

Reamers

# Catalogue

## Boring Tools

# 2022



ZCC Cutting Tools Europe GmbH

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## WELCOME TO ZCC CUTTING TOOLS EUROPE

ZCC-CT, one of the World's leading carbide tooling manufacturers, welcomes you to its products. We are able to offer you a wide product range of high performance cutting tools at economic prices and a good supply service to support the production and productivity at your manufacturing facilities. You will find the main tool types in the various sections of the catalogue, Turning is in section A, Milling in section B and Drilling in section C of the catalogue.

We are looking forward to working with you and developing good cooperation together. Our team at ZCC Cutting Tools Europe is ready to support you in all of your requirements.



**Member of Minmetals Group**



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# Boring Tools



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How to choose the right solid carbide reamers

## How to choose the right solid carbide reamers

- Shape
- Product type
- Product name
- Product category

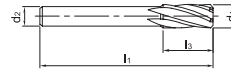
Shape size

### Reamers

#### Solid carbide reamer with straight shank and right helical flute

**3101H7**

H7



Type	Basic dimension(mm)				Number of tooth	Recommended grade YK10F
	d <sub>1</sub>	d <sub>2</sub> (h <sub>7</sub> )	l <sub>1</sub>	l <sub>3</sub>		
3101H7-0400	4.0	3.55	56	20	4	☆
3101H7-0450	4.5	4.00	63	22	6	☆
3101H7-0500	5.0	4.00	63	22	6	☆
3101H7-0550	5.5	5.00	63	22	6	☆
3101H7-0600	6.0	5.00	63	22	6	☆
3101H7-0650	6.5	5.00	63	22	6	☆
3101H7-0700	7.0	6.30	71	25	6	☆
3101H7-0750	7.5	6.30	71	25	6	☆
3101H7-0800	8.0	6.30	71	25	6	☆
3101H7-0850	8.5	8.00	71	25	6	☆
3101H7-0900	9.0	8.00	71	25	6	☆
3101H7-0950	9.5	8.00	71	25	6	☆
3101H7-1000	10.0	8.00	71	25	6	☆
3101H7-1050	10.5	8.00	71	25	6	☆
3101H7-1100	11.0	10.00	80	28	6	☆
3101H7-1150	11.5	10.00	80	28	6	☆
3101H7-1200	12.0	10.00	80	28	6	☆
3101H7-1250	12.5	10.00	80	28	6	☆
3101H7-1300	13.0	10.00	80	28	6	☆
3101H7-1350	13.5	12.5	90	32	6	☆
3101H7-1400	14.0	12.5	90	32	6	☆
3101H7-1450	14.5	12.5	90	32	6	☆
3101H7-1500	15.0	12.5	90	32	6	☆
3101H7-1550	15.5	12.5	90	32	6	☆
3101H7-1600	16.0	12.5	90	32	6	☆
3101H7-1700	17.0	12.5	90	32	6	☆
3101H7-1800	18.0	16.00	100	36	6	☆
3101H7-1900	19.0	16.00	100	36	6	☆
3101H7-2000	20.0	16.00	100	36	6	☆

☆ Recommended grade (produce according to order)

#### Applicable material table

Grade	Workpiece material										
	Mild steel HBs180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
YK10F			~40HRC	~50HRC	~60HRC		○	○	○	○	

Code key C147    Cutting parameters C151    Technical information C152-C154    Non-standard customization C155

- Applicable workpiece material range
- Hole precision class and shank type

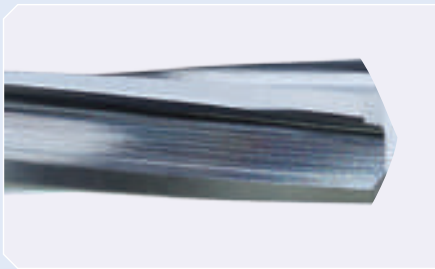
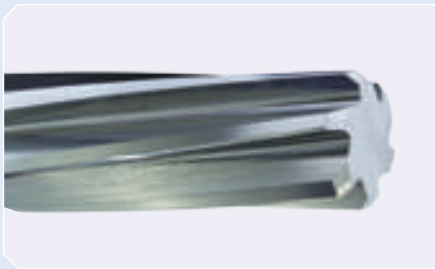
- Specification  
Type, basic dimensions, number of tooth and grade.
- Code key, cutting parameter, technical information, non-standard customization



# BORING TOOLS **C**

## Reamers




- Solid carbide reamers overview** ● C146
- Icons information** ● C146
- Solid carbide reamer code key** ● C147
- Detail information of solid carbide reamers** ● C148-C150
- Recommended cutting parameters for solid carbide reamers** ● C151
- Technical information for solid carbide reamers** ● C152-154
- Non-standard customized solid carbide reamers** ● C155





### Solid carbide reamers overview

#### Solid carbide reamers overview

Name	Type	Shape	Diameter range	Workpiece material						Page			
				P	M	K	N	S	H	Specification	Cutting parameters		
				Mild steel	Common steel	Stainless steel	Cast iron	Aluminum alloy	Copper alloy			Heat resistant alloy	High hardness steel
Right helical flute reamer	3101H7		Ø4-Ø20				○	○	○			C148	C151
Straight flute reamer	3102H7		Ø4-Ø20				○	○	○			C149	C151
Left helical flute reamer	3103H7		Ø4-Ø20				○	○	○			C150	C151

○ Very suitable ○ Suitable

Drilling tools

Reaming Tools

Solid carbide reamers overview

#### Solid carbide reamers icons information

##### Precision class of reamed hole

H7

The precision class of reamed hole reaches H7 specified in GB/T1800-1804

##### Shank type



Straight shank





**Solid carbide reamer code key**

Code	Description
3	Reamer

**Tool type**

Code	Description
1	Right chip flute
2	Straight flute
3	Left chip flute

**Type of flute**

Code	Description
H7	The precision class of reamed hole reaches H7 specified in GB/T1800-1804

**Precision class of reamed hole**

**3 1 0 1 H7 -0850**

**Shank type**

Code	Description
1	Straight shank
2	Square straight shank as per DIN10
5	Straight shank as per DIN6535HA
9	Tapered shank

**Mode of cooling**

Code	Description
0	External coolant
1	Internal coolant

**Specification**

Code	Description
0850	Diameter is 8.5mm

Drilling tools

Reaming Tools

Solid carbide reamer code key



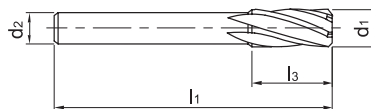


# BORING TOOL / Reaming Tools

Solid carbide reamer with straight shank and right helical flute

## Solid carbide reamer with straight shank and right helical flute

### 3101H7



H7



Type	Basic dimension(mm)				Number of tooth	Recommended grade YK10F
	d1	d2(h7)	l1	l3		
3101H7-0400	4.0	3.55	56	20	4	☆
3101H7-0450	4.5	4.00	63	22	6	☆
3101H7-0500	5.0	4.00	63	22	6	☆
3101H7-0550	5.5	5.00	63	22	6	☆
3101H7-0600	6.0	5.00	63	22	6	☆
3101H7-0650	6.5	5.00	63	22	6	☆
3101H7-0700	7.0	6.30	71	25	6	☆
3101H7-0750	7.5	6.30	71	25	6	☆
3101H7-0800	8.0	6.30	71	25	6	☆
3101H7-0850	8.5	8.00	71	25	6	☆
3101H7-0900	9.0	8.00	71	25	6	☆
3101H7-0950	9.5	8.00	71	25	6	☆
3101H7-1000	10.0	8.00	71	25	6	☆
3101H7-1050	10.5	8.00	71	25	6	☆
3101H7-1100	11.0	10.00	80	28	6	☆
3101H7-1150	11.5	10.00	80	28	6	☆
3101H7-1200	12.0	10.00	80	28	6	☆
3101H7-1250	12.5	10.00	80	28	6	☆
3101H7-1300	13.0	10.00	80	28	6	☆
3101H7-1350	13.5	12.5	90	32	6	☆
3101H7-1400	14.0	12.5	90	32	6	☆
3101H7-1450	14.5	12.5	90	32	6	☆
3101H7-1500	15.0	12.5	90	32	6	☆
3101H7-1550	15.5	12.5	90	32	6	☆
3101H7-1600	16.0	12.5	90	32	6	☆
3101H7-1700	17.0	12.5	90	32	6	☆
3101H7-1800	18.0	16.00	100	36	6	☆
3101H7-1900	19.0	16.00	100	36	6	☆
3101H7-2000	20.0	16.00	100	36	6	☆

☆ Recommended grade ( produce according to order)

Drilling tools

Reaming Tools

Solid carbide reamer with straight shank and right helical flute

### Applicable material table

○ Very suitable ○ Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
YK10F			~40HRC	~50HRC	~60HRC		○	○	○	○	

Code key

C147

Cutting parameters

C151

Technical information

C152-C154

Non-standard customization tools

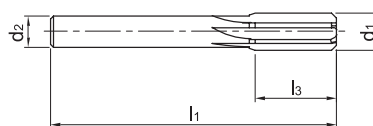
C155



Solid carbide reamer with straight shank and right helical flute

Solid carbide reamer with straight shank and straight flute

**3102H7**



H7



Type	Basic dimension(mm)				Number of tooth	Recommended grade YK10F
	d <sub>1</sub>	d <sub>2</sub> (h7)	l <sub>1</sub>	l <sub>3</sub>		
3102H7-0400	4.0	3.55	56	20	4	☆
3102H7-0450	4.5	4.00	63	22	6	☆
3102H7-0500	5.0	4.00	63	22	6	☆
3102H7-0550	5.5	5.00	63	22	6	☆
3102H7-0600	6.0	5.00	63	22	6	☆
3102H7-0650	6.5	5.00	63	22	6	☆
3102H7-0700	7.0	6.30	71	25	6	☆
3102H7-0750	7.5	6.30	71	25	6	☆
3102H7-0800	8.0	6.30	71	25	6	☆
3102H7-0850	8.5	8.00	71	25	6	☆
3102H7-0900	9.0	8.00	71	25	6	☆
3102H7-0950	9.5	8.00	71	25	6	☆
3102H7-1000	10.0	8.00	71	25	6	☆
3102H7-1050	10.5	8.00	71	25	6	☆
3102H7-1100	11.0	10.00	80	28	6	☆
3102H7-1150	11.5	10.00	80	28	6	☆
3102H7-1200	12.0	10.00	80	28	6	☆
3102H7-1250	12.5	10.00	80	28	6	☆
3102H7-1300	13.0	10.00	80	28	6	☆
3102H7-1350	13.5	12.5	90	32	6	☆
3102H7-1400	14.0	12.5	90	32	6	☆
3102H7-1450	14.5	12.5	90	32	6	☆
3102H7-1500	15.0	12.5	90	32	6	☆
3102H7-1550	15.5	12.5	90	32	6	☆
3102H7-1600	16.0	12.5	90	32	6	☆
3102H7-1700	17.0	12.5	90	32	6	☆
3102H7-1800	18.0	16.00	100	36	6	☆
3102H7-1900	19.0	16.00	100	36	6	☆
3102H7-2000	20.0	16.00	100	36	6	☆

☆ Recommended grade ( produce according to order)

Drilling tools

Reaming Tools

Solid carbide reamer with straight shank and right helical flute

▶▶ Applicable material table

○Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
YK10F			~40HRC	~50HRC	~60HRC		○	○	○	○	

Code key

C147

Cutting parameters  
C151

Technical information  
C152-C154

Non-standard customization tools  
C155

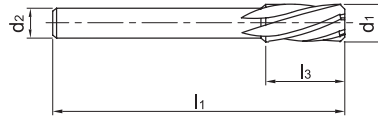


# BORING TOOL / Reaming Tools

Solid carbide reamer with straight shank and right helical flute

## Solid carbide reamer with straight shank and left helical flute

### 3103H7



H7



Type	Basic dimension(mm)				Number of tooth	Recommended grade
	d1	d2(h7)	l1	l3		YK10F
3103H7-0400	4.0	3.55	56	20	4	☆
3103H7-0450	4.5	4.00	63	22	6	☆
3103H7-0500	5.0	4.00	63	22	6	☆
3103H7-0550	5.5	5.00	63	22	6	☆
3103H7-0600	6.0	5.00	63	22	6	☆
3103H7-0650	6.5	5.00	63	22	6	☆
3103H7-0700	7.0	6.30	71	25	6	☆
3103H7-0750	7.5	6.30	71	25	6	☆
3103H7-0800	8.0	6.30	71	25	6	☆
3103H7-0850	8.5	8.00	71	25	6	☆
3103H7-0900	9.0	8.00	71	25	6	☆
3103H7-0950	9.5	8.00	71	25	6	☆
3103H7-1000	10.0	8.00	71	25	6	☆
3103H7-1050	10.5	8.00	71	25	6	☆
3103H7-1100	11.0	10.00	80	28	6	☆
3103H7-1150	11.5	10.00	80	28	6	☆
3103H7-1200	12.0	10.00	80	28	6	☆
3103H7-1250	12.5	10.00	80	28	6	☆
3103H7-1300	13.0	10.00	80	28	6	☆
3103H7-1350	13.5	12.5	90	32	6	☆
3103H7-1400	14.0	12.5	90	32	6	☆
3103H7-1450	14.5	12.5	90	32	6	☆
3103H7-1500	15.0	12.5	90	32	6	☆
3103H7-1550	15.5	12.5	90	32	6	☆
3103H7-1600	16.0	12.5	90	32	6	☆
3103H7-1700	17.0	12.5	90	32	6	☆
3103H7-1800	18.0	16.00	100	36	6	☆
3103H7-1900	19.0	16.00	100	36	6	☆
3103H7-2000	20.0	16.00	100	36	6	☆

☆ Recommended grade ( produce according to order)

Drilling tools

Reaming Tools

Solid carbide reamer with straight shank and right helical flute

### Applicable material table

⊙ Very suitable ○ Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
YK10F			~40HRC	~50HRC	~60HRC		⊙	⊙	⊙	⊙	

Code key

C147

Cutting parameters

C151

Technical information

C152-C154

Non-standard customization tools

C155



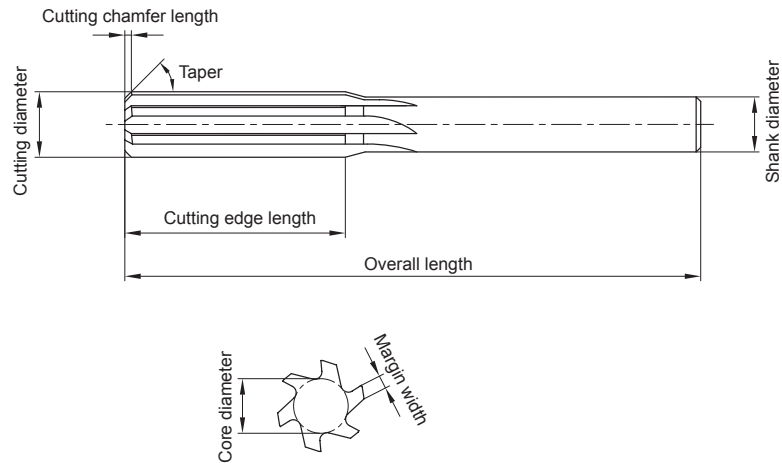
## 3101H7★3102H7★3103H7

Workpiece material	Cast iron Nodular cast iron			Copper alloy			Casting aluminium alloy		
Cutting speed	8~16m/min			10~25m/min			15~30 m/min		
Diameter (mm)	Rotating speed (min <sup>-1</sup> )	Feed rate (mm/r)	Allowance (mm)	Rotating speed (min <sup>-1</sup> )	Feed rate (mm/r)	Allowance (mm)	Rotating speed (min <sup>-1</sup> )	Feed rate (mm/r)	Allowance (mm)
4	950	0.04~0.06	0.1~0.2	1600	0.04~0.06	0.1~0.2	2000	0.04~0.06	0.1~0.2
5	760	0.05~0.09	0.1~0.2	1300	0.05~0.09	0.1~0.2	1600	0.05~0.09	0.1~0.2
6	640	0.06~0.12	0.1~0.2	1050	0.06~0.12	0.1~0.2	1300	0.06~0.12	0.1~0.2
7	550	0.07~0.14	0.1~0.2	910	0.07~0.14	0.1~0.2	1150	0.07~0.14	0.1~0.2
8	480	0.08~0.16	0.1~0.2	800	0.08~0.16	0.1~0.2	1000	0.08~0.16	0.1~0.2
9	430	0.09~0.18	0.1~0.2	710	0.09~0.18	0.1~0.2	890	0.09~0.18	0.1~0.2
10	380	0.10~0.20	0.1~0.2	640	0.10~0.20	0.1~0.2	800	0.10~0.20	0.1~0.2
11	350	0.11~0.22	0.1~0.2	580	0.11~0.22	0.1~0.2	720	0.11~0.22	0.1~0.2
12	320	0.12~0.24	0.1~0.2	530	0.12~0.24	0.1~0.2	660	0.12~0.24	0.1~0.2
13	290	0.13~0.26	0.1~0.2	490	0.13~0.26	0.1~0.2	610	0.13~0.26	0.1~0.2
14	270	0.14~0.28	0.1~0.2	460	0.14~0.28	0.1~0.2	570	0.14~0.28	0.1~0.2
15	250	0.15~0.30	0.1~0.2	430	0.15~0.30	0.1~0.2	530	0.15~0.30	0.1~0.2
16	240	0.16~0.32	0.1~0.2	400	0.16~0.32	0.1~0.2	500	0.16~0.32	0.1~0.2
17	225	0.18~0.34	0.1~0.2	380	0.18~0.34	0.1~0.2	470	0.18~0.34	0.1~0.2
18	210	0.20~0.36	0.1~0.2	350	0.20~0.36	0.1~0.2	440	0.20~0.36	0.1~0.2
19	200	0.22~0.38	0.1~0.2	340	0.22~0.38	0.1~0.2	420	0.22~0.38	0.1~0.2
20	190	0.24~0.40	0.1~0.2	320	0.24~0.40	0.1~0.2	400	0.24~0.40	0.1~0.2

1. Please select the holder with high rigidity and high precision.
2. Make sure coolant supply is sufficient.
3. Please adjust cutting parameters according workpiece and machine rigidity.



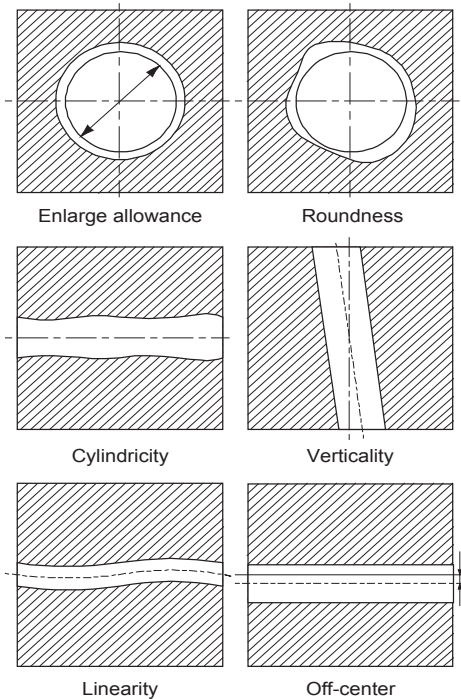
### Terminology of reamer



Reaming is the semi-finishing and finishing of an existing hole to achieve precise size, high surface quality, perfect roundness and cylindricity, etc.

In order to gain precise hole in reaming process, the reamer diameter must be defined correctly. Therefore, it is necessary to consider the allowance which is determined by workpiece material and machining conditions. It is also necessary to select the cutting conditions correctly in addition to using high precision reamer to achieve good surface quality.

The reaming precision is mainly determined by diameter and radial run-out. With respect to cutting condition, it is better to select low speed cutting to improve machining precision, but the upper limit should be considered carefully for higher machining efficiency.





### Common problems and solutions for reaming

Common problems	Solutions
<b>Oversized holes</b>	<ol style="list-style-type: none"> <li>1.Reduce diameter of reamer.</li> <li>2.The center of reamer is not in alignment with hole center. Adjust the concentricity of hole and reamer.</li> <li>3.Radial run-out of reamer is too large. Good radial run-out is a key to successful reaming.</li> <li>4.Scratches on reamer shank.</li> <li>5.When using bushing and bushing, ensure shank is clean.</li> <li>6.Select a suitable coolant.</li> <li>7.Adjust cutting parameters.</li> </ol>
<b>Undersized holes</b>	<ol style="list-style-type: none"> <li>1.Increase diameter of reamer.</li> <li>2.Reduce rotating speed.</li> <li>3.Reduce the margin width.</li> <li>4.Excessive tool abrasion, please conduct cutting after regrinding.</li> <li>5.Thermal expansion coefficient of workpiece is too large. Please keep it cooled enough.</li> </ol>
<b>Poor hole roundness and linearity</b>	<ol style="list-style-type: none"> <li>1.Ensure better roundness of reamer chamfer.</li> <li>2.Reamer rigidity is low. Make the overhang as short as possible in conditions of non-interference.</li> <li>3.Check radial run-out after clamping reamer.</li> <li>4.Adjust the concentricity of hole and reamer.</li> <li>5.Ensure reaming allowance equality.</li> </ol>
<b>Poor hole surface quality</b>	<ol style="list-style-type: none"> <li>1.The hole surface roughness of entering part is bad.</li> <li>2.Reduce rotating speed.</li> <li>3.Ensure correct reaming allowance. The allowance being too large or too small would result in bad surface roughness.</li> <li>4.Select the reamer with large chip pocket to avoid chip jamming.</li> <li>5.Increase clearance angle of reamer entering part.</li> <li>6.Check whether there is built-up on chamfer and margin land.</li> <li>7.Increase the rigidity of machine, holder and reamer.</li> <li>8.Check out whether the type of reamer head is suitable for the workpiece.</li> <li>9.Increase the margin width and land width appropriately.</li> </ol>
<b>Hole precision is low</b>	<ol style="list-style-type: none"> <li>1.In return pass, the reamer should be pulled out of hole rotating at the same direction as before. Opposite rotation must be prohibited.</li> <li>2.Reduce rotating speed.</li> <li>3.Select the reamer with more lips.</li> <li>4.Increase the margin width appropriately to enhance the guiding performance and extrusion effect.</li> <li>5.Improve reamer lubricating property by surface treatment.</li> <li>6.Select a suitable coolant.</li> </ol>



### Common problems and solutions for reaming

Common problems	Solutions
<b>Reamer breakage, thermal damage</b>	<ol style="list-style-type: none"> <li>1.The guide hole is defective before reaming, for example, linearity is not good.</li> <li>2.Adjust machining allowance to avoid tool breakage caused by too large allowance.</li> <li>3.If the chip removal is obstructed, select a reamer with larger chip pocket.</li> <li>4.Ensure sufficient coolant supply.</li> <li>5.Adjust rotating speed and feed speed appropriately.</li> <li>6.Increase the rigidity of machine, holder and reamer.</li> <li>7.Improve the sharpness of reamer to make cutting easy and fast.</li> <li>8.Excessive abrasion occurs on cutting edge, which means tool life has expired. It is recommended to change or regrind tool.</li> </ol>
<b>Damage on reamer shank</b>	<ol style="list-style-type: none"> <li>1.Check whether the shank hardness is enough. Too low hardness would cause deformation, and too high hardness may cause breakage.</li> <li>2.Check the conjunction of holder and bushing. Do not use a defective holder.</li> </ol>
<b>Short tool life</b>	<ol style="list-style-type: none"> <li>1.Enhance the hardness of reamer cutting edge.</li> <li>2.Select the reamer made by advanced material.</li> <li>3.Check the coolant.</li> <li>4.Use surface treatment for reamer such as nitride process.</li> <li>5.Change the straight flute to helical flute.</li> <li>6.Check all factors affecting machining precision.</li> </ol>
<b>Scratches on hole surface</b>	<ol style="list-style-type: none"> <li>1.Make sure no built-up is on the reamer surface.</li> <li>2.Improve workpiece holding.</li> </ol>
<b>Trumpet-shaped entry hole</b>	<ol style="list-style-type: none"> <li>1.Improve workpiece holding.</li> <li>2.Check radial run-out after clamping reamer.</li> <li>3.The center of reamer is not in alignment with the hole center. Adjust the concentricity of hole and reamer.</li> </ol>
<b>Oversized holes</b>	<ol style="list-style-type: none"> <li>1.The center of reamer is not in alignment with hole center. Adjust the concentricity of hole and reamer.</li> <li>2.Improve workpiece holding.</li> </ol>





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**Hole information and workpiece material**

Hole shape to be machined:

Through hole      Blind hole

Size of processed hole=  mm

Tolerance of processed hole=

Depth of processed hole=  mm

Material grade to be processed:

Grey cast iron

Ductile Iron

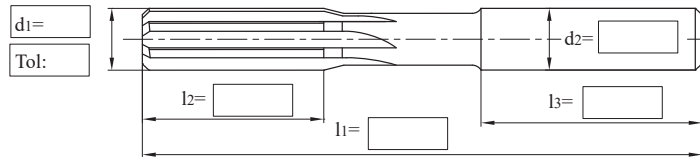
Aluminum alloy Tensile strength=  N/mm<sup>2</sup>

Silicon Aluminum Alloy Si <10% Hardness=  Units:(HRC,HB,etc.)

Silicon Aluminum Alloy Si ≥10%

**Tool Information**

Direction of cutting tools' rotation	
Right-handed rotation	<input type="checkbox"/>
Straight flute	<input type="checkbox"/>
Left-handed rotation	<input type="checkbox"/>



Lead angle forms	
45° A= <input type="text"/>	45° A= <input type="text"/> B= <input type="text"/>
30° A= <input type="text"/>	<30° <input type="text"/>

Coolant type	
Internal coolant	<input type="checkbox"/>
External coolant	<input type="checkbox"/>

Coating	
Coated	<input type="checkbox"/>
Non-Coated	<input type="checkbox"/>

DIN6535	Shank form	
	<input type="checkbox"/>	Form HA
	<input type="checkbox"/>	Form HB
	<input type="checkbox"/>	Form HE
<input type="checkbox"/>	Ordinary straight handle	
<input type="checkbox"/>	With flat tail handle DIN 1809	
<input type="checkbox"/>	Morse Taper Shank MT <input type="checkbox"/>	
Special shapes		

Note:

Order Quantity:      PCS

Expected delivery date:

Quotation:

Confirmation:

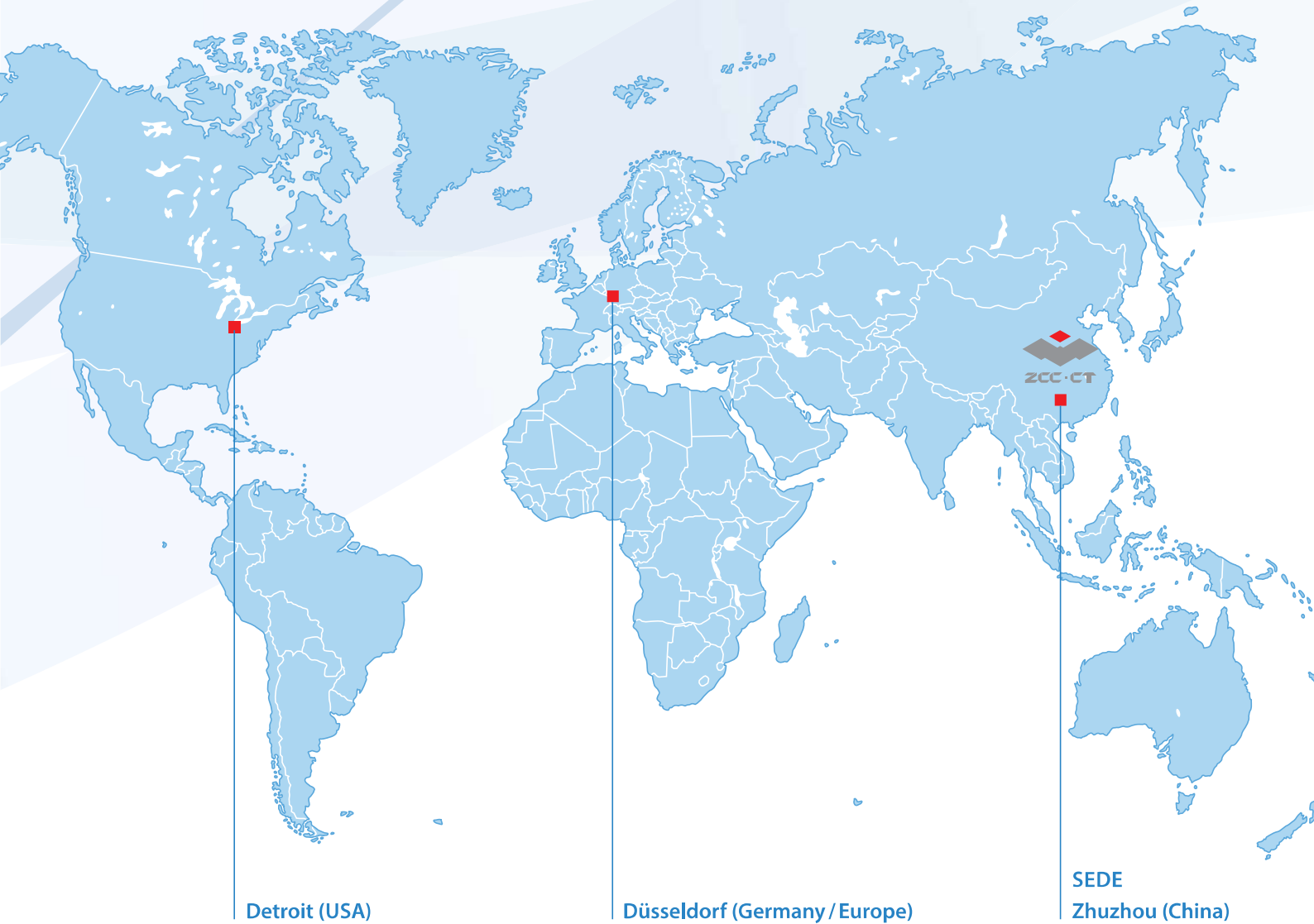
Date:

Drilling tools

Reaming Tools

Non-standard customization for special application





Detroit (USA)

Düsseldorf (Germany / Europe)

SEDE  
Zhuzhou (China)





Oficina central europea

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