LOUIS BELET
Cutting tools

SUN TOOLS
простые решения

Drilling of composite materials

A high performance drill

SWISS MADE

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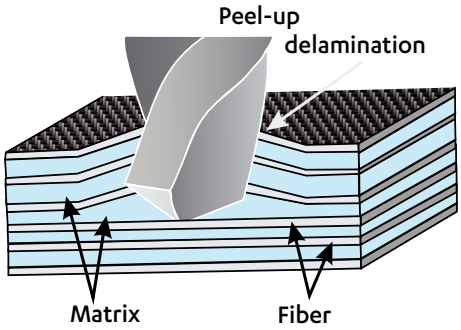
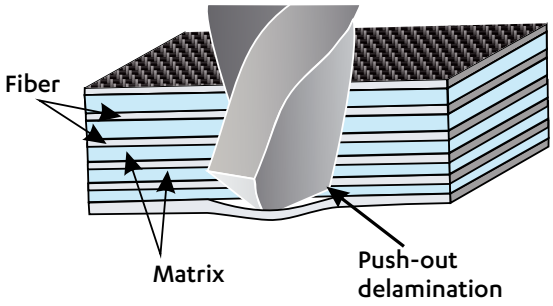
Machining of composite materials

One problem

Carbon or Glass Fiber Reinforced Plastics (CFRP/GFRP) are very hard to machine. The drilling efficiency is reduced and delamination problems occur frequently.

As shown in the picture below, delamination may happen at two levels: at the entry of the drilled hole (peel-up delamination) and at the exit periphery of the drilled hole ("push out" delamination).





One solution

- Bélet has developed a custom tool with specific carbide, geometry and coating for composite materials.

- This tool allows high speed drilling of thousands of holes in GFRP without experiencing delamination issues.

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N°1

This tool has been tested along with 12 competitors. Bélet's drill obtained the best results!

Tool

Bélet's drill REF 300

Through-hole drilling

1.6 mm

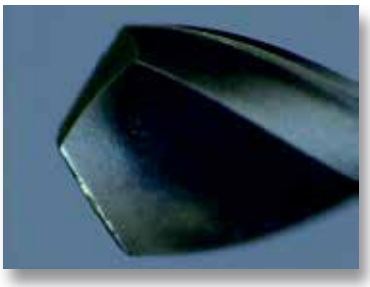
Hole tolerance

± 0.05 mm

Results

	Drill von Bélet REF 300	Competitor A
# holes	10'000	10'000
Conical from	All holes OK	3'000
Out of tolerances from hole n°	All holes OK	5'000
Burr on top from hole n°	All holes OK	2'400
Bottom burr from hole n°	6'600	3'000
Number of good holes	6'600	3'000
Tool wear after 10'000 holes	Good	Highly worn

Drill Bélet REF 300: tool wear after 10'000 holes



Observations :

- After 10'000 holes, only the cutting edge is worn. Other edges are sharp
- The tip is intact
- The radial relief is present => drilling ø is correct
- The coating is still present

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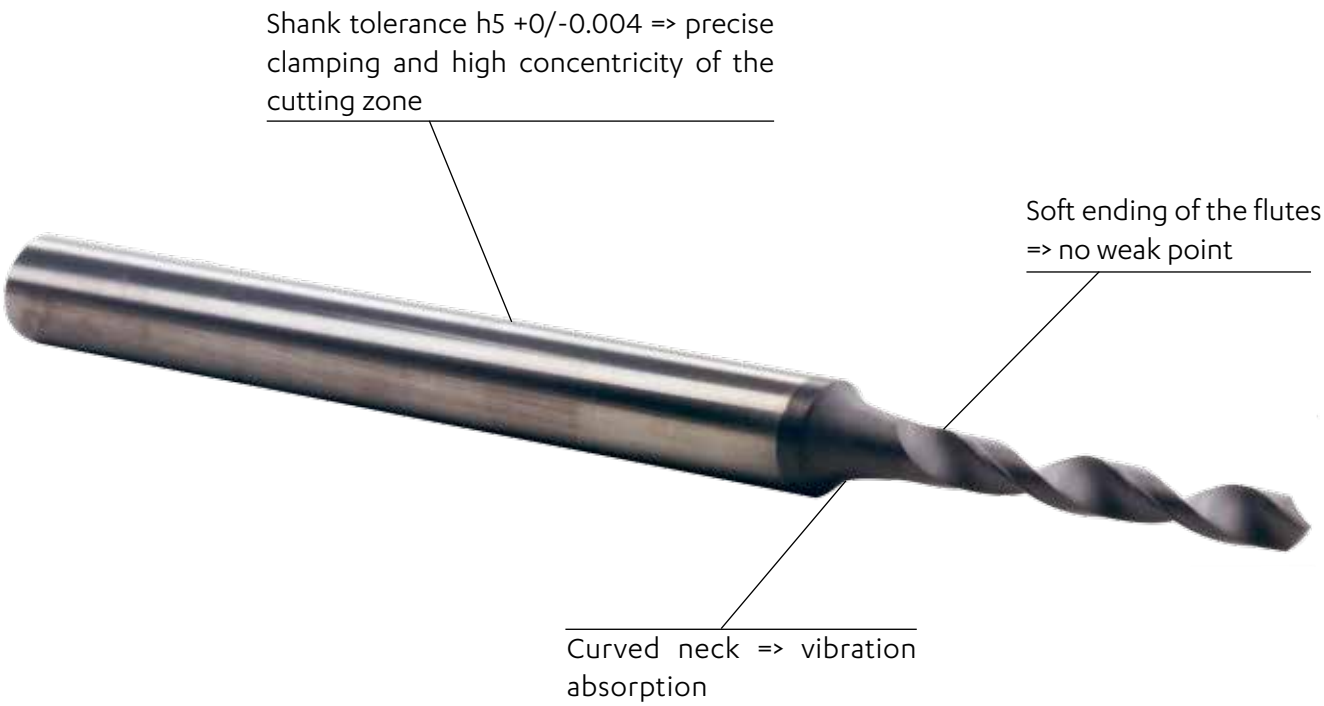
Main features



High quality micro grain solid carbide

- Chosen for its hardness and high tenacity
- Allows also a flexibility of the drill

Polished surface

- Allows a good chip evacuation
- Sharp cutting edges

Tight geometric tolerances

- Centered tool sharpening
- Less constraints when drilling

Specific coating

- Reduces friction coefficient
- High reduction of the tool war

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Drill for composite materials

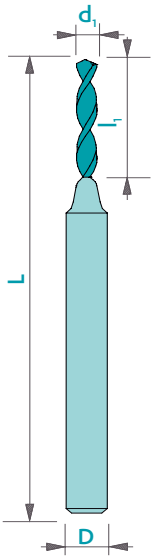
REF. 300

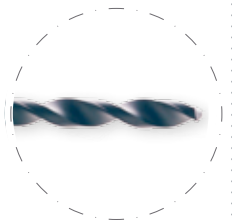
Material	Vc [m/min]
Composite materials	200

Tolerances

d_1 : +0 -0.004

D : h5





Long tool life

Minimal delamination

Z2

HM MG

N HSC

d_1	l_1	D	L
0.80	8	3	38
0.90	8	3	38
1.00	10	3	38
1.10	10	3	38
1.20	10	3	38
1.30	10	3	38
1.40	10	3	38
1.50	10	3	38
1.55	10	3	38
1.60	10	3	38
1.65	10	3	38
1.70	10	3	38
1.75	10	3	38
1.80	10	3	38
1.85	10	3	38
1.90	10	3	38
1.95	10	3	38
2.00	10	3	38

Prices and other dimensions available upon request