



东莞铭天创数控科技有限公司
Dongguan Mingtianchuang CNC Technology Co.,Ltd

CONTENTS

目录

外冷钻

Exterior Cold Drill



01-08

内冷钻

Internal Cooling Drill



09-13

微小钻

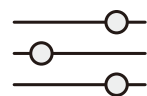
Micro Drill



14-16

切削参数

Cutting Parameters



17-22

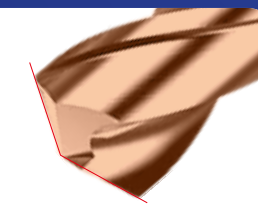
外冷钻

Exterior Cold Drill



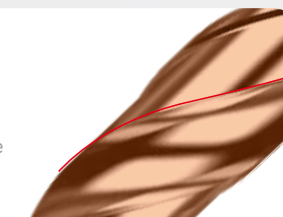
独特的钻尖角，切
削轻快，定心更稳

Unique drill point, cutting light,
centering more stable



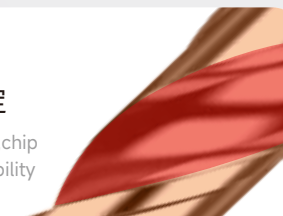
刃口钝化，抗崩刃，
抗磨损

Edge passivation, anti collapse
and wear resistance



槽口大空间，抛光，
排屑顺畅，切削稳定

Large groove space, polishing, chip
removal smoothly, cutting stability



优势 Advantages

- 独特的钻尖设计，加工铸铁更轻快，定心稳
- 刃口钝化处理，耐冲击，抗崩刃，增加寿命
- 排屑槽空间大，排屑快，适合高速大进给切削
- The unique drill point design make cast iron more light and steady.
- Blade passivation, impact resistance, anti collapse, and life increase.
- The chip cutting trough has large space and fast chip removal, which is suitable for high-speed and large feed cutting.

硬质合金定柄钻头3D（外冷）

Carbide fixed shank drill 3D (External cooling)

使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.

制造特点 Manufacutring characteristics

刃部公差：m7

排屑槽型：特殊设计，便于排屑

横刃制造：横刃修正，铭泰顺标准

柄部形式：DIN6535HA h6

涂层：He/PT

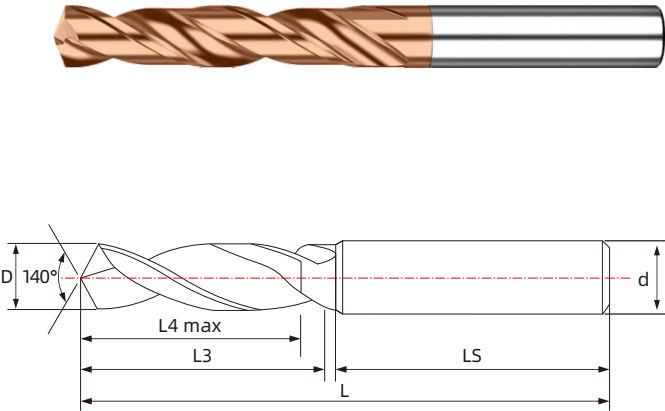
Cutting edge tolerance: m7

Chip groove: Specidl design,easy to chip removal

Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard

Shank form: DIN6535HA h6

Coating: He/PT



刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
3.0	20	28	4	62
3.1	20	28	4	62
3.2	20	28	4	62
3.3	20	28	4	62
3.4	20	28	4	62
3.5	20	28	4	62
3.6	20	28	4	62
3.7	20	28	4	62
3.8	20	28	4	62
3.9	20	28	4	62
4.0	20	28	4	62
4.1	24	28	6	66
4.2	24	28	6	66
4.3	24	28	6	66
4.4				
4.5				
4.6				
4.7				
4.8				
4.9				
5.0				
5.1				
5.2				

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
5.3	28	36	6	66
5.4	28	36	6	66
5.5	28	36	6	66
5.6	28	36	6	66
5.7	28	36	6	66
5.8	28	36	6	66
5.9	28	36	6	66
6.0	28	36	6	66
6.1	34	36	8	79
6.2	34	36	8	79
6.3	34	36	8	79
6.4	34	36	8	79
6.5	34	36	8	79
6.6	34	36	8	79

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
7.6	34	36	8	79
7.7	34	36	8	79
7.8	34	36	8	79
7.9	34	36	8	79
8.0	34	36	8	79
8.1	47	40	10	89
8.2	47	40	10	89
8.3	47	40	10	89
8.4	47	40	10	89
8.5	47	40	10	89
8.6	47	40	10	89
8.7	47	40	10	89
8.8	47	40	10	89
8.9	47	40	10	89
9.0	47	40	10	89
9.1	47	40	10	89
9.2	47	40	10	89
9.3	47	40	10	89
9.4	47	40	10	89
9.5	47	40	10	89
9.6	47	40	10	89
9.7	47	40	10	89
9.8	47	40	10	89
9.9	47	40	10	89
10.0	47	40	10	89
10.1	55	45	12	102
10.2	55	45	12	102
10.3	55	45	12	102
10.4	55	45	12	102
10.5	55	45	12	102
10.6	55	45	12	102
10.7	55	45	12	102
10.8	55	45	12	102
10.9	55	45	12	102

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
11.9	55	45	12	102
12.0	55	45	12	102
12.1	60	45	14	107
12.2	60	45	14	107
12.3	60	45	14	107
12.4	60	45	14	107
12.5	60	45	14	107
12.6	60	45	14	107
12.7	60	45	14	107
12.8	60	45	14	107
12.9	60	45	14	107
13.0	60	45	14	107
13.1	60	45	14	107
13.2	60	45	14	107
13.3	60	45	14	107
13.4	60	45	14	107
13.5	60	45	14	107
13.6	60	45	14	107
13.7	60	45	14	107
13.8	60	45	14	107
13.9	60	45	14	107
14.0	60	45	14	107
14.1	65	48	16	115
14.2	65	48	16	115
14.3	65	48	16	115
14.4	65	48	16	115
14.5	65	48	16	115
14.6	65	48	16	115
14.7	65	48	16	115
14.8	65	48	16	115
14.9	65	48	16	115
15.0	65	48	16	115
15.1	65	48	16	115
15.2	65	48	16	115

硬质合金定柄钻头5D（外冷）

Carbide fixed shank drill 5D (External cooling)

使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.

制造特点 Manufacutring characteristics

刃部公差：m7

排屑槽型：特殊设计，便于排屑

横刃制造：横刃修正，铭泰顺标准

柄部形式：DIN6535HA h6

涂层：He/PT

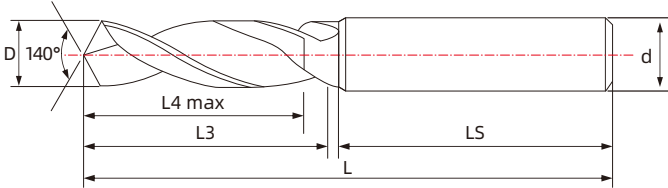
Cutting edge tolerance: m7

Chip groove: Specidl design,easy to chip removal

Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard

Shank form: DIN6535HA h6

Coating: He/PT



刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
3.0	28	28	4	62
3.1	28	28	4	62
3.2	28	28	4	62
3.3	28	28	4	62
3.4	28	28	4	62
3.5	28	28	4	62
3.6	28	28	4	62
3.7	28	28	4	62
3.8	28	28	4	62
3.9	28	28	4	62
4.0	28	28	4	62
4.1	36	36	6	74
4.2	36	36	6	74
4.3	36	36	6	74
4.4	36	36	6	74
4.5	36	36	6	74
4.6	36	36	6	74
4.7	36	36	6	74
4.8	44	36	6	82
4.9	44	36	6	82
5.0	44	36	6	82
5.1	44	36	6	82
5.2	44	36	6	82

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
5.3	44	36	6	82
5.4	44	36	6	82
5.5	44	36	6	82
5.6	44	36	6	82
5.7	44	36	6	82
5.8	44	36	6	82
5.9	44	36	6	82
6.0	44	36	6	82
6.1	53	36	8	91
6.2	53	36	8	91
6.3	53	36	8	91
6.4	53	36	8	91
6.5	53	36	8	91
6.6	53	36	8	91
6.7	53	36	8	91
6.8	53	36	8	91
6.9	53	36	8	91
7.0	53	36	8	91
7.1	53	36	8	91
7.2	53	36	8	91
7.3	53	36	8	91
7.4	53	36	8	91
7.5	53	36	8	91

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
7.6	53	36	8	91
7.7	53	36	8	91
7.8	53	36	8	91
7.9	53	36	8	91
8.0	53	36	8	91
8.1	61	40	10	103
8.2	61	40	10	103
8.3	61	40	10	103
8.4	61	40	10	103
8.5	61	40	10	103
8.6	61	40	10	103
8.7	61	40	10	103
8.8	61	40	10	103
8.9	61	40	10	103
9.0	61	40	10	103
9.1	61	40	10	103
9.2	61	40	10	103
9.3	61	40	10	103
9.4	61	40	10	103
9.5	61	40	10	103
9.6	61	40	10	103
9.7	61	40	10	103
9.8	61	40	10	103
9.9	61	40	10	103
10.0	61	40	10	103
10.1	71	45	12	118
10.2	71	45	12	118
10.3	71	45	12	118
10.4	71	45	12	118
10.5	71	45	12	118
10.6	71	45	12	118
10.7	71	45	12	118
10.8	71	45	12	118
10.9	71	45	12	118
11.0	71	45	12	118
11.1	71	45	12	118
11.2	71	45	12	118
11.3	71	45	12	118
11.4	71	45	12	118
11.5	71	45	12	118
11.6	71	45	12	118
11.7	71	45	12	118
11.8	71	45	12	118

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
11.9	71	45	12	118
12.0	71	45	12	118
12.1	77	45	14	124
12.2	77	45	14	124
12.3	77	45	14	124
12.4	77	45	14	124
12.5	77	45	14	124
12.6	77	45	14	124
12.7	77	45	14	124
12.8	77	45	14	124
12.9	77	45	14	124
13.0	77	45	14	124
13.1	77	45	14	124
13.2	77	45	14	124
13.3	77	45	14	124
13.4	77	45	14	124
13.5	77	45	14	124
13.6	77	45	14	124
13.7	77	45	14	124
13.8	77	45	14	124
13.9	77	45	14	124
14.0	77	45	14	124
14.1	83	48	16	133
14.2	83	48	16	133
14.3	83	48	16	133
14.4	83	48	16	133
14.5	83	48	16	133
14.6	83	48	16	133
14.7	83	48	16	133
14.8	83	48	16	133
14.9	83	48	16	133
15.0	83	48	16	133
15.1	83	48	16	133
15.2	83	48	16	133
15.3	83	48	16	133
15.4	83	48	16	133
15.5	83	48	16	133
15.6	83	48	16	133
15.7	83	48	16	133
15.8	83	48	16	133
15.9	83	48	16	133
16.0	83	48	16	133

硬质合金直柄钻头（外冷）

Carbide straight shank drill (External cooling)

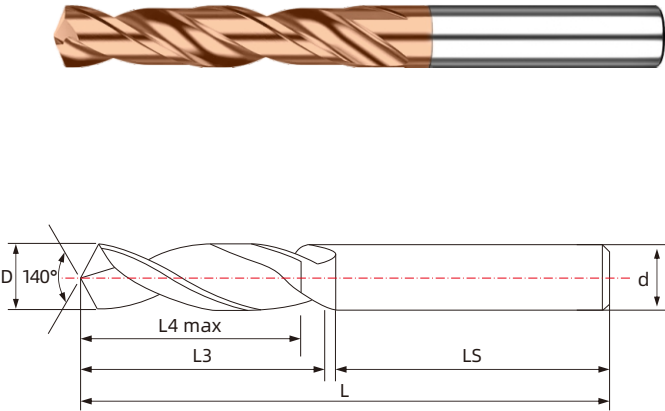
使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.

制造特点 Manufacutring characteristics

刃部公差：m7
排屑槽型：特殊设计，便于排屑
横刃制造：横刃修正，铭泰顺标准
柄部形式：DIN6535HA h6
涂层：He/PT
Cutting edge tolerance: m7
Chip groove: Specidl design,easy to chip removal
Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard
Shank form: DIN6535HA h6
Coating: He/PT



刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
3	20	3	50
3.1	20	3.1	50
3.2	20	3.2	50
3.3	20	3.3	50
3.4	20	3.4	50
3.5	20	3.5	50
3.6	20	3.6	50
3.7	20	3.7	50
3.8	20	3.8	50
3.9	20	3.9	50
4	20	4	50
4.1	20	4.1	50
4.2	20	4.2	50
4.3	20	4.3	50
4.4	20	4.4	50
4.5	20	4.5	50
4.6	20	4.6	50
4.7	20	4.7	50
4.8	20	4.8	50
4.9	20	4.9	50
5	20	5	50
5.1	20	5.1	50
5.2	20	5.2	50

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
5.3	20	5.3	50
5.4	20	5.4	50
5.5	20	5.5	50
5.6	20	5.6	50
5.7	20	5.7	50
5.8	20	5.8	50
5.9	20	5.9	50
6	30	6	60
6.1	30	6.1	60
6.2	30	6.2	60
6.3	30	6.3	60
6.4	30	6.4	60
6.5	30	6.5	60
6.6	30	6.6	60
6.7	30	6.7	60
6.8	30	6.8	60
6.9	30	6.9	60
7	30	7	60
7.1	30	7.1	60
7.2	30	7.2	60
7.3	30	7.3	60
7.4	30	7.4	60
7.5	30	7.5	60

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
7.6	30	7.6	60
7.7	30	7.7	60
7.8	30	7.8	60
7.9	30	7.9	60
8	40	8	75
8.1	40	8.1	75
8.2	40	8.2	75
8.3	40	8.3	75
8.4	40	8.4	75
8.5	40	8.5	75
8.6	40	8.6	75
8.7	40	8.7	75
8.8	40	8.8	75
8.9	40	8.9	75
9	40	9	75
9.1	40	9.1	75
9.2	40	9.2	75
9.3	40	9.3	75
9.4	40	9.4	75
9.5	40	9.5	75
9.6	40	9.6	75
9.7	40	9.7	75
9.8	40	9.8	75

加长刃

Extended blade

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
4	40	4	75
4.1	40	4.1	75
4.2	40	4.2	75
4.3	40	4.3	75
4.4	40	4.4	75
4.5	40	4.5	75
4.6	40	4.6	75
4.7	40	4.7	75
4.8	40	4.8	75
4.9	40	4.9	75
5	40	5	75
5.1	40	5.1	75
5.2	40	5.2	75
5.3	40	5.3	75

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
9.9	40	9.9	75
10	40	10	75
10.1	40	10.1	75
10.2	40	10.2	75
10.3	40	10.3	75
10.4	40	10.4	75
10.5	40	10.5	75
10.6	40	10.6	75
10.7	40	10.7	75
10.8	40	10.8	75
10.9	40	10.9	75
11	40	11	75
11.1	40	11.1	75
11.2	40	11.2	75
11.3	40	11.3	75
11.4	40	11.4	75
11.5	40	11.5	75
11.6	40	11.6	75
11.7	40	11.7	75
11.8	40	11.8	75
11.9	40	11.9	75
12	40	12	75

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
6.8	40	6.8	75
6.9	40	6.9	75
7	40	7	75
7.1	40	7.1	75
7.2	40	7.2	75
7.3	40	7.3	75
7.4	40	7.4	75
7.5	40	7.5	75
7.6	40	7.6	75
7.7	40	7.7	75
7.8	40	7.8	75
7.9	40	7.9	75
8	60	8	100
8.1	60	8.1	100
8.2	60	8.2	100
8.3	60	8.3	100
8.4	60	8.4	100
8.5	60	8.5	100
8.6	60	8.6	100
8.7	60	8.7	100
8.8	60	8.8	100
8.9	60	8.9	100
9	60	9	100
9.1	60	9.1	100
9.2	60	9.2	100
9.3	60	9.3	100
9.4	60	9.4	100

刃径 (D)	槽长 (L3)	柄径 (d)	全长 (L)
9.5	60	9.5	100
9.6	60	9.6	100
9.7	60	9.7	100
9.8	60	9.8	100
9.9	60	9.9	100
10	60	10	100
10.1	60	10.1	100
10.2	60	10.2	100
10.3	60	10.3	100
10.4	60	10.4	100
10.5	60	10.5	100
10.6	60	10.6	100
10.7	60	10.7	100
10.8	60	10.8	100
10.9	60	10.9	100
11	60	11	100
11.1	60	11.1	100
11.2	60	11.2	100
11.3	60	11.3	100
11.4	60	11.4	100
11.5	60	11.5	100
11.6	60	11.6	100
11.7	60	11.7	100
11.8	60	11.8	100
11.9	60	11.9	100
12	60	12	100

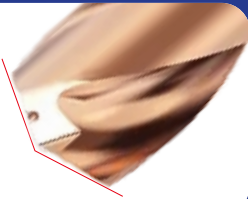


内冷钻

Internal Cooling Drill

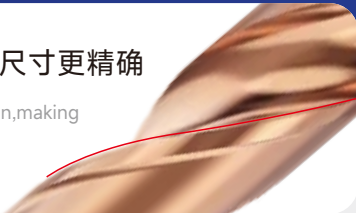
钻肩R角设计，抗崩刃，
耐磨损

Drill shoulder R angle design, anti
collapse,wear resistance



双刃带设计，让尺寸更精确

Double blade belt design,making
the size more accurate



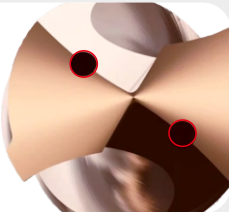
优化槽型设计，提高排屑性能

Optimizing groove design to improve
chip removal performance



钻尖出水，降低温度，
冲出积屑，让寿命更持久

Drill point water,reduce temperature,
rush out chip,make life more



优势 Advantages

- 钻肩采用R角设计，加工钢件耐磨性更好
- 双刃带导向，加工稳定，尺寸精确，提高孔壁粗糙度
- 排屑槽空间大，槽底抛光，排屑轻快
- The drilling shoulder adopts R angle design,and the processed steel parts have better wear resistance
- Double edge belt guidance,stable processing,accurate size,and improved hole wall roughness
- The chip removal slot has large space,the bottom of the slot is polished,and the chip removal is light and fast

硬质合金定柄钻头3D（内冷）

Carbide fixed shank drill 3D (Inner cooling)

使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.

制造特点 Manufacutring characteristics

刃部公差：m7

排屑槽型：特殊设计，便于排屑

横刃制造：横刃修正，铭泰顺标准

柄部形式：DIN6535HA h6

涂层：He/PT

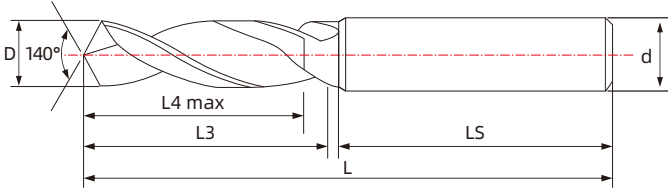
Cutting edge tolerance: m7

Chip groove: Specidl design,easy to chip removal

Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard

Shank form: DIN6535HA h6

Coating: He/PT



刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
3.0	20	28	4	62
3.1	20	28	4	62
3.2	20	28	4	62
3.3	20	28	4	62
3.4	20	28	4	62
3.5	20	28	4	62
3.6	20	28	4	62
3.7	20	28	4	62
3.8	20	28	4	62
3.9	20	28	4	62
4.0	20	28	4	62
4.1	24	36	6	66
4.2	24	36	6	66
4.3	24	36	6	66
4.4	24	36	6	66
4.5	24	36	6	66
4.6	24	36	6	66
4.7	24	36	6	66
4.8	28	36	6	66
4.9	28	36	6	66
5.0	28	36	6	66
5.1	28	36	6	66
5.2	28	36	6	66

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
5.3	28	36	6	66
5.4	28	36	6	66
5.5	28	36	6	66
5.6	28	36	6	66
5.7	28	36	6	66
5.8	28	36	6	66
5.9	28	36	6	66
6.0	28	36	6	66
6.1	34	36	8	79
6.2	34	36	8	79
6.3	34	36	8	79
6.4	34	36	8	79
6.5	34	36	8	79
6.6	34	36	8	79
6.7	34	36	8	79
6.8	34	36	8	79
6.9	34	36	8	79
7.0	34	36	8	79
7.1	41	36	8	79
7.2	41	36	8	79
7.3	41	36	8	79
7.4	41	36	8	79
7.5	41	36	8	79

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
7.6	41	36	8	79
7.7	41	36	8	79
7.8	41	36	8	79
7.9	41	36	8	79
8.0	41	36	8	79
8.1	47	40	10	89
8.2	47	40	10	89
8.3	47	40	10	89
8.4	47	40	10	89
8.5	47	40	10	89
8.6	47	40	10	89
8.7	47	40	10	89
8.8	47	40	10	89
8.9	47	40	10	89
9.0	47	40	10	89
9.1	47	40	10	89
9.2	47	40	10	89
9.3	47	40	10	89
9.4	47	40	10	89
9.5	47	40	10	89
9.6	47	40	10	89
9.7	47	40	10	89
9.8	47	40	10	89
9.9	47	40	10	89
10.0	47	40	10	89
10.1	55	45	12	102
10.2	55	45	12	102
10.3	55	45	12	102
10.4	55	45	12	102
10.5	55	45	12	102
10.6	55	45	12	102
10.7	55	45	12	102
10.8	55	45	12	102
10.9	55	45	12	102
11.0	55	45	12	102
11.1	55	45	12	102
11.2	55	45	12	102
11.3	55	45	12	102
11.4	55	45	12	102
11.5	55	45	12	102
11.6	55	45	12	102
11.7	55	45	12	102
11.8	55	45	12	102

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
11.9	55	45	12	102
12.0	55	45	12	102
12.1	60	45	14	107
12.2	60	45	14	107
12.3	60	45	14	107
12.4	60	45	14	107
12.5	60	45	14	107
12.6	60	45	14	107
12.7	60	45	14	107
12.8	60	45	14	107
12.9	60	45	14	107
13.0	60	45	14	107
13.1	60	45	14	107
13.2	60	45	14	107
13.3	60	45	14	107
13.4	60	45	14	107
13.5	60	45	14	107
13.6	60	45	14	107
13.7	60	45	14	107
13.8	60	45	14	107
13.9	60	45	14	107
14.0	60	45	14	107
14.1	65	48	16	115
14.2	65	48	16	115
14.3	65	48	16	115
14.4	65	48	16	115
14.5	65	48	16	115
14.6	65	48	16	115
14.7	65	48	16	115
14.8	65	48	16	115
14.9	65	48	16	115
15.0	65	48	16	115
15.1	65	48	16	115
15.2	65	48	16	115
15.3	65	48	16	115
15.4	65	48	16	115
15.5	65	48	16	115
15.6	65	48	16	115
15.7	65	48	16	115
15.8	65	48	16	115
15.9	65	48	16	115
16.0	65	48	16	115

硬质合金定柄钻头5D（内冷）

Carbide fixed shank drill 5D（Inner cooling）

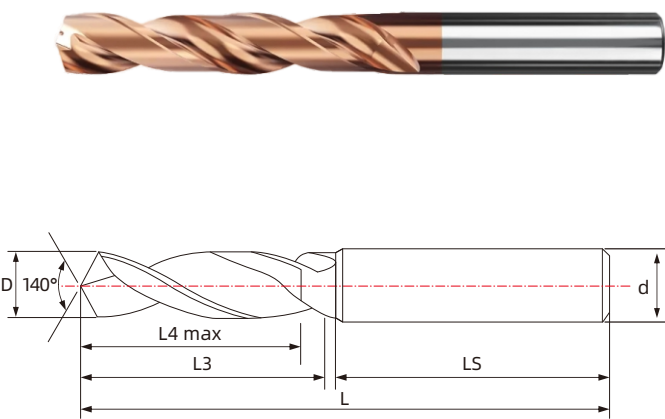
使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.

制造特点 Manufacutring characteristics

刃部公差：m7
排屑槽型：特殊设计，便于排屑
横刃制造：横刃修正，铭泰顺标准
柄部形式：DIN6535HA h6
涂层：He/PT
Cutting edge tolerance: m7
Chip groove: Specidl design,easy to chip removal
Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard
Shank form: DIN6535HA h6
Coating: He/PT



刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
3.0	28	28	4	62
3.1	28	28	4	62
3.2	28	28	4	62
3.3	28	28	4	62
3.4	28	28	4	62
3.5	28	28	4	62
3.6	28	28	4	62
3.7	28	28	4	62
3.8	28	28	4	62
3.9	28	28	4	62
4.0	28	28	4	62
4.1	36	36	6	74
4.2	36	36	6	74
4.3	36	36	6	74
4.4	36	36	6	74
4.5	36	36	6	74
4.6	36	36	6	74
4.7	36	36	6	74
4.8	44	36	6	82
4.9	44	36	6	82
5.0	44	36	6	82
5.1	44	36	6	82
5.2	44	36	6	82

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
5.3	44	36	6	82
5.4	44	36	6	82
5.5	44	36	6	82
5.6	44	36	6	82
5.7	44	36	6	82
5.8	44	36	6	82
5.9	44	36	6	82
6.0	44	36	6	82
6.1	53	36	8	91
6.2	53	36	8	91
6.3	53	36	8	91
6.4	53	36	8	91
6.5	53	36	8	91
6.6	53	36	8	91
6.7	53	36	8	91
6.8	53	36	8	91
6.9	53	36	8	91
7.0	53	36	8	91
7.1	53	36	8	91
7.2	53	36	8	91
7.3	53	36	8	91
7.4	53	36	8	91
7.5	53	36	8	91

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
7.6	53	36	8	91
7.7	53	36	8	91
7.8	53	36	8	91
7.9	53	36	8	91
8.0	53	36	8	91
8.1	61	40	10	103
8.2	61	40	10	103
8.3	61	40	10	103
8.4	61	40	10	103
8.5	61	40	10	103
8.6	61	40	10	103
8.7	61	40	10	103
8.8	61	40	10	103
8.9	61	40	10	103
9.0	61	40	10	103
9.1	61	40	10	103
9.2	61	40	10	103
9.3	61	40	10	103
9.4	61	40	10	103
9.5	61	40	10	103
9.6	61	40	10	103
9.7	61	40	10	103
9.8	61	40	10	103
9.9	61	40	10	103
10.0	61	40	10	103
10.1	71	45	12	118
10.2	71	45	12	118
10.3	71	45	12	118
10.4	71	45	12	118
10.5	71	45	12	118
10.6	71	45	12	118
10.7	71	45	12	118
10.8	71	45	12	118
10.9	71	45	12	118
11.0	71	45	12	118
11.1	71	45	12	118
11.2	71	45	12	118
11.3	71	45	12	118
11.4	71	45	12	118
11.5	71	45	12	118
11.6	71	45	12	118
11.7	71	45	12	118
11.8	71	45	12	118

刃径 (D)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
11.9	71	45	12	118
12.0	71	45	12	118
12.1	77	45	14	124
12.2	77	45	14	124
12.3	77	45	14	124
12.4	77	45	14	124
12.5	77	45	14	124
12.6	77	45	14	124
12.7	77	45	14	124
12.8	77	45	14	124
12.9	77	45	14	124
13.0	77	45	14	124
13.1	77	45	14	124
13.2	77	45	14	124
13.3	77	45	14	124
13.4	77	45	14	124
13.5	77	45	14	124
13.6	77	45	14	124
13.7	77	45	14	124
13.8	77	45	14	124
13.9	77	45	14	124
14.0	77	45	14	124
14.1	83	48	16	133
14.2	83	48	16	133
14.3	83	48	16	133
14.4	83	48	16	133
14.5	83	48	16	133
14.6	83	48	16	133
14.7	83	48	16	133
14.8	83	48	16	133
14.9	83	48	16	133
15.0	83	48	16	133
15.1	83	48	16	133
15.2	83	48	16	133
15.3	83	48	16	133
15.4	83	48	16	133
15.5	83	48	16	133
15.6	83	48	16	133
15.7	83	48	16	133
15.8	83	48	16	133
15.9	83	48	16	133
16.0	83	48	16	133

微小钻

Micro Drill



优势 Advantages

- D1最长可做到80倍镜
- D2以上可做中心出水
- 精度可保证0.005以内
- D1 can achieve 80 times the longest
- D2 above can be used as central effluent
- The accuracy can be guaranteed within: 0.005

微小钻
Micro Drill

14-15

微小钻 Micro Drill

使用特点 Use features

用于：灰铸铁、球墨铸铁、不锈钢、结构钢、合金钢等常见材料的加工，定心能力强，稳定的尺寸精度和良好的表面质量。

For:gray cast iron,ductile iron,stainless,structural steel,alloy steel and other common materials processing,centering energy strong force,stable dimensional accuracy and good surface quality.



制造特点 Manufacutring characteristics

刃部公差：m7

排屑槽型：特殊设计，便于排屑

横刃制造：横刃修正，铭泰顺标准

柄部形式：DIN6535HA h6

涂层：He/PT

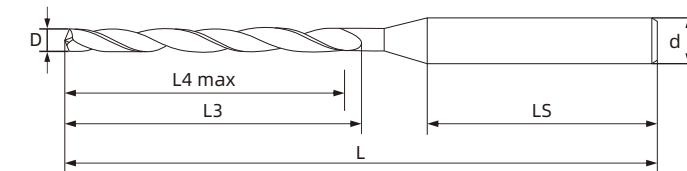
Cutting edge tolerance: m7

Chip groove: Specidl design,easy to chip removal

Chisel edge manufacturing: Chisel edge correction,Mingtaishun standard

Shank form: DIN6535HA h6

Coating: He/PT



5D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	14	17	35	3	57
2.1	14	18	35	3	57
2.2	15	19	34	3	57
2.3	16	20	35	3	59
2.4	16	20	35	3	59
2.5	17	21	34	3	59
2.6	18	22	36	3	62
2.7	18	23	36	3	62
2.8	19	24	35	3	62
2.9	20	25	34	3	62

8D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
1.0	12	15	36	3	55
1.1	12	15	36	3	55
1.2	12	15	35	3	55
1.3	12	15	34	3	55
1.4	12	15	33	3	55
1.5	17	20	46	3	68
1.6	17	20	45	3	68
1.7	17	20	44	3	68
1.8	17	20	44	3	68
1.9	17	20	43	3	68
2.0	20	23	35	3	63
2.1	20	24	35	3	63
2.2	21	25	34	3	63
2.3	22	26	37	3	67
2.4	24	28	35	3	67
2.5	25	29	34	3	67
2.6	26	30	37	3	71
2.7	26	31	37	3	71
2.8	27	32	36	3	71
2.9	28	33	35	3	71

12D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	28	31	36	3	72
2.1	29	33	35	3	72
2.2	30	34	34	3	72
2.3	32	36	37	3	77
2.4	33	37	36	3	77
2.5	35	39	34	3	77
2.6	36	40	39	3	83
2.7	37	42	38	3	83
2.8	38	43	37	3	83
2.9	40	45	35	3	83

16D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	36	39	37	3	81
2.1	37	41	36	3	81
2.2	39	43	34	3	81
2.3	39	45	38	3	87
2.4	43	47	36	3	87
2.5	45	49	34	3	87
2.6	47	51	40	3	95
2.7	48	53	39	3	95
2.8	50	55	37	3	95
2.9	52	57	35	3	95

20D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	44	47	38	3	90
2.1	45	49	37	3	90
2.2	48	52	34	3	90
2.3	50	54	39	3	97
2.4	52	56	37	3	97
2.5	55	59	34	3	97
2.6	57	61	42	3	107
2.7	58	63	41	3	107
2.8	61	66	38	3	107
2.9	63	68	36	3	107

25D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	54	57	39	3	101
2.1	56	60	37	3	101
2.2	59	63	34	3	101
2.3	62	66	37	3	107
2.4	64	68	35	3	107
2.5	67	71	32	3	107
2.6	70	74	44	3	122
2.7	72	77	41	3	122
2.8	75	80	38	3	122
2.9	78	83	36	3	122

30D					
刃径 (D)	有效切深 (L4)	槽长 (L3)	柄长 (LS)	柄径 (d)	全长 (L)
2.0	64	67	40	3	112
2.1	66	70	38	3	112
2.2	70	74	34	3	112
2.3	73	74	41	3	112
2.4	76	80	38	3	122
2.5	80	84	34	3	122
2.6	83	87	45	3	136
2.7	85	90	42	3	136
2.8	89	94	38	3	136
2.9	92	97	36	3	136

钻头的正确使用方式

The correct way to use the drill

钻头的装夹

Clamp the drill bit

① 夹具的选择和检查

请确保不会发生振动。对于使用弹簧卡头装夹方式(推力轴承式)，其锁持力强，可以安心使用。

钻头夹头和无开头夹头由于锁持力弱，不适合用于多用途钻头。

请在钻头更换时，定期清洗被油污的弹簧卡头的内外部，除去切屑微粉。若有划伤请用油石处理。

② 钻头的装夹

请将钻头的装夹外圆跳动控制在0.03mm以内。

请绝对不要将钻头沟槽部夹进卡头。

若钻头沟部夹进卡头内部，会妨碍切屑的排出令钻头破损。

① Fixture selection and inspection

Please ensure that no vibration occurs. For the use of spring clamp (thrust bearing type), its locking force is strong, you can be safe to use.

Drill chuck and no-start chuck are not suitable for multi-purpose drill bits due to weak locking force.

When the drill is replaced, clean the inside and outside of the oil-stained spring clamp regularly to remove the cutting powder. If there is a scratch, please treat it with a stone.

② Drill clamp

Please control the round runout of the drill bit within 0.03mm.

Never clip the groove of the drill bit into the clamp.

If the groove of the bit is clamped inside the clamp head, it will prevent the discharge of chips and cause the bit to be damaged.



切削油的使用方式

How cutting oil is used

①切削油的选择方式

切削速度达到40mm/min以上时，推荐使用冷却效果和切屑处理优异，并加入极压添加剂浸透性好的水溶性切削油JISW种2号或相当品。

切削速度为40mm/min以下、优先考虑刀具寿命时，推荐使用有润滑效果的非水溶性切削油；活性硫化盐化油JISA1种1号。

※使用非水溶性切削油会有火灾发生的危险。为了防止火灾需使用大量油来压制油烟。

②冷却方式

外冷的场合

外部的切削油需充分供给孔的入口。油压0.3~0.5MPaA

油量以3~10cmin为标准

内冷的场合（例:HK型）

φ4以下时;冷却孔小，所以必须有1.5MPa以上的油压。

超过φ6时当孔深为钻径的3倍以下时需0.5~1.0MPa,超过3倍时推荐1~2MPa以上。

① The selection of cutting oil

When the cutting speed reaches more than 40mm/min, it is recommended to use excellent cooling effect and chip treatment, and add water-soluble cutting oil JISW type 2 or equivalent with good extreme pressure additive penetration.

When the cutting speed is less than 40mm/min and the tool life is given priority, it is recommended to use non-water-soluble cutting oil with lubricating effect. Active vulcanized oil JISA1 No. 1.

※ There is a risk of fire when using non-water-soluble cutting oil. In order to prevent fire, it is necessary to use a lot of oil to suppress the oil smoke.

② Cooling method

It's cold outside

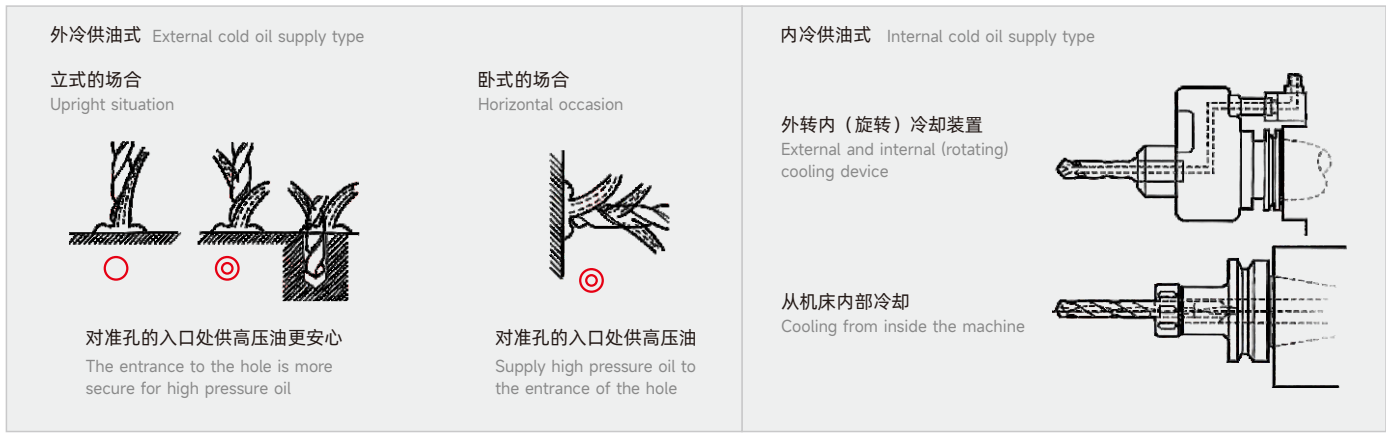
The external cutting oil should be sufficiently supplied to the inlet of the hole. Oil pressure 0.3~0.5MPaA

The amount of oil is 3~10cmin

Internal cold situation (example :HK type)

Below φ4; The cooling hole is small, so there must be more than 1.5MPa oil pressure.

When the hole depth exceeds φ6, 0.5 to 1.0MPa is required when the hole depth is less than 3 times the drilling diameter, and 1 to 2MPa is recommended when the hole depth exceeds 3 times.



功率和轴向力的计算方式 Calculation of power and axial force

切削速度的计算法 Calculation method of cutting speed

$$Vc = \frac{\pi * Dc * n}{1.000} \quad n = \frac{1.000 * Vc}{\pi * Dc}$$

进给速度，进+给量的计算法 Feed rate, feed + feed calculation method

$$V_i = n \times f \quad f = \frac{Vf}{n}$$

加工时间的计算方式 Calculation of processing time

$$T = \frac{H}{Vf}$$

功率和轴向力的计算方式 Calculation of power and axial force

$$\text{所需功率 Required power (KW)} = HB \times Dc^{0.68} \times Vc^{1.27} \times f^{0.59} / 36.000$$

$$\text{轴向力 Axial force (N)} = 0.24 \times HB \times Dc^{1.27} \times f^{0.59} \times 9.8$$

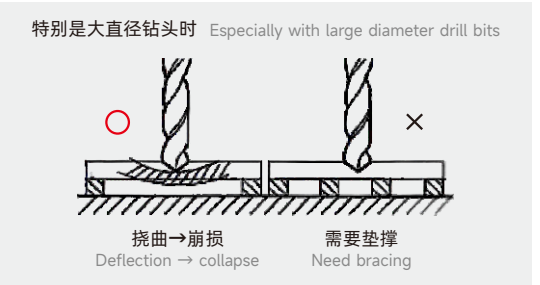
※ 在设计配备机床时，请以上述公式求出所需功率的1.6倍。轴向力的1.4倍为标准

※ When designing machine tools, please use the above formula to find 1.6 times the required power. 1.4 times the axial force is standard

工件的夹持 Clamping of the workpiece

进行高效率钻孔加工时，会产生很大的轴向力，所以必须有支撑，防止因扰度产生的崩损。另外，会有很大的扭矩和水平方向的切削力，能承受这些力而不发生振动的夹持是非常重要的。

When high-efficiency drilling is carried out, a large axial force will be generated, so there must be support to prevent collapse caused by disturbance. In addition, there will be a lot of torque and horizontal cutting forces, can withstand these forces without vibration clamping is very important.



使用钻头再修磨 Use a drill to regrind

何时修磨

除了发生崩口外，当边缘刃带部出现1~2根进给痕迹及刀角的磨损达到刃带宽度时即已达到钻头的使用限度需尽快修磨。

如何修磨

推荐再修磨+再涂层。在单做再修磨，而被削材为钢件时，会出现寿命低下。为避免此情况发生，请务必实现再修+再涂层。此外，由于采用新涂层技术，请向本公司及公司认可的再修磨合作公司提出修磨要求。

自行修磨

本公司备用多用途钻头的再修磨要领，自行再修磨时请向本公司或交易商社索取。



When to trim

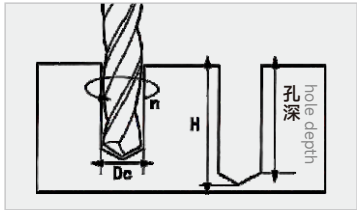
In addition to the collapse of the mouth, when there are 1 to 2 feed marks on the edge edge belt and the wear of the knife Angle reaches the width of the edge belt, it has reached the limit of use of the bit and needs to be trimmed as soon as possible.

How to trim

Regrinding + recoating is recommended. When only regrinding is done, and the material is cut into steel, there will be a low life. To prevent this from happening, be sure to achieve re-repair + re-coating. In addition, due to the use of new coating technology, please submit grinding requests to our company and our approved re-grinding partners.

Self-grinding

The re-grinding instructions of our spare multi-purpose drill bits should be obtained from our company or trading house when re-grinding yourself.



Vc:切削速度 Cutting speed (m/min)

π: 圆周率 $\pi \approx 3.14$

Dc: 钻头的刃径 Blade diameter (mm)

N: 转速 Rotate speed (min-1)

Vf: 进给速度 Feed speed (mm/min)

f: 每转进给量 Feed per revolution (mm/rev)

H: 转孔深度 Swivel depth (mm)

T: 加工时间 Processing time (min)

HB: 布氏硬度 Brinell Hardness

孔加工的问题和对策

Problems and countermeasures of hole processing

问题		原因	基本对策	对策集体例
钻头损伤	前刀面磨损	切削条件不合适	在高速领域中使用	按铭泰顺数控刀具样本中推荐的上限切削条件
			提高进给量	按铭泰顺数控刀具样本中推荐的上限切削条件
		切削油剂不当	内冷钻的场合，减少供油吐出货量	1.5MPa以下（深孔LD=2）以下时，要进行外部供油
			使用高润滑性切削油	使用相当于JIS A1种1号
	横刃部的崩损	切入性差	降低钻入口的进给量	f=0.08~0.12mm/rev
			追加前加工工序，平面咬合	用立铣刀进行平面加工
		设备及被切削材料等的刚性不足	变更切削条件，减小阻力	增大Vc，减少f（减小轴向力）
			提高被削材夹持强度	
		刃尖强度不够	增大横刀宽度	凿宽为0.1~0.2mm
			增大切刃口的钝化处理量	中心部的扭转部为现行宽度的1.5倍
		加工条件不合适	降低切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
			降低进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
	切刃外周部的崩损	切削油剂不当	使用高润滑性切削油	使用相当于JIS A1种1号
			设备及被切削材料等的刚性不足	提高被削材夹持强度
		刃尖强度不够	增大切刃口的钝化处理量	切刃外周部为现行宽度的1.5倍
			减小前后刀角	前后刀角比现行的减少2~3°
		来自切刃外周的咬合	增大刀带宽度(W刃带规格)	刃带宽度为现行的2~3倍
			降低进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
		贯通时的断续切削	增大切刃口的钝化处理量	切刃外周部为现行宽度的1.5倍
			减小前后刀角	前后刀角比现行的减少2~3°
	刃带部的磨损	加工条件的不合适	降低切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
			使用高润滑性切削油	使用相当于JIS A1种1号
		切削油剂不当	增加切削油供给量	若是外部供油，则变更为内部供油式
			刃带残留磨损	及早进行再次研磨，以确保倒锥度
		工具设计不当	加大倒锥度	倒锥度为0.5/100
			减小刃带宽度	刃带宽度为现行的2/3左右
	钻头刀体的折断	切屑堆积	使用最合适的切削条件和工具	参照天照硬质合金切削工具产品目录上所登载的推挤条件表
			增加切削油供给量	若是外部供油，则变更为内部供油式
		固定工具夹持强度不足	使用高强度的固定工具	弹簧夹头若有损伤则进行更换
				使用尺寸大1号的弹簧刀杆
		设备及被切削材料等的刚性不足	提高被削材夹持强度	参照天照硬质合金切削工具产品目录
切削处理不良	切屑堵塞	切削条件不合适	提高切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
			提高进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
		切屑排出不良	内冷钻的场合，减少供油吐出货量	
	不断屑	加工条件不合适	提高进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
			提高切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
		内冷效果好	内冷钻的场合，减少供油吐出货量	内部供油时，喷出压力为1.5MPa以下
		切刃锋利性差	减小切刃口的钝化处理量	减少现行宽度的2/3左右

问题		原因	基本对策	对策集体例
加工精度不良	孔径扩大量大	切入性差	降低转入口处的进给量	f=0.08~0.12mm/rev
			降低切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
			追加前加工工序,平面咬合	用立铣刀进行平面加工
		钻头刚性不足	使用最适合于深孔的钻头	参照天照硬质合金切削工具产品目录
			提高钻头整体刚性	心厚大，槽宽比小
		钻头的跳动	提高钻头的安装精度	弹簧夹头若有损伤则进行更换
			提高钻头的夹持刚性	使用尺寸大1号的弹簧刀杆
		设备及被切削材料等的刚性不足	提高被削材夹持强度	
	精加工面粗糙不良	切削条件不合适	提高切削速度	按铭泰顺数控刀具样本中推荐的下限切削条件
			降低进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
		切削油剂不当	使用高润滑性切削油	使用相当于JIS A1种1号
	直线度不良	切入性差	提高进给量	按铭泰顺数控刀具样本中推荐的下限切削条件
		钻头安装不良	提高钻头的安装精度	弹簧夹头若有损伤则进行更换
			提高被削材夹持刚性	使用尺寸大1号的弹簧刀杆
		设备及被切削材料等的刚性不足	提高被削材夹持强度	
			制作成双刃带	参照天照硬质合金切削工具产品目录

Problems and countermeasures of hole processing

Problem		Reason	Basic Countermeasure	Game Collective
Bit damage	Front blade face worn	Cutting conditions are not suitable	It is used in high-speed fields	According to the upper limit cutting conditions recommended in Mingtaishun NC tool sample
			Increase the feed	According to the upper limit cutting conditions recommended in Mingtaishun NC tool sample
		Improper cutting oil	In the case of internal cold drilling, reduce the oil discharge	When the depth of the hole is less than 1.5MPa (LD=2), external oil supply is required
			Use high lubricity cutting oil	Use equivalent to JIS A1 Type 1
	The breakdown of the transverse edge	Poor penetration	Reduce the inlet feed	f=0.08-0.12mm/rev
			Additional pre-machining process, plane bite	Surface machining with end mill
		Insufficient rigidity of equipment and materials to be cut	Change cutting conditions to reduce resistance	Increase Vc, decrease f (decrease axial force)
			Improve the clamping strength of the cut material	
		The tip strength is not enough	Increase the width of the transverse edge	Chisel width is 0.1~0.2mm
			Increase the amount of passivation treatment of cutting edge	The torsion part of the center is 1.5 times the current width
	The collapse of the periphery of the cutting edge	Processing conditions are not suitable	Reduce cutting speed	According to the upper limit cutting conditions recommended in Mingtaishun NC tool sample
			Reduce the feed	According to the upper limit cutting conditions recommended in Mingtaishun NC tool sample
		Improper cutting oil	Use high lubricity cutting oil	Use equivalent to JIS A1 Type 1
		Insufficient rigidity of equipment and materials to be cut	Improve the clamping strength of the cut material	
			Increase the amount of passivation treatment of cutting edge	The outer edge of the cutting edge is 1.5 times the current width
		The tip strength is not enough	Reduce the front and rear knife angles	The front and rear cutter angles are reduced by 2~3° compared with the current ones
			The bite from the outside of the cutting edge	The width of the blade belt is 2 to 3 times that of the current one
		Intermittent cutting during penetration	Reduce the feed	According to the upper limit cutting conditions recommended in Mingtaishun NC tool sample
			Increase the amount of passivation treatment of cutting edge	The outer edge of the cutting edge is 1.5 times the current width
			Reduce the front and rear knife angles	The front and rear cutter angles are reduced by 2~3° compared with the current ones

问题		原因	基本对策	对策集体例	
Bit damage	Wear on the blade belt	Inappropriate processing conditions	Reduce cutting speed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
		Improper cutting oil	Use high lubricity cutting oil	Use equivalent to JIS A1 Type 1	
			Increase cutting oil supply	If external oil supply, change to internal oil supply	
		Blade band residual wear	Re-grind early to ensure inverted taper	When the blade belt damage is less than 1mm, grind again	
		Improper tool design	Increase the taper	The inverted taper is 0.5/100	
			Salty small blade band width	The width of the blade belt is about 2/3 of the current width	
	Breaking of the bit body	Chip accumulation	Use the most suitable cutting conditions and tools	Refer to the table of pushing conditions published in the catalogue of Amateru Carbide cutting tools	
			Increase cutting oil supply	If external oil supply, change to internal oil supply	
		The clamping strength of the fixed tool is insufficient	Use high-strength stationary tools	Replace the spring chuck if it is damaged	
				Use a switchblade lever one size larger	
Insufficient rigidity of equipment and materials to be cut	Improve the clamping strength of the cut material	Refer to the catalogue of Amateru Carbide cutting tools			
Poor cutting	Chip plugging	Cutting conditions are not suitable	Increase cutting speed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
			Increase the feed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
		Poor chip discharge	In the case of internal cold drilling, reduce the oil discharge		
	Continuous chip	Processing conditions are not suitable	Increase the feed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
			Increase cutting speed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
		Good internal cooling effect	In the case of internal cold drilling, reduce the oil discharge	When the internal oil supply, the ejection pressure is less than 1.5MPa	
		Poor cutting edge sharpness	Reduce the passivation of the cutting edge	Reduce the current width by about 2/3	
Poor machining accuracy	Large expansion of aperture	Poor penetration	Reduce the feed at the turnstile	f=0.08~0.12mm/rev	
			Reduce cutting speed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
			Additional pre-machining process, plane bite	Surface machining with end mill	
		Underrigidity of bit	Use the drill best suited for deep holes	Refer to the catalogue of Amateru Carbide cutting tools	
			Improve the overall rigidity of the bit	The heart thickness is large, the slot width ratio is small	
			Bit run-out	Improve drill bit installation accuracy	Replace the spring chuck if it is damaged
				Improve the clamping rigidity of the bit	Use a switchblade lever one size larger
	Insufficient rigidity of equipment and materials to be cut	Improve the clamping strength of the cut material			
		Rough finish surface	Cutting conditions are not suitable	Increase cutting speed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample
				Reduce the feed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample
	Improper cutting oil		Use high lubricity cutting oil	Use equivalent to JIS A1 Type 1	
	Poor straightness	Poor penetration	Increase the feed	According to the lower limit cutting conditions recommended in Mingtaishun NC tool sample	
		Poor bit installation	Improve drill bit installation accuracy	Replace the spring chuck if it is damaged	
			Improve the clamping rigidity of the cut material	Use a switchblade lever one size larger	
			Insufficient rigidity of equipment and materials to be cut	Improve the clamping strength of the cut material	
		Make a double-edged belt		Refer to the catalogue of Amateru Carbide cutting tools	