

US



## signmaking

plastic, composites & light metal machining



LMT Technology Group

**BELIN  
FETTE  
KIENINGER  
ONSRUD**

**V8**

[www.lmtbelinusa.com](http://www.lmtbelinusa.com)



## The LMT group



LMT Belin has been part of the LMT Group since 2001. The group has its roots in Germany and gathers together four cutting tools manufacturers:

- LMT Kieninger, specialist in mold and dies industries and special tools,
- LMT Fette, specialist in gear cutters, threading solutions (taps and rolling systems) and other high performance milling systems,
- LMT Onsrud, specialist in exotic metals, composites and plastics,

Each firm has its own competences and allows LMT Group to supply performing products throughout the whole world thanks to subsidiaries and exclusive partners.



LMT Belin FR



LMT Fette DE



LMT Kieninger DE



LMT Onsrud US





**Our staff is our greatest asset.**

For over 50 years they learn, share and adapt their unique know-how in designing and manufacturing cutting tools. Our goal is to offer performing solutions meeting the highest demands.

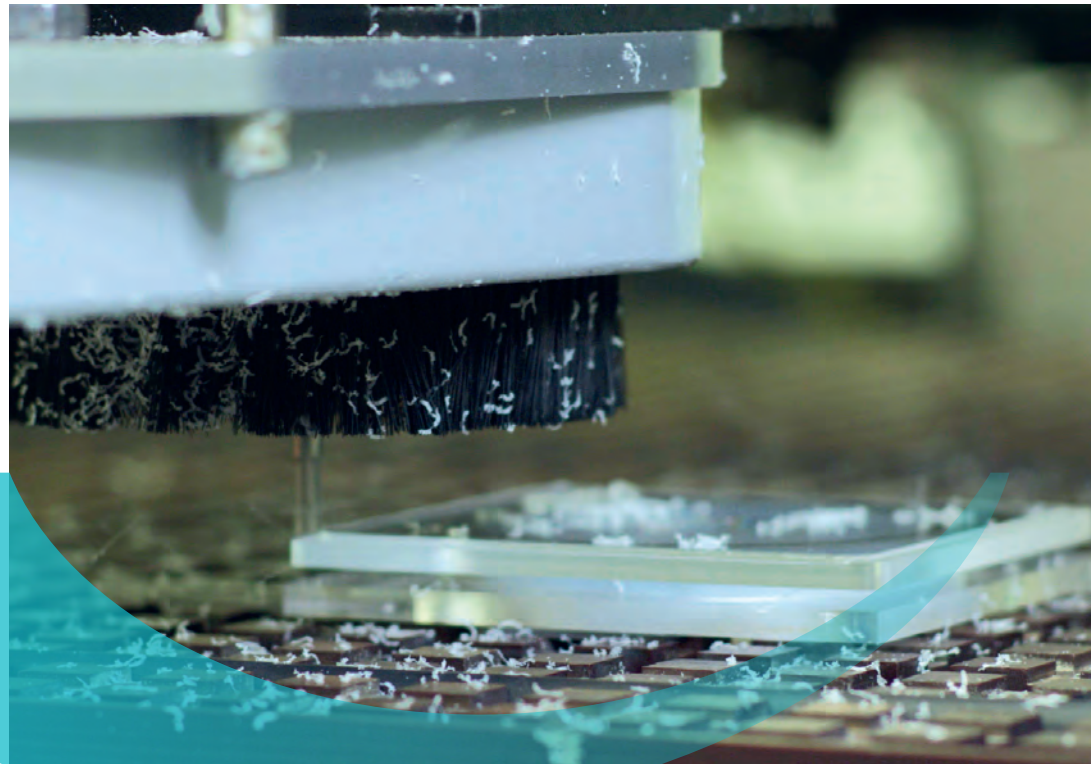
We make a point to handover know-how between skilled and newly arrived employees.

Cutting tools manufacturing has no concrete education this is why we insist on knowledge sharing either for our employees or our customers.

This way we can promote quality manufacturing for everyone.

Whether you machine plastics, composites or light metals (aluminium, alucobond, dibond, etc) LMT offers standard and specials tools adapted to your needs.





### **Innovate, test and qualify**

LMT Belin is equipped with specific machines to develop new machining solutions.

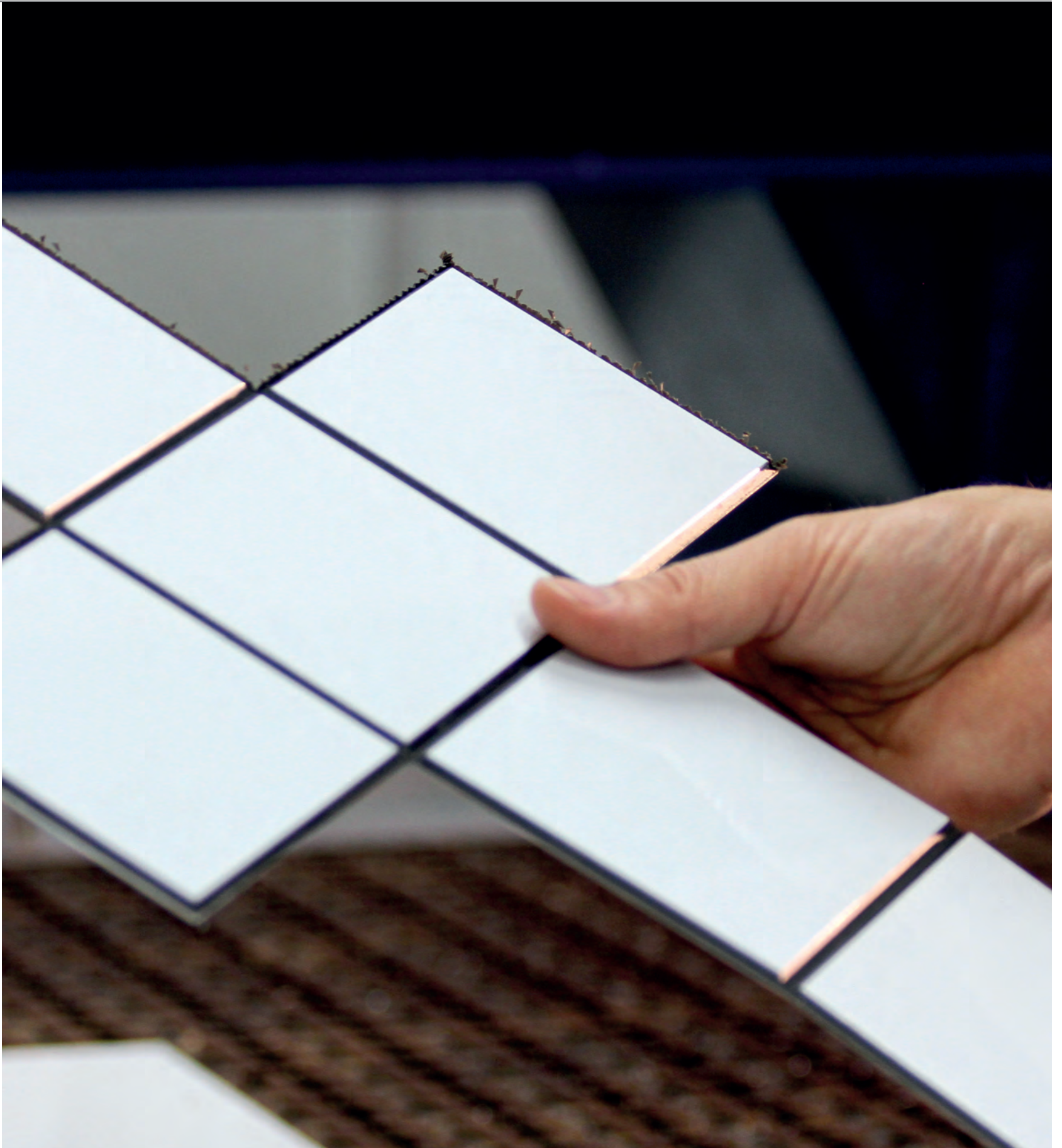
Solid carbide endmills, PCD tipped mills, form cutters, surface cutters, engraving mills, engraving mills, special design endmills and drills, etc

We make a point to test every tool developed so that you get the highest quality products to manufacture qualitative parts.

This dedicated area for research and development is also used to run tests for our partners to deliver special tools matching their needs.







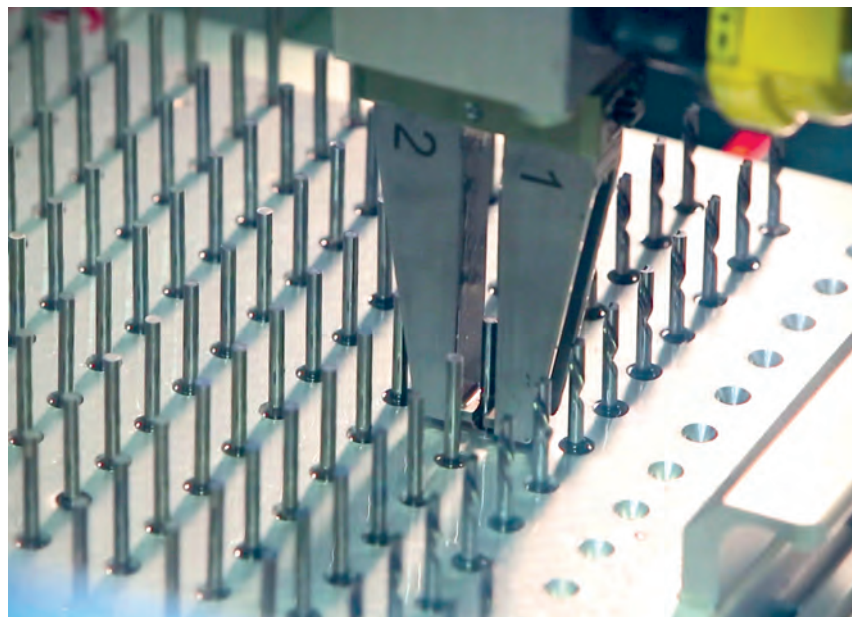
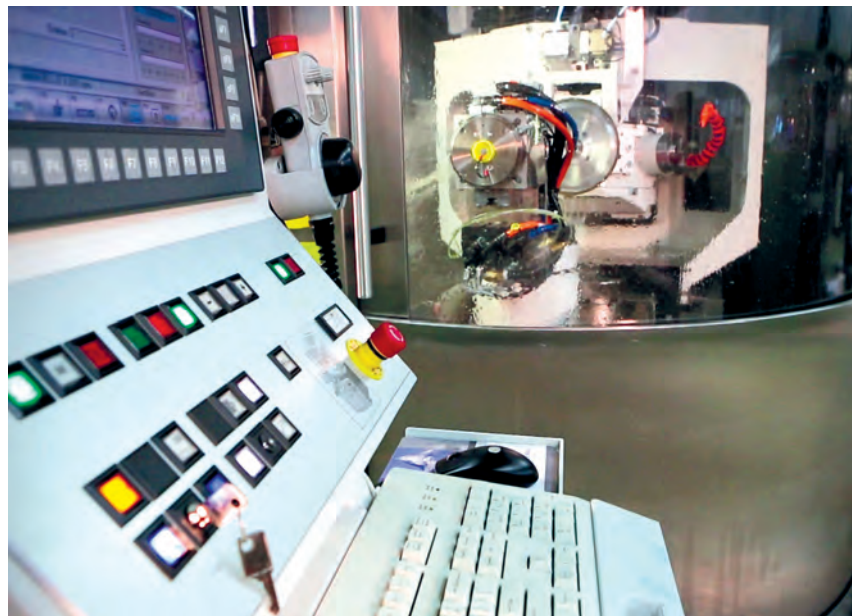


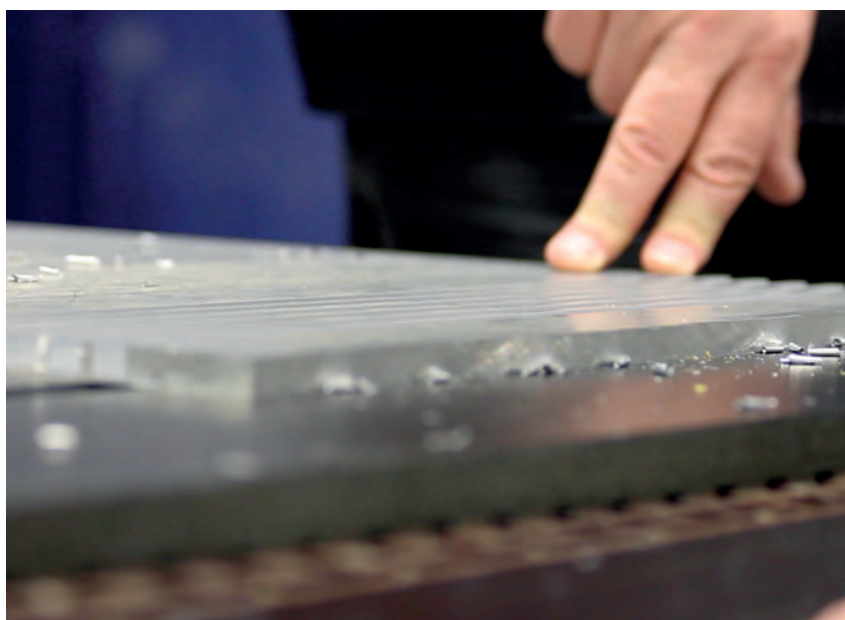
## EXPERIENCE

For over 50 years, LMT BELIN has acquired its experience by responding to the technical challenges proposed by its customers and partners, from the most demanding to the most prestigious in numerous industries (aeronautic, automotive, watchmakers and optical industries).

## THE KNOW-HOW

To answer your needs, LMT BELIN focuses its attention to customers expectations. A dedicated sales team listening to your experience, helped by engineers is fully available for you. Our staff is continuously trained and the workshop equipped with flexible and modern machines. Our strength is the tooling project management. Thanks to the professionalism of its teams LMT BELIN is committed to supply you with an integrated solution in the shortest timescale with state-of-the-art tooling solutions.





## QUALITY

Recognized worldwide for the quality of its cutting tools (mirror finished flutes and an exceptionally superior edge) LMT BELIN demands from its suppliers materials of the highest quality in order to ensure the best performance. We work with you in order to achieve significant production benefits in your process time.

LMT Belin is ISO 9001:2008 certified.

## SERVICE

Once the tool has been developed, our technicians will assist you in your optimization with a maximum reactivity until optimal performance is reached. An engineering service is also at your disposal for your tooling process studies. Please do not hesitate to contact us so that we may study and assist with your projects. Our team is permanently at your disposal. The catalogues presenting our range of standard and specific cutting tools to each trade are available upon request and on [www.lmt-belin.com](http://www.lmt-belin.com)





# Milling

|                                                     |                                                           |                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Cat-Nr 12 000</b>                                |                                                           | <b>12</b>                                                                             |
| EG solid carbide single flute downcut               | Plastic, foam board, wood                                 |    |
| <b>Cat-Nr 13 000</b>                                |                                                           | <b>13</b>                                                                             |
| ED solid carbide single flute upcut                 | Plastic, foam board, wood                                 |    |
| <b>Cat-Nr 53 000</b>                                |                                                           | <b>14</b>                                                                             |
| CRISTAL solid carbide single flute upcut            | Plastics and non-ferrous                                  |    |
| <b>Cat-Nr 22-200 + 33 000</b>                       |                                                           | <b>16</b>                                                                             |
| EDA / EGA solid carbide single flute up and downcut | Non ferrous metals                                        |    |
| <b>Cat-Nr GDA + XGDA</b> <b>NEW</b>                 |                                                           | <b>17</b>                                                                             |
| GDA/ XGDA solid carbide single flute upcut          | Non ferrous metals                                        |  |
| <b>Cat-Nr 176 000 + 16 000</b>                      |                                                           | <b>18</b>                                                                             |
| Solid carbide slotting cutters                      | Aluminium<br>Ferrous metals (steel, stainless steel, etc) |  |
| <b>Cat-Nr 102 000 + 15 000</b>                      |                                                           | <b>19</b>                                                                             |
| Solid carbide 3 and 4 flutes milling cutters        | Ferrous metals (steel, stainless steel, etc)              |  |
| <b>Cat-Nr 43 000 + 193 000</b>                      |                                                           | <b>20</b>                                                                             |
| 2 flutes solid carbide milling cutters              | Laminate, Composites, MDF                                 |  |
| <b>Cat-Nr R</b>                                     |                                                           | <b>21</b>                                                                             |
| R cutters - carbide tipped cutters                  | Plastics                                                  |  |



### Cat-Nr 02105 + STRAT-R & STRAT-F

**NEW**

Solid carbide milling cutters - Special materials

Glassfiber reinforced plastics GFRP  
( < 40%)



Composite materials (abrasive),  
phenolic, etc



22

### Cat-Nr 60-200

**NEW**

Solid carbide milling cutters - Special materials

Foam board



23

### Presentation SAPHIR

24

### Cat-Nr 205 000 + 206 000

**NEW**

PCD tipped SAPHIR milling cutter

Plastics



25

### Cat-Nr 61 000 + 95 000

Solid carbide milling cutters - Special materials

Thermo-moulded plastics



Plastics, Thermosets plastics, wood



26

### Cat-Nr DE

DE surface cutters - carbide tipped cutters

Plastic, foam board, hard wood



27

### Cat-Nr DE

DE surface cutters - carbide tipped cutters

Plastic, foam board, hard wood



28

### Cat-Nr DEPCD

PCD Face milling cutters

Plastic, wood, non-ferrous metals



29

### Cat-Nr DEPCDR

PCD Face milling cutter with radius

Plastic, wood, non-ferrous metals



29



## Milling

### Cat-Nr 117 000 + 52 000

NEW

Solid carbide Ball nose endmill

Plastic, foam board, wood, resin

32



### Cat-Nr 65 200

NEW

Superfinish Ball nose endmill

Plastic, foam board, wood, resin

33



### Cat-Nr EDC + EDR

Solid carbide form milling cutters

Plastic, foam board, wood

34



### Cat-Nr EDAC + EDAR

Solid carbide form milling cutters

Non-ferrous metals

35



### Cat-Nr NPR + NPRC

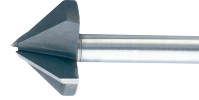
Conical cutters carbide tipped

Plastic, foam board, hard wood

36



Soft plastics, nylon, soft wood

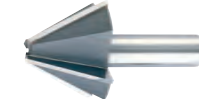


### Cat-Nr IED

Contour milling cutter IED

Plastic, foam board, hard wood

37



### Cat-Nr NPCRD

Conical cutter PCD tipped /

Plastic, wood, non-ferrous metals

37



### Cat-Nr PLIH + PLI

NEW

Solid carbide special cutters for folding

Alucobond and non-ferrous metals

38



Plastics



### Cat-Nr FCOB

Carbide tipped cutters special for folding

Alucobond

39





## Cat-Nr DR 40

Solid carbide spherical cutters DR

Plastic, foam board, hard wood



## Cat-Nr DR 40

Carbide tipped spherical cutters DR /

Plastic, foam board, hard wood



## Cat-Nr P 41

Straight engraving mill P

Plastic, foam board, hard wood



## Engraving

## Cat-Nr 212 000 NEW 44

Superfinish Engraving cutters

Plastics and non-ferrous metals



## Cat-Nr GR 45

Solid carbide engraving mill

Plastic, wood, non-ferrous metals



## Cat-Nr GR 46

Engraving cutters

For various types of materials



## Cat-Nr GR 47

Solid carbide engraving mill for Gravograph Machine

For various types of materials



## Cat-Nr GRP 47

Solid carbide pyramidal Engraving cutter GRP "X TIALN" coated

Special cutter for form manufacturing or engraving hard materials (stainless steel, treaded steel)



## Knives



## Accessories

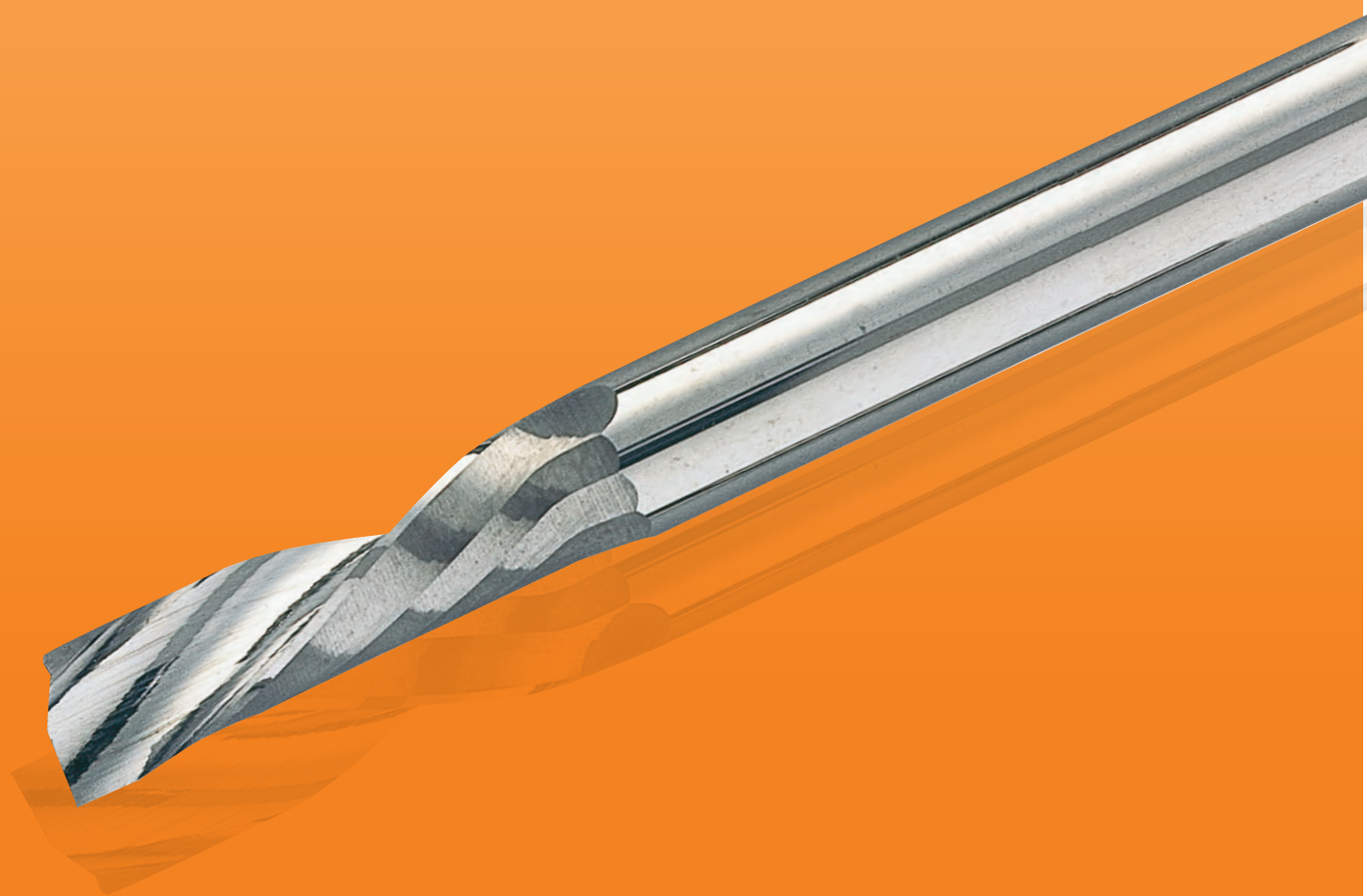


## Technical notes

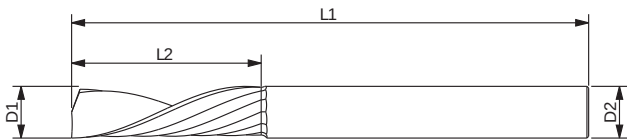




# Milling



➔ Plastic, foam board, wood



|  |           | Ø D1   | Ø D2 | L2 | L1 |   |
|-----------------------------------------------------------------------------------|-----------|--------|------|----|----|---|
| Cat-Nr 12000                                                                      |           | mm     | mm   | mm | mm | z |
| Ref.                                                                              | LMT- Code | METRIC |      |    |    |   |
| 2700279                                                                           | 12010     | 1      | 3    | 4  | 30 | 1 |
| 2700281                                                                           | 12015     | 1,5    | 3    | 6  | 30 | 1 |
| 2700025                                                                           | 12020     | 2      | 2    | 8  | 30 | 1 |
| 2701844                                                                           | 12020A    | 2      | 2    | 8  | 60 | 1 |
| 2700282                                                                           | 12020B    | 2      | 3    | 8  | 30 | 1 |
| 2700254                                                                           | 12025     | 2,5    | 2,5  | 8  | 30 | 1 |
| 2701846                                                                           | 12025A    | 2,5    | 2,5  | 8  | 60 | 1 |
| 2703050                                                                           | 12030     | 3      | 3    | 10 | 30 | 1 |
| 2701847                                                                           | 12030A    | 3      | 3    | 10 | 60 | 1 |
| 2700283                                                                           | 12030B    | 3      | 6    | 10 | 50 | 1 |
| 2700256                                                                           | 12040     | 4      | 4    | 12 | 50 | 1 |
| 2701849                                                                           | 12040A    | 4      | 4    | 20 | 60 | 1 |
| 2701850                                                                           | 12040B    | 4      | 4    | 30 | 70 | 1 |
| 2700284                                                                           | 12040C    | 4      | 6    | 12 | 50 | 1 |
| 2700257                                                                           | 12050     | 5      | 5    | 16 | 60 | 1 |
| 2701852                                                                           | 12050A    | 5      | 5    | 30 | 70 | 1 |
| 2700285                                                                           | 12050B    | 5      | 6    | 16 | 60 | 1 |
| 2700258                                                                           | 12060     | 6      | 6    | 20 | 60 | 1 |
| 2701843                                                                           | 12060A    | 6      | 6    | 30 | 70 | 1 |
| 2701841                                                                           | 12060B    | 6      | 6    | 38 | 80 | 1 |
| 2700259                                                                           | 12080     | 8      | 8    | 22 | 60 | 1 |
| 2701854                                                                           | 12080A    | 8      | 8    | 38 | 80 | 1 |
| 2700260                                                                           | 12100     | 10     | 10   | 30 | 75 | 1 |
| 2700261                                                                           | 12120     | 12     | 12   | 30 | 75 | 1 |



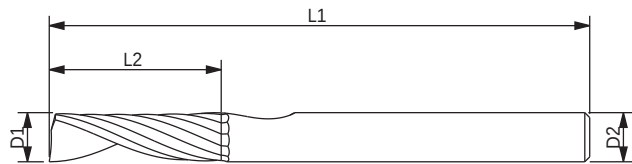
|              |           | Ø D1 |       | Ø D2 |      | L2    |      | L1   |        |   |
|--------------|-----------|------|-------|------|------|-------|------|------|--------|---|
| Cat-Nr 12000 |           | mm   | inch  | mm   | inch | mm    | inch | mm   | inch   | z |
| Ref.         | LMT- Code | INCH |       |      |      |       |      |      |        |   |
| 2701848      | 12317     | 3,17 | 1/8"  | 6,35 | 1/4" | 12,7  | 1/2" | 38,1 | 1 1/2" | 1 |
| 2701851      | 12476     | 4,76 | 3/16" | 6,35 | 1/4" | 15,87 | 5/8" | 50,8 | 2"     | 1 |
| 2701853      | 12635     | 6,35 | 1/4"  | 6,35 | 1/4" | 19,05 | 3/4" | 50,8 | 2"     | 1 |



EXPERT ADVICE

The chips are ejected through the end of the cutter. A space between the material and the cutting table is necessary to clear the chips.

➡ Plastic, foam board, wood



| Cat-Nr 13000 |           | Ø D1 | Ø D2 | L2 | L1 | z |
|--------------|-----------|------|------|----|----|---|
| Ref.         | LMT- Code | mm   | mm   | mm | mm |   |
| 2750696      | 13018     | 1,8  | 3    | 6  | 30 | 1 |
| 2700280      | 13010     | 1    | 3    | 4  | 30 | 1 |
| 2750688      | 13011     | 1,1  | 3    | 4  | 30 | 1 |
| 2750690      | 13012     | 1,2  | 3    | 4  | 30 | 1 |
| 2750692      | 13014     | 1,4  | 3    | 4  | 30 | 1 |
| 2700286      | 13015     | 1,5  | 3    | 6  | 30 | 1 |
| 2750694      | 13016     | 1,6  | 3    | 6  | 30 | 1 |
| 2700132      | 13020     | 2    | 2    | 8  | 30 | 1 |
| 2701855      | 13020A    | 2    | 2    | 8  | 60 | 1 |
| 2700287      | 13020B    | 2    | 3    | 8  | 30 | 1 |
| 2728731      | 13020C    | 2    | 6    | 8  | 50 | 1 |
| 2700262      | 13025     | 2,5  | 2,5  | 8  | 30 | 1 |
| 2701856      | 13025A    | 2,5  | 2,5  | 8  | 60 | 1 |
| 2700263      | 13030     | 3    | 3    | 10 | 30 | 1 |
| 2817688      | 13030F    | 3    | 3    | 12 | 40 | 1 |
| 2731105      | 13030E    | 3    | 3    | 15 | 40 | 1 |
| 2701867      | 13030A    | 3    | 3    | 10 | 60 | 1 |
| 2700288      | 13030B    | 3    | 6    | 10 | 50 | 1 |
| 2817690      | 13030G    | 3    | 6    | 12 | 50 | 1 |
| 2709117      | 13030C    | 3    | 3    | 20 | 60 | 1 |
| 2709118      | 13030D    | 3    | 6    | 20 | 60 | 1 |
| 2700264      | 13040     | 4    | 4    | 12 | 50 | 1 |
| 2828107      | 13040F    | 4    | 4    | 14 | 50 | 1 |



| Cat-Nr 13000 |           | Ø D1 | Ø D2 | L2 | L1 | z |
|--------------|-----------|------|------|----|----|---|
| Ref.         | LMT- Code | mm   | mm   | mm | mm |   |
| 2828108      | 13040G    | 4    | 4    | 22 | 60 | 1 |
| 2701860      | 13040B    | 4    | 4    | 30 | 70 | 1 |
| 2700289      | 13040C    | 4    | 6    | 12 | 50 | 1 |
| 2828109      | 13040H    | 4    | 6    | 14 | 50 | 1 |
| 2828110      | 13040J    | 4    | 6    | 22 | 60 | 1 |
| 2734847      | 13040E    | 4    | 4    | 12 | 40 | 1 |
| 2700265      | 13050     | 5    | 5    | 16 | 60 | 1 |
| 2819576      | 13050C    | 5    | 5    | 22 | 60 | 1 |
| 2817700      | 13050D    | 5    | 6    | 22 | 60 | 1 |
| 2701861      | 13050A    | 5    | 5    | 30 | 70 | 1 |
| 2700290      | 13050B    | 5    | 6    | 16 | 60 | 1 |
| 2817702      | 13060C    | 6    | 6    | 14 | 50 | 1 |
| 2867836      | 13060D    | 6    | 6    | 22 | 60 | 1 |
| 2828111      | 13060E    | 6    | 6    | 32 | 70 | 1 |
| 2701863      | 13060B    | 6    | 6    | 38 | 80 | 1 |
| 2700267      | 13080     | 8    | 8    | 22 | 60 | 1 |
| 2817710      | 13080B    | 8    | 8    | 32 | 70 | 1 |
| 2701865      | 13080A    | 8    | 8    | 38 | 80 | 1 |
| 2817712      | 13080C    | 8    | 8    | 42 | 80 | 1 |
| 2700268      | 13100     | 10   | 10   | 30 | 75 | 1 |
| 2700269      | 13120     | 12   | 12   | 30 | 75 | 1 |



| Cat-Nr 13000 |           | Ø D1 |       | Ø D2 |       | L2    |         | L1    |        | z |
|--------------|-----------|------|-------|------|-------|-------|---------|-------|--------|---|
| Ref.         | LMT- Code | mm   | inch  | mm   | inch  | mm    | inch    | mm    | inch   |   |
| 2781272      | 13159     | 1,59 | 1/16" | 3,17 | 1/8"  | 6,35  | 1/4"    | 38,1  | 1 1/2" | 1 |
| 2701858      | 13317     | 3,17 | 1/8"  | 6,35 | 1/4"  | 12,7  | 1/2"    | 38,1  | 1 1/2" | 1 |
| 2703218      | 13317A    | 3,17 | 1/8"  | 3,17 | 1/8"  | 12,7  | 1/2"    | 50,8  | 2"     | 1 |
| 2701866      | 13476     | 4,76 | 3/16" | 6,35 | 1/4"  | 15,87 | 5/8"    | 50,8  | 2"     | 1 |
| 2703219      | 13476A    | 4,76 | 3/16" | 4,76 | 3/16" | 15,87 | 5/8"    | 50,8  | 2"     | 1 |
| 2709114      | 13476B    | 4,76 | 3/16" | 6,35 | 1/4"  | 31,75 | 1 1/4"  | 76,2  | 3"     | 1 |
| 2701864      | 13635     | 6,35 | 1/4"  | 6,35 | 1/4"  | 19,05 | 3/4"    | 50,8  | 2"     | 1 |
| 2709115      | 13635A    | 6,35 | 1/4"  | 6,35 | 1/4"  | 38,1  | 1 1/2"  | 76,2  | 3"     | 1 |
| 2743445      | 13635B    | 6,35 | 1/4"  | 6,35 | 1/4"  | 58    | 2 1/4"  | 95,25 | 3 3/4" | 1 |
| 2750260      | 13635C    | 6,35 | 1/4"  | 6,35 | 1/4"  | 28    | 1 1/8"  | 76,2  | 3"     | 1 |
| 2743447      | 13952     | 9,52 | 3/8"  | 9,52 | 3/8"  | 28,57 | 1 1/8"  | 76,2  | 3"     | 1 |
| 2743449      | 13952A    | 9,52 | 3/8"  | 9,52 | 3/8"  | 80,96 | 3 3/16" | 127   | 5"     | 1 |
| 2709116      | 13127     | 12,7 | 1/2"  | 12,7 | 1/2"  | 31,75 | 1 1/4"  | 76,2  | 3"     | 1 |
| 2751019      | 13127A    | 12,7 | 1/2"  | 12,7 | 1/2"  | 50,8  | 2"      | 102   | 4"     | 1 |

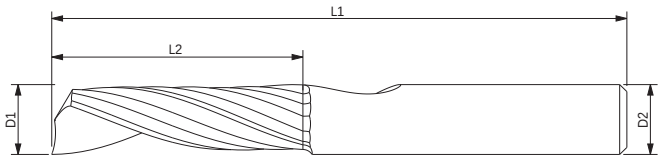


EXPERT ADVICE

The chips are ejected on the shank side of the tool. Ideally used on machines with a vacuum process, this cutter allows a good surface finish.



➔ Plastics and non-ferrous metals



| Cat-Nr 53 000 |          | Ø D1 | Ø D2 | L2 | L1 | z |
|---------------|----------|------|------|----|----|---|
| Ref.          | LMT-Code | mm   | mm   | mm | mm |   |
| 2823827       | 53030    | 3    | 3    | 9  | 30 | 1 |
| 2823828       | 53040    | 4    | 4    | 13 | 50 | 1 |
| 2803593       | 53040A   | 4    | 6    | 13 | 50 | 1 |
| 2823830       | 53060    | 6    | 6    | 16 | 50 | 1 |
| 2823831       | 53080    | 8    | 8    | 20 | 60 | 1 |
| 2823832       | 53100    | 10   | 10   | 23 | 60 | 1 |



| Cat-Nr 53 000 |          | Ø D1 |       | Ø D2 |       | L2   |      | L1    |        | z |
|---------------|----------|------|-------|------|-------|------|------|-------|--------|---|
| Ref.          | LMT-Code | mm   | inch  | mm   | inch  | mm   | inch | mm    | inch   |   |
| 2864636       | 53476    | 4,76 | 3/16" | 4,76 | 3/16" | 12,7 | 1/2" | 38,1  | 1 1/2" | 1 |
| 2864637       | 53635    | 6,35 | 1/4"  | 6,35 | 1/4"  | 16   | 5/8" | 50,8  | 2"     | 1 |
| 2864638       | 53952    | 9,52 | 3/8"  | 9,52 | 3/8"  | 25,4 | 1"   | 60,32 | 2 3/8" | 1 |



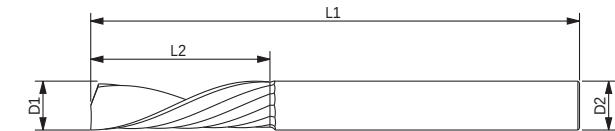
EXPERT ADVICE

The CRISTAL range of endmills provides better results in surface quality, tool life and a geometry allowing plastics and non-ferrous metals machining.

LMT as tool manufacturer supplies machining solutions for composites, exotic metals, metals, etc



➔ Non ferrous metals



|  |          | Ø D1   | Ø D2 | L2 | L1 |   |
|-----------------------------------------------------------------------------------|----------|--------|------|----|----|---|
| Cat-Nr 22 000                                                                     |          | mm     | mm   | mm | mm | z |
| Ref.                                                                              | LMT-Code | METRIC |      |    |    |   |
| 2700139                                                                           | 22015    | 1.5    | 3    | 4  | 30 | 1 |
| 2700051                                                                           | 22020    | 2      | 3    | 5  | 30 | 1 |
| 2700140                                                                           | 22025    | 2.5    | 3    | 6  | 30 | 1 |
| 2700141                                                                           | 22030    | 3      | 3    | 8  | 30 | 1 |
| 2700142                                                                           | 22040    | 4      | 4    | 12 | 60 | 1 |
| 2700147                                                                           | 22040A   | 4      | 6    | 10 | 50 | 1 |
| 2700143                                                                           | 22050    | 5      | 5    | 16 | 60 | 1 |
| 2700148                                                                           | 22050A   | 5      | 6    | 12 | 50 | 1 |
| 2700144                                                                           | 22060    | 6      | 6    | 15 | 50 | 1 |
| 2700145                                                                           | 22080    | 8      | 8    | 20 | 60 | 1 |
| 2700146                                                                           | 22100    | 10     | 10   | 23 | 60 | 1 |



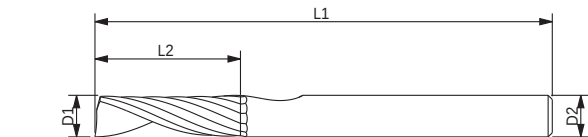
|                                                                                    |          |      |       |      |      |      |       |      |        |   |
|------------------------------------------------------------------------------------|----------|------|-------|------|------|------|-------|------|--------|---|
|  |          | Ø D1 |       | Ø D2 |      | L2   |       | L1   |        | z |
| Cat-Nr 22 000                                                                      |          | mm   | inch  | mm   | inch | mm   | inch  | mm   | inch   |   |
| Ref.                                                                               | LMT-Code | INCH |       |      |      |      |       |      |        |   |
| 2730637                                                                            | 22317    | 3,17 | 1/8"  | 6,35 | 1/4" | 7,93 | 5/16" | 38,1 | 1 1/2" | 1 |
| 2724106                                                                            | 22476    | 4,76 | 3/16" | 6,35 | 1/4" | 12   | 1/2"  | 50,8 | 2"     | 1 |
| 2730641                                                                            | 22635    | 6,35 | 1/4"  | 6,35 | 1/4" | 15   | 5/8"  | 50,8 | 2"     | 1 |



EXPERT ADVICE

The chips are ejected through the end of the cutter.  
A space between the material and the cutting table  
is necessary to clear the chips.

➔ Non ferrous metals



|               |          | Ø D1   | Ø D2 | L2 | L1  |   |
|---------------|----------|--------|------|----|-----|---|
| Cat-Nr 33 000 |          | mm     | mm   | mm | mm  | z |
| Ref.          | LMT-Code | METRIC |      |    |     |   |
| 2700149       | 33015    | 1,5    | 3    | 4  | 30  | 1 |
| 2700131       | 33020    | 2      | 3    | 5  | 30  | 1 |
| 2700150       | 33025    | 2,5    | 3    | 6  | 30  | 1 |
| 2700151       | 33030    | 3      | 3    | 8  | 30  | 1 |
| 2700153       | 33040    | 4      | 4    | 12 | 60  | 1 |
| 2700154       | 33040A   | 4      | 6    | 10 | 50  | 1 |
| 2760622       | 33040B   | 4      | 4    | 30 | 70  | 1 |
| 2700156       | 33050    | 5      | 5    | 16 | 60  | 1 |
| 2700157       | 33050A   | 5      | 6    | 12 | 50  | 1 |
| 2758088       | 33050B   | 5      | 5    | 30 | 70  | 1 |
| 2758086       | 33050C   | 5      | 8    | 25 | 70  | 1 |
| 2760621       | 33050D   | 5      | 8    | 35 | 80  | 1 |
| 2700158       | 33060    | 6      | 6    | 15 | 50  | 1 |
| 2754630       | 33060A   | 6      | 6    | 15 | 70  | 1 |
| 2758092       | 33060B   | 6      | 6    | 20 | 60  | 1 |
| 2758094       | 33060C   | 6      | 6    | 30 | 70  | 1 |
| 2758096       | 33060D   | 6      | 6    | 38 | 80  | 1 |
| 2758090       | 33060E   | 6      | 8    | 30 | 80  | 1 |
| 2700160       | 33080    | 8      | 8    | 20 | 60  | 1 |
| 2754632       | 33080A   | 8      | 8    | 20 | 80  | 1 |
| 2758100       | 33080B   | 8      | 8    | 38 | 80  | 1 |
| 2700161       | 33100    | 10     | 10   | 23 | 60  | 1 |
| 2754634       | 33100A   | 10     | 10   | 23 | 100 | 1 |
| 2758102       | 33100B   | 10     | 10   | 30 | 75  | 1 |



|               |          | Ø D1 |       | Ø D2 |       | L2    |        | L1   |        |   |
|---------------|----------|------|-------|------|-------|-------|--------|------|--------|---|
| Cat-Nr 33 000 |          | mm   | inch  | mm   | inch  | mm    | inch   | mm   | inch   | z |
| Ref.          | LMT-Code | INCH |       |      |       |       |        |      |        |   |
| 2700152       | 33317    | 3,17 | 1/8"  | 6,35 | 1/4"  | 8     | 5/16"  | 38,1 | 1 1/2" | 1 |
| 2709120       | 33317A   | 3,17 | 1/8"  | 3,17 | 1/8"  | 8     | 5/16"  | 38,1 | 1 1/2" | 1 |
| 2700155       | 33476    | 4,76 | 3/16" | 6,35 | 1/4"  | 12    | 1/2"   | 50,8 | 2      | 1 |
| 2709121       | 33476A   | 4,76 | 3/16" | 4,76 | 3/16" | 12    | 1/2"   | 50,8 | 2      | 1 |
| 2781274       | 33476B   | 4,76 | 3/16" | 4,76 | 3/16" | 15,9  | 5/8"   | 50,8 | 2      | 1 |
| 2700159       | 33635    | 6,35 | 1/4"  | 6,35 | 1/4"  | 15    | 5/8"   | 50,8 | 2      | 1 |
| 2744581       | 33952    | 9,52 | 3/8"  | 9,52 | 3/8"  | 25,4  | 1      | 76,2 | 3      | 1 |
| 2744583       | 33127    | 12,7 | 1/2"  | 12,7 | 1/2"  | 28,57 | 1 1/8" | 88,9 | 3 1/2" | 1 |



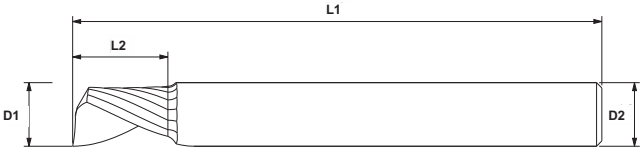
EXPERT ADVICE

The chips are ejected towards the shank of the cutter.  
Most popular design as vacuum directly above the tool  
offers a very clean and efficient operation.





Non ferrous metals, composites panels (Alucobond®, Dibond®, ...)



| Cat-Nr GDA |          | Ø D1 | Ø D2 | L2  | L1 | z |
|------------|----------|------|------|-----|----|---|
| Ref.       | LMT-Code | mm   | mm   | mm  | mm |   |
| 2828082    | GDA030   | 3    | 3    | 4,5 | 40 | 1 |
| 2828083    | GDA030A  | 3    | 6    | 4,5 | 50 | 1 |
| 2828084    | GDA040   | 4    | 4    | 6   | 50 | 1 |
| 2828085    | GDA040A  | 4    | 6    | 6   | 50 | 1 |
| 2828086    | GDA050   | 5    | 5    | 7,5 | 50 | 1 |
| 2828087    | GDA060   | 6    | 6    | 9   | 50 | 1 |
| 2828088    | GDA080   | 8    | 8    | 12  | 60 | 1 |
| 2828089    | GDA100   | 10   | 10   | 15  | 65 | 1 |



EXPERT ADVICE

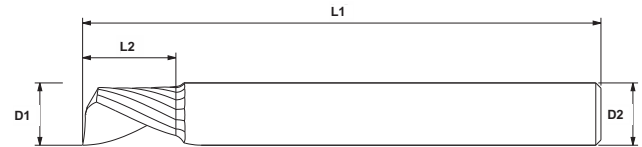
This tool geometry has been specially developed for non-ferrous panels machining.  
This products allow you to:

- Increase cutting speeds
- Improve surface finish

For best result we recommend you choose a diameter close to the material thickness.  
Machining with coolant is highly recommended



Non ferrous metals, composites panels (Alucobond®, Dibond®, ...)



| Cat-Nr XGDA |          | Ø D1 | Ø D2 | L2  | L1 | z |
|-------------|----------|------|------|-----|----|---|
| Ref.        | LMT-Code | mm   | mm   | mm  | mm |   |
| 2828090     | XGDA030  | 3    | 3    | 4,5 | 40 | 1 |
| 2830244     | XGDA030A | 3    | 6    | 4,5 | 50 | 1 |
| 2830245     | XGDA040  | 4    | 4    | 6   | 50 | 1 |
| 2830247     | XGDA040A | 4    | 6    | 6   | 50 | 1 |
| 2830248     | XGDA050  | 5    | 5    | 7,5 | 50 | 1 |
| 2828091     | XGDA060  | 6    | 6    | 9   | 50 | 1 |
| 2830246     | XGDA080  | 8    | 8    | 12  | 60 | 1 |
| 2828092     | XGDA100  | 10   | 10   | 15  | 65 | 1 |



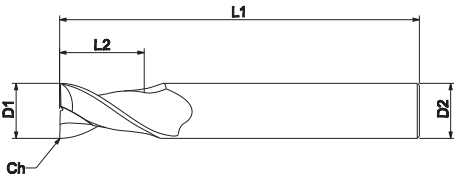
EXPERT ADVICE

This tool geometry has been specially developed for non-ferrous panels machining.  
This products allow you to:

- Increase cutting speeds
- Improve surface finish

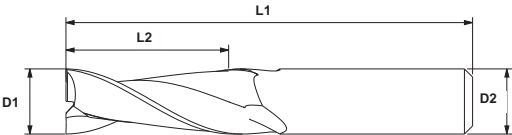
For best result we recommend you to choose a diameter close to the material thickness.  
This cutter is provided with an innovative coating which prevents chips from sticking in the flutes. Machining without coolant.

➔ Aluminium and non-ferrous metals



| Cat-Nr 176 000 |          | Ø D1 | Ø D2 | L2 | L1  | CH 45° | z |
|----------------|----------|------|------|----|-----|--------|---|
| Ref.           | LMT-Code | mm   | mm   | mm | mm  | mm     |   |
| METRIC         |          |      |      |    |     |        |   |
| 2727733        | 176020   | 2    | 6    | 6  | 50  | 0,1    | 2 |
| 2727735        | 176030   | 3    | 6    | 7  | 50  | 0,1    | 2 |
| 2727321        | 176040   | 4    | 6    | 8  | 50  | 0,1    | 2 |
| 2727323        | 176050   | 5    | 6    | 10 | 50  | 0,2    | 2 |
| 2727737        | 176060   | 6    | 6    | 10 | 50  | 0,2    | 2 |
| 2727739        | 176080   | 8    | 8    | 15 | 60  | 0,2    | 2 |
| 2727741        | 176100   | 10   | 10   | 18 | 65  | 0,25   | 2 |
| 2727743        | 176120   | 12   | 12   | 20 | 70  | 0,25   | 2 |
| 2727745        | 176140   | 14   | 14   | 22 | 75  | 0,25   | 2 |
| 2727747        | 176160   | 16   | 16   | 25 | 80  | 0,3    | 2 |
| 6550080        | 176180   | 18   | 18   | 28 | 100 | 0,3    | 2 |
| 2727751        | 176200   | 20   | 20   | 35 | 100 | 0,3    | 2 |

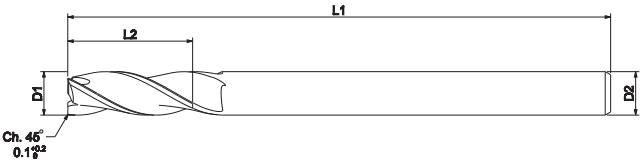
➔ Ferrous metals (steel, stainless steel, etc.)



| Cat-Nr 16 000 |          | Ø D1 | Ø D2 | L2  | L1 | z |
|---------------|----------|------|------|-----|----|---|
| Ref.          | LMT-Code | mm   | mm   | mm  | mm |   |
| METRIC        |          |      |      |     |    |   |
| 2700058       | 16010    | 1    | 3    | 4   | 38 | 2 |
| 2700165       | 16015    | 1,5  | 3    | 4,5 | 38 | 2 |
| 2700112       | 16020    | 2    | 2    | 7   | 40 | 2 |
| 2700166       | 16020A   | 2    | 3    | 6,3 | 35 | 2 |
| 2700167       | 16025    | 2,5  | 2,5  | 8   | 40 | 2 |
| 2700168       | 16025A   | 2,5  | 3    | 9   | 38 | 2 |
| 2700169       | 16030    | 3    | 3    | 10  | 40 | 2 |
| 2700171       | 16040    | 4    | 4    | 11  | 48 | 2 |



| Cat-Nr 16 000 |          | Ø D1 | Ø D2 | L2 | L1 | z |
|---------------|----------|------|------|----|----|---|
| Ref.          | LMT-Code | mm   | mm   | mm | mm |   |
| METRIC        |          |      |      |    |    |   |
| 2700173       | 16050    | 5    | 5    | 13 | 60 | 2 |
| 2700175       | 16060    | 6    | 6    | 16 | 60 | 2 |
| 2700177       | 16070    | 7    | 7    | 20 | 60 | 2 |
| 2700180       | 16080    | 8    | 8    | 23 | 60 | 2 |
| 2700182       | 16090    | 9    | 9    | 23 | 60 | 2 |
| 2700184       | 16100    | 10   | 10   | 23 | 60 | 2 |
| 2700188       | 16120    | 12   | 12   | 30 | 76 | 2 |
| 2700192       | 16140    | 14   | 14   | 30 | 76 | 2 |



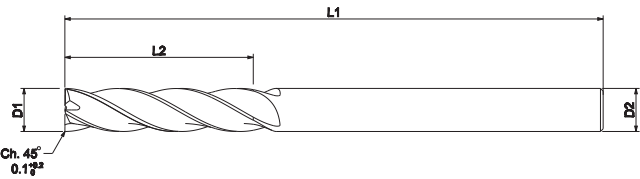
| Cat-Nr 102 000 |           | Ø D1 | Ø D2 | L2 | L1 | z |
|----------------|-----------|------|------|----|----|---|
| Ref.           | LMT- Code | mm   | mm   | mm | mm |   |
| METRIC         |           |      |      |    |    |   |
| 6550353        | 102020    | 2    | 2    | 7  | 40 | 3 |
| 6550000        | 102030    | 3    | 3    | 10 | 40 | 3 |
| 6550001        | 102040    | 4    | 4    | 11 | 48 | 3 |
| 6550002        | 102050    | 5    | 5    | 13 | 60 | 3 |
| 6550003        | 102060    | 6    | 6    | 16 | 60 | 3 |
| 6550004        | 102070    | 7    | 7    | 20 | 60 | 3 |
| 6550005        | 102080    | 8    | 8    | 23 | 60 | 3 |
| 6550006        | 102090    | 9    | 9    | 23 | 60 | 3 |
| 6550007        | 102100    | 10   | 10   | 23 | 60 | 3 |



| Cat-Nr 102 000 |           | Ø D1 | Ø D2 | L2 | L1 | z |
|----------------|-----------|------|------|----|----|---|
| Ref.           | LMT- Code | mm   | mm   | mm | mm |   |
| METRIC         |           |      |      |    |    |   |
| 6550008        | 102110    | 11   | 11   | 30 | 76 | 3 |
| 6550009        | 102120    | 12   | 12   | 30 | 76 | 3 |
| 6550010        | 102130    | 13   | 13   | 30 | 76 | 3 |
| 6550011        | 102140    | 14   | 14   | 30 | 76 | 3 |
| 6550012        | 102150    | 15   | 15   | 30 | 76 | 3 |
| 6550013        | 102160    | 16   | 16   | 32 | 80 | 3 |
| 6550014        | 102180    | 18   | 18   | 32 | 80 | 3 |
| 6550015        | 102200    | 20   | 20   | 38 | 90 | 3 |



| Cat-Nr 102 000 |           | Ø D1 |       | Ø D2 |      | L2 |        | L1 |        | z |
|----------------|-----------|------|-------|------|------|----|--------|----|--------|---|
| Ref.           | LMT- Code | mm   | inch  | mm   | inch | mm | inch   | mm | inch   |   |
| INCH           |           |      |       |      |      |    |        |    |        |   |
| 2709122        | 102317    | 3,17 | 1/8"  | 6,35 | 1/4" | 10 | 0.393" | 40 | 1.574" | 3 |
| 2709123        | 102476    | 4,76 | 3/16" | 6,35 | 1/4" | 11 | 0.433" | 48 | 1.89"  | 3 |
| 2709124        | 102635    | 6,35 | 1/4"  | 6,35 | 1/4" | 16 | 0.63"  | 60 | 2.362" | 3 |

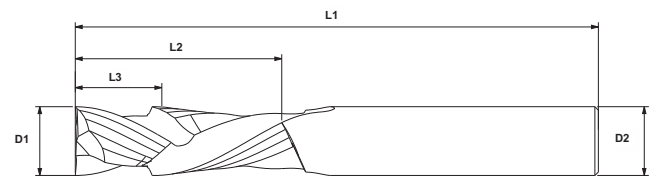


| Cat-Nr 15 000 |           | Ø D1 | Ø D2 | L2  | L1 | z |
|---------------|-----------|------|------|-----|----|---|
| Ref.          | LMT- Code | mm   | mm   | mm  | mm |   |
| METRIC        |           |      |      |     |    |   |
| 6550314       | 15010     | 1    | 3    | 4   | 38 | 4 |
| 6550315       | 15015     | 1,5  | 3    | 4,5 | 38 | 4 |
| 6550037       | 15020     | 2    | 2    | 7   | 40 | 4 |
| 6550384       | 15020A    | 2    | 3    | 6,3 | 35 | 4 |
| 2700197       | 15025     | 2,5  | 2,5  | 8   | 40 | 4 |
| 2706135       | 15025A    | 2,5  | 3    | 9   | 38 | 4 |
| 6550039       | 15030     | 3    | 3    | 10  | 40 | 4 |
| 6550040       | 15035     | 3,5  | 3,5  | 10  | 40 | 4 |
| 6550041       | 15040     | 4    | 4    | 11  | 48 | 4 |
| 6550042       | 15045     | 4,5  | 4,5  | 11  | 48 | 4 |
| 6550043       | 15050     | 5    | 5    | 13  | 60 | 4 |
| 2825803       | 15055     | 5,5  | 5,5  | 13  | 60 | 4 |



| Cat-Nr 15 000 |           | Ø D1 | Ø D2 | L2 | L1 | z |
|---------------|-----------|------|------|----|----|---|
| Ref.          | LMT- Code | mm   | mm   | mm | mm |   |
| METRIC        |           |      |      |    |    |   |
| 6550045       | 15060     | 6    | 6    | 16 | 60 | 4 |
| 6550046       | 15070     | 7    | 7    | 20 | 60 | 4 |
| 6550047       | 15080     | 8    | 8    | 23 | 60 | 4 |
| 6550057       | 15090     | 9    | 9    | 23 | 60 | 4 |
| 6550048       | 15100     | 10   | 10   | 23 | 60 | 4 |
| 6550049       | 15120     | 12   | 12   | 30 | 76 | 4 |
| 6550050       | 15140     | 14   | 14   | 30 | 76 | 4 |
| 6550052       | 15150     | 15   | 15   | 30 | 76 | 4 |
| 6550053       | 15160     | 16   | 16   | 32 | 80 | 4 |
| 2868163       | 15180     | 18   | 18   | 32 | 80 | 4 |
| 6550055       | 15200     | 20   | 20   | 38 | 90 | 4 |

➔ Laminate, Composites, MDF



|               |          | Ø D1   | Ø D2 | L2 | L3   | L1 |   |
|---------------|----------|--------|------|----|------|----|---|
| Cat-Nr 43 000 |          | mm     | mm   | mm | mm   | mm | z |
| Ref.          | LMT-Code | METRIC |      |    |      |    |   |
| 2709823       | 43060    | 6      | 6    | 22 | 11   | 76 | 2 |
| 2730648       | 43080    | 8      | 8    | 25 | 12,5 | 76 | 2 |
| 2709827       | 43100    | 10     | 10   | 30 | 15   | 76 | 2 |
| 2755506       | 43120    | 12     | 12   | 35 | 17,5 | 80 | 2 |

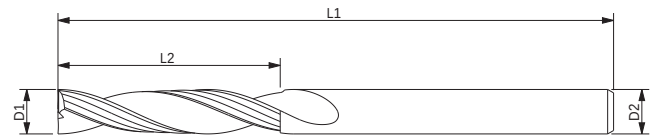
|               |          | Ø D1 |      | Ø D2 |      | L2    |        | L3   |       | L1   |        | z |  |
|---------------|----------|------|------|------|------|-------|--------|------|-------|------|--------|---|--|
|               |          | mm   | inch | mm   | inch | mm    | inch   | mm   | inch  | mm   | inch   |   |  |
| Cat-Nr 43 000 |          |      |      |      |      |       |        |      |       |      |        |   |  |
| Ref.          | LMT-Code | INCH |      |      |      |       |        |      |       |      |        |   |  |
| 2730650       | 43635    | 6,35 | 1/4" | 6,35 | 1/4" | 22,22 | 7/8"   | 11,1 | 7/16" | 63,5 | 2 1/2" | 2 |  |
| 2730646       | 43952    | 9,52 | 3/8" | 9,52 | 3/8" | 25,4  | 1"     | 12,7 | 1/2"  | 76,2 | 3"     | 2 |  |
| 2730652       | 43127    | 12,7 | 1/2" | 12,7 | 1/2" | 28,57 | 1 1/8" | 14,3 | 9/16" | 76,2 | 3"     | 2 |  |



EXPERT ADVICE

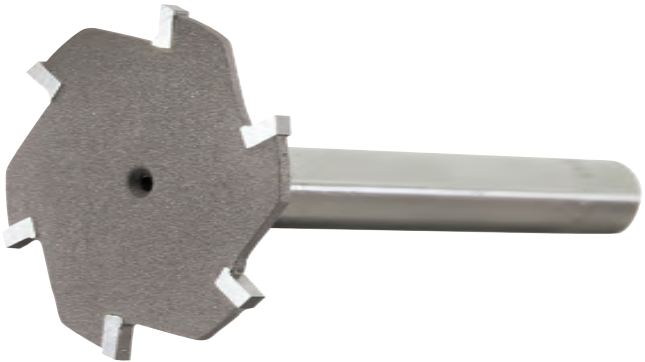
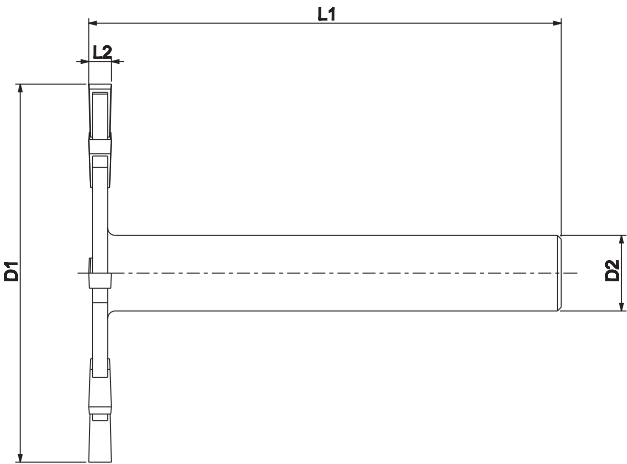
The sharp edge combined with an upcut-downcut helix allows to cut soft plastics also with skin layers without generating burrs.

➔ Plastic, foam board, wood

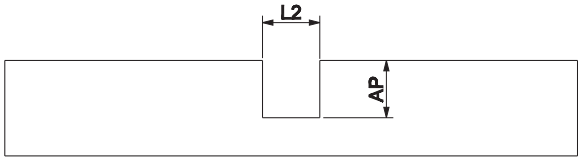


|                                                                                     |          |        |      |    |    |   |
|-------------------------------------------------------------------------------------|----------|--------|------|----|----|---|
|  |          |        |      |    |    |   |
|                                                                                     |          | Ø D1   | Ø D2 | L2 | L1 |   |
| Cat-Nr 193 000                                                                      |          | mm     | mm   | mm | mm | z |
| Ref.                                                                                | LMT-Code | METRIC |      |    |    |   |
| 2758471                                                                             | 193050   | 5      | 5    | 20 | 70 | 2 |
| 2755602                                                                             | 193060   | 6      | 6    | 22 | 76 | 2 |
| 2755604                                                                             | 193080   | 8      | 8    | 25 | 76 | 2 |
| 2755606                                                                             | 193100   | 10     | 10   | 30 | 76 | 2 |
| 2757588                                                                             | 193120   | 12     | 12   | 35 | 80 | 2 |



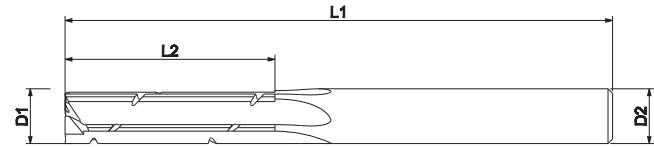


|          |           | Ø D1           | Ø D2 | L2  | L1 |   |        |
|----------|-----------|----------------|------|-----|----|---|--------|
|          |           | mm             | mm   | mm  | mm | z | Ap max |
| Cat-Nr R |           |                |      |     |    |   |        |
| Ref.     | LMT- Code | right rotation |      |     |    |   |        |
| 2702129  | 18112     | 15             | 6    | 1,2 | 28 | 6 | 4      |
| 2702134  | 18114     | 15             | 6    | 1,4 | 28 | 6 | 4      |
| 2702135  | 18116     | 15             | 6    | 1,6 | 28 | 6 | 4      |
| 2702136  | 18118     | 15             | 6    | 1,8 | 28 | 6 | 4      |
| 2702137  | 18120     | 15             | 6    | 2   | 28 | 6 | 4      |
| 2702138  | 18010     | 25             | 6    | 1   | 26 | 6 | 8,5    |
| 2703248  | 95046     | 25             | 8    | 1   | 62 | 6 | 8,5    |
| 2702139  | 18011     | 25             | 6    | 1,1 | 26 | 6 | 8,5    |
| 2702140  | 18012     | 25             | 6    | 1,2 | 26 | 6 | 8,5    |
| 2702141  | 18013     | 25             | 6    | 1,3 | 26 | 6 | 8,5    |
| 2702142  | 18014     | 25             | 6    | 1,4 | 26 | 6 | 8,5    |
| 2702143  | 18015     | 25             | 6    | 1,5 | 26 | 6 | 8,5    |
| 2702144  | 18016     | 25             | 6    | 1,6 | 26 | 6 | 8,5    |
| 2702145  | 18018     | 25             | 6    | 1,8 | 26 | 6 | 8,5    |
| 2702146  | 18020     | 25             | 6    | 2   | 26 | 6 | 8,5    |
| 2702133  | 82321     | 25             | 6    | 2   | 62 | 6 | 8,5    |
| 2700078  | 90279     | 25             | 8    | 2   | 62 | 6 | 8,5    |
| 2702130  | 90241     | 35             | 6    | 2   | 62 | 8 | 13,5   |
| 2702131  | 90467     | 50             | 10   | 3   | 62 | 8 | 19     |



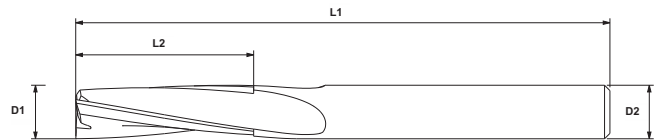
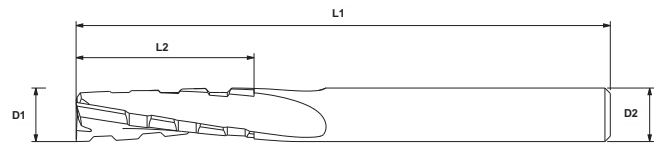
|          |           | Ø D1          | Ø D2 | L2 | L1 |   |        |
|----------|-----------|---------------|------|----|----|---|--------|
|          |           | mm            | mm   | mm | mm | z | Ap max |
| Cat-Nr R |           |               |      |    |    |   |        |
| Ref.     | LMT- Code | left rotation |      |    |    |   |        |
| 2702132  | 95154     | 25            | 6    | 2  | 62 | 6 | 8,5    |

➔ Glassfiber reinforced plastics (GFRP < 40%)



| Cat-Nr 02105 |          | Ø D1   | Ø D2 | L2 | L1 | z |
|--------------|----------|--------|------|----|----|---|
|              |          | mm     | mm   | mm | mm |   |
| Ref.         | LMT-Code | METRIC |      |    |    |   |
| 2754636      | 02105A   | 5      | 5    | 19 | 60 | 5 |
| 2754638      | 02105B   | 6      | 6    | 23 | 60 | 5 |
| 2754640      | 02105C   | 8      | 8    | 30 | 70 | 5 |

➔ Composite materials (abrasive), denser honeycomb, ...



| Cat-Nr STRAT-F |          | Ø D1           | Ø D2 | L2 | L1 | z |
|----------------|----------|----------------|------|----|----|---|
|                |          | mm             | mm   | mm | mm |   |
| Ref.           | LMT-Code | UPCUT / METRIC |      |    |    |   |
| 2700049        | STRATF6  | 6              | 6    | 20 | 60 | 3 |



| Cat-Nr STRAT-R |          | Ø D1           | Ø D2 | L2 | L1 | z |
|----------------|----------|----------------|------|----|----|---|
|                |          | mm             | mm   | mm | mm |   |
| Ref.           | LMT-Code | UPCUT / METRIC |      |    |    |   |
| 2826279        | STRATR6  | 6              | 6    | 20 | 60 | 3 |
| 2830889        | STRATR8  | 8              | 8    | 20 | 64 | 3 |
| 7053886        | PCL56269 | 10             | 10   | 22 | 75 | 3 |
| 7053887        | PCL56270 | 12             | 12   | 28 | 75 | 3 |



| Cat-Nr STRAT-R |          | Ø D1             | Ø D2 | L2 | L1 | z |
|----------------|----------|------------------|------|----|----|---|
|                |          | mm               | mm   | mm | mm |   |
| Ref.           | LMT-Code | DOWNCUT / METRIC |      |    |    |   |
| 7053888        | PCL56271 | 10               | 10   | 22 | 75 | 3 |
| 7053889        | PCL56272 | 12               | 12   | 28 | 75 | 3 |



EXPERT ADVICE

The chip-breaker geometry (STRAT-R) is perfectly suited for roughing operations. To get the best surface state possible use the finishing geometry (STRAT-F).

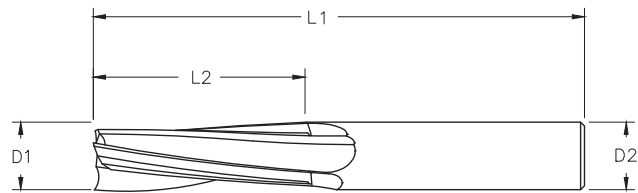


| Cat-Nr STRAT-R |          | Ø D1         | Ø D2 | L2     | L1   | z |
|----------------|----------|--------------|------|--------|------|---|
|                |          | inch         | inch | inch   | inch |   |
| Ref.           | LMT-Code | UPCUT / INCH |      |        |      |   |
| 7053890        | 67-205   | 3/8"         | 3/8" | 7/8"   | 3"   | 3 |
| 7053891        | 67-211   | 1/2"         | 1/2" | 1 1/8" | 3"   | 3 |
| 7053892        | 67-215   | 1/2"         | 1/2" | 2 2/8" | 4"   | 3 |

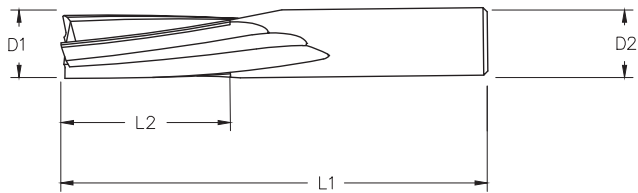


| Cat-Nr STRAT-R |          | Ø D1           | Ø D2 | L2     | L1     | z |
|----------------|----------|----------------|------|--------|--------|---|
|                |          | inch           | inch | inch   | inch   |   |
| Ref.           | LMT-Code | DOWNCUT / INCH |      |        |        |   |
| 7053893        | 67-206   | 3/8"           | 3/8" | 7/8"   | 3"     | 3 |
| 7053894        | 67-212   | 1/2"           | 1/2" | 1 1/8" | 3 1/2" | 3 |
| 7053895        | 67-216   | 1/2"           | 1/2" | 2 2/8" | 4 1/2" | 3 |

➔ Foam board



| Cat-Nr 60-200 |          | Ø D1  |      | Ø D2  |      | L2    |        | L1     |        | z |
|---------------|----------|-------|------|-------|------|-------|--------|--------|--------|---|
| Ref.          | LMT-Code | mm    | inch | mm    | inch | mm    | inch   | mm     | inch   |   |
| 7088755       | 60-239   | 6,35  | 1/4" | 6,35  | 1/4" | 9,52  | 3/8"   | 76,19  | 3"     | 3 |
| 7100389       | 60-241   | 6,35  | 1/4" | 6,35  | 1/4" | 22,23 | 7/8"   | 76,19  | 3"     | 3 |
| 7088756       | 60-243   | 9,52  | 3/8" | 9,52  | 3/8" | 15,88 | 5/8"   | 76,19  | 3"     | 3 |
| 2600889       | 60-245   | 9,52  | 3/8" | 9,52  | 3/8" | 28,58 | 1-1/8" | 76,19  | 3"     | 3 |
| 7088757       | 60-249   | 12,7  | 1/2" | 12,7  | 1/2" | 28,58 | 1-1/8" | 88,89  | 3-1/2" | 3 |
| 6601431       | 60-251   | 12,7  | 1/2" | 12,7  | 1/2" | 53,98 | 2-1/8" | 114,3  | 4-1/2" | 3 |
| 2865347       | 60-253   | 12,7  | 1/2" | 12,7  | 1/2" | 41,28 | 1-5/8" | 101,6  | 4"     | 3 |
| 2600893       | 60-269   | 19,04 | 3/4" | 19,04 | 3/4" | 41,28 | 1-5/8" | 101,6  | 4"     | 3 |
| 2600895       | 60-271   | 19,04 | 3/4" | 19,04 | 3/4" | 53,98 | 2-1/8" | 127    | 5"     | 3 |
| 2600897       | 60-277   | 19,04 | 3/4" | 19,04 | 3/4" | 79,38 | 3-1/8" | 152,39 | 6"     | 3 |

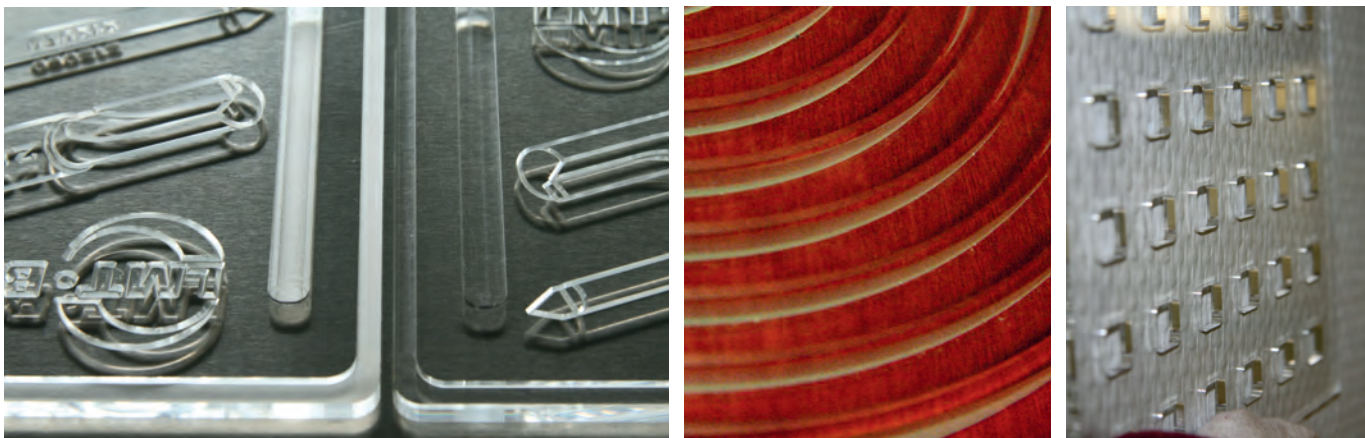


| Cat-Nr 60-200 |          | Ø D1  |      | Ø D2  |      | L2    |        | L1     |        | z |
|---------------|----------|-------|------|-------|------|-------|--------|--------|--------|---|
| Ref.          | LMT-Code | mm    | inch | mm    | inch | mm    | inch   | mm     | inch   |   |
| 6601420       | 60-240   | 6,35  | 1/4" | 6,35  | 1/4" | 9,52  | 3/8"   | 76,19  | 3"     | 3 |
| 7100391       | 60-242   | 6,35  | 1/4" | 6,35  | 1/4" | 22,23 | 7/8"   | 76,19  | 3"     | 3 |
| 2600888       | 60-244   | 9,52  | 3/8" | 9,52  | 3/8" | 15,88 | 5/8"   | 76,19  | 3"     | 3 |
| 2600890       | 60-246   | 9,52  | 3/8" | 9,52  | 3/8" | 28,58 | 1-1/8" | 76,19  | 3"     | 3 |
| 2600891       | 60-250   | 12,7  | 1/2" | 12,7  | 1/2" | 28,58 | 1-1/8" | 88,89  | 3-1/2" | 3 |
| 6601432       | 60-252   | 12,7  | 1/2" | 12,7  | 1/2" | 53,98 | 2-1/8" | 114,3  | 4-1/2" | 3 |
| 2600892       | 60-254   | 12,7  | 1/2" | 12,7  | 1/2" | 41,28 | 1-5/8" | 101,6  | 4"     | 3 |
| 2600894       | 60-270   | 19,04 | 3/4" | 19,04 | 3/4" | 41,28 | 1-5/8" | 101,6  | 4"     | 3 |
| 2600896       | 60-272   | 19,04 | 3/4" | 19,04 | 3/4" | 53,98 | 2-1/8" | 127    | 5"     | 3 |
| 2600898       | 60-278   | 19,04 | 3/4" | 19,04 | 3/4" | 79,38 | 3-1/8" | 152,39 | 6"     | 3 |



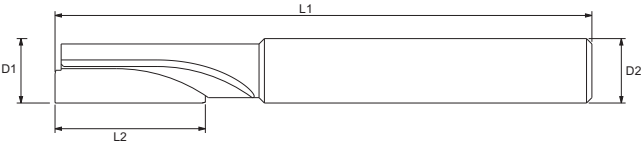
LMT Belin has developed a range of products for finishing operations in plastics (PMMA as an example). Those tools with a polycrystalline diamond insert (synthetic diamond – PCD) allow you to avoid polishing or flaming operations. Furthermore this range of tools will guarantee you long tool life and the possibility to regrind them (depending on our expert assessment)

- Clear surface finish
- Long tool life thanks to PCD insert





➔ Plastic



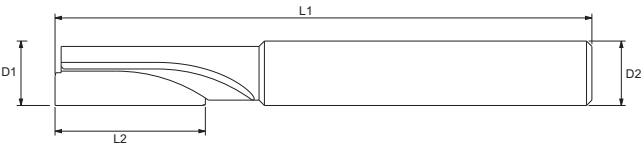
| PCD            |           | Ø D1   | Ø D2 | L2 | L1 |   |
|----------------|-----------|--------|------|----|----|---|
| Cat-Nr 205 000 |           | mm     | mm   | mm | mm | z |
| Ref.           | LMT- Code | METRIC |      |    |    |   |
| 2825477        | 205030    | 3      | 6    | 6  | 50 | 1 |
| 2825594        | 205040    | 4      | 6    | 10 | 50 | 1 |
| 2818506        | 205060    | 6      | 6    | 14 | 50 | 1 |
| 2818352        | 205080    | 8      | 8    | 18 | 50 | 1 |
| 2825459        | 205100    | 10     | 10   | 22 | 60 | 1 |



EXPERT ADVICE

The 205 SAPHIR milling cutter with its finegrade PCD tipped insert allows perfect surface finish for contour milling on plastics. Delivered with an endcut you can also machine pockets.

➔ Plastic



| PCD           |           | Ø D1   | Ø D2 | L2 | L1 |   |
|---------------|-----------|--------|------|----|----|---|
| Cat-Nr 206000 |           | mm     | mm   | mm | mm | z |
| Ref.          | LMT- Code | METRIC |      |    |    |   |
| 2864846       | 206030    | 3      | 6    | 6  | 50 | 1 |
| 2825883       | 206040    | 4      | 6    | 10 | 50 | 1 |
| 2865165       | 206060    | 6      | 6    | 14 | 50 | 1 |
| 2868376       | 206080    | 8      | 8    | 18 | 50 | 1 |
| 2868381       | 206100    | 10     | 8    | 22 | 60 | 1 |
| 2868377       | 206120    | 12     | 8    | 22 | 60 | 1 |

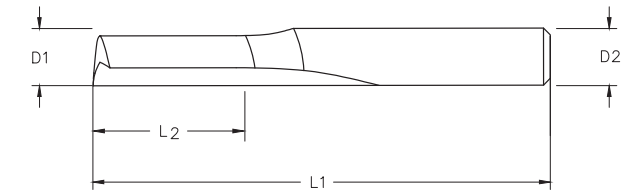


EXPERT ADVICE

The 206 SAPHIR milling cutter with its finegrade PCD tipped insert allows perfect surface finish on plastics. Delivered with an endcut you can also machine pockets with an extreme good surface state.

|               |           | Ø D1  |       | Ø D2 |      | L2    |        | L1    |      |   |
|---------------|-----------|-------|-------|------|------|-------|--------|-------|------|---|
| Cat-Nr 206000 |           | mm    | inch  | mm   | inch | mm    | inch   | mm    | inch | z |
| Ref.          | LMT- Code | INCH  |       |      |      |       |        |       |      |   |
| 2871934       | 206476    | 4,76  | 3/16" | 6,35 | 1/4" | 7,9   | 5/16"  | 76,2  | 3"   | 1 |
| 2871932       | 206635    | 6,35  | 1/4"  | 6,35 | 1/4" | 15,87 | 5/8"   | 76,2  | 3"   | 1 |
| 2871935       | 206793    | 7,937 | 5/16" | 9,52 | 3/8" | 15,87 | 5/8"   | 76,2  | 3"   | 1 |
| 2871936       | 206952    | 9,52  | 3/8"  | 9,52 | 3/8" | 15,87 | 5/8"   | 101,6 | 4"   | 1 |
| 2871937       | 206952A   | 9,52  | 3/8"  | 9,52 | 3/8" | 28,57 | 1 1/8" | 101,6 | 4"   | 1 |

Thermo-moulded plastics



|               |          | Ø D1   | Ø D2 | L2 | L1 |   |
|---------------|----------|--------|------|----|----|---|
| Cat-Nr 61-000 |          | mm     | mm   | mm | mm | z |
| Ref.          | LMT-Code | METRIC |      |    |    |   |
| 7054031       | 61-410   | 4      | 4    | 16 | 64 | 1 |
| 7054032       | 61-411   | 5      | 6    | 20 | 64 | 1 |
| 7054033       | 61-412   | 6      | 6    | 25 | 64 | 1 |
| 7054034       | 61-414   | 8      | 8    | 25 | 64 | 1 |
| 7054035       | 61-418   | 12     | 12   | 35 | 88 | 1 |

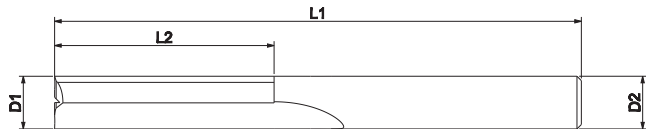
|               |           | Ø D1 |       | Ø D2 |      | L2    |        | L1   |        |   |
|---------------|-----------|------|-------|------|------|-------|--------|------|--------|---|
| Cat-Nr 61-000 |           | mm   | inch  | mm   | inch | mm    | inch   | mm   | inch   | z |
| Ref.          | LMT- Code | INCH |       |      |      |       |        |      |        |   |
| 7054025       | 61-042    | 3,17 | 1/8"  | 6,35 | 1/4" | 12,7  | 1/2"   | 50,8 | 2"     | 1 |
| 7054026       | 61-043    | 3,17 | 1/8"  | 6,35 | 1/4" | 15,87 | 5/8"   | 102  | 4"     | 1 |
| 7054027       | 61-062    | 4,76 | 3/16" | 6,35 | 1/4" | 15,87 | 5/8"   | 50,8 | 2"     | 1 |
| 7054028       | 61-082    | 6,35 | 1/4"  | 6,35 | 1/4" | 19,05 | 3/4"   | 63,5 | 2 1/2" | 1 |
| 7054029       | 61-084    | 6,35 | 1/4"  | 6,35 | 1/4" | 31,75 | 1 1/4" | 102  | 4"     | 1 |
| 7054030       | 61-122    | 9,52 | 3/8"  | 9,52 | 3/8" | 22,25 | 7/8"   | 63,5 | 2 1/2" | 1 |



EXPERT ADVICE

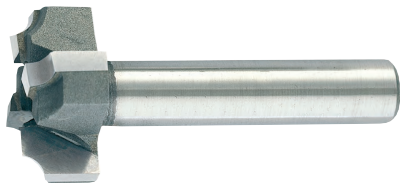
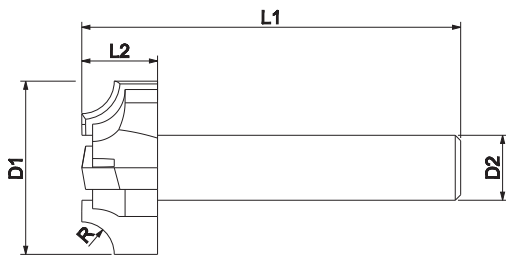
Can be used with manual machines. The influence from the cutting tool is neutral which improves part holding.

Plastics, thermosets plastics, wood



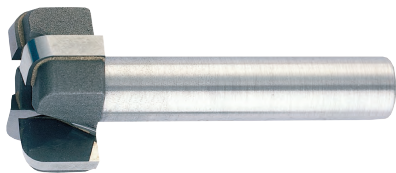
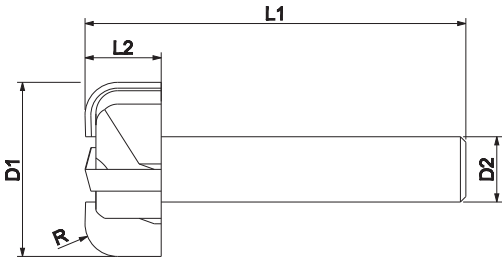
|               |           | Ø D1   | Ø D2 | L2 | L1 |   |
|---------------|-----------|--------|------|----|----|---|
| Cat-Nr 95 000 |           | mm     | mm   | mm | mm | z |
| Ref.          | LMT- Code | METRIC |      |    |    |   |
| 2749532       | 95209A    | 3      | 3    | 15 | 60 | 2 |
| 2749534       | 95209B    | 4      | 4    | 20 | 60 | 2 |
| 2749536       | 95209C    | 5      | 5    | 20 | 60 | 2 |
| 2722057       | 95209D    | 6      | 6    | 25 | 60 | 2 |
| 2749539       | 95209E    | 8      | 8    | 35 | 80 | 2 |

➔ Plastic, foam board, hard wood



Concave

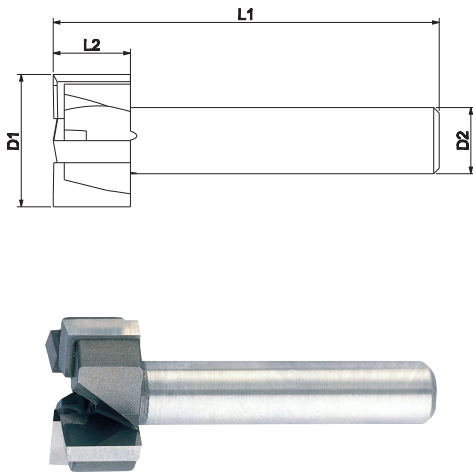
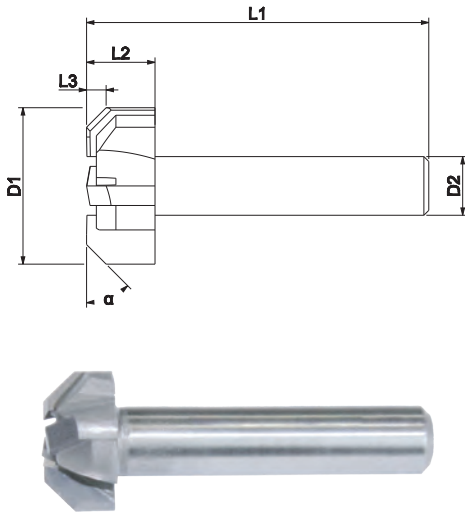
| Cat-Nr DE |            | Ø D1 | Ø D2 | L2 | L1 | R   | z |
|-----------|------------|------|------|----|----|-----|---|
| Ref.      | LMT- Code  | mm   | mm   | mm | mm | mm  |   |
| 2702470   | 47110 Ø 10 | 10   | 6    | 7  | 35 | 1   | 4 |
| 2702599   | 47110 Ø 12 | 12   | 6    | 7  | 35 | 1   | 4 |
| 2702600   | 47110 Ø 16 | 16   | 6    | 7  | 35 | 1   | 4 |
| 2702601   | 47110 Ø 20 | 20   | 6    | 7  | 35 | 1   | 4 |
| 2702471   | 47115 Ø 10 | 10   | 6    | 7  | 35 | 1.5 | 4 |
| 2702482   | 47115 Ø 12 | 12   | 6    | 7  | 35 | 1.5 | 4 |
| 2702604   | 47115 Ø 16 | 16   | 6    | 7  | 35 | 1.5 | 4 |
| 2702605   | 47115 Ø 20 | 20   | 6    | 7  | 35 | 1.5 | 4 |
| 2702409   | 47120 Ø 10 | 10   | 6    | 7  | 35 | 2   | 4 |
| 2702467   | 47120 Ø 12 | 12   | 6    | 7  | 35 | 2   | 4 |
| 2825694   | 47120 Ø 16 | 16   | 6    | 7  | 35 | 2   | 4 |
| 2702469   | 47120 Ø 20 | 20   | 6    | 7  | 35 | 2   | 4 |
| 2702472   | 47125 Ø 10 | 10   | 6    | 7  | 35 | 2.5 | 4 |
| 2702606   | 47125 Ø 12 | 12   | 6    | 7  | 35 | 2.5 | 4 |
| 2702698   | 47125 Ø 16 | 16   | 6    | 7  | 35 | 2.5 | 4 |
| 2702608   | 47125 Ø 20 | 20   | 6    | 7  | 35 | 2.5 | 4 |
| 2702473   | 47130 Ø 10 | 10   | 6    | 7  | 35 | 3   | 4 |
| 2702609   | 47130 Ø 12 | 12   | 6    | 7  | 35 | 3   | 4 |
| 2702610   | 47130 Ø 16 | 16   | 6    | 7  | 35 | 3   | 4 |
| 2702611   | 47130 Ø 20 | 20   | 6    | 7  | 35 | 3   | 4 |



Convex

| Cat-Nr DE |            | Ø D1 | Ø D2 | L2 | L1 | R   | z |
|-----------|------------|------|------|----|----|-----|---|
| Ref.      | LMT- Code  | mm   | mm   | mm | mm | mm  |   |
| 2702474   | 48105 Ø 10 | 10   | 6    | 7  | 35 | 0,5 | 4 |
| 2702612   | 48105 Ø 12 | 12   | 6    | 7  | 35 | 0,5 | 4 |
| 2702613   | 48105 Ø 16 | 16   | 6    | 7  | 35 | 0,5 | 4 |
| 2702614   | 48105 Ø 20 | 20   | 6    | 7  | 35 | 0,5 | 4 |
| 2702475   | 48110 Ø 10 | 10   | 6    | 7  | 35 | 1   | 4 |
| 2702615   | 48110 Ø 12 | 12   | 6    | 7  | 35 | 1   | 4 |
| 2702616   | 48110 Ø 16 | 16   | 6    | 7  | 35 | 1   | 4 |
| 2702617   | 48110 Ø 20 | 20   | 6    | 7  | 35 | 1   | 4 |
| 2702476   | 48115 Ø 10 | 10   | 6    | 7  | 35 | 1,5 | 4 |
| 2702618   | 48115 Ø 12 | 12   | 6    | 7  | 35 | 1,5 | 4 |
| 2702619   | 48115 Ø 16 | 16   | 6    | 7  | 35 | 1,5 | 4 |
| 2702620   | 48115 Ø 20 | 20   | 6    | 7  | 35 | 1,5 | 4 |
| 2702477   | 48120 Ø 10 | 10   | 6    | 7  | 35 | 2   | 4 |
| 2702621   | 48120 Ø 12 | 12   | 6    | 7  | 35 | 2   | 4 |
| 2702622   | 48120 Ø 16 | 16   | 6    | 7  | 35 | 2   | 4 |
| 2702623   | 48120 Ø 20 | 20   | 6    | 7  | 35 | 2   | 4 |
| 2702478   | 48125 Ø 10 | 10   | 6    | 7  | 35 | 2,5 | 4 |
| 2702624   | 48125 Ø 12 | 12   | 6    | 7  | 35 | 2,5 | 4 |
| 2702625   | 48125 Ø 16 | 16   | 6    | 7  | 35 | 2,5 | 4 |
| 2702626   | 48125 Ø 20 | 20   | 6    | 7  | 35 | 2,5 | 4 |
| 2702479   | 48130 Ø 10 | 10   | 6    | 7  | 35 | 3   | 4 |
| 2702627   | 48130 Ø 12 | 12   | 6    | 7  | 35 | 3   | 4 |
| 2702628   | 48130 Ø 16 | 16   | 6    | 7  | 35 | 3   | 4 |
| 2702629   | 48130 Ø 20 | 20   | 6    | 7  | 35 | 3   | 4 |
| 2702630   | 48140 Ø 12 | 12   | 6    | 7  | 35 | 4   | 4 |
| 2702631   | 48140 Ø 16 | 16   | 6    | 7  | 35 | 4   | 4 |
| 2702632   | 48140 Ø 20 | 20   | 6    | 7  | 35 | 4   | 4 |
| 2702634   | 48150 Ø 16 | 16   | 6    | 7  | 35 | 5   | 4 |
| 2702633   | 48150 Ø 20 | 20   | 6    | 7  | 35 | 5   | 4 |

➡ Plastic, foam board, hard wood



Angle

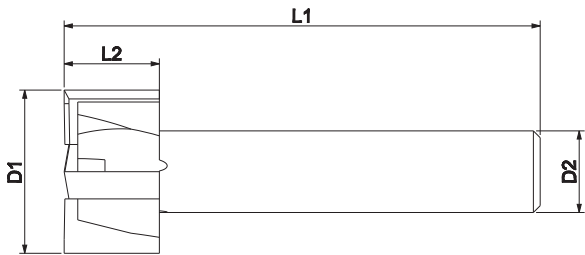
| Cat-Nr DE |            | Ø D1 | Ø D2 | L2 | L3  | L1 | α  | z |
|-----------|------------|------|------|----|-----|----|----|---|
| Ref.      | LMT- Code  | mm   | mm   | mm | mm  | mm | mm |   |
| 2702381   | 45130 Ø 10 | 10   | 6    | 7  | 1,7 | 35 | 30 | 4 |
| 2702384   | 45130 Ø 12 | 12   | 6    | 7  | 1,7 | 35 | 30 | 4 |
| 2702387   | 45130 Ø 16 | 16   | 6    | 7  | 1,7 | 35 | 30 | 4 |
| 2702390   | 45130 Ø 20 | 20   | 6    | 7  | 1,7 | 35 | 30 | 4 |
| 2702380   | 45145 Ø 10 | 10   | 6    | 7  | 2   | 35 | 45 | 4 |
| 2702383   | 45145 Ø 12 | 12   | 6    | 7  | 2   | 35 | 45 | 4 |
| 2702386   | 45145 Ø 16 | 16   | 6    | 7  | 2   | 35 | 45 | 4 |
| 2709587   | 45145 Ø 20 | 20   | 6    | 7  | 2   | 35 | 45 | 4 |
| 2702379   | 45160 Ø 10 | 10   | 6    | 7  | 2   | 35 | 60 | 4 |
| 2702382   | 45160 Ø 12 | 12   | 6    | 7  | 2   | 35 | 60 | 4 |
| 2702385   | 45160 Ø 16 | 16   | 6    | 7  | 2   | 35 | 60 | 4 |
| 2702388   | 45160 Ø 20 | 20   | 6    | 7  | 2   | 35 | 60 | 4 |
| 2702363   | 45170 Ø 10 | 10   | 6    | 7  | 3   | 35 | 70 | 4 |
| 2702354   | 45170 Ø 12 | 12   | 6    | 7  | 3   | 35 | 70 | 4 |
| 2702365   | 45170 Ø 16 | 16   | 6    | 7  | 3   | 35 | 70 | 4 |
| 2702366   | 45170 Ø 20 | 20   | 6    | 7  | 3   | 35 | 70 | 4 |
| 2702353   | 45180 Ø 10 | 10   | 6    | 7  | 4   | 35 | 80 | 4 |
| 2702364   | 45180 Ø 12 | 12   | 6    | 7  | 4   | 35 | 80 | 4 |
| 2702355   | 45180 Ø 16 | 16   | 6    | 7  | 4   | 35 | 80 | 4 |
| 2702356   | 45180 Ø 20 | 20   | 6    | 7  | 4   | 35 | 80 | 4 |

| Cat-Nr DE |            | Ø D1 | Ø D2 | L2 | L1 | α  | z |
|-----------|------------|------|------|----|----|----|---|
| Ref.      | LMT- Code  | mm   | mm   | mm | mm | mm |   |
| 2702160   | 45190 Ø 10 | 10   | 6    | 7  | 35 | 90 | 4 |
| 2702198   | 45190 Ø 12 | 12   | 6    | 7  | 35 | 90 | 4 |
| 2702199   | 45190 Ø 16 | 16   | 6    | 7  | 35 | 90 | 4 |
| 2702200   | 45190 Ø 20 | 20   | 6    | 7  | 35 | 90 | 4 |



Face milling cutter

➔ Plastic, wood, non-ferrous metals



| PCD          |          | Ø D1   | Ø D2 | L2 | L1 |   |
|--------------|----------|--------|------|----|----|---|
| Cat-Nr DEPCD |          | mm     | mm   | mm | mm | z |
| Ref.         | LMT-Code | METRIC |      |    |    |   |
| 2709462      | 98105    | 16     | 6    | 6  | 36 | 4 |

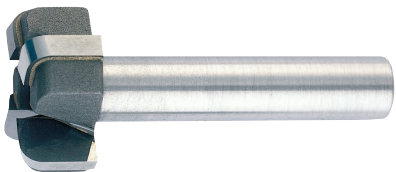
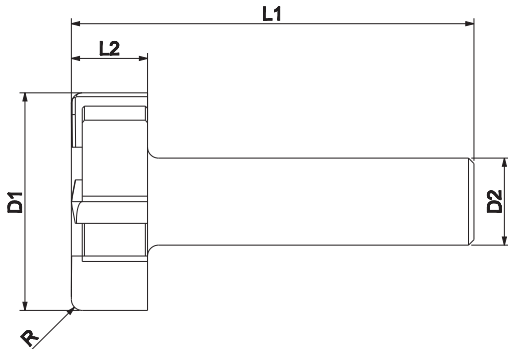


EXPERT ADVICE

PCD advantages:  
- very long tool life  
- best surface finish

PCD Face milling cutter with radius

➔ Plastic, wood, non-ferrous metals



| PCD           |          | Ø D1   | Ø D2 | L2 | L1 | R   |   |  |
|---------------|----------|--------|------|----|----|-----|---|--|
| Cat-Nr DEPCDR |          | mm     | mm   | mm | mm | mm  | z |  |
| Ref.          | LMT-Code | METRIC |      |    |    |     |   |  |
| 2704724       | 91176    | 10     | 6    | 6  | 35 | 0,5 | 2 |  |
| 2709460       | 98103    | 10     | 6    | 6  | 34 | 1   | 2 |  |
| 2709461       | 98104    | 10     | 6    | 6  | 35 | 2   | 2 |  |
| 2704723       | 97251    | 20     | 8    | 7  | 37 | 1   | 4 |  |

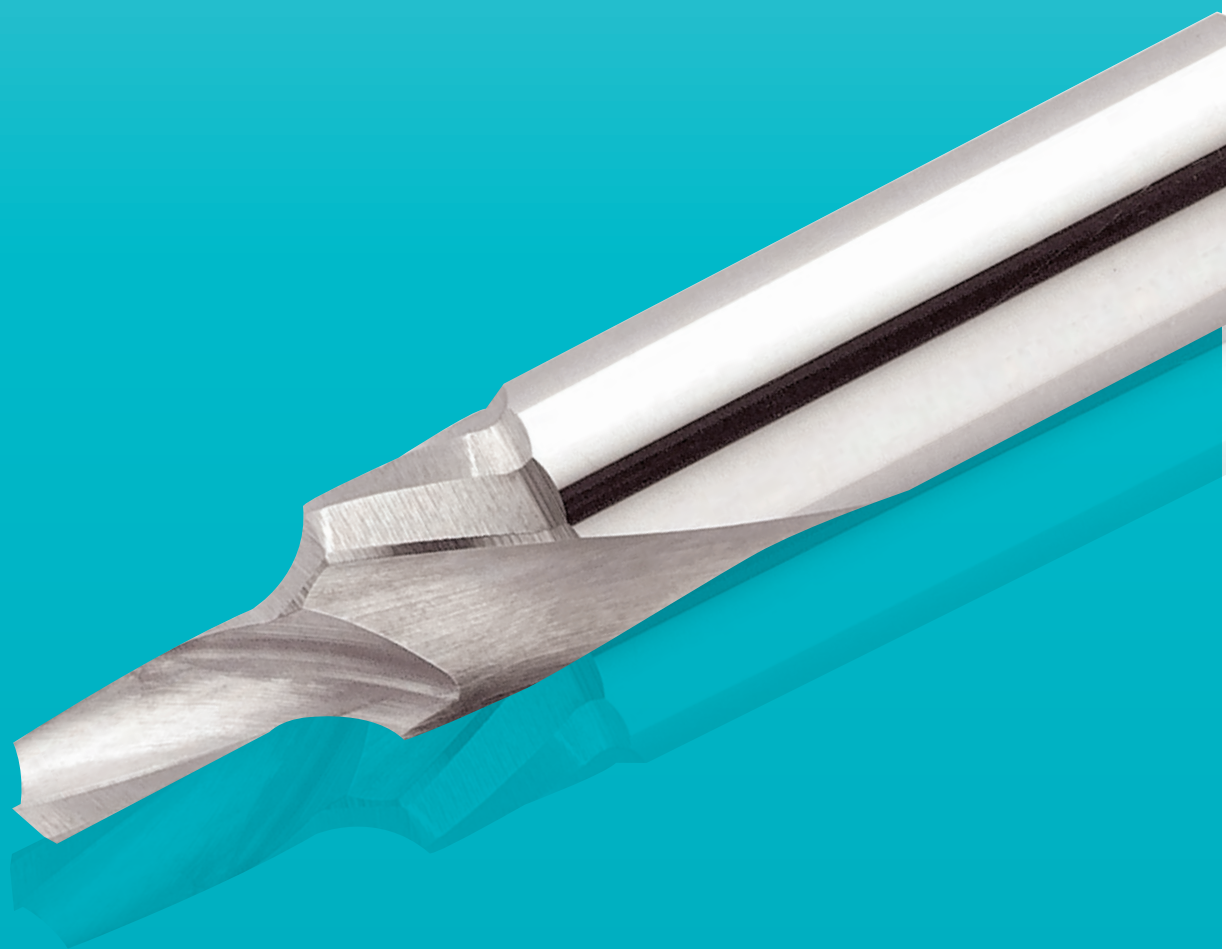


EXPERT ADVICE

PCD advantages:  
- very long tool life  
- best surface finish

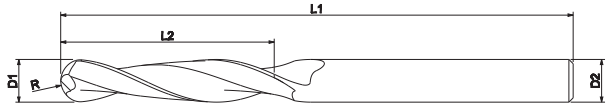


# Form milling





Plastic, foam board, wood, resin



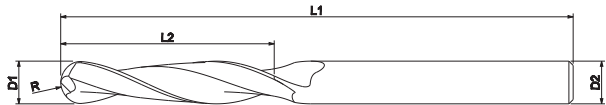


| Cat-Nr 117 000 |          | Ø D1 | Ø D2 | L2 | L1  | R   | z |
|----------------|----------|------|------|----|-----|-----|---|
| Ref.           | LMT-Code | mm   | mm   | mm | mm  | mm  |   |
| METRIC         |          |      |      |    |     |     |   |
| Long           |          |      |      |    |     |     |   |
| 2700055        | 117020   | 2    | 4    | 10 | 80  | 1   | 2 |
| 2700334        | 117030   | 3    | 6    | 15 | 90  | 1,5 | 2 |
| 2700335        | 117040   | 4    | 6    | 20 | 100 | 2   | 2 |
| 2700336        | 117050   | 5    | 6    | 20 | 100 | 2,5 | 2 |
| 2700337        | 117060   | 6    | 6    | 30 | 130 | 3   | 2 |
| 2700340        | 117080   | 8    | 8    | 40 | 150 | 4   | 2 |
| 2700338        | 117100   | 10   | 10   | 50 | 180 | 5   | 2 |
| 2700339        | 117120   | 12   | 12   | 50 | 200 | 6   | 2 |
| Short          |          |      |      |    |     |     |   |
| 7053992        | 52-240BM | 3    | 6    | 12 | 50  | 1,5 | 2 |
| 7053993        | 52-280BM | 6    | 6    | 22 | 64  | 3   | 2 |
| 7053994        | 52-320BM | 10   | 10   | 29 | 76  | 5   | 2 |
| 7053995        | 52-360BM | 12   | 12   | 29 | 76  | 6   | 2 |

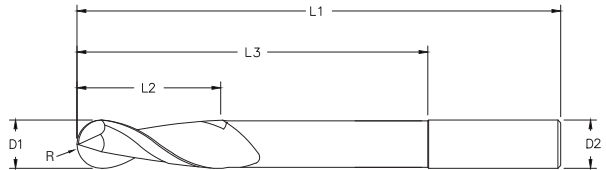


EXPERTS ADVICES

Designed for carving and modeling operations.  
Their improved geometry gives a superior cut  
compared to most ball nose end mills



|  |           | Ø D1  |       | Ø D2  |      | L2    |        | L1   |        | R    |       |   |
|-------------------------------------------------------------------------------------|-----------|-------|-------|-------|------|-------|--------|------|--------|------|-------|---|
| Cat-Nr 52-000                                                                       |           | mm    | inch  | mm    | inch | mm    | inch   | mm   | inch   | mm   | inch  | z |
| Ref.                                                                                | LMT- Code | INCH  |       |       |      |       |        |      |        |      |       |   |
| Short                                                                               |           |       |       |       |      |       |        |      |        |      |       |   |
| 7053996                                                                             | 52-235B   | 1,58  | 1/16" | 3,17  | 1/8" | 6,35  | 1/4"   | 50,8 | 2      | 0,79 | 1/32" | 2 |
| 7053997                                                                             | 52-244B   | 3,17  | 1/8"  | 3,17  | 1/8" | 12,7  | 1/2"   | 50,8 | 2      | 1,59 | 1/16" | 2 |
| 7053998                                                                             | 52-240B   | 3,17  | 1/8"  | 6,35  | 1/4" | 12,7  | 1/2"   | 50,8 | 2      | 1,59 | 1/16" | 2 |
| 7053999                                                                             | 52-260B   | 4,76  | 3/16" | 6,35  | 1/4" | 19,05 | 3/4"   | 50,8 | 2      | 2,38 | 3/32" | 2 |
| 7054000                                                                             | 52-280B   | 6,35  | 1/4"  | 6,35  | 1/4" | 22,25 | 7/8"   | 63,5 | 2 1/2" | 3,18 | 1/8"  | 2 |
| 7054001                                                                             | 52-320B   | 9,52  | 3/8"  | 9,52  | 3/8" | 28,5  | 1 1/8" | 76,2 | 3      | 4,76 | 3/16" | 2 |
| 7054002                                                                             | 52-360B   | 12,7  | 1/2"  | 12,7  | 1/2" | 28,5  | 1 1/8" | 76,2 | 3      | 6,35 | 1/4"  | 2 |
| 7054003                                                                             | 52-386B   | 15,87 | 5/8"  | 15,87 | 5/8" | 57,15 | 2 1/4" | 102  | 4      | 7,94 | 5/16" | 2 |
| 7054004                                                                             | 52-397B   | 19,05 | 3/4"  | 19,05 | 3/4" | 63,5  | 2 1/2" | 127  | 5      | 9,53 | 3/8"  | 2 |

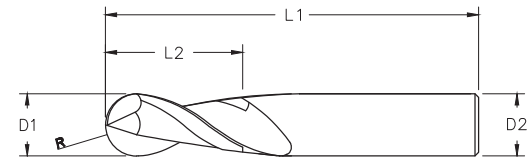


|               |          | Ø D1  |       | Ø D2  |      | L2    |        | L3     |        | L1    |      | R    |       |   |
|---------------|----------|-------|-------|-------|------|-------|--------|--------|--------|-------|------|------|-------|---|
| Cat-Nr 52-000 |          | mm    | inch  | mm    | inch | mm    | inch   | mm     | inch   | mm    | inch | mm   | inch  | z |
| Ref.          | LMT-Code | INCH  |       |       |      |       |        |        |        |       |      |      |       |   |
| Long          |          |       |       |       |      |       |        |        |        |       |      |      |       |   |
| 7054005       | 52-235BL | 1,58  | 1/16" | 3,17  | 1/8" | 6,35  | 1/4"   | -      | -      | 76,2  | 3    | 0,79 | 1/32" | 2 |
| 7054006       | 52-244BL | 3,17  | 1/8"  | 3,17  | 1/8" | 12,7  | 1/2"   | 41,28  | 1 5/8" | 76,2  | 3    | 1,59 | 1/16" | 2 |
| 7054007       | 52-240BL | 3,17  | 1/8"  | 6,35  | 1/4" | 12,7  | 1/2"   | 41,28  | 1 5/8" | 76,2  | 3    | 1,59 | 1/16" | 2 |
| 7054008       | 52-260BL | 4,76  | 3/16" | 6,35  | 1/4" | 19,05 | 3/4"   | 41,28  | 1 5/8" | 76,2  | 3    | 2,38 | 3/32" | 2 |
| 7054009       | 52-280BL | 6,35  | 1/4"  | 6,35  | 1/4" | 25,4  | 1      | 66,68  | 2 5/8" | 102   | 4    | 3,18 | 1/8"  | 2 |
| 7054010       | 52-320BL | 9,52  | 3/8"  | 9,52  | 3/8" | 31,75 | 1 1/4" | 66,68  | 2 5/8" | 102   | 4    | 4,76 | 3/16" | 2 |
| 7054011       | 52-360BL | 12,7  | 1/2"  | 12,7  | 1/2" | 38,1  | 1 1/2" | 92,08  | 3 5/8" | 127   | 5    | 6,35 | 1/4"  | 2 |
| 7054012       | 52-386BL | 15,87 | 5/8"  | 15,87 | 5/8" | 63,5  | 2 1/2" | 92,08  | 3 5/8" | 127   | 5    | 7,94 | 5/16" | 2 |
| 7054013       | 52-397BL | 19,05 | 3/4"  | 19,05 | 3/4" | 76,2  | 3      | 117,48 | 4 5/8" | 152,4 | 6    | 9,53 | 3/8"  | 2 |



Form milling

➔ Plastic, foam board, wood, resin



| Cat-Nr 65-200 |          | Ø D1 | Ø D2 | L2 | L1 | R   | z |
|---------------|----------|------|------|----|----|-----|---|
| Ref.          | LMT-Code | mm   | mm   | mm | mm | mm  |   |
| METRIC        |          |      |      |    |    |     |   |
| 7053979       | 65-280B  | 3    | 3    | 12 | 64 | 1,5 | 2 |
| 7053980       | 65-285B  | 6    | 6    | 20 | 76 | 3   | 2 |
| 7053981       | 65-290B  | 8    | 8    | 25 | 76 | 4   | 2 |
| 7053982       | 65-295B  | 10   | 10   | 30 | 76 | 5   | 2 |



| Cat-Nr 65-200 |          | Ø D1 |       | Ø D2 |       | L2   |        | L1   |        | R     |       | z |
|---------------|----------|------|-------|------|-------|------|--------|------|--------|-------|-------|---|
| Ref.          | LMT-Code | mm   | inch  | mm   | inch  | mm   | inch   | mm   | inch   | mm    | inch  |   |
| INCH          |          |      |       |      |       |      |        |      |        |       |       |   |
| 7053983       | 65-205B  | 1,58 | 1/16" | 3,17 | 1/8"  | 6,35 | 1/4"   | 50,8 | 2      | 0,79  | 1/32" | 2 |
| 7053984       | 65-210B  | 3,17 | 1/8"  | 3,17 | 1/8"  | 12,7 | 1/2"   | 63,5 | 2 1/2" | 1,58  | 1/16" | 2 |
| 7053985       | 65-215B  | 4,76 | 3/16" | 6,35 | 1/4"  | 12,7 | 1/2"   | 63,5 | 2 1/2" | 2,38  | 3/32" | 2 |
| 7053986       | 65-220B  | 6,35 | 1/4"  | 6,35 | 1/4"  | 12,7 | 1/2"   | 63,5 | 2 1/2" | 3,17  | 1/8"  | 2 |
| 7053987       | 65-225B  | 6,35 | 1/4"  | 6,35 | 1/4"  | 28,5 | 1 1/8" | 76,2 | 3      | 3,17  | 1/8"  | 2 |
| 7053988       | 65-235B  | 7,95 | 5/16" | 7,95 | 5/16" | 12,7 | 1/2"   | 76,2 | 3      | 3,975 | 5/32" | 2 |
| 7053989       | 65-240B  | 7,95 | 5/16" | 7,95 | 5/16" | 28,5 | 1 1/8" | 76,2 | 3      | 3,975 | 5/32" | 2 |
| 7053990       | 65-250B  | 9,52 | 3/8"  | 9,52 | 3/8"  | 28,5 | 1 1/8" | 76,2 | 3      | 4,76  | 3/16" | 2 |
| 7053991       | 65-260B  | 12,7 | 1/2"  | 12,7 | 1/2"  | 28,5 | 1 1/8" | 76,2 | 3      | 6,35  | 1/4"  | 2 |

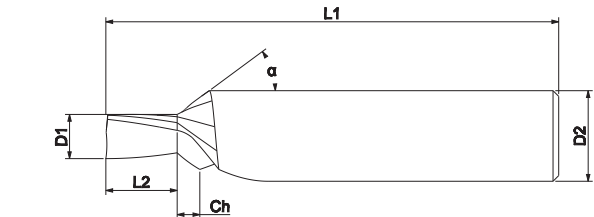


EXPERTS ADVICES

The new tool's geometry, specially designed point, and highly polished primary clearance and flute give the tool the ability to attain a surface quality of 28 Ra (inch) in mechanical plastic (e. g. inlays for kneeprothesis), avoiding an irregular surface finish or evident tool marks.



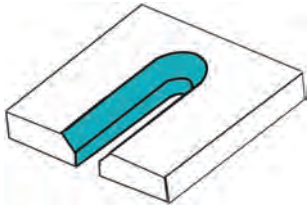
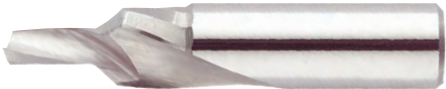
➔ Plastic, foam board, wood



| Cat-Nr EDC |          | Ø D1 | Ø D2 | L2  | L1 | Ch | α   | z |
|------------|----------|------|------|-----|----|----|-----|---|
| Ref.       | LMT-Code | mm   | mm   | mm  | mm | mm | °   |   |
| METRIC     |          |      |      |     |    |    |     |   |
| 2725238    | 99058    | 4    | 8    | 4.3 | 40 | 2  | 45° | 1 |
| 2739327    | 00191    | 4    | 8    | 6.3 | 40 | 2  | 45° | 1 |

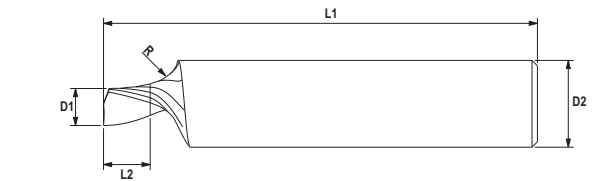


| Cat-Nr EDC |          | Ø D1 |       | Ø D2 |      | L2  |        | L1   |      | Ch   |        | α   | z |
|------------|----------|------|-------|------|------|-----|--------|------|------|------|--------|-----|---|
| Ref.       | LMT-Code | mm   | inch  | mm   | inch | mm  | inch   | mm   | inch | mm   | inch   | °   |   |
| INCH       |          |      |       |      |      |     |        |      |      |      |        |     |   |
| 2739331    | 00192    | 4.76 | 3/16" | 9.52 | 3/8" | 4.3 | 0.169" | 50.8 | 2"   | 2.38 | 0.094" | 45° | 1 |
| 2739333    | 00193    | 4.76 | 3/16" | 9.52 | 3/8" | 6.3 | 0.248" | 50.8 | 2"   | 2.38 | 0.094" | 45° | 1 |



Do not hesitate to contact us for customized dimensions

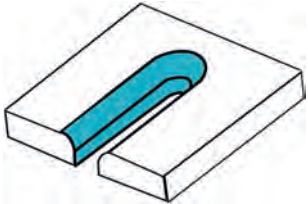
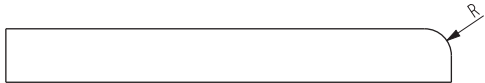
➔ Plastic, foam board, wood



| Cat-Nr EDR |          | Ø D1 | Ø D2 | L2  | L1 | R  | z |
|------------|----------|------|------|-----|----|----|---|
| Ref.       | LMT-Code | mm   | mm   | mm  | mm | mm |   |
| METRIC     |          |      |      |     |    |    |   |
| 2739439    | 00194    | 4    | 8    | 4.3 | 40 | 2  | 1 |
| 2739441    | 00195    | 4    | 8    | 6.3 | 40 | 2  | 1 |

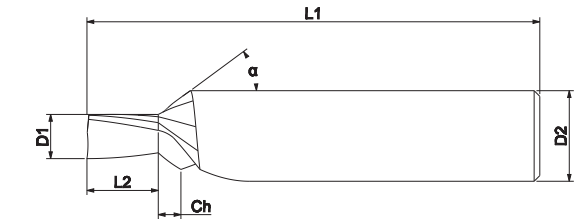


| Cat-Nr EDR |          | Ø D1 |       | Ø D2 |      | L2  |        | L1   |      | R    |        | z |
|------------|----------|------|-------|------|------|-----|--------|------|------|------|--------|---|
| Ref.       | LMT-Code | mm   | inch  | mm   | inch | mm  | inch   | mm   | inch | mm   | inch   |   |
| INCH       |          |      |       |      |      |     |        |      |      |      |        |   |
| 2739443    | 00196    | 4.76 | 3/16" | 9.52 | 3/8" | 4.3 | 0.169" | 50.8 | 2"   | 2.38 | 0.094" | 1 |
| 2739445    | 00197    | 4.76 | 3/16" | 9.52 | 3/8" | 6.3 | 0.248" | 50.8 | 2"   | 2.38 | 0.094" | 1 |



Do not hesitate to contact us for customized dimensions

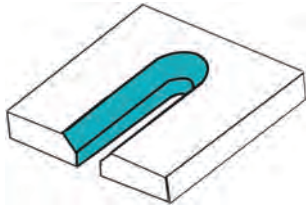
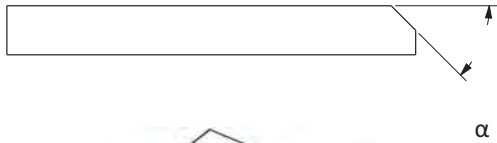
➔ Special for non-ferrous metals



| Cat-Nr EDAC |          | Ø D1 | Ø D2 | L2  | L1 | Ch | α   | z |
|-------------|----------|------|------|-----|----|----|-----|---|
| Ref.        | LMT-Code | mm   | mm   | mm  | mm | mm | °   |   |
| METRIC      |          |      |      |     |    |    |     |   |
| 2730645     | 99203    | 4    | 6    | 2,3 | 40 | 1  | 45° | 1 |
| 2739335     | 00198    | 4    | 6    | 3,3 | 40 | 1  | 45° | 1 |

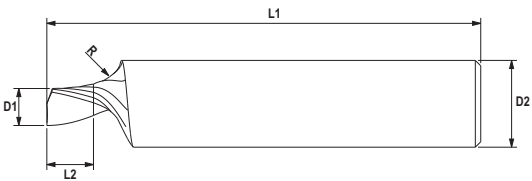


| Cat-Nr EDAC |          | Ø D1 |       | Ø D2 |      | L2  |       | L1   |      | Ch |       | α   | z |
|-------------|----------|------|-------|------|------|-----|-------|------|------|----|-------|-----|---|
| Ref.        | LMT-Code | mm   | inch  | mm   | inch | mm  | inch  | mm   | inch | mm | inch  | °   |   |
| INCH        |          |      |       |      |      |     |       |      |      |    |       |     |   |
| 2739343     | 00199    | 4,76 | 3/16" | 6,35 | 1/4" | 2,3 | 0,091 | 50,8 | 2"   | 1  | 0,031 | 45° | 1 |
| 2739345     | 00200    | 4,76 | 3/16" | 6,35 | 1/4" | 3,3 | 0,130 | 50,8 | 2"   | 1  | 0,031 | 45° | 1 |



Do not hesitate to contact us for customized dimensions

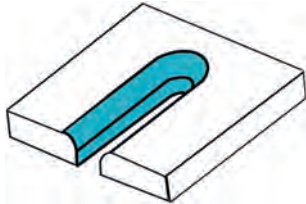
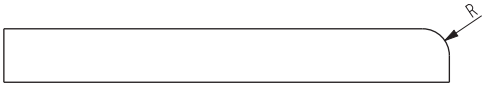
➔ Special for non-ferrous metals



| Cat-Nr EDAR |          | Ø D1 | Ø D2 | L2  | L1 | R  | z |
|-------------|----------|------|------|-----|----|----|---|
| Ref.        | LMT-Code | mm   | mm   | mm  | mm | mm |   |
| METRIC      |          |      |      |     |    |    |   |
| 2739431     | 00201    | 4    | 6    | 2,3 | 40 | 1  | 1 |
| 2739433     | 00202    | 4    | 6    | 3,3 | 40 | 1  | 1 |

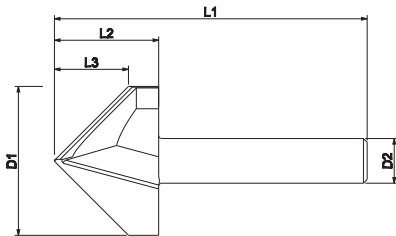


| Cat-Nr EDAR |          | Ø D1 |       | Ø D2 |      | L2  |       | L1   |      | R  |       | z |
|-------------|----------|------|-------|------|------|-----|-------|------|------|----|-------|---|
| Ref.        | LMT-Code | mm   | inch  | mm   | inch | mm  | inch  | mm   | inch | mm | inch  |   |
| INCH        |          |      |       |      |      |     |       |      |      |    |       |   |
| 2739435     | 00203    | 4,76 | 3/16" | 6,35 | 1/4" | 2,3 | 0,091 | 50,8 | 2"   | 1  | 0,039 | 1 |
| 2739437     | 00204    | 4,76 | 3/16" | 6,35 | 1/4" | 3,3 | 0,130 | 50,8 | 2"   | 1  | 0,039 | 1 |

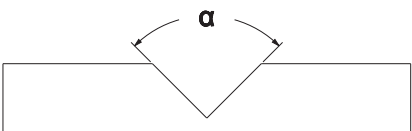
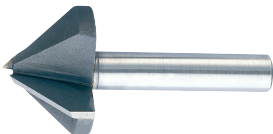


Do not hesitate to contact us for customized dimensions

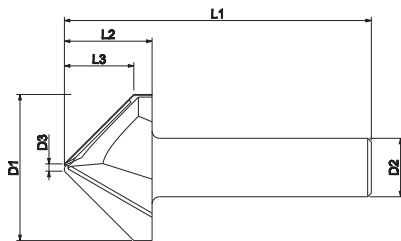
➔ Plastic, foam board, hard wood



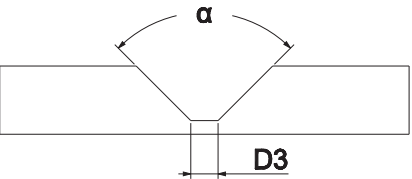
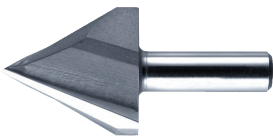
|            |          | Ø D1   | Ø D2 | L2   | L3   | L1 | α    |   |
|------------|----------|--------|------|------|------|----|------|---|
| Cat-Nr NPR |          | mm     | mm   | mm   | mm   | mm | °    | z |
| Ref.       | LMT-Code | METRIC |      |      |      |    |      |   |
| 2702990    | 80039    | 20     | 6    | 20,5 | 17,3 | 48 | 60°  | 2 |
| 2702401    | 77310    | 20     | 6    | 14   | 10   | 42 | 90°  | 2 |
| 2702420    | 77311    | 20     | 6    | 12,4 | 8,4  | 40 | 100° | 2 |
| 2702421    | 77312    | 20     | 6    | 11   | 7    | 39 | 110° | 2 |
| 2702422    | 77313    | 20     | 6    | 9,8  | 5,8  | 38 | 120° | 2 |
| 2702423    | 77314    | 20     | 6    | 8,7  | 4,7  | 37 | 130° | 2 |
| 2702424    | 77315    | 20     | 6    | 9    | 4    | 37 | 140° | 2 |
| 2702425    | 77316    | 20     | 6    | 6,6  | 2,6  | 34 | 150° | 2 |
| 2702426    | 77317    | 20     | 6    | 5,8  | 1,8  | 34 | 160° | 2 |



➔ Soft plastics, nylon, soft wood

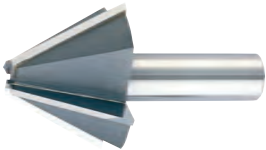
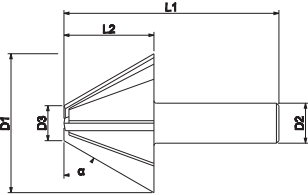


|             |          | Ø D1   | Ø D2 | Ø D3 | L2 | L3   | L1 | α    |   |
|-------------|----------|--------|------|------|----|------|----|------|---|
| Cat-Nr NPRC |          | mm     | mm   | mm   | mm | mm   | mm | °    | z |
| Ref.        | LMT-Code | METRIC |      |      |    |      |    |      |   |
| 2730661     | 99162    | 32     | 8    | 0,5  | 32 | 27,7 | 62 | 60°  | 2 |
| 2730663     | 99163    | 32     | 8    | 0,5  | 20 | 16   | 50 | 90°  | 2 |
| 2747409     | 02013    | 32     | 8    | 0,5  | 17 | 13,4 | 47 | 100° | 2 |
| 2747411     | 02014    | 32     | 8    | 0,5  | 14 | 11,2 | 44 | 110° | 2 |
| 2747413     | 02015    | 32     | 8    | 0,5  | 12 | 9,2  | 42 | 120° | 2 |
| 2730665     | 99164    | 32     | 8    | 0,5  | 10 | 5,8  | 40 | 140° | 2 |

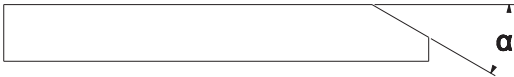


|             |          | Ø D1  |      | Ø D2 |     | Ø D3 |    | L2     |      | L3     |    | L1   |      | α | z |
|-------------|----------|-------|------|------|-----|------|----|--------|------|--------|----|------|------|---|---|
| Cat-Nr NPRC |          | mm    | mm   | inch | mm  | inch | mm | inch   | mm   | inch   | mm | inch | °    |   |   |
| Ref.        | LMT-Code | INCH  |      |      |     |      |    |        |      |        |    |      |      |   |   |
| 2730655     | 99159    | 31,75 | 9,52 | 3/8" | 0,5 | 0,02 | 32 | 1,26"  | 27   | 1,06"  | 62 | 2,44 | 60°  | 2 |   |
| 2730657     | 99160    | 31,75 | 9,52 | 3/8" | 0,5 | 0,02 | 20 | 0,787" | 15,6 | 0,614" | 50 | 1,97 | 90°  | 2 |   |
| 2730659     | 99161    | 31,75 | 9,52 | 3/8" | 0,5 | 0,02 | 10 | 0,394" | 5,7  | 0,224" | 40 | 1,57 | 140° | 2 |   |

➔ Plastic, foam board, hard wood

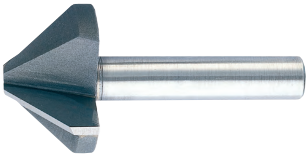
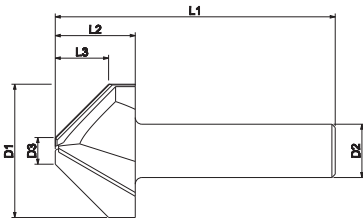


|            |          | Ø D1   | Ø D2 | Ø D3 | L2 | L1 | α      |   |
|------------|----------|--------|------|------|----|----|--------|---|
| Cat-Nr IED |          | mm     | mm   | mm   | mm | mm | °      | z |
| Ref.       | LMT-Code | METRIC |      |      |    |    |        |   |
| 2702347    | 77036    | 13,35  | 8    | 7    | 18 | 43 | 80°    | 4 |
| 2702346    | 77037    | 15     | 8    | 7    | 18 | 43 | 77°30' | 4 |
| 2702345    | 77038    | 16,65  | 8    | 7    | 18 | 43 | 75°    | 4 |
| 2702344    | 77039    | 18,35  | 8    | 7    | 18 | 43 | 72°30' | 4 |
| 2702343    | 77040    | 20,1   | 8    | 7    | 18 | 43 | 70°    | 4 |
| 2702342    | 77041    | 21,9   | 8    | 7    | 18 | 43 | 67°30' | 4 |
| 2702341    | 77042    | 23,8   | 8    | 7    | 18 | 43 | 65°    | 4 |
| 2702340    | 77043    | 25,75  | 8    | 7    | 18 | 43 | 62°30' | 4 |
| 2702339    | 77044    | 27,8   | 8    | 7    | 18 | 43 | 60°    | 4 |
| 2702337    | 91095    | 30,5   | 8    | 7    | 14 | 39 | 50°    | 4 |
| 2702336    | 91094    | 31     | 8    | 7    | 12 | 37 | 45°    | 4 |

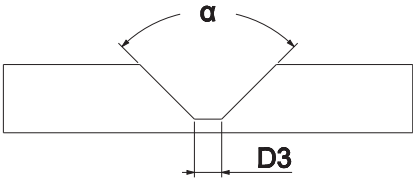


Conical cutter PCD tipped

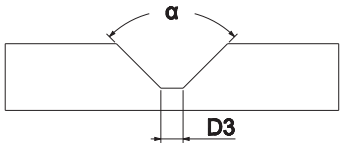
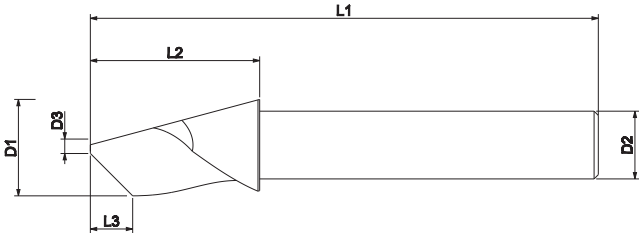
➔ Plastic, wood, non-ferrous metals



| PCD           |          | Ø D1   | Ø D2 | Ø D3 | L2 | L3 | L1 | α   | z |
|---------------|----------|--------|------|------|----|----|----|-----|---|
| Cat-Nr NPRPCD |          | mm     | mm   | mm   | mm | mm | mm | °   |   |
| Ref.          | LMT-Code | METRIC |      |      |    |    |    |     |   |
| 2829770       | NPRPCD   | 20     | 8    | 4    | 12 | 8  | 42 | 90° | 2 |



➔ Alucobond and non-ferrous metals



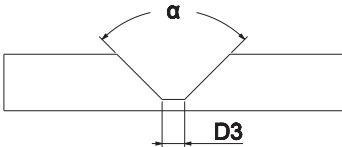
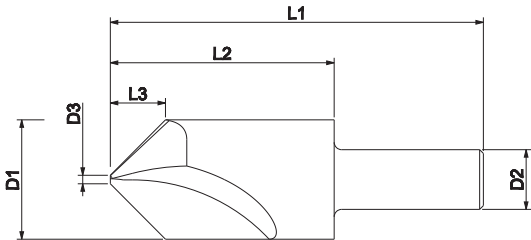
| Cat-Nr PLIH |           | Ø D1   | Ø D2 | Ø D3 | L2 | L3  | L1 | α  | z |
|-------------|-----------|--------|------|------|----|-----|----|----|---|
|             |           | mm     | mm   | mm   | mm | mm  | mm | °  |   |
| Ref.        | LMT- Code | METRIC |      |      |    |     |    |    |   |
| 2874112     | PLIH060A  | 6      | 6    | 0,3  | -  | 2,9 | 60 | 90 | 1 |
| 2872630     | PLIH060B  | 6      | 6    | 0,5  | -  | 2,8 | 60 | 90 | 1 |
| 2874113     | PLIH080A  | 8      | 8    | 0,3  | -  | 3,9 | 60 | 90 | 1 |
| 2874111     | PLIH080B  | 8      | 8    | 0,5  | -  | 3,8 | 60 | 90 | 1 |
| 2872631     | PLIH100A  | 10     | 6    | 2    | 40 | 4,0 | 60 | 90 | 1 |
| 2874114     | PLIH100B  | 10     | 8    | 0,3  | 40 | 4,9 | 60 | 90 | 1 |
| 2874115     | PLIH100C  | 10     | 10   | 0,5  | -  | 4,8 | 60 | 90 | 1 |
| 2874116     | PLIH120A  | 12     | 8    | 0,3  | 40 | 5,9 | 60 | 90 | 1 |
| 2874117     | PLIH120B  | 12     | 8    | 2    | 40 | 5,0 | 60 | 90 | 1 |
| 2874118     | PLIH120C  | 12     | 10   | 0,5  | 40 | 5,8 | 60 | 90 | 1 |



EXPERTS ADVICES

Thanks to a new geometry especially developed for milling operations of chamfered grooves. For alucobond and non-ferrous metals.

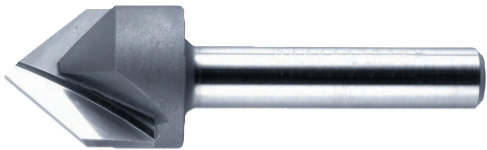
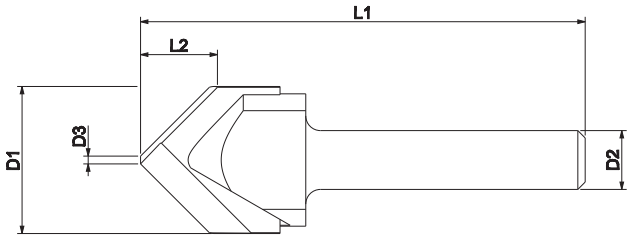
➔ Plastics



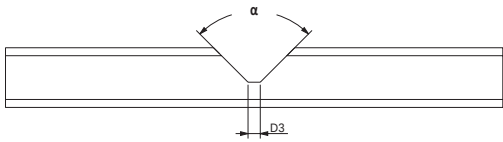
| Cat-Nr PLI |           | Ø D1   | Ø D2 | Ø D3 | L2 | L3   | L1 | α  | z |
|------------|-----------|--------|------|------|----|------|----|----|---|
|            |           | mm     | mm   | mm   | mm | mm   | mm | °  |   |
| Ref.       | LMT- Code | METRIC |      |      |    |      |    |    |   |
| 2830895    | 31014007  | 8      | 8    | 0,2  | -  | 9,4  | 50 | 45 | 2 |
| 2830894    | 31014006  | 16     | 8    | 0,2  | 30 | 19   | 50 | 45 | 2 |
| 2702157    | 91106     | 8      | 8    | 0,2  | -  | 3,9  | 50 | 90 | 2 |
| 2702156    | 91105     | 12     | 12   | 0,2  | -  | 5,9  | 50 | 90 | 2 |
| 2702158    | 96188     | 16     | 8    | 0,2  | 30 | 7,9  | 50 | 90 | 2 |
| 2739405    | 00209     | 16     | 8    | 0,5  | 30 | 7,75 | 50 | 90 | 2 |
| 2739403    | 00210     | 16     | 8    | 1    | 30 | 7,5  | 50 | 90 | 2 |



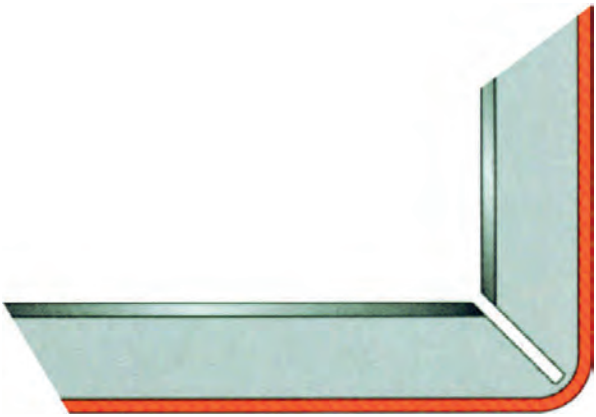
➔ Alucobond



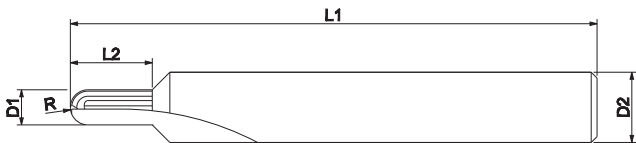
| Cat-Nr FCOB |          | Ø D1 | Ø D2 | Ø D3 | L2  | L1 | α   | z |
|-------------|----------|------|------|------|-----|----|-----|---|
| Ref.        | LMT-Code | mm   | mm   | mm   | mm  | mm | °   |   |
| 2730666     | 99165    | 20   | 8    | 3    | 8,5 | 60 | 90  | 2 |
| 2730668     | 99166    | 20   | 8    | 2    | 3,7 | 60 | 135 | 2 |



| Cat-Nr FCOB |          | Ø D1  |      | Ø D2 |      | Ø D3 |       | L2  |       | L1 |       | α   | z |
|-------------|----------|-------|------|------|------|------|-------|-----|-------|----|-------|-----|---|
| Ref.        | LMT-Code | mm    | inch | mm   | inch | mm   | inch  | mm  | inch  | mm | inch  | °   |   |
| 2730672     | 99167    | 19,05 | 3/4" | 9,52 | 3/8" | 3    | 0,118 | 8   | 0,315 | 60 | 2,352 | 90  | 2 |
| 2730674     | 99168    | 19,05 | 3/4" | 9,52 | 3/8" | 2    | 0,078 | 3,6 | 0,142 | 60 | 2,352 | 135 | 2 |
| 2749541     | 99167A   | 19,05 | 3/4" | 9,52 | 3/8" | 2    | 0,078 | 6,2 | 0,244 | 60 | 2,352 | 108 | 2 |



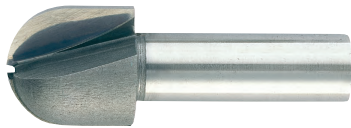
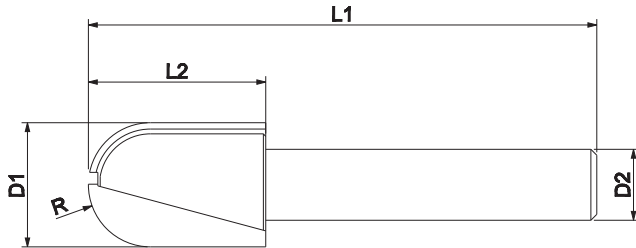
➡ Plastic, foam board, hard wood



|           |          | Ø D1   | Ø D2 | L2 | L1 | R    |   |
|-----------|----------|--------|------|----|----|------|---|
| Cat-Nr DR |          | mm     | mm   | mm | mm | mm   | z |
| Ref.      | LMT-Code | METRIC |      |    |    |      |   |
| 2702215   | 96186    | 1      | 6    | 3  | 45 | 0,5  | 2 |
| 2702214   | 96185    | 1,5    | 6    | 3  | 45 | 0,75 | 2 |
| 2702213   | 78085    | 2      | 6    | 3  | 45 | 1    | 2 |
| 2702212   | 96085    | 2,5    | 6    | 7  | 45 | 1,25 | 2 |
| 2702211   | 77358    | 3      | 6    | 7  | 45 | 1,5  | 2 |
| 2702210   | 77357    | 4      | 6    | 7  | 45 | 2    | 2 |
| 2702209   | 77356    | 5      | 6    | 7  | 45 | 2,5  | 2 |
| 2702161   | 77355    | 6      | 6    | 7  | 45 | 3    | 2 |

Carbide tipped spherical cutters DR

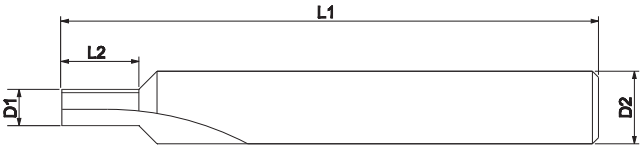
➡ Plastic, foam board, hard wood



|           |          | Ø D1   | Ø D2 | L2 | L1 | R    |   |
|-----------|----------|--------|------|----|----|------|---|
| Cat-Nr DR |          | mm     | mm   | mm | mm | mm   | z |
| Ref.      | LMT-Code | METRIC |      |    |    |      |   |
| 2702480   | 77354    | 7      | 6    | 7  | 45 | 3,5  | 2 |
| 2702229   | 77353    | 8      | 6    | 10 | 40 | 4    | 2 |
| 2702446   | 77352    | 8,5    | 6    | 10 | 38 | 4,25 | 2 |
| 2702445   | 76462    | 9      | 6    | 10 | 38 | 4,5  | 2 |
| 2702444   | 77351    | 9,5    | 6    | 10 | 38 | 4,75 | 2 |
| 2702443   | 73584    | 10     | 6    | 15 | 43 | 5    | 2 |
| 2702442   | 73585    | 10,5   | 6    | 15 | 43 | 5,25 | 2 |
| 2702441   | 72528    | 11     | 8    | 15 | 40 | 5,5  | 2 |
| 2702440   | 73479    | 11,5   | 8    | 15 | 40 | 5,75 | 2 |
| 2702439   | 72527    | 12     | 8    | 15 | 40 | 6    | 2 |
| 2702438   | 73478    | 12,5   | 8    | 15 | 40 | 6,25 | 2 |
| 2702437   | 72526    | 13     | 8    | 15 | 40 | 6,5  | 2 |
| 2702436   | 73477    | 13,5   | 8    | 15 | 40 | 6,75 | 2 |
| 2702203   | 72525    | 14     | 8    | 15 | 40 | 7    | 2 |
| 2702435   | 73476    | 14,5   | 8    | 15 | 40 | 7,25 | 2 |
| 2702434   | 72524    | 15     | 8    | 15 | 40 | 7,5  | 2 |

|           |          | Ø D1   | Ø D2 | L2 | L1 | R    |   |
|-----------|----------|--------|------|----|----|------|---|
| Cat-Nr DR |          | mm     | mm   | mm | mm | mm   | z |
| Ref.      | LMT-Code | METRIC |      |    |    |      |   |
| 2702433   | 73475    | 15,5   | 8    | 15 | 40 | 7,75 | 2 |
| 2702432   | 73505    | 16     | 8    | 15 | 40 | 8    | 2 |
| 2702457   | 73474    | 16,5   | 8    | 15 | 40 | 8,25 | 2 |
| 2702456   | 73470    | 17     | 8    | 15 | 40 | 8,5  | 2 |
| 2702455   | 73473    | 17,5   | 8    | 15 | 40 | 8,75 | 2 |
| 2702454   | 73506    | 18     | 8    | 15 | 40 | 9    | 2 |
| 2702453   | 73472    | 18,5   | 8    | 15 | 40 | 9,25 | 2 |
| 2702452   | 73471    | 19     | 8    | 15 | 40 | 9,5  | 2 |
| 2702451   | 68415    | 20     | 8    | 15 | 40 | 10   | 2 |
| 2702450   | 71515    | 22     | 8    | 16 | 41 | 11   | 2 |
| 2702449   | 68416    | 24     | 8    | 15 | 40 | 12   | 2 |
| 2702448   | 71516    | 26     | 8    | 18 | 43 | 13   | 2 |
| 2702447   | 75349    | 28     | 8    | 15 | 40 | 14   | 2 |

➔ Plastic, foam board, hard wood



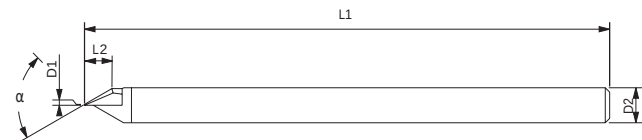
|          |           | Ø D1   | Ø D2 | L2 | L1 |   |
|----------|-----------|--------|------|----|----|---|
| Cat-Nr P |           | mm     | mm   | mm | mm | z |
| Ref.     | LMT- Code | METRIC |      |    |    |   |
| 2702162  | 19020     | 2      | 6    | 3  | 40 | 2 |
| 2702216  | 19025     | 2.5    | 6    | 3  | 40 | 2 |
| 2702217  | 19030     | 3      | 6    | 3  | 40 | 2 |
| 2702218  | 19035     | 3.5    | 6    | 4  | 40 | 2 |
| 2702219  | 19040     | 4      | 6    | 4  | 40 | 2 |
| 2702219  | 19045     | 4.5    | 6    | 4  | 40 | 2 |
| 2702221  | 19050     | 5      | 6    | 4  | 40 | 2 |
| 2702222  | 19055     | 5.5    | 6    | 4  | 40 | 2 |
| 2702223  | 19060     | 6      | 6    | 4  | 40 | 2 |
| 2702225  | 19080     | 8      | 6    | 9  | 45 | 2 |

[illegible]

# Engraving



➔ Plastics and non-ferrous metals



PCD

| PCD            |           | Ø D1   | Ø D2 | L2   | L1 | α  | z |
|----------------|-----------|--------|------|------|----|----|---|
| Cat-Nr: 212000 |           | mm     | mm   | mm   | mm | °  |   |
| Ref.           | LMT- Code | METRIC |      |      |    |    |   |
| 2825591        | 212090    | 0,1    | 4    | 1,05 | 60 | 90 | 1 |
| 2821644        | 212060    | 0,2    | 4    | 3,3  | 60 | 60 | 1 |



EXPERTS ADVICES

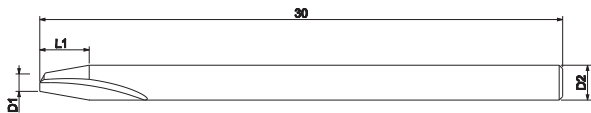
The superfinish PCD tipped engraving mills allow you to machine plastics and non-ferrous metals with a very clear surface finish (close to natural diamond machining results) with an increased tool life.

Do not hesitate to contact us for customized dimensions.





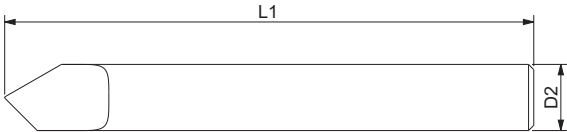
➔ Plastic, wood, non-ferrous metals



| Cat-Nr FI |          | D1  | D2 | L1  |  |  |  |  |
|-----------|----------|-----|----|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Ref.      | LMT-Code | mm  | mm | mm  | D1                                                                                | D1                                                                                | D1                                                                                 | D1                                                                                  |
| 2802159   | 94083    | 0,5 | 3  | 7   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |
| 2702237   | 93072    | 1   | 3  | 5,6 |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |
| 2702235   | 93071    | 0,8 | 3  | 2   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702234   | 93070    | 1   | 3  | 2   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702233   | 93069    | 1,5 | 3  | 3   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702232   | 93068    | 2   | 3  | 4   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702163   | 79354    | 0,7 | 2  | 1,5 |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |
| 2702226   | 79599    | 0,5 | 2  | 2   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |
| 2702227   | 79245    | 1   | 2  | 2,8 |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |
| 2702164   | 91006    | -   | 2  | 3,2 |                                                                                   |                                                                                   |                                                                                    | X                                                                                   |
| 2702165   | 91014    | 1   | 2  | 2   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702231   | 80206    | 1,5 | 2  | 2,5 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |
| 2702236   | 83470    | 2   | 2  | 3   | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |

Do not hesitate to contact us for customized dimensions.

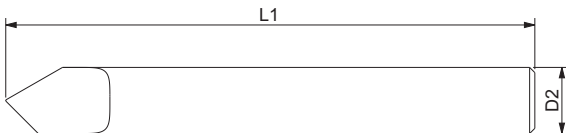
➡ For various types of materials

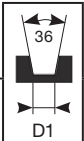
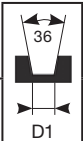


|           |           | D1            | D2           | L1            |  |  |  |  |
|-----------|-----------|---------------|--------------|---------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Cat-Nr GR |           | mm            | mm / inch    | mm / inch     | D1                                                                                | D1                                                                                 | D1                                                                                  | D1                                                                                  |
| Ref.      | LMT- Code | METRIC / INCH |              |               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| 2731951   | 94161     | 0,1           | 3            | 30            |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 6550236   | 00185     | 0,1           | 3,17 (1/8")  | 38,1 (1 1/2") |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 2731947   | 92175     | 0,1           | 4            | 60            |                                                                                   |                                                                                    |                                                                                     | x                                                                                   |
| 6550234   | 00183     | 0,1           | 4,76 (3/16") | 50,8 (2")     |                                                                                   |                                                                                    |                                                                                     | x                                                                                   |
| 2731949   | 92176     | 0,1           | 6            | 60            |                                                                                   |                                                                                    |                                                                                     | x                                                                                   |
| 6550235   | 00184     | 0,1           | 6,35 (1/4")  | 50,8 (2")     |                                                                                   |                                                                                    |                                                                                     | x                                                                                   |
| 2731935   | 91096     | 0,2           | 4            | 60            |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 6550229   | 00177     | 0,2           | 4,76 (3/16") | 50,8 (2")     |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 6550038   | 94163     | 0,3           | 3            | 30            | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 6550238   | 00187     | 0,3           | 3,17 (1/8")  | 38,1 (1 1/2") | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 6550116   | 91100     | 0,3           | 4            | 60            | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 2739377   | 00181     | 0,3           | 4,76 (3/16") | 50,8 (2")     | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 2731953   | 94162     | 0,3           | 3            | 30            |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |
| 6550237   | 00186     | 0,3           | 3,17 (1/8")  | 38,1 (1 1/2") |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |
| 2731939   | 91098     | 0,3           | 4            | 60            |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |
| 6550231   | 00179     | 0,3           | 4,76 (3/16") | 50,8 (2")     |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |
| 2731937   | 91097     | 0,4           | 6            | 60            |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 6550230   | 00178     | 0,4           | 6,35 (1/4")  | 50,8 (2")     |                                                                                   |                                                                                    | x                                                                                   |                                                                                     |
| 6550117   | 91101     | 0,5           | 6            | 60            | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 6550233   | 00182     | 0,5           | 6,35 (1/4")  | 50,8 (2")     | x                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 2731941   | 91099     | 0,5           | 6            | 60            |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |
| 6550232   | 00180     | 0,5           | 6,35 (1/4")  | 50,8 (2")     |                                                                                   | x                                                                                  |                                                                                     |                                                                                     |

Do not hesitate to contact us for customized dimensions.

➡ For various types of materials



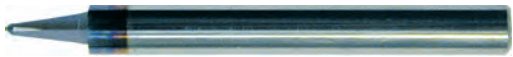
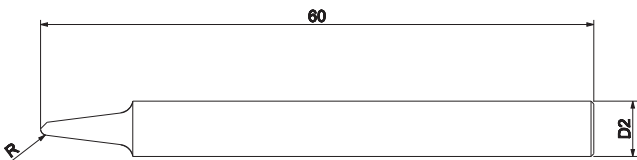


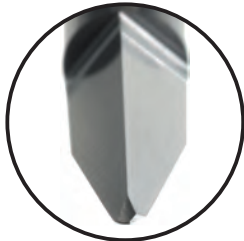
| Cat-Nr GR |           | Ø D1 |        | Ø D2 |        |     | L1  |
|-----------|-----------|------|--------|------|--------|-----|-----|
| Ref.      | LMT- Code | mm   | inch   | mm   | inch   |     | mm  |
| 2701879   | 91400     | 0,32 | 0,012" | 3,17 | 1/8"   | 36° | 105 |
| 2701880   | 91400     | 0,5  | 0,02"  | 3,17 | 1/8"   | 36° | 105 |
| 2701881   | 91400     | 0,75 | 0,03"  | 3,17 | 1/8"   | 36° | 105 |
| 2701882   | 91400     | 1    | 0,04"  | 3,17 | 1/8"   | 36° | 105 |
| 2701886   | 91401     | 0,32 | 0,012" | 4,36 | 11/64" | 36° | 155 |
| 2701887   | 91401     | 0,5  | 0,02"  | 4,36 | 11/64" | 36° | 155 |
| 2701888   | 91401     | 0,75 | 0,03"  | 4,36 | 11/64" | 36° | 155 |
| 2701890   | 91401     | 1    | 0,04"  | 4,36 | 11/64" | 36° | 155 |

| Cat-Nr GR |           | Ø D1 |        | Ø D2 |        |     | L1  |
|-----------|-----------|------|--------|------|--------|-----|-----|
| Ref.      | LMT- Code | mm   | inch   | mm   | inch   |     | mm  |
| 2701891   | 91401     | 1,25 | 0,05"  | 4,36 | 11/64" | 36° | 155 |
| 2722978   | 91401     | 1,5  | 0,06"  | 4,36 | 11/64" | 36° | 155 |
| 2701892   | 91401     | 2    | 0,078" | 4,36 | 11/64" | 36° | 155 |
| 2722980   | 91401     | 2,3  | 0,09"  | 4,36 | 11/64" | 36° | 155 |
| 2701893   | 91401     | 3,17 | 0,125" | 4,36 | 11/64" | 36° | 155 |
| 2701896   | 91402     | 0,32 | 0,012" | 6,35 | 1/4"   | 36° | 155 |
| 2701897   | 91402     | 0,5  | 0,02"  | 6,35 | 1/4"   | 36° | 155 |

Solid carbide pyramidal Engraving cutter GRP "X TIALN" coated

➡ Special cutter for form manufacturing or engraving hard materials  
(stainless steel, treated steel)

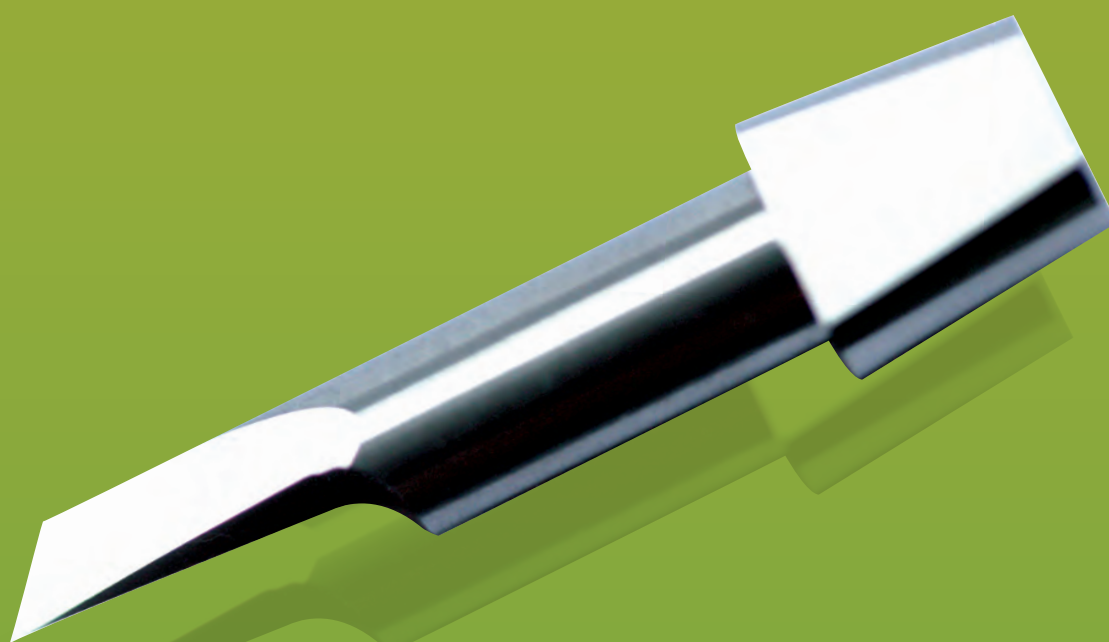




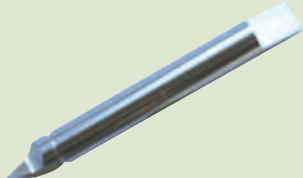
| Cat-Nr GRP |           |     | Ø D2 | R    |
|------------|-----------|-----|------|------|
| Ref.       | LMT- Code |     | mm   | mm   |
| 2744163    | 00188     | 15° | 6    | 0,7  |
| 2744165    | 00189     | 15° | 4    | 0,3  |
| 2744159    | 00190     | 15° | 4    | 0,15 |



# Knives



**ARISTO:** AG 50 • AG 130



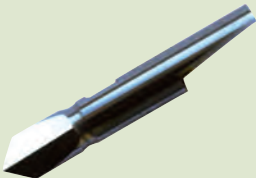
★ Ref. 91112   ✱ Ref. 94148

**GRAPHITYP:** CSR 466 - 700 - TURBO



★ Ref. 91272   ✱ Ref. 93196

**CREAGRAPH**



★ Ref. 94165   ✱ Ref. 94166

**GRAPHITYP:** CSR 466 - 700 - TURBO

PCD



★ Ref. 93278

**CSR ECOM 2**



★ Ref. 93343

**GRAPHIX:** EUROVISION 375 - 750



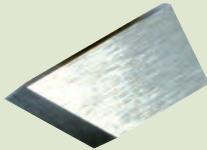
★ Ref. 00176

**GRAPHIX:** GSX



★ Ref. 94177

**GRAPHIX:** 2 - 3 - 4 - SPRINT  
SUPER SPRINT - ADVANTAGE



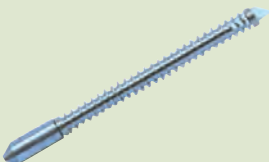
★ Ref. 84272   ✱ Ref. 94147

★ Standard usage

✱ Special Tool for thick or fluorescent materials



GRAPHTEC



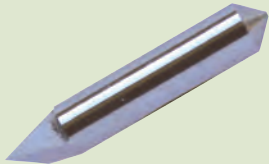
★ Ref. 93342

MIMAKI



★ Ref. 94153   ✱ Ref. 94154

IOLINE



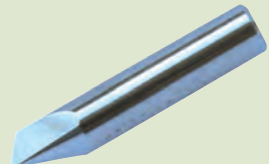
★ Ref. 94159   ✱ Ref. 94160

MUTHO



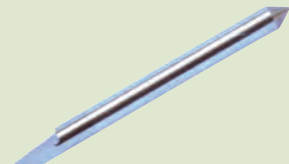
★ Ref. 96065   ✱ Ref. 94152

KONGSBERG



★ Ref. 92171   ✱ Ref. 92172

ROLAND: CAMM1 - PNC 1100 - 1500 1900 - 450



★ Ref.91115   ✱ Ref. 92054

MECANUMERIC



★ Ref. 94046

SEI

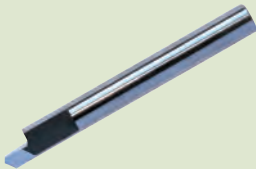


★ Ref. 94155   ✱ Ref. 94156

★ Standard usage

✱ Special Tool for thick or fluorescent materials

**SEI:** 750 - 1400  
**CSR:** 1000 - 1200 - 2400



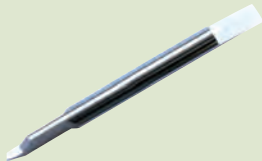
★ Ref. 94012      ✱ Ref. 94151

**WILD:** TA 30 - 41/40 - 410 - 500  
**ZUND:** P700 - P1200 PLUS - P2000



★ Ref. 95126

**SUMMA GRAPHICS:** T1300



★ Ref. 95242

**WILD:** TA 30 - 41/40 - 410 - 500  
**ZUND:** P700 - P1200 PLUS - P2000



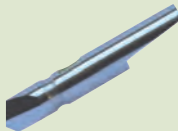
★ Ref. 91113      ✱ Ref. 94149

**SUMMA GRAPHICS:** D610



★ Ref. 94170      ✱ Ref. 94171

**ZUND:** P700 - P1200 PLUS - P2000



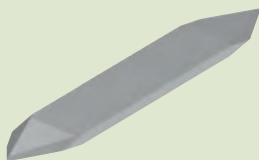
★ Ref. 91114      ✱ Ref. 94150

**WIDMATIC**



★ Ref. 98293

**ZUND**



★ Ref. 2820322

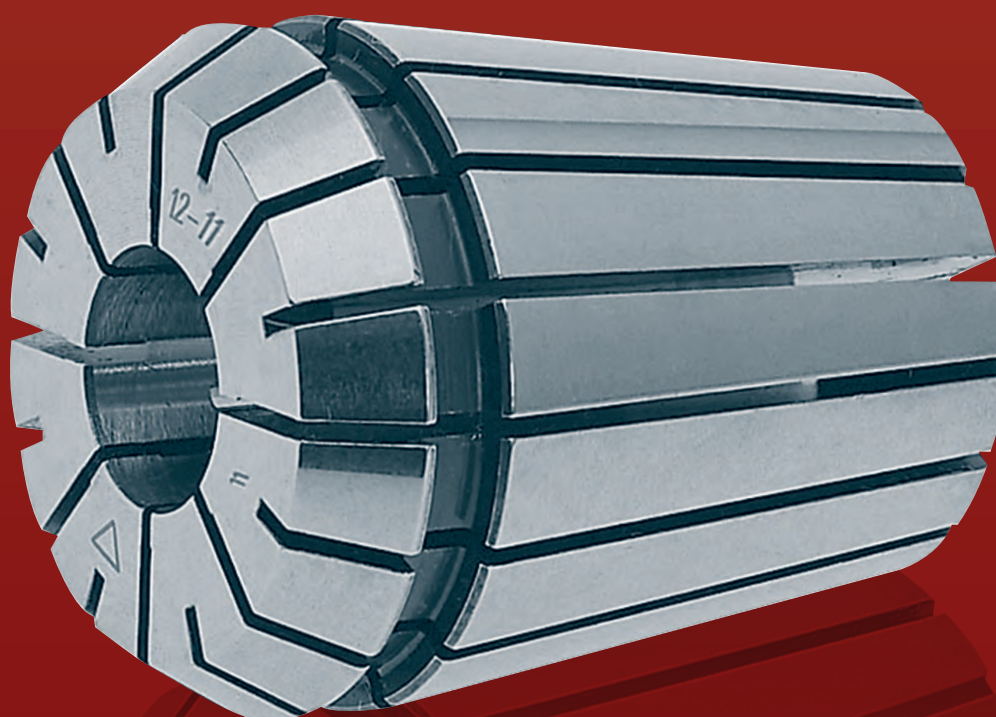
★ Standard usage

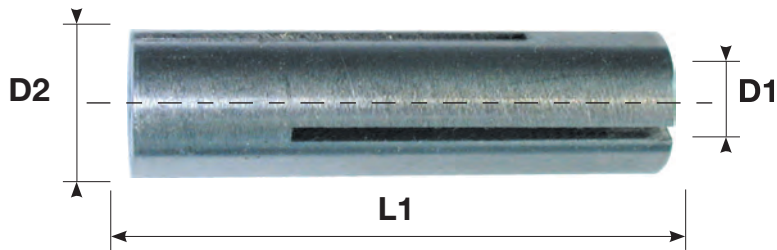
✱ Special Tool for thick or fluorescent materials



[illegible]

# Accessories





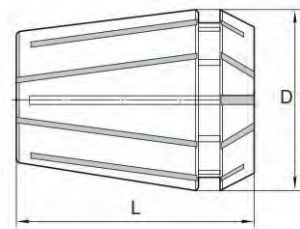
|          |          | D1   |      | D2   |      | L1 |
|----------|----------|------|------|------|------|----|
| Ident-N° | LMT-Code | mm   | inch | mm   | inch | mm |
| METRIC   |          |      |      |      |      |    |
| 2782662  | 86060    | 3,5  | -    | 6    | -    | 20 |
| 2702159  | 86060A   | 2    | -    | 4    | -    | 20 |
| 2702187  | 86060B   | 2,5  | -    | 4    | -    | 20 |
| 2702188  | 86060C   | 3    | -    | 4    | -    | 20 |
| 2702189  | 86060D   | 2    | -    | 6    | -    | 20 |
| 2702190  | 86060E   | 2,5  | -    | 6    | -    | 20 |
| 2702191  | 86060F   | 3    | -    | 6    | -    | 20 |
| 2702192  | 86060G   | 4    | -    | 6    | -    | 20 |
| 2702197  | 86060L   | 3,17 | 1/8" | 6    | -    | 20 |
| 2702193  | 86060H   | 2    | -    | 6,35 | 1/4" | 20 |
| 2702194  | 86060I   | 2,5  | -    | 6,35 | 1/4" | 20 |
| 2702195  | 86060J   | 3    | -    | 6,35 | 1/4" | 20 |
| 2702196  | 86060K   | 4    | -    | 6,35 | 1/4" | 20 |
| 2709709  | 86060M   | 2    | -    | 8    | -    | 20 |
| 2709710  | 86060N   | 2,5  | -    | 8    | -    | 20 |
| 2709711  | 86060P   | 3    | -    | 8    | -    | 20 |
| 2709712  | 86060Q   | 4    | -    | 8    | -    | 20 |
| 2709713  | 86060R   | 5    | -    | 8    | -    | 20 |
| 2709714  | 86060S   | 6    | -    | 8    | -    | 20 |
| 2711226  | 86060V   | 5    | -    | 6    | -    | 20 |



EXPERTS ADVICES

When the appropriate collet is not available or a cost effective option, we recommend the use of a collet adaptor.  
(Collet diameter = tool shank diameter)

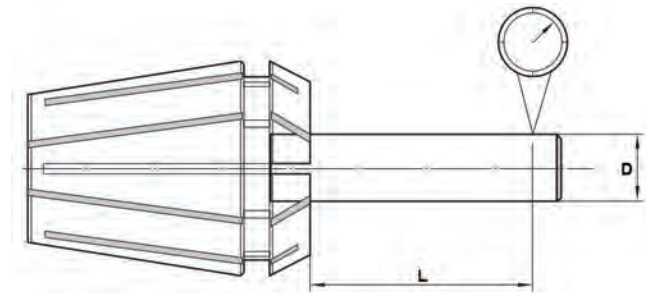




|      | D (mm) | L (mm) |
|------|--------|--------|
| ER16 | 17     | 27,5   |
| ER20 | 21     | 31,5   |
| ER25 | 26     | 34     |
| ER32 | 33     | 40     |



Radial run out tolerances for ER collets



| D1         | L  | →    |
|------------|----|------|
| 2 - 3      | 10 | 0,01 |
| 4 - 5 - 6  | 16 | 0,01 |
| 7 - 8 - 10 | 25 | 0,01 |
| 12,7       | 40 | 0,01 |

EXEMPLE:

For a Ø5 collet, maximum concentricity default is 0,01 measured at 16 mm from collet end.

| Ident-N°   | Diameter range [from ØXX to ØXX] |
|------------|----------------------------------|
| Pince ER16 |                                  |
| 2868197    | Ø 1,0 à Ø 0,5                    |
| 2703094    | Ø 2,0 à Ø 1,0                    |
| 2703103    | Ø 2,5 à Ø 1,5                    |
| 2703104    | Ø 3,0 à Ø 2,0                    |
| 2727332    | Ø 3,5 à Ø 2,5                    |
| 2703106    | Ø 4,0 à Ø 3,0                    |
| 2703105    | Ø 5,0 à Ø 4,0                    |
| 2703107    | Ø 6,0 à Ø 5,0                    |
| 2709474    | Ø 6,5 à Ø 5,5                    |
| 2864483    | Ø 7,0 à Ø 6,0                    |
| 2703108    | Ø 8,0 à Ø 7,0                    |
| 2733171    | Ø 10,0 à Ø 9,0                   |

| Ident-N°   | Diameter range [from ØXX to ØXX] |
|------------|----------------------------------|
| Pince ER25 |                                  |
| 2727460    | Ø 2,0 à Ø 1,0                    |
| 2729310    | Ø 2,5 à Ø 1,5                    |
| 2730631    | Ø 3,0 à Ø 2,0                    |
| 2727186    | Ø 3,5 à Ø 2,5                    |
| 2729063    | Ø 4,0 à Ø 3,0                    |
| 2728571    | Ø 5,0 à Ø 4,0                    |
| 2727473    | Ø 6,0 à Ø 5,0                    |
| 2729240    | Ø 6,5 à Ø 5,5                    |
| 2731146    | Ø 7,0 à Ø 6,0                    |
| 2727177    | Ø 8,0 à Ø 7,0                    |
| 2728651    | Ø 10,0 à Ø 9,0                   |
| 2817906    | Ø 12,0 à Ø 11,0                  |
| 2727592    | Ø 13,0 à Ø 12,0                  |

| Ident-N°   | Diameter range [from ØXX to ØXX] |
|------------|----------------------------------|
| Pince ER20 |                                  |
| 2800734    | Ø 2,0 à Ø 1,0                    |
| 2800736    | Ø 3,0 à Ø 2,0                    |
| 2800738    | Ø 4,0 à Ø 3,0                    |
| 2825636    | Ø 5,0 à Ø 4,0                    |
| 2800742    | Ø 6,0 à Ø 5,0                    |
| 2790034    | Ø 8,0 à Ø 7,0                    |
| 2800746    | Ø 10,0 à Ø 9,0                   |

| Ident-N°   | Diameter range [from ØXX to ØXX] |
|------------|----------------------------------|
| Pince ER32 |                                  |
| 2783948    | Ø 2,0 à Ø 1,0                    |
| 2755534    | Ø 3,0 à Ø 2,0                    |
| 2772160    | Ø 4,0 à Ø 3,0                    |
| 2793268    | Ø 5,0 à Ø 4,0                    |
| 2772162    | Ø 6,0 à Ø 5,0                    |
| 2821560    | Ø 7,0 à Ø 6,0                    |
| 2790593    | Ø 8,0 à Ø 7,0                    |
| 2788706    | Ø 9,0 à Ø 8,0                    |
| 2788708    | Ø 10,0 à Ø 9,0                   |
| 2824855    | Ø 11,0 à Ø 10,0                  |
| 2790595    | Ø 12,0 à Ø 11,0                  |
| 2867314    | Ø 13,0 à Ø 12,0                  |



EXPERTS ADVICES

Tool diameter: 5mm  
Choose the ER collet from 5 to 4 and avoid using a 6 to 5  
(concentricity problem more important, less rigidity of the tool and collet)

NOTES

Handwritten notes area with horizontal lines.

# Technical notes



## Technical information

### Introduction

Follow the CNC machine manufacturer guidelines for setup — alignment — calibration and maintenance schedules. Regular attention to these guidelines will keep your CNC machine in top operating condition. LMT Precision Tools work best in well-maintained CNC machines giving excellent cutting performance and longer tool life.

### CNC Rigidity – Setup

Machine stability is when material hold down is achieved with no movement and minimal vibration. Also, consider that software programs need to be verified and the spindle(s) aligned and calibrated, creating the optimum working conditions to minimize runout side pressures giving the best cut/edge quality and longer tool life.

## Cutting conditions

|                  |    |        |
|------------------|----|--------|
| Tool diameter    | D  | mm     |
| Number of flutes | Z  |        |
| Cutting speed    | Vc | m/min  |
| RPM              | N  | Tr/min |
| Feed per tooth   | Fz | mm/z   |
| Feed rate        | Vf | mm/min |

|                          |                             |
|--------------------------|-----------------------------|
| Spindle rotation formula | $N = \frac{1000 Vc}{\pi D}$ |
| Feed rate calculation    | $Vf = Fz \times Z \times N$ |

|                                                 |            | FEED PER TOOTH Fz |               |                     |              |
|-------------------------------------------------|------------|-------------------|---------------|---------------------|--------------|
| MATERIALS                                       | Vc         | D < Ø3            | Ø3 to Ø5      | Ø5 to Ø8            | Ø8 to Ø14    |
| Pur Aluminium                                   | 200 to 400 | 0,01 - 0,03       | 0,025 - 0,045 | <b>0,05 - 0,075</b> | 0,08 - 0,12  |
| Aluminium alloys                                | 200 to 400 | 0,01 - 0,03       | 0,025 - 0,045 | 0,05 - 0,075        | 0,08 - 0,12  |
| Brass                                           | 150 to 300 | 0,008 - 0,02      | 0,02 - 0,04   | 0,035 - 0,05        | 0,05 - 0,08  |
| Bronze                                          | 100 to 150 | 0,008 - 0,02      | 0,02 - 0,04   | 0,035 - 0,05        | 0,05 - 0,08  |
| Plastics-Bakelite                               | 50 to 100  | 0,025 - 0,04      | 0,055 - 0,08  | 0,08 - 0,12         | 0,12 - 0,2   |
| Plastics-PVC                                    | 100 to 200 | 0,025 - 0,06      | 0,06 - 0,09   | 0,1 - 0,18          | 0,15 - 0,2   |
| Thermoplastics<br>Acetate, Plexiglass,<br>Nylon | 300 to 500 | 0,01 - 0,035      | 0,025 - 0,045 | 0,045 - 0,08        | 0,08 - 0,16  |
| Wood                                            | 300 to 400 | 0,015 - 0,035     | 0,03 - 0,05   | 0,05 - 0,075        | 0,08 - 0,12  |
| Stainless steel                                 | 50 to 90   | 0,008 - 0,015     | 0,01 - 0,03   | 0,025 - 0,045       | 0,04 - 0,065 |

|                                                 |           | FEED PER TOOTH Fz |               |                          |              |
|-------------------------------------------------|-----------|-------------------|---------------|--------------------------|--------------|
| MATERIALS                                       | Vc        | D < Ø3            | Ø3 < D < Ø5   | <b>Ø5 &lt; D &lt; Ø8</b> | Ø8 < D < Ø14 |
| Thermoplastics<br>Acetate, Plexiglass,<br>Nylon | 300 à 500 | 0,01 - 0,035      | 0,025 - 0,045 | <b>0,045 - 0,08</b>      | 0,08 - 0,16  |

This example shows that we use a Ø6 tool with 2 flutes; Cutting speed is 300 m/min, Feed per tooth is 0,035 mm/round. With these data we calculated the cutting conditions for the tool.

#### EXAMPLE:

Tool diameter D=6  
Number of flutes Z=1  
Material to machine: Acetate Plexiglass

Cutting speed Vc=400  
Feed per tooth fz=0.06

#### CALCULATION:

N = 21 221 tr/min  
Vf = 1 273 mm/min

### Plunging the material

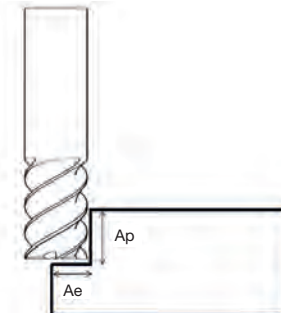
The harder the material to be routed/milled, the slower you should plunge. Reducing the plunge helps to avoid damaging the tool as it “hits” the material. Consider slower plunge when using small diameter tools, extra long cutting length tools and flatter tipped tools.

#### Examples:

- > Plastic/Wood – 40-60% of the calculated feed rate [IPM]
- > Aluminum/Non-Ferrous – 35-50% of the calculated feed rate [IPM]
- > Steel/Ferrous Metal – 20-30% of the calculated feed rate [IPM]

### Depth of cut ‘Ae’

It is important to follow the recommended ‘Ae’ listed on the Belin Cutting Formula Chart. Smaller cutting edge diameters and harder material being routed/milled require the depth of cut ‘Ae’ be reduced. Exceeding the recommended ‘Ae’ can contribute to less than optimal edge quality, shorter tool life and tool breakage.



## Troubleshooting

| Most common problems while machining with following one flute references<br>(12000, 13000, 22000, 3300) |                                          |                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Problems                                                                                                | Diagnose                                 | Solve                                                                                                                             |
| Tool breakage<br>Bad surface state of the workpiece                                                     | Damaged collet                           | Change the collet                                                                                                                 |
|                                                                                                         | Important overhang                       | Use if possible a tool with a shorter cutting length                                                                              |
|                                                                                                         | Colleting on the flute                   | The mouth or bottom of the collet must contact the tool bit slightly above the flute fadeout                                      |
|                                                                                                         | Loose in the spindle                     | Spindle maintenance                                                                                                               |
|                                                                                                         | Loose in the table                       | Machine maintenance                                                                                                               |
|                                                                                                         | Concentricity problem on the tool holder | Clean the spindle and the tool holder or change the tool holder                                                                   |
|                                                                                                         | Workpiece not maintained                 | Lower cutting conditions (Ap and/or Ae) and feed rate.                                                                            |
|                                                                                                         | Collet not adapted to the shank length   | Use a different tool with a different shank length                                                                                |
| Wear on the tool                                                                                        | Not adapted cutting conditions           | Calculate the right cutting conditions or ask your sales representative                                                           |
|                                                                                                         | Coolant problem                          | For Aluminium: cool the process with cutting oil or micro-cooling or use a coated tool.<br>For plastic materials: Use air cooling |
| Burn mark on the workpiece                                                                              | RPM is too high or feed rate is too low  | Lower RPM or increase feed rate                                                                                                   |

### Spindle power influence

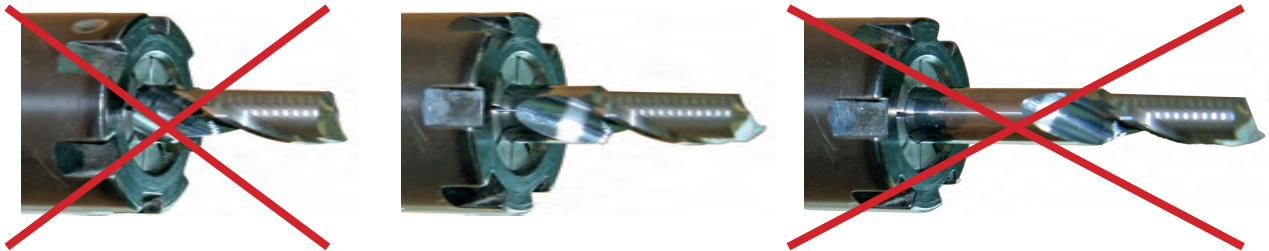
The cutting conditions given in our catalogues are adapted for spindles power equals or superior to 2 KW. It is highly recommended to divide by two those latter for spindles that are less than 2KW.  
Spindle power less than 1KW: We advise you against the use of tools with a higher diameter than 6mm.

### Flute geometry

An upcut endmill (series 13000 and 33000) tend to attract the workpiece to the spindle. The chips are well evacuated but the workpiece has to be well maintained to avoid vibrations.  
A downcut endmill (series 12000 and 22000) tend to push the workpiece in the opposite direction (it pushes the workpiece down). The workpiece will undergo less vibrations but you may encounter chips evacuation troubles (depending on the holding system used).

## Proper colleting

In all router bits, there is an area known as the flute fadeout section of the tools. This is formed when the grinding wheel utilized in the manufacturing of the tool exits the work piece. In order to properly collet a router bit, the mouth or bottom of the collet must contact the router bit slightly above the flute fadeout. Overcolleting or allowing the flute fadeout portion to extend inside the collet can damage the collet and is a common cause of tool breakage.

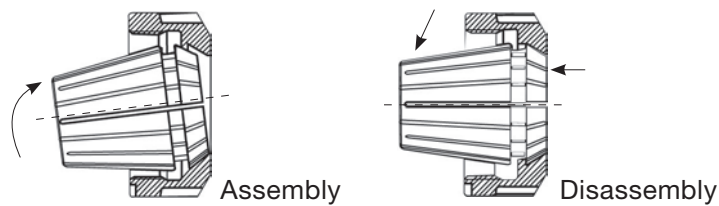


## Proper colleting and maintenance

### Introduction

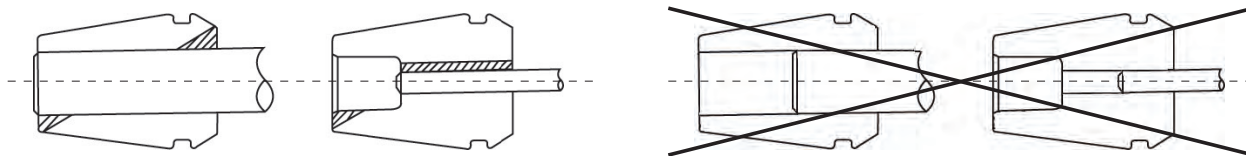
Rigidity is a key factor in the routing of plastic material. The problems associated with rigidity involve the part, as well as the machine. Parts must be held solidly with established fixturing techniques, and the machine must be appropriately maintained to insure the cutting tool is following the proper tool path in a rigid and concentric fashion.

One of the elements that aids in this whole process lies in the area of proper colleting of the router bit and the on-going maintenance procedure associated with router collets.

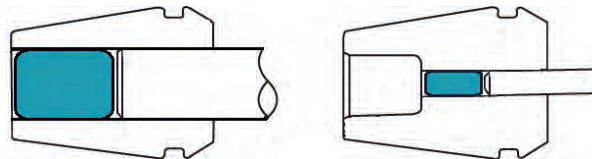


### Use

The proper method of colleting a router bit in the full grip collet is to fill at least 80% of the depth of the collet. This allows the tool to be equally distributed on all sections of the collet and provides an environment where the tool runs in a true circle or concentrically. Without concentricity, the finish of the plastic part is adversely affected, and tool failure can occur.



There are situations where the 80% rule cannot be maintained because of inadequate shank lengths or extreme reach problems. Consequently, it becomes necessary to fill the void in the top of the collet with a filler or collet life plug. This is a practical solution to avoid collapsing of the collet, which may result from not following the 80% rule.



### Collets maintenance

Router bits and collets are expected to operate accurately in a work environment inundated with heat and grime. Plastic chips formed by the cutting action of the router bit carry with them resins that migrate through the slits of the collets and adhere to the inside of this closely toleranced mechanism. The resin build up usually concentrates nearest the mouth of the collet. At this point, the tool is no longer being equally gripped causing a loss in concentricity and tool run out. Once again, the lack of a router tool running in a true circle affects the finish of the part and may cause the ultimate demise of the tool. Fortunately, this problem is easily resolved by cleaning the collets after every tool change. The procedure involves the use of non-abrasive brass tube brush applied inside the collet in combination with a cleaner such as Rust Free.

### Collet replacement

Collets are manufactured from spring steel and regular usage causes a loss of elasticity. Therefore, it becomes necessary to replace collets on a regular interval as a part of an on-going maintenance procedure. With diligent attention to proper collet maintenance, the average collet should be replaced about every 400-600 hours of run time. Avoiding regular replacement can lead to brittle collets, which may crack or break, and cause permanent damage to the spindle. Replacement of collets is a much more economical alternative than replacing router bits or expensive spindles.







NOTES

Handwriting practice lines consisting of 20 horizontal dotted lines.



**LMT Belin USA**  
1081 S. Northpoint Blvd.  
Waukegan, IL 60085  
USA  
**Phone:** 847-693-3470  
**Fax:** 855-481-8997  
sales@lmtbelinusa.com

[www.lmtbelinusa.com](http://www.lmtbelinusa.com)



**LMT Belin USA**  
1081 S. Northpoint Blvd.  
Waukegan, IL 60085  
USA  
Phone: 847-693-3470  
Fax: 855-481-8997  
sales@lmtbelinusa.com

**LMT Belin France S.A.S.**  
Lieu dit "Les Cizes"  
01590 Lavancia  
Frankreich  
Phone: +33 474 758989  
Fax: +33 474 758990  
info@lmt-belin.com  
www.lmt-belin.com

**LMT Fette Werkzeugtechnik  
GmbH & Co. KG**  
Grabauer Strasse 24  
21493 Schwarzenbek  
Deutschland  
Phone: +49 4151 12-0  
Fax: +49 4151 3797  
info@lmt-fette.com  
www.lmt-fette.com

**LMT Kieninger GmbH**  
Vogesenstrasse 23  
77933 Lahr  
Deutschland  
Phone: +49 7821 943-0  
Fax: +49 7821 943213  
info@lmt-kieninger.com  
www.lmt-kieninger.com

**LMT Onsrud LP**  
1081 S. Northpoint Blvd.  
Waukegan, IL 60085  
USA  
Phone: 847 362 1560  
Fax: 847 473 1934  
info@lmt-onsrud.com  
www.lmt-onsrud.com

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