



Manual Beginner set Carbide end mills HOBBY-Line

A router for all cases ...

... there is not any. Too wide is the range of applications, too different the materials, than that you could be equipped with two or three cutters for any purpose - one alone is certainly not enough.

Surprisingly, this looks quite different with an assortment of ten cutters (where the two most important ones are duplicated). With clever compilation, you can get pretty far.

Above all, such an assortment offers the beginner the opportunity to orient themselves, gaining experience, by which the knowledge rises to choose the right milling cutter for the given purpose from the huge variety of the market offer.

This manual briefly introduces each of the eight types of cutters in the assortment with its purpose and useful operating parameters.

Speed and feed

The question of the right spindle speed and the appropriate feed is crucial and often confusing for the beginner, because many factors interact with each other here. Even the values recommended in this manual can only be a beginning. So here are the underlying relationships.

Per revolution, each tooth of a milling cutter can lift only a limited amount of material. The decisive factors are the chip volume and the cutting speed. Too thick chips or too high a speed lead to large bending and torsional forces in the cutter and cause it to break.

However, if the chips are too thin, the cutter no longer cuts, it scrapes. The resulting friction heat can quickly lead to dulling or even burn out.

Fast feed and low speed produce thick chips. Low feed and high speed produce thin chips. Both are directly related. Often the spindle speed can not be changed. **For example, if instead of 24,000 only 16,000 1 / min are possible, the feed can also be only two thirds, so as not to exceed the possible chip thickness.**



The cutters in the beginner's set Hobby-Line:

1. 1-Flute Ø 3 mm
2. 2-Flute Ø 3 mm
3. Diamond toothed Ø 3 mm
4. Diamond toothed Ø 1,2 mm
5. 2-Flute ALU Ø 3 mm
6. Engraving needle point angle 90°
7. Spiral toothed Ø 1,2 mm
8. Spiral toothed Ø 3 mm

Now further influences are added: The cutting speed also increases with the diameter of the milling cutter, at the circumference the longest path per revolution is covered. So usually: The thicker, the smaller the speed.

Also important for the feed is the number of teeth, a two flute cuts two chips per revolution, so can withstand twice as much feed as a one flute - a three-knife trimmer but not three times, because always two teeth are engaged at a time. How deep is the router bit in the material, how big is the lateral infeed? Double chip volume means half feed.

And, last but not least: how dense is the material being cut? Because, of course, balsa wood allows much higher speeds than oak, and acrylic is cutted faster than aluminum.

Our recommendation: Experiment, develop a feeling for the cause. In case of doubt we are happy to help you, call us! We wish you success!

Hint

All cutters in this set have a shaft diameter of 3.175 mm (1/8"). To operate a suitable collet is needed.

①



1-Flute Ø 3 mm

Art.-Nr.: L1S.0300

Applications

E. g. for contours with very high quality.

Very good for soft materials, plastics in general, PE, PTFE, Acrylic, Styrodur.

Recommended parameters

Immersion depth: $2 \times D = 6 \text{ mm}$

Speed: 24,000 rpm

Feed: 600 mm / min

Tip: Use soapy water as a lubricant when milling plastics, especially acrylic.

②



2-Flute Ø 3 mm

Art.-Nr.: L2S.M.0300

Applications

Fishtail grind for easy dipping.

Universally applicable, also for harder aluminum, harder plastics and all woods

Recommended parameters

Immersion depth (wood): $1.5 \times D = 4.5 \text{ mm}$

Speed: 24,000 rpm

Feed: 1200 mm / min

Note: Never mill plastic and aluminum without coolant.

③



Diamond toothed Ø 3 mm

Art.-Nr.: LDV.M.0300

Applications

Fishtail grind for easy dipping.

Plywood, balsa, GRP, CFRP, circuit boards and composite materials.

Recommended parameters

Immersion depth: $2 \times D = 6 \text{ mm}$

Speed: 24,000 rpm

Feed: 2000 mm / min

Note: Especially when milling fiber composite materials (GRP, CFRP, ...), please ensure adequate respiratory protection.

④



Diamond toothed Ø 1,2 mm

Art.-Nr.: LDV.M.0120

Applications

Fishtail grind for easy dipping.

Plywood, balsa, GRP, CFRP, circuit boards and composite materials.

Recommended parameters

Eintauchtiefe: $2 \times D = 6 \text{ mm}$

Drehzahl: 24.000 1/min

Vorschub: 2000 mm/min

Note: Especially when milling fiber composite materials (GRP, CFRP, ...), please ensure adequate respiratory protection.



Art.-Nr.: L2SA.0300

Applications

Cutting edge geometry especially for aluminum processing.

Non-ferrous metals, harder plastics, acrylic.

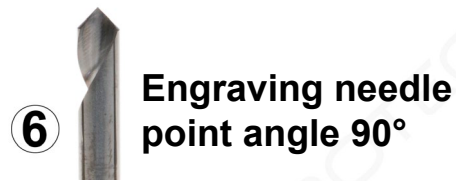
Recommended parameters

Immersion depth (aluminum): $0.5 \times D = 1.5 \text{ mm}$

Speed: 24,000 rpm

Feed: 500 mm / min

Note: Never mill plastic and aluminum without coolant.



Art.-Nr.: LGS.0090

Applications

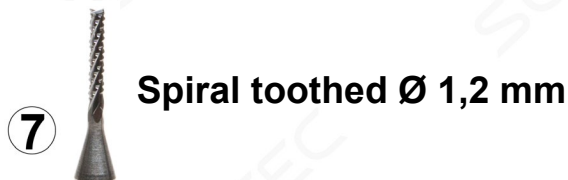
With single cutting edge and spiral groove for chip removal. Scoring / engraving of printed circuit boards.

Engravings in non-ferrous metals, wood, plastic.

Recommended parameters

Speed: 24,000 rpm

Feed: 1000 mm / min



Art.-Nr.: LSV.M.0120

Applications

Plywood, balsa,
GRP, CFRP, circuit boards and composite materials.

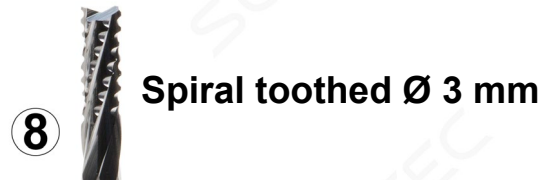
Recommended parameters

Immersion depth: $3 \times D = 3.6 \text{ mm}$

Speed: 24,000 rpm

Feed: 1000 mm / min

Note: Especially when milling fiber composite materials (GRP, CFRP, ...), please ensure adequate respiratory protection.



Art.-Nr.: LSV.M.0300

Applications

Plywood, balsa,
GRP, CFRP, circuit boards and composite materials.

Recommended parameters

Immersion depth: $2 \times D = 6 \text{ mm}$

Speed: 24,000 rpm

Feed: 2000 mm / min

Note: Especially when milling fiber composite materials (GRP, CFRP, ...), please ensure adequate respiratory protection.