROUS MATERIALS</p>
2350 2350X	TWO-FLUTE CUTTERS FOR STEEL	   <p>STEEL STAINLESS STEEL</p>
2352X	COATED, THREE-FLUTE CUTTERS FOR STEEL	    <p>STEEL LAYERS COMPOSITE PANELS STEEL STAINLESS STEEL</p>
4050	THREE-FLUTE CUTTERS FOR HPL	   <p>HIGH PRESSURE LAMINATES PHENOLIC MATERIALS</p>
4060	THREE-FLUTE CUTTERS FOR FOAMED MATERIALS AND WOOD	     <p>FOAM HARD WOOD SOFT WOOD COMPOSITE WOODS</p>

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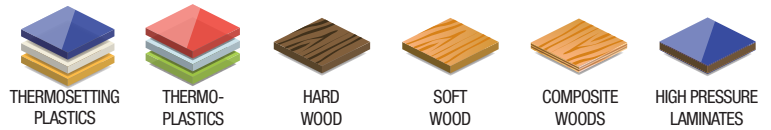
4030 WOODSPEED - COATED COMPRESSION CUTTERS P. 30



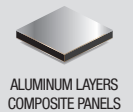
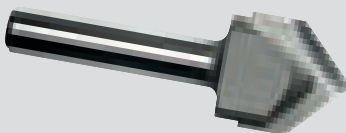
4100 TWO-FLUTE CUTTERS FOR CUTTING PROFILES AND SLOTS IN FIBROUS MATERIALS (KEVLAR/ARAMIDE) P. 31



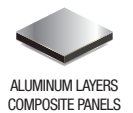
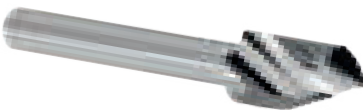
2344 SPHERICAL, TWO-FLUTE CUTTERS P. 32



4040 CUTTERS FOR SLOT CUTTING - FOLDING P. 33



4041 CONICAL, ONE-FLUTE CUTTERS FOR CUTTING SLOTS - FOLDING P. 34



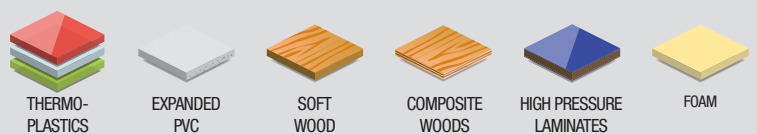
4044 CUTTERS FOR SLOT CUTTING - FOLDING - CHAMFERING P. 35



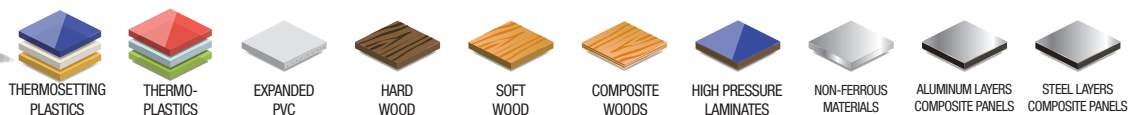
4042 CUTTERS FOR SLOT CUTTING - CHAMFERING P. 36



4043 CUTTERS FOR SLOT CUTTING - CHAMFERING P. 37



4070 CONICAL ENGRAVING CUTTERS P. 38





4080 FACE MILLING CUTTERS

P. 39



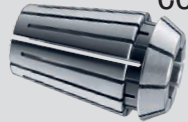
4110 SLITTING SAW CUTTERS ON A SHANK

P. 40



COLLETS

P. 42



CUTTING CONDITIONS

P. 44

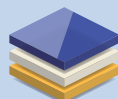
IMPACT OF COLLETS ON CUTTING QUALITY  
 ADVICE ABOUT MACHINING.  
 DEPTH OF CUT AND MACHINING DIRECTION

P. 45

# FAMILY 4013

# ONE-FLUTE UPCUT CUTTERS

## MATERIALS:



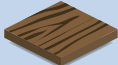
THERMOSETTING  
PLASTICS



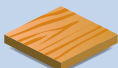
THERMO-  
PLASTICS



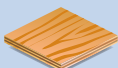
EXPANDED  
PVC



HARD  
WOOD



SOFT  
WOOD

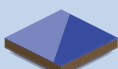


COMPOSITE  
WOODS

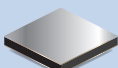


FOAM

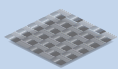
## Possible uses:



HIGH PRESSURE  
LAMINATES



ALUMINUM LAYERS  
COMPOSITE PANELS



GLASS FIBER  
REINFORCED PLASTICS

\*Strengthened shank

## THE MOST VERSATILE RANGE

SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

UPCUT TOOL, UPWARDS CHIP REMOVAL:

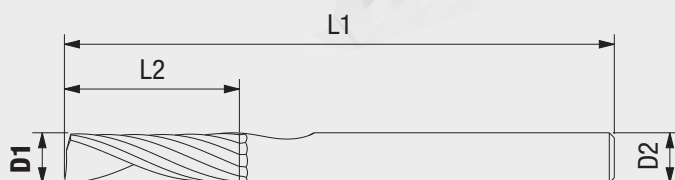
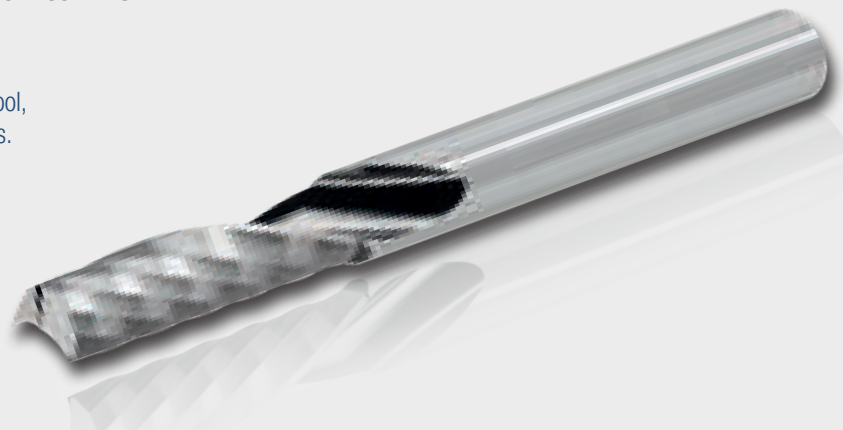
Chips evacuated efficiently.

The most commonly used.

## WHEN POSSIBLE, SELECT SHORT CUTTERS

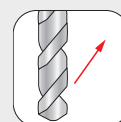
(CUTTING LENGTH = 2 X Ø):

- Improves surface finishes,
- Longer service life of the tool,
- Improves cutting conditions.



Carbide

SOLID  
CARBIDE



UPCUT  
TOOL



MILLING /  
SLOTTING

Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
1	3*	4	30	1	4013--0100
1.5	3*	6	30	1	4013--0150
2	2	4	30	1	4013--0200
2	6*	4	50	1	4013--0200A
2	2	8	30	1	4013--0200B
2	2	8	60	1	4013--0200C
2	3*	8	30	1	4013--0200D
2	6*	8	50	1	4013--0200E
2.5	2.5	8	40	1	4013--0250
2.5	2.5	8	60	1	4013--0250A
3	3	6	40	1	4013--0300
3	6*	6	50	1	4013--0300A
3	3	10	40	1	4013--0300B
3	3	10	60	1	4013--0300C
3	6*	10	50	1	4013--0300D
3	3	12	40	1	4013--0300E
3	6*	12	50	1	4013--0300F
3	3	15	40	1	4013--0300G
3	3	20	60	1	4013--0300H
3	6*	20	60	1	4013--0300J
3.17	3.17	12.7	50.8	1	4013--0317
3.17	6.35*	12.7	50.8	1	4013--0317A
4	4	8	50	1	4013--0400
4	6*	8	50	1	4013--0400A
4	4	12	50	1	4013--0400B
4	6*	12	50	1	4013--0400C
4	4	14	50	1	4013--0400D
4	6*	14	50	1	4013--0400E

Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
4	4	22	60	1	4013--0400F
4	6*	22	60	1	4013--0400G
4	4	30	70	1	4013--0400H
4.76	4.76	15.87	50.8	1	4013--0476
4.76	6.35*	15.87	50.8	1	4013--0476A
4.76	6.35*	31.75	76.2	1	4013--0476B
5	5	16	60	1	4013--0500
5	6*	16	50	1	4013--0500A
5	5	22	60	1	4013--0500B
5	6*	22	60	1	4013--0500C
5	5	30	70	1	4013--0500D
6	6	14	50	1	4013--0600
6	6	22	60	1	4013--0600A
6	6	32	70	1	4013--0600B
6	6	38	80	1	4013--0600C
6.35	6.35	19.05	50.8	1	4013--0635
6.35	6.35	28.57	76.2	1	4013--0635A
6.35	6.35	38.1	76.2	1	4013--0635B
8	8	22	60	1	4013--0800
8	8	32	70	1	4013--0800A
8	8	38	80	1	4013--0800B
8	8	42	80	1	4013--0800C
10	10	32	75	1	4013--1000
10	10	45	85	1	4013--1000A
12	12	32	75	1	4013--1200
12	12	42	100	1	4013--1200A
12	12	52	105	1	4013--1200B
14	14	62	120	1	4013--1400

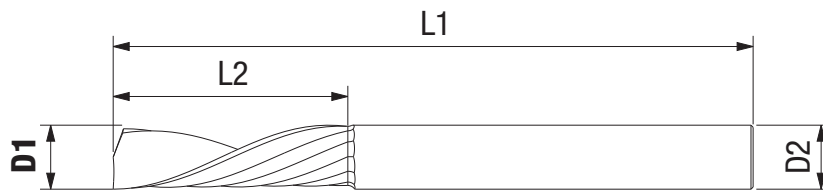
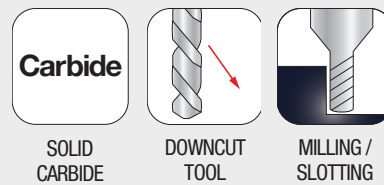
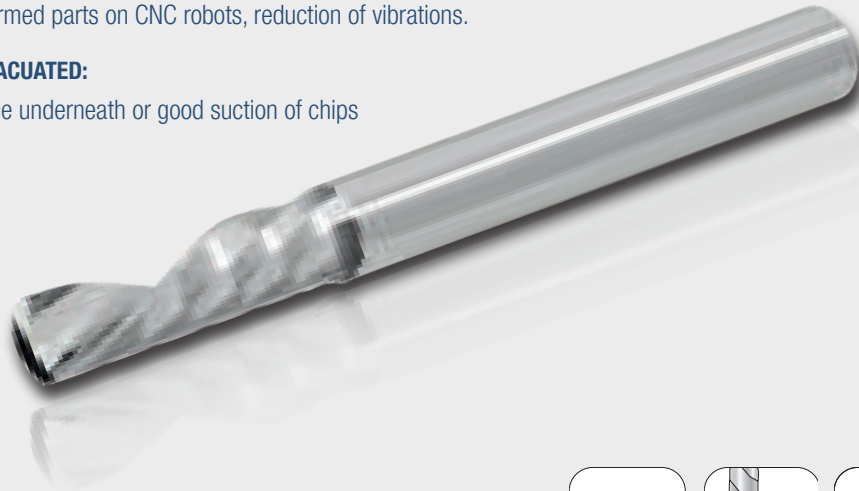
## VERSATILE RANGE

SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS  
 DOWNCUT TOOL, DOWNWARDS REMOVAL OF CHIPS

- Workpieces held better due to the downwards force.
- Limits the delamination of the upper face,
- Suited to thin materials,
- Milling thermoformed parts on CNC robots, reduction of vibrations.

### CHIPS POORLY EVACUATED:

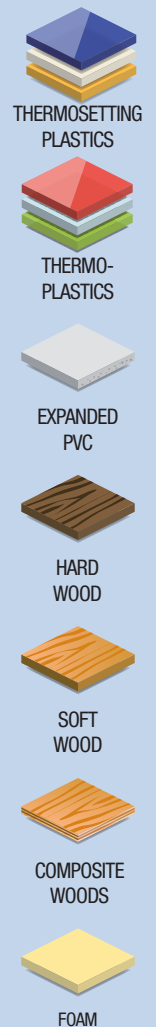
Provide clear space underneath or good suction of chips



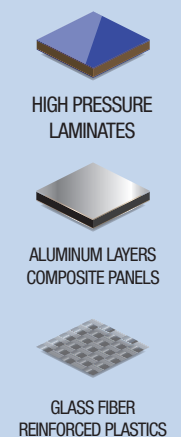
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.	Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Article
1	3*	4	30	1	4012--0100	4	4	20	60	1	4012--0400B
1.5	3*	6	30	1	4012--0150	4	4	30	70	1	4012--0400C
2	2	8	30	1	4012--0200	4.76	6.35*	15.87	50.8	1	4012--0476
2	2	8	60	1	4012--0200A	5	5	16	60	1	4012--0500
2	3*	8	30	1	4012--0200B	5	6*	16	50	1	4012--0500A
2	6*	8	50	1	4012--0200C	5	5	30	70	1	4012--0500B
2.5	2.5	8	40	1	4012--0250	6	6	20	60	1	4012--0600
2.5	2.5	8	60	1	4012--0250A	6	6	30	70	1	4012--0600A
3	3	10	40	1	4012--0300	6	6	38	80	1	4012--0600B
3	3	10	60	1	4012--0300A	6.35	6.35	19.05	50.8	1	4012--0635
3	6*	10	50	1	4012--0300B	8	8	22	60	1	4012--0800
3.17	6.35*	12.7	50.8	1	4012--0317	8	8	38	80	1	4012--0800A
4	4	12	50	1	4012--0400	10	10	30	75	1	4012--1000
4	6*	12	50	1	4012--0400A	12	12	30	75	1	4012--1200

\*Strengthened shank

## MATERIALS:



## Possible uses:





# ONE-FLUTE, HIGH-EFFICIENCY CUTTERS

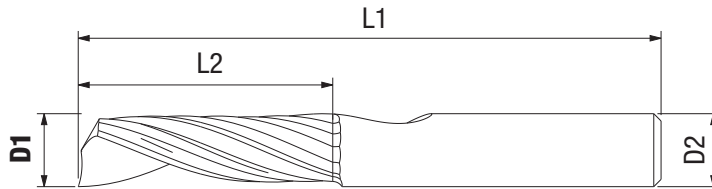
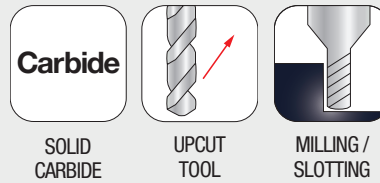
# FAMILY 4053

**THIS RANGE'S GEOMETRY HAS BEEN SPECIALLY DEVELOPED TO PRODUCE A BETTER SURFACE FINISH IN PMMA, POLYCARBONATE, PA6, CORIAN AND COMPACT LAMINATES.**  
SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS.  
UPCUT TOOL, UPWARDS REMOVAL OF CHIPS  
MORE RESISTANT TO ABRASION.

**WHEN POSSIBLE, SELECT SHORT CUTTERS**

**(CUTTING LENGTH = 2 X Ø):**

- Improves surface finishes,
- Longer service life of the tool,
- Improves cutting conditions.

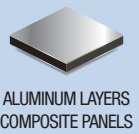
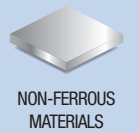
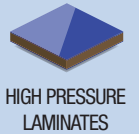
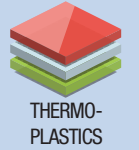
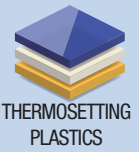


Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
2	3*	4	30	1	4053--0200
2	6*	4	50	1	4053--0200A
2	6*	6	50	1	4053--0200B
2	3*	8	30	1	4053--0200C
3	3	6	40	1	4053--0300
3	6*	6	50	1	4053--0300A
3	3	9	40	1	4053--0300B
3	6*	9	50	1	4053--0300C
4	4	8	50	1	4053--0400
4	6*	8	50	1	4053--0400A
4	4	13	50	1	4053--0400B
4	6*	13	50	1	4053--0400C
4.76	4.76	12.7	50.8	1	4053--0476

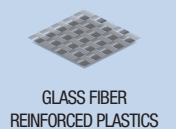
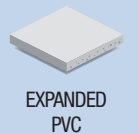
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
5	5	16	60	1	4053--0500
5	6*	16	50	1	4053--0500A
6	6	16	50	1	4053--0600
6	6	22	60	1	4053--0600A
6	6	32	70	1	4053--0600B
6.35	6.35	15.87	50.8	1	4053--0635
8	8	22	60	1	4053--0800
8	8	32	70	1	4053--0800A
9.52	9.52	25.4	60.3	1	4053--0952
10	10	23	60	1	4053--1000
10	10	32	75	1	4053--1000A
12	12	42	100	1	4053--1200

\*Strengthened shank

## MATERIALS:



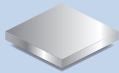
## Possible uses:



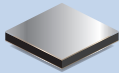
# FAMILY 4023

# ONE-FLUTE UPCUT CUTTERS FOR ALUMINIUM

## MATERIALS:



NON-FERROUS  
MATERIALS



ALUMINUM LAYERS  
COMPOSITE PANELS

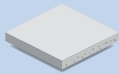
## Possible uses:



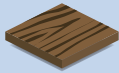
THERMOSETTING  
PLASTICS



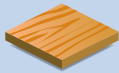
THERMO-  
PLASTICS



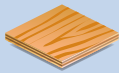
EXPANDED  
PVC



HARD  
WOOD



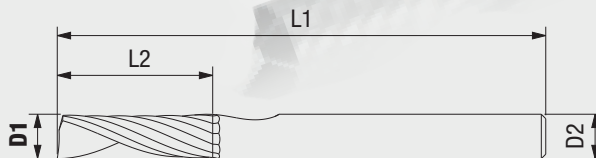
SOFT  
WOOD



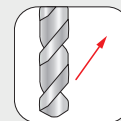
COMPOSITE  
WOODS

**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.)**  
SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS  
UPCUT TOOL, UPWARDS REMOVAL OF CHIPS.

Uncoated cutter, lubrication recommended.



SOLID  
CARBIDE



UPCUT  
TOOL



MILLING /  
SLOTTING



USE  
COOLANT

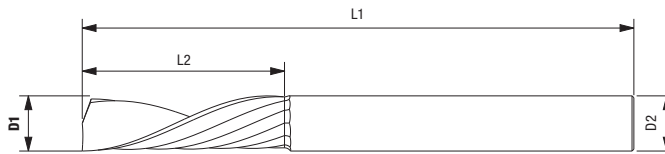
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.	Standard coating	Upgraded coating
1.5	3*	4	30	1	4023--0150	4023-X0150	4023-NHC0150
2	3*	5	30	1	4023--0200	4023-X0200	4023-NHC0200
2.5	3*	6	30	1	4023--0250	4023-X0250	4023-NHC0250
3	3	8	40	1	4023--0300	4023-X0300	4023-NHC0300
3.17	3.17	7.93	38.1	1	4023--0317	4023-X0317	4023-NHC0317
3.17	6.35*	7.93	50.8	1	4023--0317A	4023-X0317A	4023-NHC0317A
4	6*	10	50	1	4023--0400	4023-X0400	4023-NHC0400
4	4	12	60	1	4023--0400A	4023-X0400A	4023-NHC0400A
4	4	20	60	1	4023--0400B	4023-X0400B	4023-NHC0400B
4	4	30	70	1	4023--0400C	4023-X0400C	4023-NHC0400C
4.76	4.76	12.7	50.8	1	4023--0476	4023-X0476	4023-NHC0476
4.76	6.35*	12.7	50.8	1	4023--0476A	4023-X0476A	4023-NHC0476A
5	6*	12	50	1	4023--0500	4023-X0500	4023-NHC0500
5	5	16	60	1	4023--0500A	4023-X0500A	4023-NHC0500A
5	8*	25	70	1	4023--0500B	4023-X0500B	4023-NHC0500B
5	5	30	70	1	4023--0500C	4023-X0500C	4023-NHC0500C
5	8*	35	80	1	4023--0500D	4023-X0500D	4023-NHC0500D
6	6	15	50	1	4023--0600	4023-X0600	4023-NHC0600
6	6	15	70	1	4023--0600A	4023-X0600A	4023-NHC0600A
6	6	20	60	1	4023--0600B	4023-X0600B	4023-NHC0600B
6	6	30	70	1	4023--0600C	4023-X0600C	4023-NHC0600C
6	8*	30	80	1	4023--0600D	4023-X0600D	4023-NHC0600D
6	6	38	80	1	4023--0600E	4023-X0600E	4023-NHC0600E
6.35	6.35	15.87	50.8	1	4023--0635	4023-X0635	4023-NHC0635
8	8	20	60	1	4023--0800	4023-X0800	4023-NHC0800
8	8	20	80	1	4023--0800A	4023-X0800A	4023-NHC0800A
8	8	38	80	1	4023--0800B	4023-X0800B	4023-NHC0800B
10	10	23	60	1	4023--1000	4023-X1000	4023-NHC1000
10	10	23	100	1	4023--1000A	4023-X1000A	4023-NHC1000A
10	10	30	75	1	4023--1000B	4023-X1000B	4023-NHC1000B

\* Strengthened shank

**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.)**  
**SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS**  
**DOWNCUT TOOL, DOWNWARDS REMOVAL OF CHIPS**

- Workpieces held better due to the downwards force.
- Limits the delamination of the upper face.
- Suited to thin materials.
- Milling thermoformed parts on CNC robots, reduction of vibrations.

Uncoated cutter, lubrication recommended.



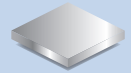
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.	Standard coating	Upgraded coating
1.5	3*	4	30	1	4022--0150	4022-X0150	4022-NHC0150
2	3*	5	30	1	4022--0200	4022-X0200	4022-NHC0200
2.5	3*	6	30	1	4022--0250	4022-X0250	4022-NHC0250
3	3	8	40	1	4022--0300	4022-X0300	4022-NHC0300
3.17	6.35*	7.93	50.8	1	4022--0317	4022-X0317	4022-NHC0317
4	6*	10	50	1	4022--0400	4022-X0400	4022-NHC0400
4	4	12	60	1	4022--0400A	4022-X0400A	4022-NHC0400A
4.76	6.35*	12.7	50.8	1	4022--0476A	4022-X0476A	4022-NHC0476A
5	6*	12	50	1	4022--0500a	4022-X0500	4022-NHC0500
5	5	16	60	1	4022--0500A	4022-X0500A	4022-NHC0500A
6	6	15	60	1	4022--0600	4022-X0600	4022-NHC0600
6.35	6.35	15.87	50.8	1	4022--0635	4022-X0635	4022-NHC0635
8	8	20	60	1	4022--0800	4022-X0800	4022-NHC0800
10	10	23	60	1	4022--1000	4022-X1000	4022-NHC1000

\*Strengthened shank

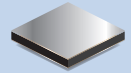
**FOR THE 4022 AND 4023 CUTTERS, THE TWO COATED VERSIONS ARE SUITED TO MACHINING WITHOUT LUBRICATION.**

**THE UPGRADED COATING OFFERS GREATER RESISTANCE TO ABRASION**

## MATERIALS:

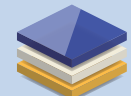


NON-FERROUS  
MATERIALS

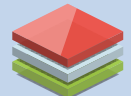


ALUMINUM LAYERS  
COMPOSITE PANELS

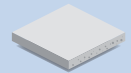
## Possible uses:



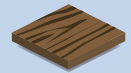
THERMOSETTING  
PLASTICS



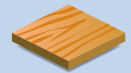
THERMO-  
PLASTICS



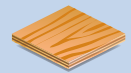
EXPANDED  
PVC



HARD  
WOOD



SOFT  
WOOD

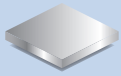


COMPOSITE  
WOODS

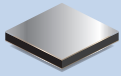
# FAMILY 4001

# SHORT ONE-FLUTE CUTTER FOR ALUMINUM

## MATERIALS:

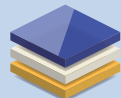


NON-FERROUS  
MATERIALS



ALUMINUM LAYERS  
COMPOSITE PANELS

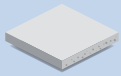
## Possible uses:



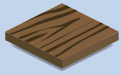
THERMOSETTING  
PLASTICS



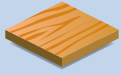
THERMO-  
PLASTICS



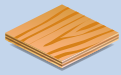
EXPANDED  
PVC



HARD  
WOOD



SOFT  
WOOD



COMPOSITE  
WOODS

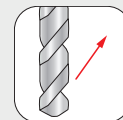
**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.)**  
**PARTICULARLY RECOMMENDED FOR DIBOND® TYPE TAC AND ACM**  
**SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS**  
**UPCUT TOOL, UPWARDS REMOVAL OF CHIPS. STUB CUTTER SERIES, HIGH RIGIDITY**

- Improves surface finishes,
- Longer service life of the tool,
- Improves cutting conditions.

Uncoated cutter, lubrication recommended



SOLID  
CARBIDE



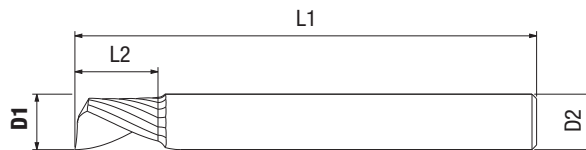
UPCUT  
TOOL



MILLING /  
SLOTTING



USE  
COOLANT



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
3	3	4.5	40	1	4001--0300
3	6*	4.5	50	1	4001--0300A
4	4	6	50	1	4001--0400
4	6*	6	50	1	4001--0400A
5	5	7.5	50	1	4001--0500
5	6*	7.5	50	1	4001--0500A
6	6	9	50	1	4001--0600
8	8	12	60	1	4001--0800
10	10	15	65	1	4001--1000
12	12	18	65	1	4001--1200

\* Strengthened shank



# SHORT, COATED ONE-FLUTE UPCUT CUTTER FOR ALUMINUM


# FAMILY 4001 X

**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.)**  
 PARTICULARLY RECOMMENDED FOR DIBOND® TYPE ACM AND TAG  
 SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS  
 UPCUT TOOL, UPWARDS REMOVAL OF CHIPS.

### STUB CUTTER SERIES, HIGH RIGIDITY

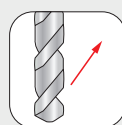
- Improves surface finishes,
- Longer service life of the tool,
- Improves cutting conditions.





**Carbide**

SOLID CARBIDE



UPCUT TOOL




MILLING /  
SLOTTING

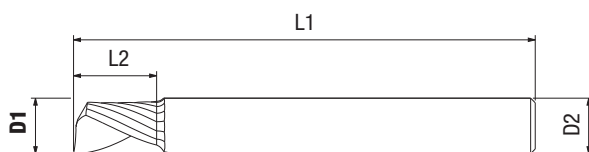


**Coated**

COATED TOOL



DRY CUTTING

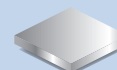


Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.	Upgraded coating
2	6*	3	50	1	4001-X0200	4001-NHC0200
3	3	4.5	40	1	4001-X0300	4001-NHC0300
3	6*	4.5	50	1	4001-X0300A	4001-NHC0300A
4	4	6	50	1	4001-X0400	4001-NHC0400
4	6*	6	50	1	4001-X0400A	4001-NHC0400A
5	5	7.5	50	1	4001-X0500	4001-NHC0500
5	6*	7.5	50	1	4001-X0500A	4001-NHC0500A
6	6	9	50	1	4001-X0600	4001-NHC0600
8	8	12	60	1	4001-X0800	4001-NHC0800
10	10	15	65	1	4001-X1000	4001-NHC1000
12	12	18	65	1	4001-X1200	4001-NHC1200

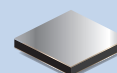
\* Strengthened shank

**THE UPGRADED COATING OFFERS GREATER RESISTANCE TO ABRASION.**

### MATERIALS:

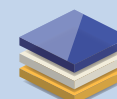


NON-FERROUS MATERIALS



ALUMINUM LAYERS  
COMPOSITE PANELS

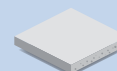
### Possible uses:



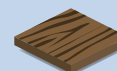
THERMOSETTING PLASTICS



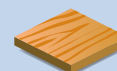
THERMO-PLASTICS



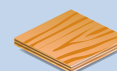
EXPANDED PVC



HARD WOOD



SOFT WOOD

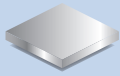


COMPOSITE WOODS

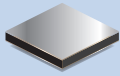
# FAMILY 4002

# SHORT, COATED ONE-FLUTE DOWNCUT CUTTER FOR ALUMINUM

## MATERIALS:



NON-FERROUS  
MATERIALS



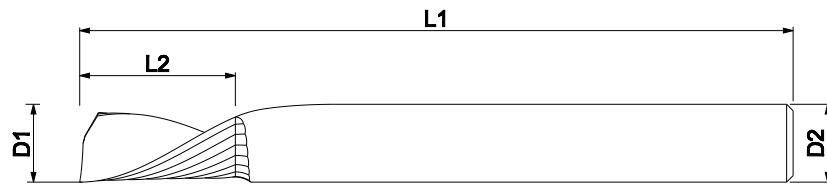
ALUMINUM LAYERS  
COMPOSITE PANELS

**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.)**

**PARTICULARLY RECOMMENDED FOR DIBOND® TYPE TAC AND ACM**

**SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS**

Coated cutter, for use without lubrication,



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
2	3*	3	30	1	4002-X0200
3	6*	4.5	50	1	4002-X0300
4	6*	6	50	1	4002-X0400

\* Strengthened shank

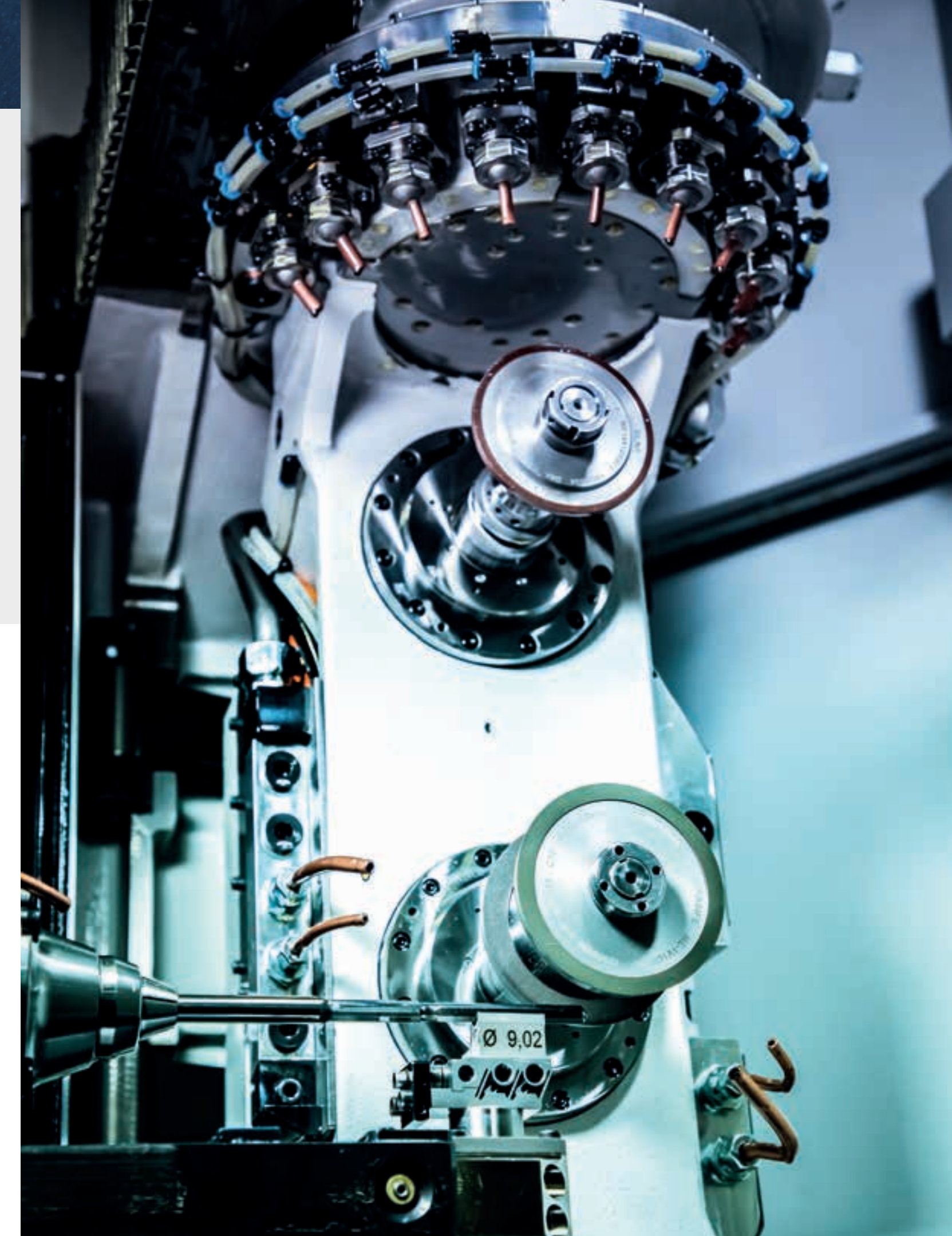
### DOWNCUT TOOL, DOWNWARDS REMOVAL OF CHIPS

Workpieces held better due to the downwards force.

- Limits the delamination of the upper face.
- Suited to thin materials.

### SHORT CUTTER SERIES, HIGH RIGIDITY

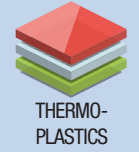
- Improves surface finishes.
- Improves service life.
- Improves cutting conditions.



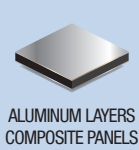
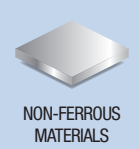
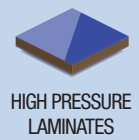
# FAMILY 4202

# ONE-FLUTE CUTTERS WITH CHAMFER FOR PLASTICS

## MATERIALS:



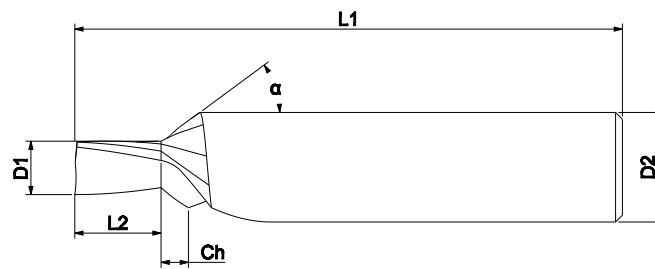
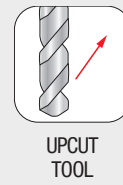
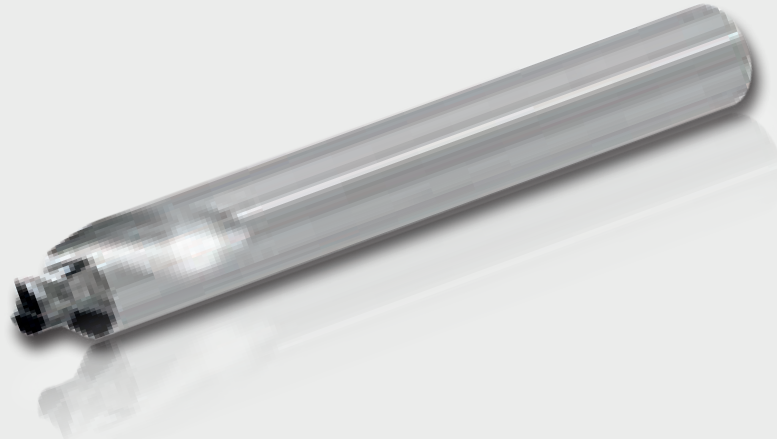
## Possible uses:



## RANGE SPECIFICALLY FOR PLASTICS

CUTS OUT AND CHAMFERS THE MATERIAL AS A SINGLE OPERATION

CAUTION: Ensure that the material is flat!



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Ch mm	α °	z	Part Ref.
4	8*	4.3	60	2	45°	1	4202--0400A
4	8*	6.3	60	2	45°	1	4202--0400B

\*Strengthened shank

# ONE-FLUTE CUTTER WITH CHAMFER FOR ALUMINIUM

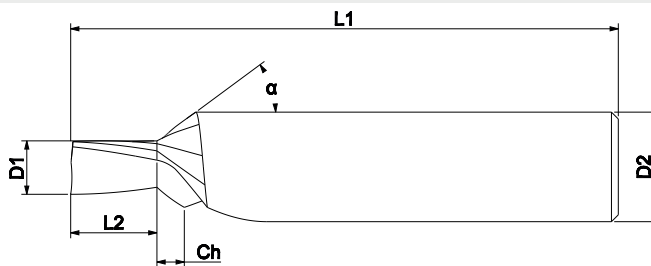
## FAMILY 4203

**RANGE SPECIFICALLY FOR NON-FERROUS METALS (ALUMINIUM, BRASS, COPPER, ETC.).  
ALSO RECOMMENDED FOR DIBOND® TYPE TAG AND ACM  
CUTS OUT AND CHAMFERS THE MATERIAL AS A SINGLE OPERATION.**

CAUTION: ensure that the material is flat!

Uncoated cutter; lubrication is strongly recommended when used on aluminium.

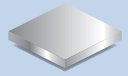
Coating on demand.



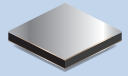
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Ch mm	α °	z	Part Ref.
4	6*	1.9	50	1	45°	1	4203--0400A
4	6*	2.3	50	1	45°	1	4203--0400B
4	6*	2.9	50	1	45°	1	4203--0400C
4	6*	3.3	50	1	45°	1	4203--0400D

\*Strengthened shank

### MATERIALS:

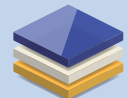


NON-FERROUS  
MATERIALS



ALUMINUM LAYERS  
COMPOSITE PANELS

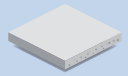
### Possible uses:



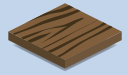
THERMOSETTING  
PLASTICS



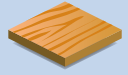
THERMO-  
PLASTICS



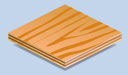
EXPANDED  
PVC



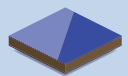
HARD  
WOOD



SOFT  
WOOD



COMPOSITE  
WOODS

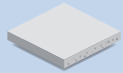


HIGH PRESSURE  
LAMINATES

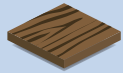
# FAMILY 4015

# TWO-FLUTE UPCUT CUTTERS

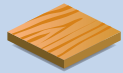
## MATERIALS:



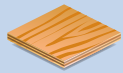
EXPANDED  
PVC



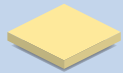
HARD  
WOOD



SOFT  
WOOD

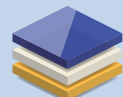


COMPOSITE  
WOODS



FOAM

## Possible uses:



THERMOSETTING  
PLASTICS



THERMO-  
PLASTICS

## CUTTERS DERIVED FROM THE 4013 BUT WITH TWO TEETH

SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

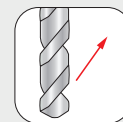
Improves the surface finish when used on foamed materials and woods compared with a one-flute cutter.

UPCUT TOOL, UPWARDS REMOVAL OF CHIPS.



Carbide

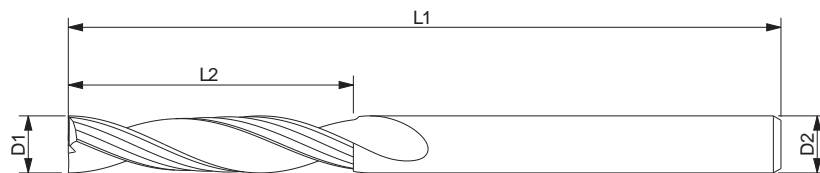
SOLID  
CARBIDE



UPCUT  
TOOL



MILLING /  
SLOTING



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
3	3	10	40	2	4015--0300
3	6*	10	50	2	4015--0300A
4	4	12	60	2	4015--0400
4	6*	12	50	2	4015--0400A
5	5	20	70	2	4015--0500
6	6	22	80	2	4015--0600
8	8	22	80	2	4015--0800
8	8	32	80	2	4015--0800A
10	10	32	75	2	4015--1000
10	10	42	85	2	4015--1000A
12	12	35	84	2	4015--1200

\* Strengthened shank

## CUTTERS DERIVED FROM THE 4012 BUT WITH TWO TEETH

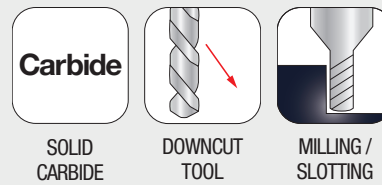
### SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

Improves the surface finish when used on foamed materials and woods compared with a one-flute cutter.

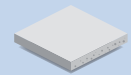
### DOWNCUT TOOL, DOWNWARDS REMOVAL OF CHIPS

Workpieces held better due to the downwards force.

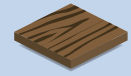
- Limits the delamination of the upper face.
- Suited to thin materials.



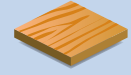
## MATERIALS:



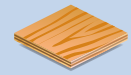
EXPANDED  
PVC



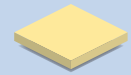
HARD  
WOOD



SOFT  
WOOD

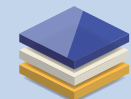


COMPOSITE  
WOODS

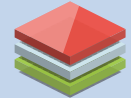


FOAM

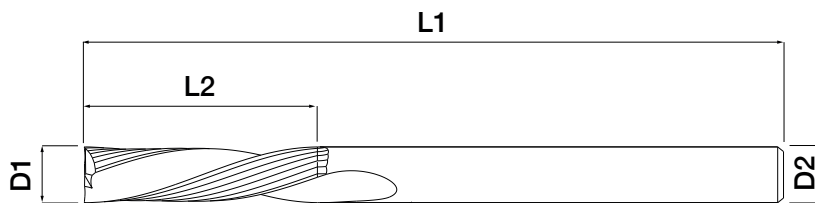
## Possible uses:



THERMOSETTING  
PLASTICS



THERMO-  
PLASTICS



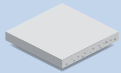
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
3	3	10	40	2	4014--0300
3	6*	10	50	2	4014--0300A
4	4	12	60	2	4014--0400
4	6*	12	50	2	4014--0400A
5	5	16	60	2	4014--0500
6	6	22	60	2	4014--0600
8	8	25	80	2	4014--0800

\*Strengthened shank

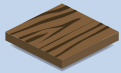
# FAMILY 4120

# STRAIGHT, TWO-FLUTE CUTTERS

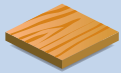
## MATERIALS:



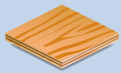
EXPANDED  
PVC



HARD  
WOOD

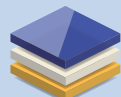


SOFT  
WOOD



COMPOSITE  
WOODS

## Possible uses:



THERMOSETTING  
PLASTICS

## STRAIGHT-FLUTED CUTTERS

### NO CHIP REMOVAL DIRECTION.

Used mainly for wood.

This cutter may also be used to produce a finished surface on certain thermoplastics, with a final cut of a few hundredths of a millimetre.



Carbide

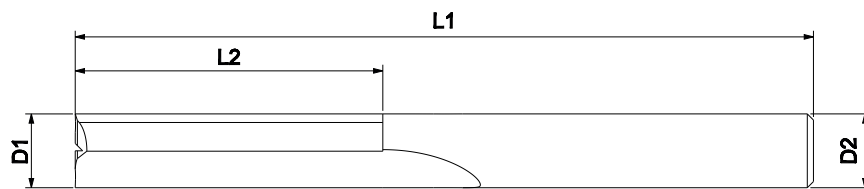
SOLID  
CARBIDE



STRAIGHT  
CUT



MILLING /  
SLOTTING



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
3	3	15	60	2	4120--0300
4	4	20	60	2	4120--0400
5	5	20	60	2	4120--0500
6	6	25	60	2	4120--0600
8	8	35	80	2	4120--0800

\*Strengthened shank



# TWO-FLUTE CUTTERS FOR CUTTING SLOTS IN NON-FERROUS METALS

## FAMILY 4003

### TWO-FLUTE CUTTERS FOR NON-FERROUS METALS WITH A SMALL PROTECTIVE CHAMFER

#### SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

Cuts slots in certain plastics, resins, compact laminates and Corian®.

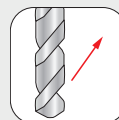
Improves surface finishes at the bottom of a pocket.

Coating on demand



**Carbide**

SOLID  
CARBIDE



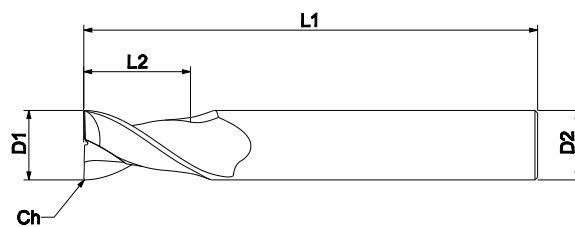
UPCUT  
TOOL



MILLING /  
SLOTTING



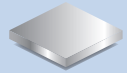
USE  
COOLANT



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Ch 45° mm	z	Part Ref.
3	6*	6	50	0.1	2	4003-0200
3	6*	7	50	0.1	2	4003-0300
4	6*	8	50	0.1	2	4003-0400
5	6*	10	50	0.2	2	4003-0500
6	6	10	50	0.2	2	4003-0600
8	8	15	60	0.2	2	4003-0800
10	10	18	60	0.25	2	4003-1000

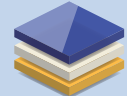
\*Strengthened shank

### MATERIALS:

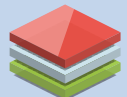


NON-FERROUS  
MATERIALS

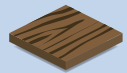
### Possible uses:



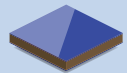
THERMOSETTING  
PLASTICS



THERMO-  
PLASTICS



HARD  
WOOD

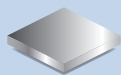


HIGH PRESSURE  
LAMINATES

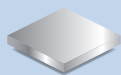
# FAMILY 2350

# TWO-FLUTE CUTTERS FOR STEEL

## MATERIALS:



STEEL

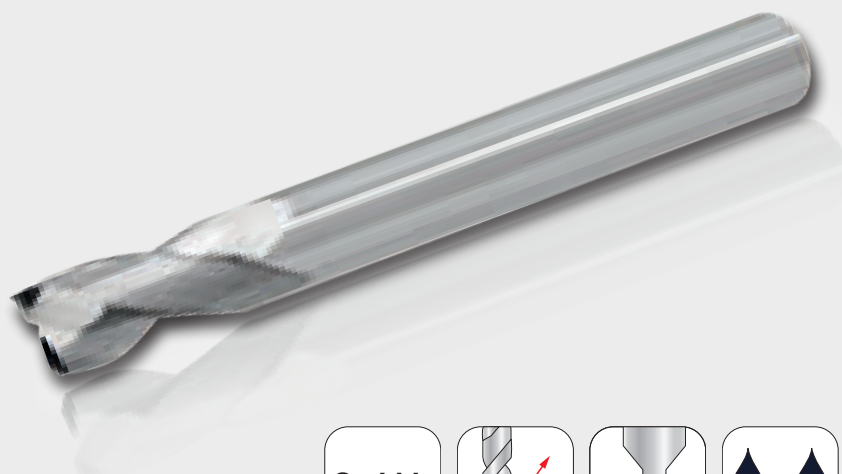


STAINLESS  
STEEL

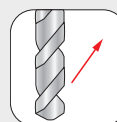
## TWO-FLUTE CUTTERS FOR MACHINING METALS

UNCOATED VERSION

COATED VERSION EXTENDS THE SERVICE LIFE



SOLID  
CARBIDE



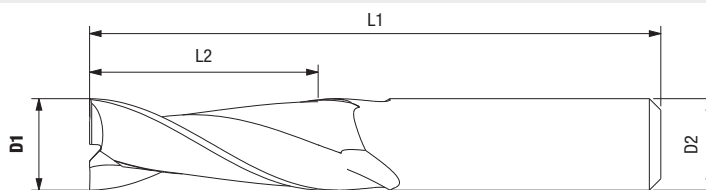
UPCUT  
TOOL



MILLING /  
SLOTTING



USE  
COOLANT



Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Z	Part Ref.	Coated with TIALNX
1	1	4	35	2	2350--0100	2350-X0100
1.5	1.5	4	35	2	2350--0150	2350-X0150
2	2	8	35	2	2350--0200	2350-X0200
2.5	2.5	8	38	2	2350--0250	2350-X0250
3	3	8	38	2	2350--0300	2350-X0300
3.5	3.5	10	43	2	2350--0350	2350-X0350
4	4	11	43	2	2350--0400	2350-X0400
4.5	4.5	13	47	2	2350--0450	2350-X0450
5	5	13	47	2	2350--0500	2350-X0500
5.5	5.5	13	57	2	2350--0550	2350-X0550
6	6	13	57	2	2350--0600	2350-X0600
6.5	6.5	16	63	2	2350--0650	2350-X0650
7	7	16	63	2	2350--0700	2350-X0700
8	8	19	63	2	2350--0800	2350-X0800
9	9	19	72	2	2350--0900	2350-X0900
10	10	22	72	2	2350--1000	2350-X1000
12	12	22	76	2	2350--1200	2350-X1200
14	14	26	83	2	2350--1400	2350-X1400
16	16	32	89	2	2350--1600	2350-X1600
18	18	32	92	2	2350--1800	2350-X1800
20	20	38	101	2	2350--2000	2350-X2000

# COATED, THREE-FLUTE CUTTERS FOR STEEL

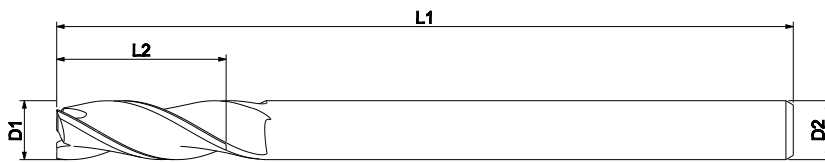
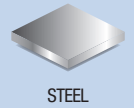
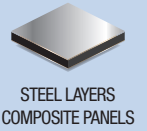
# FAMILY 2352 X

## COATED, THREE-FLUTE CUTTERS FOR MACHINING METALS

PARTICULARLY SUITED TO THE MACHINING OF STEEL-FACED COMPOSITE PANELS (SUCH AS STEELBOND® OR KÖMAS-TEEL®).



## MATERIALS:



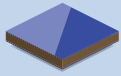
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Z	Part Ref.
1	1	4	35	3	2352-X0100
1.5	1.5	4	35	3	2352-X0150
2	2	8	35	3	2352-X0200
2.5	2.5	8	38	3	2352-X0250
3	3	8	38	3	2352-X0300
3.5	4*	10	43	3	2352-X0350
4	4	11	43	3	2352-X0400
4.5	5*	13	47	3	2352-X0450
5	5	13	47	3	2352-X0500
5.5	6*	13	57	3	2352-X0550
6	6	13	57	3	2352-X0600
6.5	8*	16	63	3	2352-X0650
7	8*	16	63	3	2352-X0700
8	8	19	63	3	2352-X0800
9	10*	19	72	3	2352-X0900
10	10	22	72	3	2352-X1000
12	12	22	76	3	2352-X1200
14	14	26	83	3	2352-X1400
16	16	32	89	3	2352-X1600
18	18	32	92	3	2352-X1800
20	20	38	101	3	2352-X2000

\*Strengthened shank

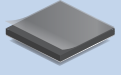
# FAMILY 4050

# THREE-FLUTE CUTTERS FOR HIGH-PRESSURE LAMINATES (HPL)

### MATERIALS:

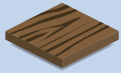


HIGH PRESSURE  
LAMINATES

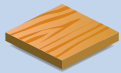


PHENOLIC  
MATERIALS

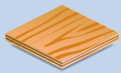
### Possible uses:



HARD  
WOOD



SOFT  
WOOD



COMPOSITE  
WOODS

### RANGE SPECIFICALLY FOR HPL (TRESPA®, FUNDERMAX®)

#### UPCUT TOOL, UPWARDS REMOVAL OF CHIPS

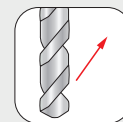
Chip breaker to improve ventilation and reduce heating.

Coating on demand.

The use of a coating extends the service life (consult us for details).



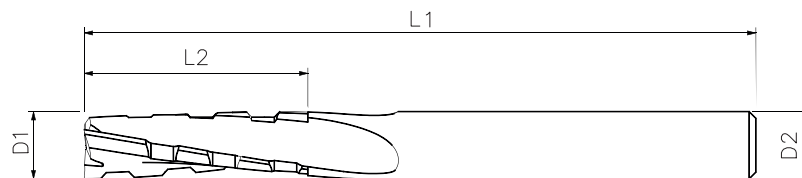
SOLID  
CARBIDE



UPCUT  
TOOL



MILLING /  
SLOTTING



Ø D1	Ø D2	L2	L1	z	Part Ref.
mm	mm	mm	mm		
6	6	15	60	3	4050--0600
8	8	12	60	3	4050--0800
8	8	20	70	3	4050--0800A
10	10	22	75	3	4050--1000
12	12	32	80	3	4050--1200

# THREE-FLUTE CUTTERS FOR FOAMED MATERIALS AND WOOD

## FAMILY 4060

### RANGE SPECIFICALLY FOR FOAMED MATERIALS AND WOOD

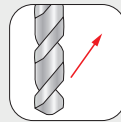
SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

Upcut tool, upwards removal of chips.



**Carbide**

SOLID CARBIDE

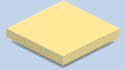


UPCUT TOOL

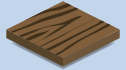


MILLING / SLOTTING

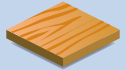
### MATERIALS:



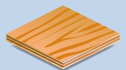
FOAM



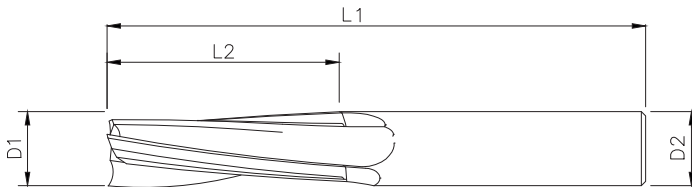
HARD WOOD



SOFT WOOD



COMPOSITE WOODS

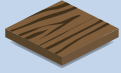


Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
6	6	25	80	3	4060--0600
8	8	25	85	3	4060--0800
10	10	35	85	3	4060--1000
12	12	45	100	3	4060--1200

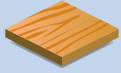
# FAMILY 4030

# WOODSPEED COATED COMPRESSION CUTTERS

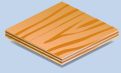
## MATERIALS:



HARD  
WOOD



SOFT  
WOOD



COMPOSITE  
WOODS

## COMPRESSION CUTTERS FOR THE CONTOUR MILLING OF WOODEN BOARDS

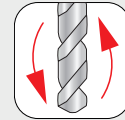
THE DOUBLE-HELIX CONFIGURATION - PRODUCING AN UPCUT AT THE TIP AND THEN A DOWNCUT - PREVENTS DELAMINATION OF THE TWO FACES OF THE MATERIAL

The cutting geometry allows high-speed machining and a perfect surface finish.

Long service life thanks to the specific carbide used and the coating.



SOLID  
CARBIDE



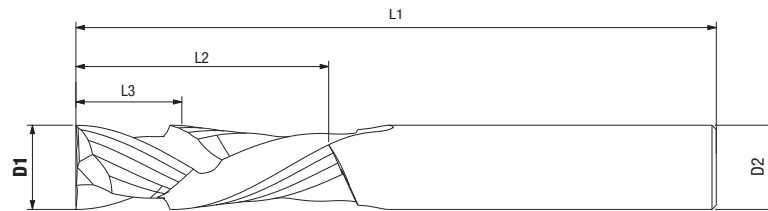
COMPRESSION



MILLING /  
SLOTTING



COATED  
TOOL



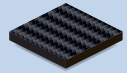
Ø D1 mm	Ø D2 mm	L2 mm	L3 mm	L1 mm	z	Part Ref.
6	6	14	4	60	1+1	4030--0600
6	6	22	4	60	1+1	4030--0600A
8	8	22	4	70	2+2	4030--0800
10	10	22	4	75	2+2	4030--1000
10	10	32	4	80	2+2	4030--1000A
12	12	32	8	80	2+2	4030--1200
12	12	42	12	100	2+2	4030--1200A

# TWO-FLUTE CUTTERS FOR CUTTING PROFILES AND SLOTS IN FIBROUS MATERIALS

## FAMILY 4100

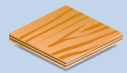
GEOMETRY SPECIALLY DESIGNED TO SHEAR FIBRES (KEVLAR / ARAMIDE, ETC.)  
ALSO PERFECTLY SUITED TO THIN PLYWOOD

MATERIALS:



KEVLAR

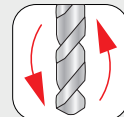
Possible uses:



COMPOSITE  
WOODS



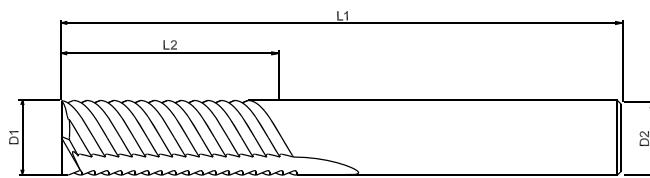
SOLID  
CARBIDE



COMPRESSION



MILLING /  
SLOTTING



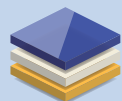
Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	Z	Part Ref.
3	3	12	60	2	4100--0300
3	6*	12	60	2	4100--0300A
4	4	15	60	2	4100--0400
4	6*	15	60	2	4100--0400A
6	6	25	75	2	4100--0600
6.35	6.35	25.4	76.2	2	4100--0635
8	8	25	75	2	4100--0800
10	10	25	75	2	4100--1000
12	12	25	75	2	4100--1200

\* Strengthened shank

# FAMILY 2344

# SPHERICAL, TWO-FLUTE CUTTERS

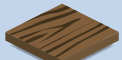
### MATERIALS:



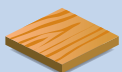
THERMOSETTING  
PLASTICS



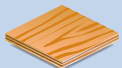
THERMO-  
PLASTICS



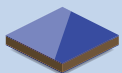
HARD  
WOOD



SOFT  
WOOD

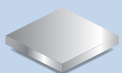


COMPOSITE  
WOODS

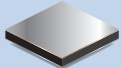


HIGH PRESSURE  
LAMINATES

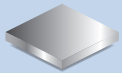
### Possible uses:



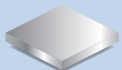
NON-FERROUS  
MATERIALS



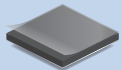
STEEL LAYERS  
COMPOSITE PANELS



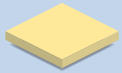
STEEL



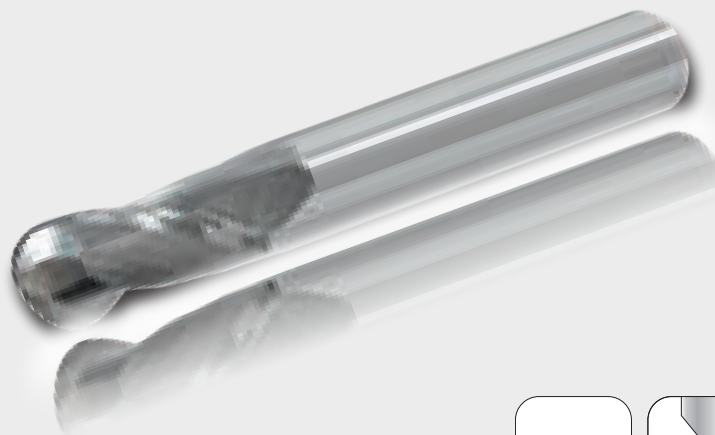
STAINLESS  
STEEL



PHENOLIC  
MATERIALS



FOAM



Carbide

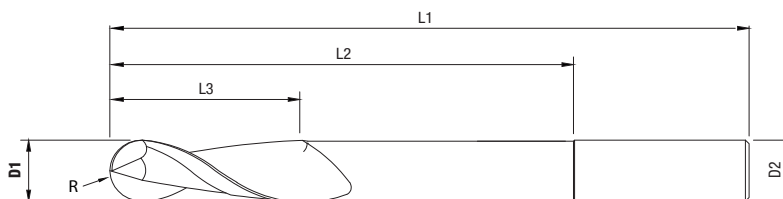
SOLID  
CARBIDE



MILLING /  
SLOTTING



FORM  
MILLING



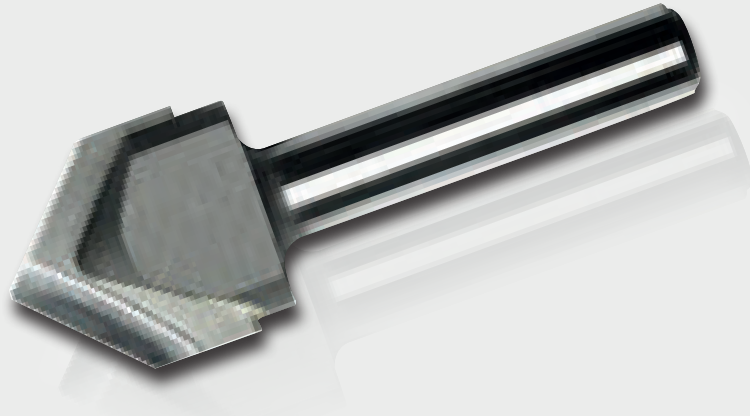
D1 mm	D2 mm	L2 mm	L1 mm	R mm	Z	Part Ref.
2	2	8	35	1	2	2344--0200
2.5	2.5	8	38	1.25	2	2344--0250
3	3	8	38	1.5	2	2344--0300
4	4	11	43	2	2	2344--0400
5	5	13	47	2.5	2	2344--0500
6	6	13	57	3	2	2344--0600
7	7	16	63	3.5	2	2344--0700
8	8	19	63	4	2	2344--0800
9	9	19	72	4.5	2	2344--0900
10	10	22	72	5	2	2344--1000
12	12	22	76	6	2	2344--1200
14	14	26	83	7	2	2344--1400
16	16	32	83	8	2	2344--1600



## CUTTERS FOR CUTTING SLOTS - FOLDING

SPECIALLY DESIGNED FOR ACM AND TAC ( DIBOND®, ALUCOBOND® )

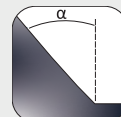
Coating on demand.



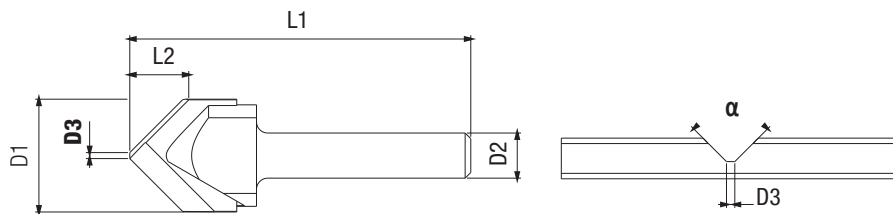
CARBIDE  
TIPPED  
STEEL BODY



MILLING /  
SLOTTING

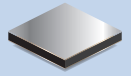


MILLING WITH  
CHAMFER



Ø D1 mm	Ø D2 mm	Ø D3 mm	L2 mm	L1 mm	α °	z	Part Ref.
20	8	3	8.5	60	90°	2	4040--090°
20	8	2	3.7	60	135°	2	4040--135°

## MATERIALS:

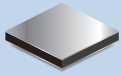


ALUMINUM LAYERS  
COMPOSITE PANELS

# FAMILY 4041

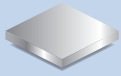
# CONICAL, ONE-FLUTE CUTTERS FOR CUTTING SLOTS - FOLDING

## MATERIALS:

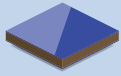


ALUMINUM LAYERS  
COMPOSITE PANELS

## Possible uses:



NON-FERROUS  
MATERIALS



HIGH PRESSURE  
LAMINATES

## CUTTERS FOR SLOT CUTTING - FOLDING

SPECIALLY DESIGNED FOR ACM AND TAC ( DIBOND®, ALUCOBOND® )

Very good surface finish.

Improves the evacuation of chips.

## SMOOTH AND POLISHED FLUTE, LIMITED BUILT-UP EDGE EFFECTS

UPCUT TOOL, UPWARDS REMOVAL OF CHIPS.

Coating on demand.

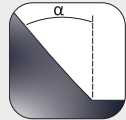
Machining of non-ferrous metals with spraying or coating



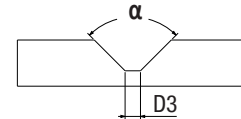
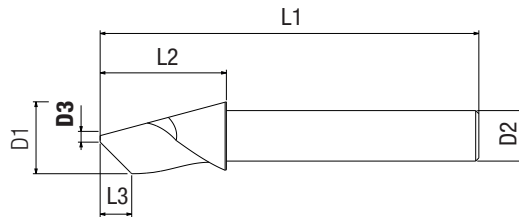
SOLID  
CARBIDE



MILLING /  
SLOTTING



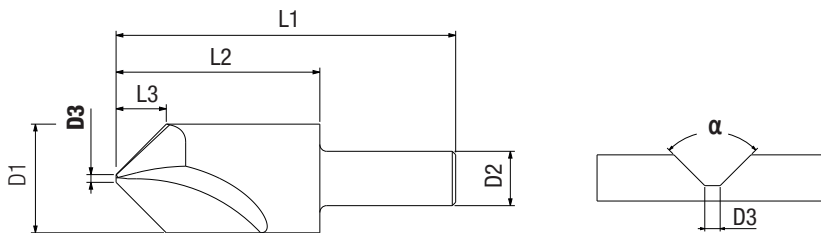
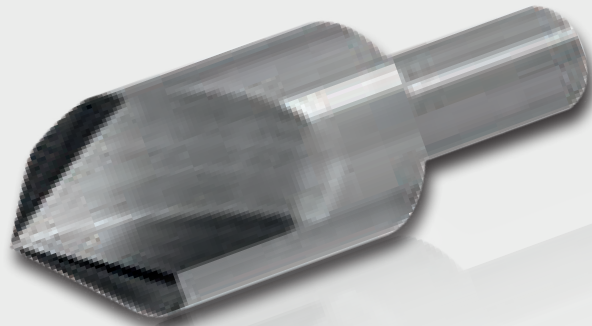
MILLING WITH  
CHAMFER



Ø D1 mm	Ø D2 mm	Ø D3 mm	L3 mm	L2 mm	L1 mm	α °	z	Part Ref.
6	6	0.3	2.3	-	60	100°	1	4041--06P0030-100°
8	8	0.5	3.1	-	60	100°	1	4041--08P0050-100°
10	6*	2	3.6	20	60	95°	1	4041--10P0200-095°

\*Smaller shank diameter

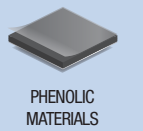
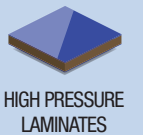
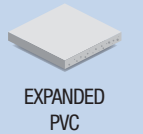
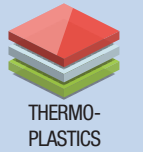
**VERY GOOD SURFACE FINISH**  
SOLID CARBIDE, HIGH RIGIDITY



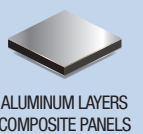
Ø D1 mm	Ø D2 mm	Ø D3 mm	L3 mm	L2 mm	L1 mm	α °	z	Part Ref.
8	8	0.2	3.9	-	50	90°	2	4044--08P0020-090°
10	6*	0.2	4.9	25	50	90°	2	4044--10P0020-090°
12	12	0.2	5.9	-	50	90°	2	4044--12P0020-090°
16	8*	0.2	7.9	12	50	90°	2	4044--16P0020-090°

\*Smaller shank diameter

## MATERIALS:



## Possible uses:



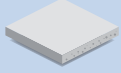
# FAMILY 4042

# CUTTERS FOR SLOT CUTTING - CHAMFERING

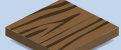
## MATERIALS:



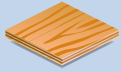
THERMOSETTING  
PLASTICS



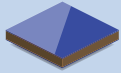
EXPANDED  
PVC



HARD  
WOOD



COMPOSITE  
WOODS



HIGH PRESSURE  
LAMINATES

SPECIFICALLY DESIGNED FOR HARDER MATERIALS (PMMA, CORIAN, POLYCARBONATES, HARDWOODS, ETC.)

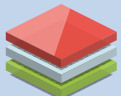


**Carbide  
Steel**  
CARBIDE  
TIPPED  
STEEL BODY

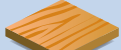
MILLING /  
SLOTTING

MILLING WITH  
CHAMFER

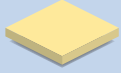
## Possible uses:



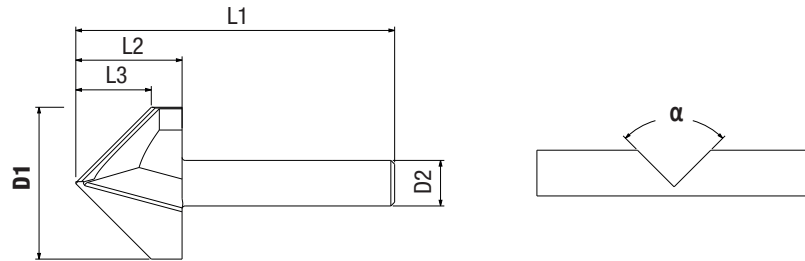
THERMO-  
PLASTICS



SOFT  
WOOD



FOAM



Ø D1 mm	Ø D2 mm	L3 mm	L2 mm	L1 mm	α °	z	Part Ref.
20	6	17.3	20.5	48	60°	2	4042--20-060°
20	6	10	14	42	90°	2	4042--20-090°
20	6	8.4	12.4	40	100°	2	4042--20-100°
20	6	5.8	9.8	38	120°	2	4042--20-120°

# CUTTERS FOR SLOT CUTTING - CHAMFERING

## FAMILY 4043

SPECIFICALLY DESIGNED FOR SOFT MATERIALS (SOFTWOODS, COMPOSITE WOOD PRODUCTS, FOAMED MATERIALS, ETC.)

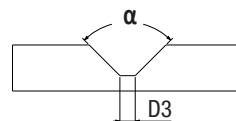
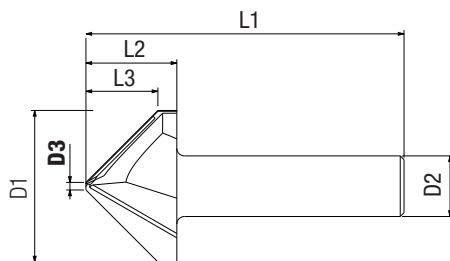


**Carbide Steel**  
CARBIDE TIPPED STEEL BODY


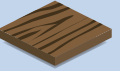


### MATERIALS:

-  THERMOSETTING PLASTICS
-  EXPANDED PVC
-  SOFT WOOD
-  COMPOSITE WOODS
-  HIGH PRESSURE LAMINATES
-  FOAM



### Possible uses:

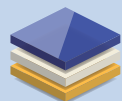
-  THERMOPLASTICS
-  HARD WOOD

Ø D1 mm	Ø D2 mm	Ø D3 mm	L3 mm	L2 mm	L1 mm	α °	z	Part Ref.
32	8	0.5	27.3	32	62	60°	2	4043--32P0050-060°
32	8	0.5	15.75	20	50	90°	2	4043--32P0050-090°
32	8	0.5	9.1	12	42	120°	2	4043--32P0050-120°

# FAMILY 4070

# CONICAL ENGRAVING CUTTERS

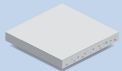
## MATERIALS:



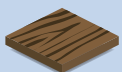
THERMOSETTING  
PLASTICS



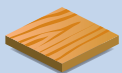
THERMO-  
PLASTICS



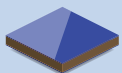
EXPANDED  
PVC



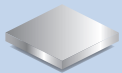
HARD  
WOOD



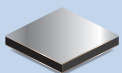
SOFT  
WOOD



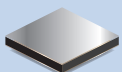
HIGH PRESSURE  
LAMINATES



NON-FERROUS  
MATERIALS

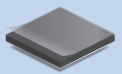


ALUMINUM LAYERS  
COMPOSITE PANELS

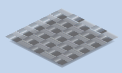


STEEL LAYERS  
COMPOSITE PANELS

## Possible uses:



PHENOLIC  
MATERIALS



GLASS FIBER  
REINFORCED PLASTICS

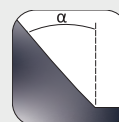
## CONICAL, MULTI-MATERIAL ENGRAVING CUTTERS



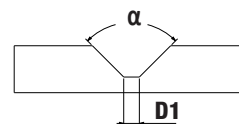
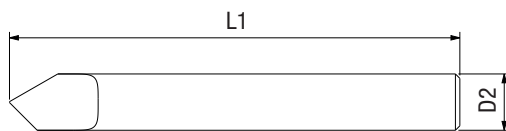
SOLID  
CARBIDE



ENGRAVING



MILLING WITH  
CHAMFER

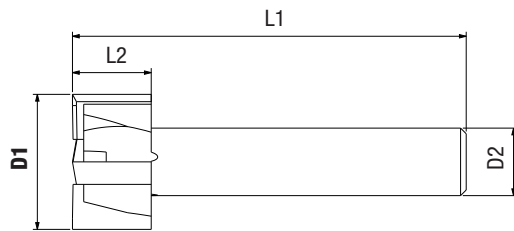


ØD1 mm	Ø D2 mm	L1 mm	α °	Z	Part Ref.
0.3	3	30	30°	1	4070--03P0030-030°
0.3	4	60	30°	1	4070--04P0030-030°
0.5	6	60	30°	1	4070--06P0050-030°
0.3	3	30	40°	1	4070--03P0030-040°
0.3	4	60	40°	1	4070--04P0030-040°
0.5	6	60	40°	1	4070--06P0050-040°
0.1	3	30	60°	1	4070--03P0010-060°
0.2	4	60	60°	1	4070--04P0020-060°
0.4	6	60	60°	1	4070--06P0040-060°
0.1	4	60	90°	1	4070--04P0010-090°
0.1	6	60	90°	1	4070--06P0010-090°

## FACE MILLING CUTTERS (FACE MILLING ON MARTYR PLATES, ETC.)

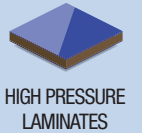
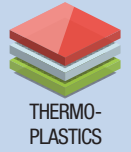


**Carbide Steel**  
CARBIDE  
TIPPED  
STEEL BODY

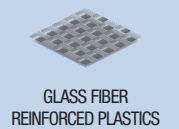
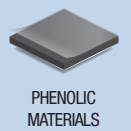


Ø D1 mm	Ø D2 mm	L2 mm	L1 mm	z	Part Ref.
20	8	7	35	4	4080--2000
30	8	8	35	6	4080--3000

### MATERIALS:



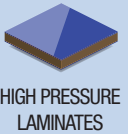
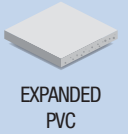
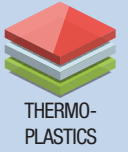
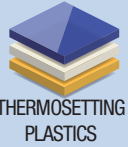
### Possible uses:



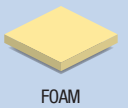
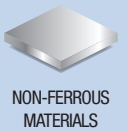
# FAMILY 4110

# SLITTING SAW CUTTERS ON A SHANK

## MATERIALS:

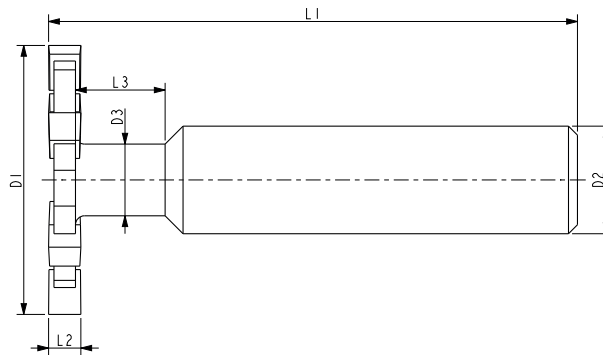


## Possible uses:



## SLITTING SAW CUTTERS WITH CARBIDE INSERTS ON A STEEL SHANK MACHINING OF SLOTS AND SLITS

Cutting out thermoformed parts



ØD1	Ø D2	L2	L1	Z	Part Ref.
25	8	1	62	6	4110--25-0100A
25	6	2	62	6	4110--25-0200
25	8	2	62	6	4110--25-0200A
35	6	2	62	8	4110--35-0200
50	10	3	62	8	4110--50-0300

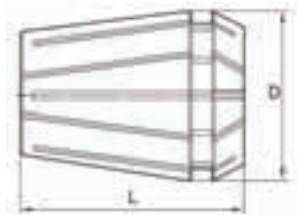




**FANUC** Robot  
LR Mate 200iD

# ER SPRING COLLETS

## DIN 6499 - ISO 15488



### D (mm) L (mm)

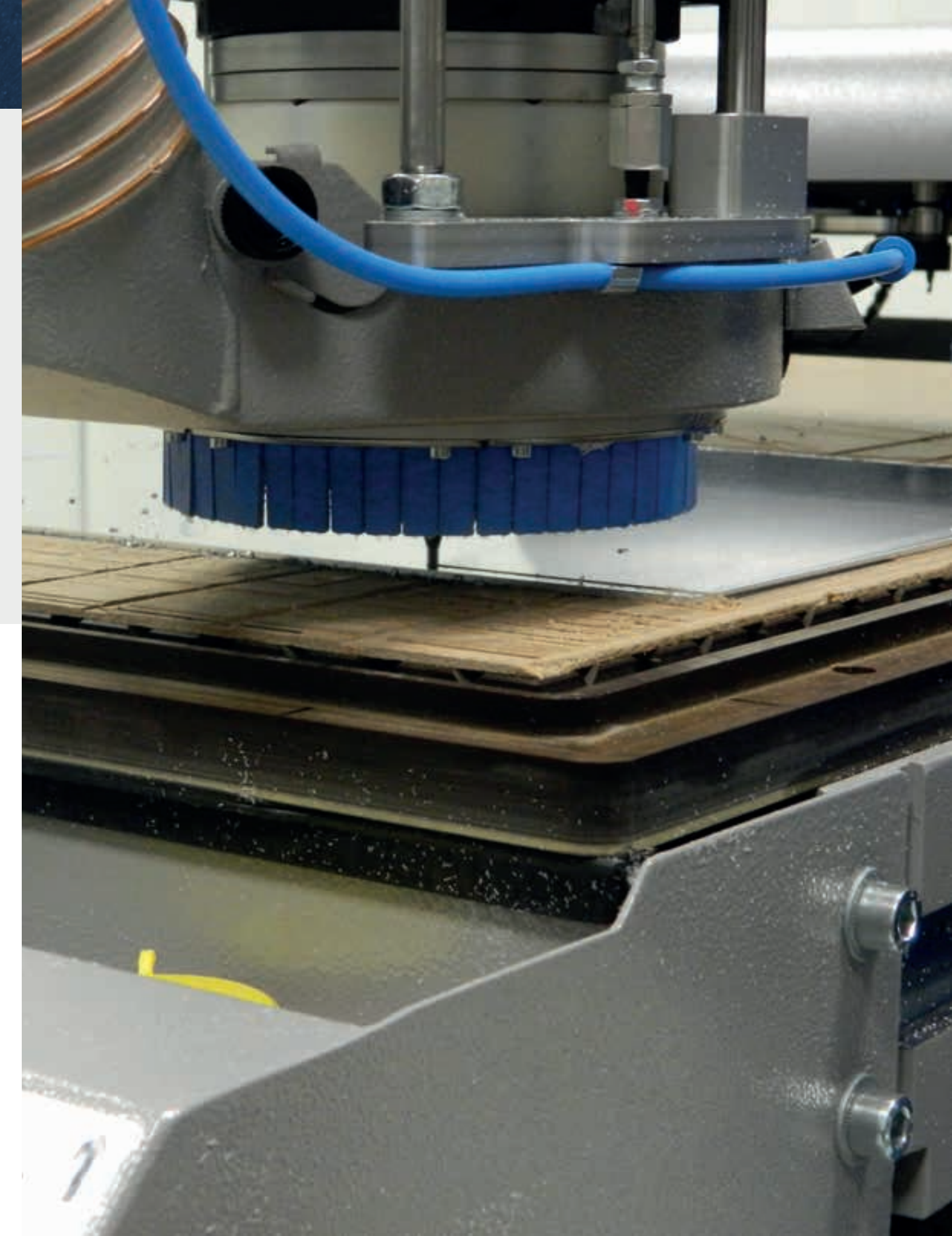
ER16	17	27.5
ER20	21	31.5
ER25	26	34
ER32	33	40

ER 16	
Ref	Clamping range
Collet ER16 Ø2.00	Ø2.0 to Ø1.0
Collet ER16 Ø3.00	Ø3.0 to Ø2.0
Collet ER16 Ø4.00	Ø4.0 to Ø3.0
Collet ER16 Ø5.00	Ø5.0 to Ø4.0
Collet ER16 Ø6.00	Ø6.0 to Ø5.0
Collet ER16 Ø8.00	Ø8.0 to Ø7.0
Collet ER16 Ø10.00	Ø10.0 to Ø9.0

ER 25	
Ref	Clamping range
Collet ER25 Ø2.00	Ø2.0 to Ø1.0
Collet ER25 Ø3.00	Ø3.0 to Ø2.0
Collet ER25 Ø4.00	Ø4.0 to Ø3.0
Collet ER25 Ø5.00	Ø5.0 to Ø4.0
Collet ER25 Ø6.00	Ø6.0 to Ø5.0
Collet ER25 Ø8.00	Ø8.0 to Ø7.0
Collet ER25 Ø10.00	Ø10.0 to Ø9.0
Collet ER25 Ø12.00	Ø12.0 to Ø11.0

ER 20	
Ref	Clamping range
Collet ER20 Ø2.00	Ø2.0 to Ø1.0
Collet ER20 Ø3.00	Ø3.0 to Ø2.0
Collet ER20 Ø4.00	Ø4.0 to Ø3.0
Collet ER20 Ø5.00	Ø5.0 to Ø4.0
Collet ER20 Ø6.00	Ø6.0 to Ø5.0
Collet ER20 Ø8.00	Ø8.0 to Ø7.0
Collet ER20 Ø10.00	Ø10.0 to Ø9.0
Collet ER20 Ø12.00	Ø12.0 to Ø11.0

ER 32	
Ref	Clamping range
Collet ER32 Ø3.00	Ø3.0 to Ø2.0
Collet ER32 Ø4.00	Ø4.0 to Ø3.0
Collet ER32 Ø5.00	Ø5.0 to Ø4.0
Collet ER32 Ø6.00	Ø6.0 to Ø5.0
Collet ER32 Ø8.00	Ø8.0 to Ø7.0
Collet ER32 Ø10.00	Ø10.0 to Ø9.0
Collet ER32 Ø12.00	Ø12.0 to Ø11.0
Collet ER32 Ø14.00	Ø14.0 to Ø13.0
Collet ER32 Ø16.00	Ø16.0 to Ø15.0



## CUTTING CONDITIONS (GUIDELINE DATA)

Calculation of the rotational speed of the spindle

$$n = (1000 \times VC) / (\pi \times D)$$

Calculation of the feed speed:

$$Vf = Fz \times Z \times N$$

Calculation of the cutting speed

$$Vc = (n \times \pi \times D) / 1000$$

Calculation of the feed per tooth

$$Fz = Vf / (Z \times n)$$

$$\pi = 3.1416$$

Tool diameter	D	mm
Number of teeth	Z	
Cutting speed	Vc	m/min
Rotational speed	N	rpm
Feed per tooth	Fz	mm/z
Feed speed	Vf	mm/min

### FOR EXAMPLE:

Single-flute, Ø6 cutter

Material: PMMA

Vc = 450

Fz = 0.07

Rotational speed:

$$n = (1,000 \times 450) / (\pi \times 6) = 23,873 \text{ (24,000 rpm)}$$

Feed:

$$Vf = 0.07 \times 1 \times 24,000 = 1,680 \text{ mm/min}$$

MATERIALS		Feed per tooth Fz			
		<Ø3	Ø3 to Ø5	Ø5 to Ø8	Ø8 to Ø14
Aluminium alloy	200 to 400	0.01 - 0.03	0.025 - 0.05	0.04 - 0.09	0.07 - 0.17
Unalloyed aluminium (1,000)	200 to 400	0.04 - 0.06	0.05 - 0.10	0.08 - 0.17	0.12 - 0.25
Brass	200 to 400	0.01 - 0.03	0.03 - 0.06	0.06 - 0.09	0.08 - 0.12
Bronze	100 to 150	0.008 - 0.02	0.02 - 0.04	0.035 - 0.05	0.05 - 0.08
Copper	150 to 300	0.01 - 0.03	0.015 - 0.04	0.03 - 0.07	0.06 - 0.14
Thermoplastics, Plexiglass, ABS,	300 to 500	0.02 - 0.05	0.05 - 0.08	0.07 - 0.14	0.12 - 0.25
Nylon, polyethylene, Acetate, High-impact PS	150 to 350	0.07 - 0.10	0.1 - 0.2	0.2 - 0.3	0.3 - 0.4
Plastics - PVC - PE - PP	100 to 300	0.045 - 0.11	0.10 - 0.20	0.18 - 0.35	0.20 - 0.45
Expanded PVC	250 to 500	0.08 - 0.15	0.15 - 0.25	0.25 - 0.35	0.20 - 0.45
POM-C, PA6	200 to 400	0.02 - 0.05	0.05 - 0.08	0.07 - 0.14	0.12 - 0.25
PEHD (500 - 1000)	300 to 450	0.04 - 0.08	0.08 - 0.12	0.12 - 0.25	0.25 - 0.35
High-impact PS	150 to 250	0.04 - 0.1	0.1 - 0.15	0.1 - 0.3	0.2 - 0.5
Corian	400 to 500	0.03 - 0.045	0.045 - 0.06	0.06 - 0.09	0.09 - 0.14
Polyester, PC, PET	250 to 400	0.015 - 0.025	0.025 - 0.04	0.04 - 0.08	0.08 - 0.12
PETG	400 to 500	0.02 - 0.04	0.045 - 0.07	0.06 - 0.10	0.09 - 0.15
Bakelite	100 to 250	0.04 - 0.06	0.05 - 0.10	0.08 - 0.17	0.12 - 0.25
Foamed materials	300 to 350	0.07 - 0.10	0.1 - 0.2	0.2 - 0.3	0.3 - 0.4
Horn	150 to 350	0.03 - 0.045	0.045 - 0.06	0.06 - 0.09	0.09 - 0.14
LAB	250 to 400	0.04 - 0.07	0.06 - 0.1	0.1 - 0.2	0.2 - 0.3
Natural PEEK	250 to 450	0.01 - 0.025	0.02 - 0.04	0.035 - 0.07	0.07 - 0.11
Wood	300 to 450	0.015 - 0.07	0.05 - 0.1	0.07 - 0.15	0.12 - 0.25
MDF with Z1	250 to 400	0.04 - 0.08	0.08 - 0.12	0.1 - 0.15	0.15 - 0.2
MDF with 4030	300 to 700			0.15 - 0.20	0.15 - 0.3
Trespa	300 to 500	0.04 - 0.08	0.08 - 0.12	0.1 - 0.15	0.15 - 0.2
Stainless steel	40 to 90	0.008 - 0.015	0.01 - 0.02	0.015 - 0.04	0.03 - 0.06
Galvanised steel	100 - 150	0.008 - 0.015	0.02 - 0.03	0.03 - 0.05	0.04 - 0.08

## IMPACT OF COLLETS ON CUTTING QUALITY

Poor collet condition accounts for the majority of the problems encountered: poor surface finishes, shorter tool life, abnormal machining noises, etc.

Perfect machining is only possible when every element in the clamping chain (spindle, chuck, collet) is in perfect condition.

### MAINTAINING SPRING COLLETS

During machining, chips and dust particles lodge inside collets.

For this reason, collets must be well maintained.

We recommend that you systematically clean the collet and the tool holder carefully at every tool changeover.

Apply a rust inhibiting product to collets before putting them in storage. (remember to remove this product before reusing the collet).

### SERVICE LIFE OF COLLETS

Collets are wear parts and as such must be replaced regularly. They lose their elasticity and are marked by the various tools they come into contact with.

As a preventive measure, we recommend replacing them approximately every 500 hours.

Well-serviced collets may last much longer.

A collet must be replaced if the tool it was holding broke, since this would mark the collet and make the runout incompatible with high quality machining.

### GOOD CLAMPING PRACTICES

The tool must be held by as much of the collet's gripping surface as possible; at least 80 % of the length of the collet. This lets the tool rotate concentrically and limits vibrations that have an adverse effect on cutting quality.

#### TOOL INSERTED TOO FAR INTO THE COLLET.

Runout is possible.  
Chips can get inside the collet.



#### TOOL INSUFFICIENTLY INSERTED.

Runout  
Vibration, poor surface finishes.  
Breakage possible  
Reduced service life  
Impaired cutting conditions



#### TOOL CORRECTLY INSERTED

2 to 3 mm of shank visible after the end of the flute.

## ADVICE ABOUT MACHINING

### PREAMBLE:

The key principles and recommendations are covered below.

Machining quality is dependent on many criteria. The five criteria for success are:

**1 ) Production equipment:** condition and choice of equipment (machine, spindle, suction, workpiece clamping, choice of cutting tool, etc.)

**2) Machining method** and strategy: machining direction (conventional (up) or down), number of cuts, type of entrance into the cut (angular, tangential), use or not of sprayed lubricant, etc.

**3) Human resources:** training, level of experience of the technicians in using the production resources.

**4) Material:** type and quality of the material.

**5) Environment:** dust, vibration, temperature (workshop and material), etc.

**And also,** required surface finish and target machining time.

### IMPACT OF SPINDLE POWER:

In general, low-power spindles (0.5 to 1.5 kW) can reach high rotational speeds, but deliver very low torque at low speeds. They should not, therefore, be fitted with tools whose diameter is more than 6 mm.

When machining thick materials, the number of cuts must be increased.

For cutters with a diameter of less than 4 mm, the axial depth of cut ( $A_p$ ) should be equal to the  $\emptyset$  and be about 3 mm for cutters with a diameter of 5 to 6 mm.

### ROTATIONAL SPEED OF SPINDLE: (REFER TO PAGE 44 "CUTTING CONDITIONS")

The calculations (given in page 46 of this catalogue) used to determine the rotational speed of the spindle clearly show that when the  $\emptyset$  of the tool is larger, the rotational speed of the spindle needs to be reduced, irrespective of the material. The rotational speed should also be adjusted to suit the properties of the material.

For example: when machining soft materials, the rotational speed should be lower so as not to heat the material.

The rotational speed should also be reduced if the tool is long (since the potential out-of-balance is greater as is the risk of breakage and vibration).

### FEED: (REFER TO PAGE 44 "CUTTING CONDITIONS")

A small-diameter tool is more susceptible to bending. The feed speed should therefore be set lower than that possible with a larger diameter.

The same principle applies for tools that have a long cutting length - the feed should be reduced since this type of tool generates a lot of bending.

When machining soft materials, the feed speed can be increased so as not to heat up the material.

Take care when calculating the feed speed: when you increase the number of teeth, you need to reduce the  $F_z$  value due to the impact of less effective chip evacuation (you cannot go three times quicker with three teeth than you can with one tooth).

The in-feed (or plunge) speed is normally half, or even a third, of the feed speed.

The impact on the machining time is not too significant, but this lower speed increases the service life of the tool (by protecting the tip) and the spindle.

(It can even be lower. For example:  $\emptyset$  20 face cutter fed directly onto the material:

in-feed (plunge) speed of about 50 mm/min)

There is no benefit in setting a very high feed for very small workpieces. The reason is that the machine only very rarely reaches this speed; the gain in time and in surface finish is very small. However, the geometry of the workpieces and the service life of the cutters is degraded.

#### **“RUNNING-IN” PERIOD FOR NEW TOOLS:**

New tools being used for the first time will not produce their best surface finish until the tool has machined a few metres of material, due to the extremely sharp edges on new tools.

This is particularly true for one-flute tools used to machine plastics.

The 4053 series cuts less aggressively and does not need to be “run in”.

#### **CHOICE OF USEFUL LENGTH OF TOOL:**

The useful length must be greater than the thickness to be cut, without being too long, since this leads to:

- A longer unsupported length,
- A less rigid and more breakable tool,
- An impaired surface finish and shorter tool life.

#### **HELIX DIRECTION:**

Upcut cutters with a right-handed cut tend to pull the machined workpiece towards the tool: the chips are very well evacuated, but the workpiece must be clamped securely to avoid any vibration problems.

Downcut cutters with a right-handed cut tend to push the machined workpiece against the table of the machine, which reduces clamping-related issues. There will be no delamination of the material near the surface of the workpiece, but the chips will be poorly evacuated (with a risk of chip jamming).

Excellent chip suction or providing clear space under the workpiece are recommended.

#### **SURFACE FINISH:**

A number of criteria need to be satisfied to obtain a good surface finish, with feed speed far from being the only one.

- Securely holding the workpiece (extremely important).
- The right tool for the type and thickness of the material.
- Good condition of the machine (shafts, spindles, tapers, collets, etc.) and tool.
- Good chip suction.
- Good cutting conditions.
- Good machining strategies.

#### **FINISHING CUT:**

Removing 0.3 to 0.5 mm of material with a finishing cut is a good way to obtain a better surface finish for many materials. This eliminates any built-up edge-related issues and smooths out the effects of vibration. However, this is not true for all materials.

#### **MACHINING THE BOTTOM OF POCKETS:**

One-flute cutters, due to their geometry, do not produce the best surface finish in the bottom of pockets. Two-flute cutters have flatter tips and produce a better surface finish.

Smaller overlaps and lower speeds also greatly improve the surface finish.

## ADVICE ABOUT DEPTHS OF CUT.

### RADIAL DEPTH OF CUT, AE:

When contouring (or profiling) a workpiece, it is advisable to reduce the radial depth of cut ( $A_e$ ) when machining hard materials and when using small-diameter tools.

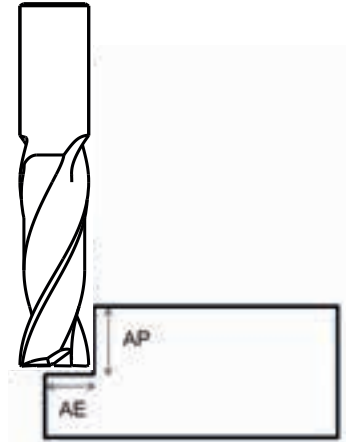
### AXIAL DEPTH OF CUT, AP:

For most plastics, the  $A_p$  should be 1 to 2 times the tool diameter.

For non-ferrous metals (aluminium, etc.) 0.5 to 1 times the diameter of the tool.

### THESE ARE GUIDELINE VALUES.

For example: for expanded PVC, the  $A_p$  can be 3 to 4 times the tool  $\varnothing$  (for tools with a  $\varnothing$  of 6 mm and above)



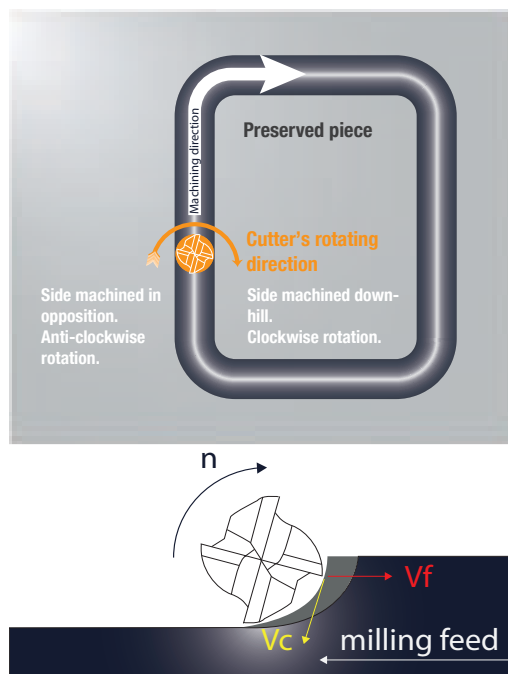
## MACHINING DIRECTION

THE CHOICE OF MACHINING DIRECTION IS PRIMARILY DETERMINED BY THE DESIRED QUALITY OF THE SURFACE FINISH. THE PROPERTIES OF THE MATERIAL ALSO HAS TO BE CONSIDERED.

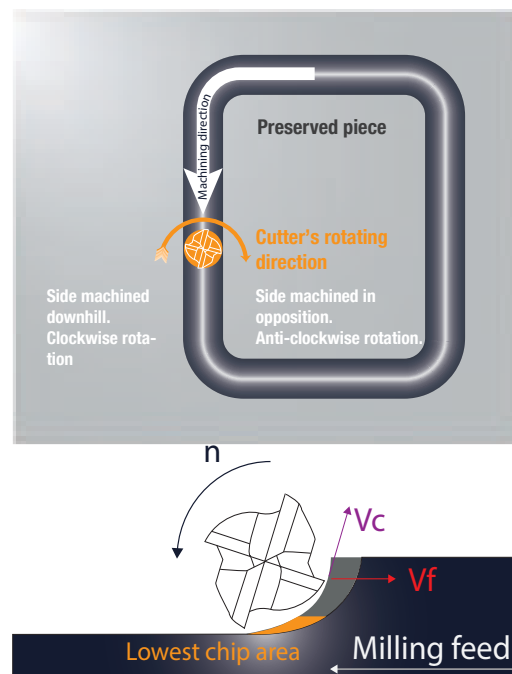
Down (or climb) milling is used for most plastics.  
The cuts are more “gentle”.

Conventional (up) milling tends to be used for soft or fibrous materials.  
The cut is more “aggressive”.

### DOWN MILLING / CLOCKWISE



### CONVENTIONAL (UP) MILLING / ANTICLOCKWISE









## A TEAM FOCUSED ON CUSTOMER SATISFACTION



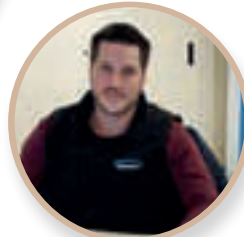
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