



硬质合金铣加工技术

Milling Technology Of Cemented Carbide

LZCUT从它创立以来，一直致力于设计、研制铣削工具。我公司提供多种整体异型硬质合金铣刀。产品涵盖了立铣刀、齿轮铣刀、模具铣刀、端面可换刀片铣刀、齿轮铣刀以及最复杂的特殊外形铣刀。

凭借刀具类型和刀具材料的多样化、高标准和高精度，LZCUT的铣刀产品系列能够达到高质量的水准要求。

Since its inception, LZCUT has been devoted to the design and development of milling tools. Our company provides a variety of integral special-shaped carbide milling cutters. The products cover end mill cutters, gear milling cutters, die milling cutters, end-face replaceable insert milling cutters, gear milling cutters and the most complex special shape milling cutters.

With the diversification, high standard and high precision of tool types and materials, LZCUT's milling product series can meet the requirements of high quality.



硬质合金孔加工技术

Machining Technology of Cemented Carbide Holes



LZCUT新型整体硬质合金钻头是多年来广泛研究的成果。最新的刀具几何角度，刀具材料和涂层的研究成果应用到该刀具中。

挤压螺纹的钻孔直径体现在最新技术研究成果中。

螺纹刀具与钻孔刀具在确保螺纹加工的高品质和高经济性方面互相调整。对于成功的螺纹加工和钻出适合的底孔，最佳的自定心特征和良好的切削性能是决定性的参数。

一个非常平稳的操作和轻快的切削可以使钻头工作时产生非常低的扭矩并消耗少量的动力。

钻头的几何角度，硬质合金材料及涂层的完美组合，使其在几乎所有材料加工时，实现了最高切削量。

具有4条导向棱的钻头，其优秀的导向特性在加工相交或倾斜孔工件时非常有帮助。

LZCUT Drill具有以下典型特征：

- 钻头前端具有特殊的后刀面
- 2或4个的导向棱具有最佳的导向性能
- 支持外冷或内冷
- 直柄和侧固式柄
- 按DIN标准尺寸生产

孔加工刀具：

钨钢台阶钻头，钨钢阶梯铰刀，钨钢右旋精铰刀，钨钢钻铰刀，钨钢钻铣刀，钨钢成型扁钻，钨钢切槽刀，钨钢内孔精镗刀等等！

LZCUT new type integral cemented carbide bit is the result of extensive research for many years. The latest research results on tool geometry, tool materials and coatings are applied to the tool.

The borehole diameter of extrusion thread is reflected in the latest research results.

Thread cutters and drilling cutters adjust each other in ensuring high quality and high economy of thread processing. For successful threading and suitable bottom hole drilling, excellent self-centering characteristics and good cutting performance are the decisive parameters.

A very smooth operation and light cutting can produce very low torque and consume a small amount of power while drilling.

The geometric angle of drill bit, the perfect combination of cemented carbide material and coating make it achieve the highest cutting quantity in almost all material processing.

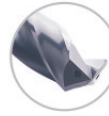
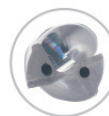
The drill with four guiding edges has excellent guiding characteristics which are very helpful in processing intersecting or inclined hole workpieces.

LZCUT Drill has the following typical characteristics:

- The front end of the bit has a special flank.
- 2 or 4 steering edges have the best steering performance.
- Supporting external or internal cooling.
- Straight handle and side-fixed handle.
- Production according to DIN standard size.

Hole Machining Tools:

Tungsten steel step drill, tungsten steel step reamer, tungsten steel right-hand precision reamer, tungsten steel drill reamer, tungsten steel drill and milling cutter, tungsten steel forming flat drill, tungsten steel slotting cutter, tungsten steel inner hole precision boring cutter and so on!





硬质合金成型刀技术

Cemented Carbide Forming Tool Technology

LZCUT立展切削工具有限公司专业生产的成型刀具，依靠自身完美的质量，完善的售后服务体系，最佳的解决方案以及特殊的生产工艺，造就了LZCUT的品牌，其产品是航空航天，军工行业，汽车零部件，3C不锈钢高光倒角刀，精密结构件成型铣刀，医疗器械精密小零件生产厂家的最佳选择！

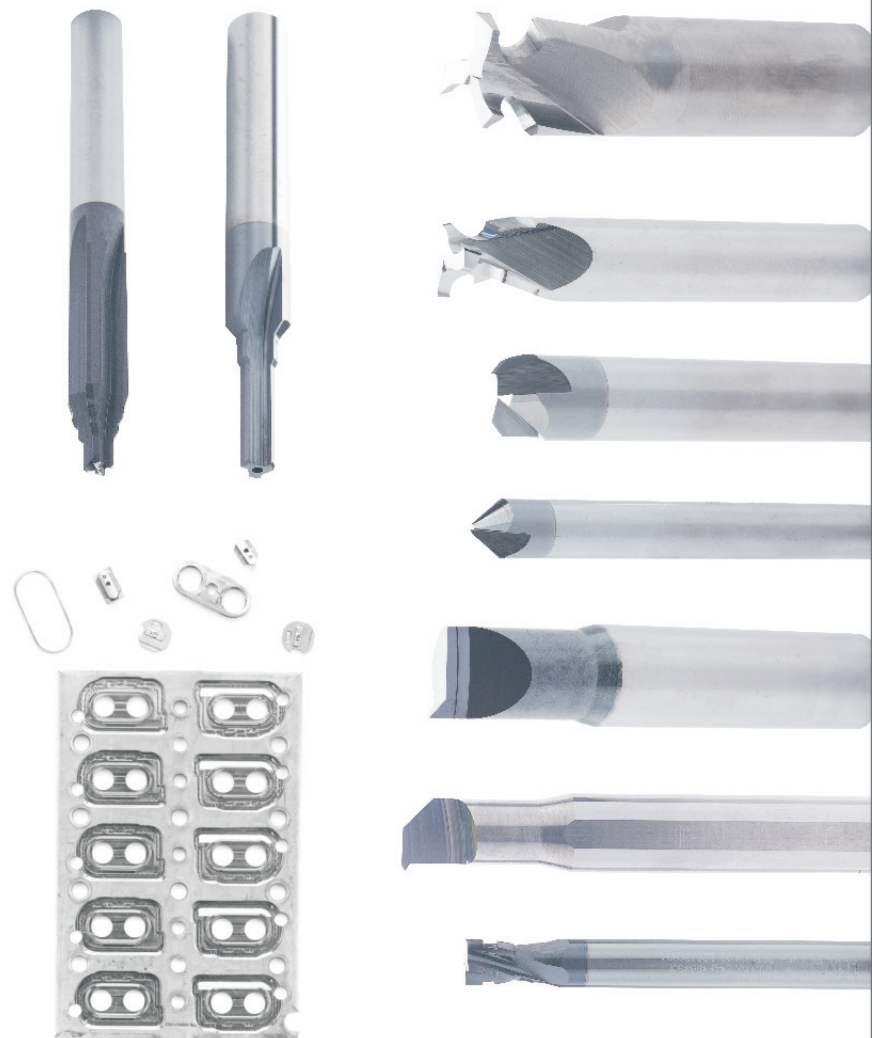
铣加工刀具：

不锈钢高光倒角刀，钨钢台阶铣刀，钨钢成型铣刀、钨钢T型铣刀，钨钢燕尾槽铣刀，钨钢圆球形铣刀，钨钢曲线铣刀，钨钢倒角铣刀，钨钢阀座铣刀，钨钢内R倒角铣刀等！

LZCUT Vertical Cutting Tools Co., Ltd. specializes in the production of forming tools, relying on its own perfect quality, perfect after-sales service system, the best solution and special production technology, creating the brand of LZCUT. Its products are aerospace, military industry, automotive parts, 3C stainless steel high-light chamfering cutter, precision structural parts forming milling cutter, medical equipment precision small parts. The best choice for the manufacturer!

Milling cutters:

Stainless steel high-gloss chamfer cutter, tungsten steel step milling cutter, tungsten steel forming spool cutter, tungsten steel T-shaped milling cutter, tungsten steel dovetail groove milling cutter, tungsten steel spherical milling cutter, tungsten steel curve milling cutter, tungsten steel chamfer milling cutter, tungsten steel valve seat milling cutter, tungsten steel R chamfer milling cutter, etc.



硬质合金螺纹切削铣削技术

Cutting and Milling Technology of Cemented Carbide Thread



LZCUT螺纹刀具铣加工方案技术的普遍应用为内外螺纹的未来制造工艺创造了基本条件。

大量实践证明，螺纹铣削是攻丝和挤压螺纹的一个很有效的替代加工方法。它有以下优点：

- 螺纹加工几乎不依附于螺纹尺寸和公差的大小。同一把刀具可以同时加工左旋和右旋螺纹
- 因为只产生非常小的铣屑，所以不存在排屑问题
- 螺纹无轴向误切（过切第一扣螺纹）
- 由于高速度切削和进给，极大缩短了加工时间
- 极小的切削力也适合于薄壁工件加工
- 螺纹钻铣刀可以完成多工序加工

LZCUT的螺纹铣刀/硬质合金丝锥系列：

- 由硬质合金材料加工而成
- 带有中心出水、侧冷
- 带有高效耐磨材料涂层

这些性能特点可以使螺纹铣刀完成机加工领域的大多数加工任务。

The universal application of LZCUT threaded tool milling technology creates basic conditions for the future manufacturing process of internal and external threads.

Many practices have proved that thread milling is an effective alternative processing method for tapping and extruding threads. It has the following advantages:

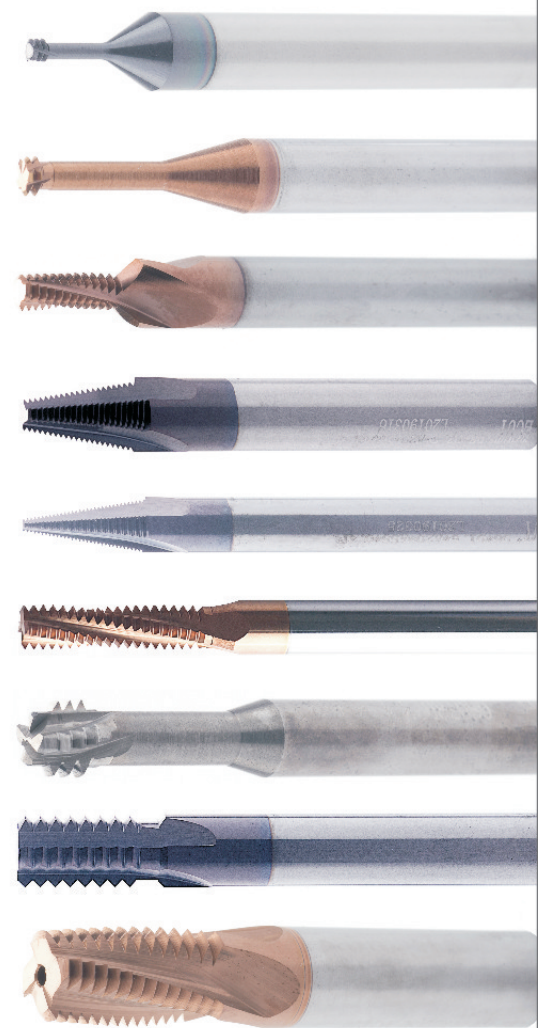
Thread processing hardly depends on thread size and tolerance. The same tool can process both left and right threads at the same time.

- Because only very small milling chips are produced, there is no chip removal problem.
- No axial miscutting of threads (overcutting of the first thread)
- Due to high speed cutting and feeding, the processing time is greatly shortened.
- Minimal cutting force is also suitable for thin-walled workpiece processing
- Thread drilling and milling cutter can complete multi-process processing

LZCUT threaded milling cutter/carbide tap series:

- Processing from cemented carbide materials
- With central effluent and side cooling
- Coatings with high-efficiency wear-resistant materials

These characteristics enable the thread milling cutter to complete most of the processing tasks in the field of machining.





Aviation parts solutions

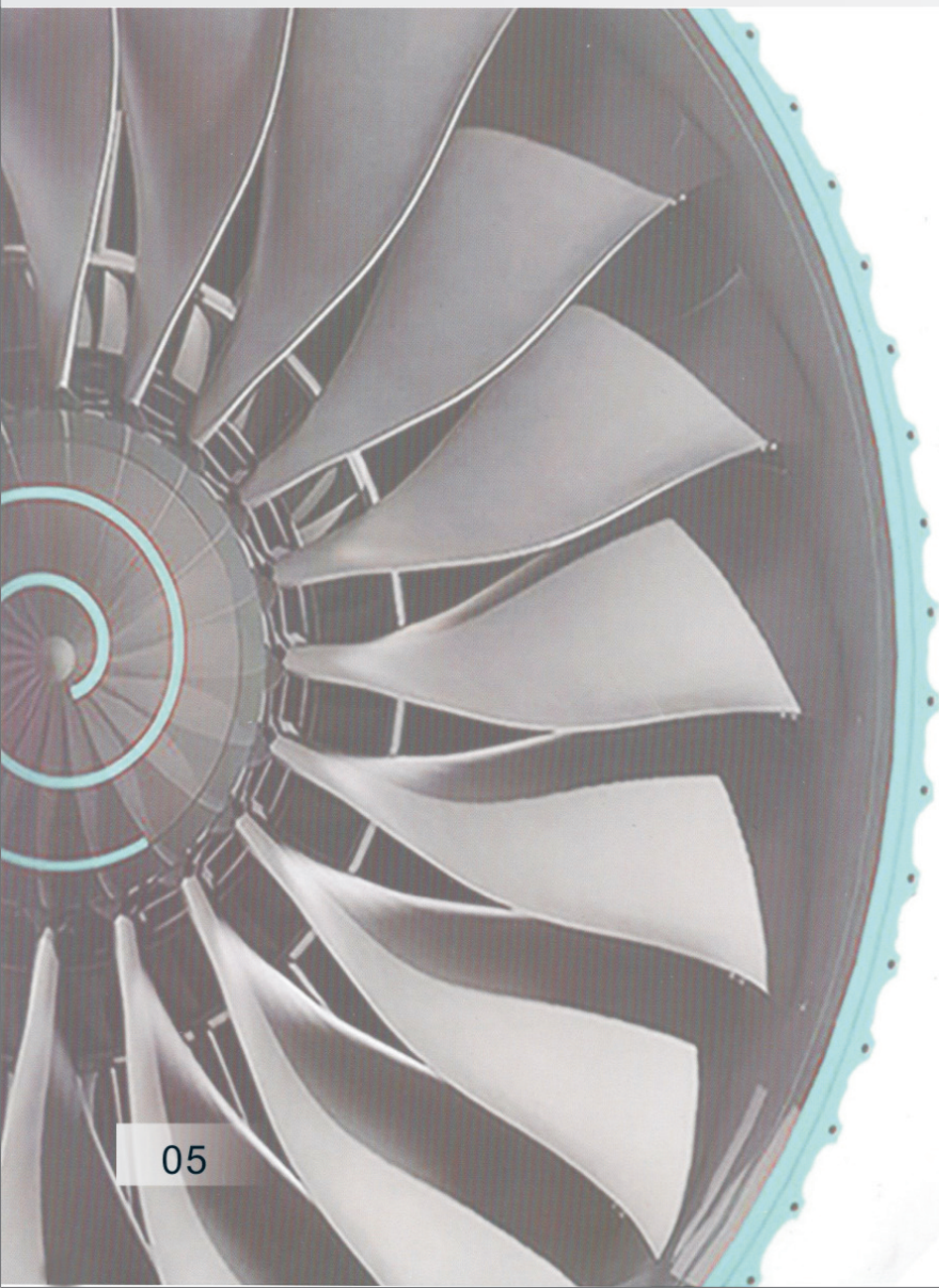
航空零部件解决方案

钛合金 Titanium alloy

高温合金 Superalloy

难加工材料

Hard-to-process materials



尺寸 Dimension		Size (mm)			订货号 Type No.
D	d	R	L1	L	
4	6	0.2	10	50	LZ04R021050
4	6	0.5	10	50	LZ04R051050
4	6	1.0	10	50	LZ04R101050
6	6	0.5	15	50	LZ06R051550
6	6	1.0	15	50	LZ06R101550
6	6	2.0	15	50	LZ06R201550
8	8	0.5	20	60	LZ08R052060
8	8	1.0	20	60	LZ08R102060
8	8	1.5	20	60	LZ08R152060
8	8	2.0	30	60	LZ08R203060
10	10	0.5	30	75	LZ10R053075
10	10	1.0	30	75	LZ10R103075
10	10	1.5	30	75	LZ10R153075
10	10	2.0	30	75	LZ10R203075
10	10	3.0	30	75	LZ10R303075
12	12	0.5	32	75	LZ12R053275
12	12	1.0	32	75	LZ12R103275
12	12	1.5	32	75	LZ12R153275
12	12	2.0	32	75	LZ12R203275
12	12	3.0	32	75	LZ12R303275
16	16	0.5	40	100	LZ16R0540100
16	16	1.0	40	100	LZ16R1040100
16	16	1.5	40	100	LZ16R1540100
16	16	2.0	40	100	LZ16R2040100
16	16	3.0	40	100	LZ16R3040100
20	20	0.5	50	100	LZ20R0550100
20	20	1.0	50	100	LZ20R1050100
20	20	1.5	50	100	LZ20R1550100
20	20	2.0	50	100	LZ20R2050100
20	20	3.0	50	100	LZ20R3050100

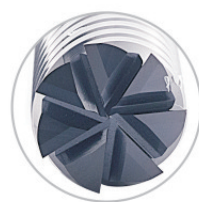


材料 Material	INCO718&Titanium
工具 Tool	硬质合金铣刀 Solid carbide mills
尺寸 Size	D12*R1.0*32H*D12*75L
切割速度 Cutting Speed Vc(m/min)	25
每分钟转数 RPM	500
进料速度 Feed Rate Vf(mm/min)	200
Ae(mm)	4.5
Ap(mm)	3
加工寿命 Processing Life	300

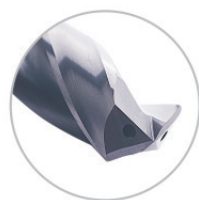


航空零部件解决方案 Aviation parts solutions

规格 Specification		尺寸Size (mm)			订货号 Type No.
D1	D2	L2	L1	Z	
3.0	6.0	8	57	6	LZ03060857
4.0	6.0	11	57	6	LZ04061157
5.0	6.0	13	57	6	LZ05061357
6.0	6.0	13	57	6	LZ06061357
8.0	8.0	19	63	6	LZ08081963
10.0	10.0	22	72	6	LZ10102272
12.0	12.0	26	83	6	LZ12122683
16.0	16.0	32	92	8	LZ16163292
20.0	20.0	38	104	8	LZ202038104



材料 Material	INCO718&Titanium
工具 Tool	硬质合金高硬度铣刀 Carbide High Hardness Milling Cutter
尺寸 Size	D20*8T*38*104L
切割速度 Cutting Speed Vc(m/min)	110
每分钟转数 RPM	1750
进料速度 Feed Rate Vf(mm/min)	700
进给Feed fz(mm/tooth)	0.1
Ap(mm)	35
加工寿命 Processing Life	500



材料 Material 铁体粉末冶金 Ferrite Powder Metallurgy/42CrMo

工具 Tool 硬质合金深孔钻

Carbide Deep Hole Drill

尺寸 Size D9.8*230*290

切割速度 Cutting Speed Vc(m/min) 105

每分钟转数 RPM 3583

进给 Feed fz(mm/tooth) 0.35

通孔/盲孔 through/blind holes 盲孔 Blind holes

Ap(mm) 180

加工寿命 Processing Life 622holes/112m

尺寸 Dimension		Size (mm)		订货号 Type No.
D	d	L1	L	
5.5	6	100	145	LZ05506100145
5.6	6	100	145	LZ05606100145
5.7	6	100	145	LZ05706100145
5.8	6	100	145	LZ05806100145
5.9	6	100	145	LZ05906100145
6.0	6	100	145	LZ06006100145
6.1	8	108	145	LZ06108108145
6.2	8	108	145	LZ06208108145
6.3	8	108	145	LZ06308108145
6.4	8	108	145	LZ06408108145
6.5	8	130	170	LZ06508130170
6.6	8	130	170	LZ06608130170
6.7	8	130	170	LZ06708130170
6.8	8	130	170	LZ06808130170
6.9	8	130	170	LZ06908130170
7.0	8	130	170	LZ07008130170
7.5	8	130	170	LZ07508130170
7.8	8	130	170	LZ07808130170
8.0	8	130	170	LZ08008130170
8.5	10	163	208	LZ08510163208
8.8	10	163	208	LZ08810163208
9.0	10	163	208	LZ09010163208
9.5	10	163	208	LZ09510163208
9.8	10	163	208	LZ09810163208
10.0	10	163	208	LZ10010163208
10.2	12	195	245	LZ10212195245
10.5	12	195	245	LZ10512195245
10.8	12	195	245	LZ10812195245
11.0	12	195	245	LZ11012195245
11.2	12	195	245	LZ11212195245
11.5	12	195	245	LZ11512195245
11.8	12	195	245	LZ11812195245
12.0	12	195	245	LZ12012195245
12.5	14	230	280	LZ12514230280
13.0	14	230	280	LZ13014230280
13.8	14	230	280	LZ13814230280
14.0	14	230	280	LZ14014230280
14.8	16	260	310	LZ14816260310
15.0	16	260	310	LZ15016260310
15.8	16	260	310	LZ15816260310
16.0	16	260	310	LZ16016260310



材料 Material 316不锈钢Stainless Steel/INCO625

工具 Tool 硬质合金内冷钻

Carbide Internal Cold Drill

尺寸 Size D6.5*76*114

切割速度 Cutting Speed Vc(m/min) 65

每分钟转数 RPM 3185

进给Feed fz(mm/tooth) 0.4

通孔/盲孔 through/blind holes 盲孔 Blind holes

Ap(mm) 50

加工寿命 Processing Life 1360holes/68m

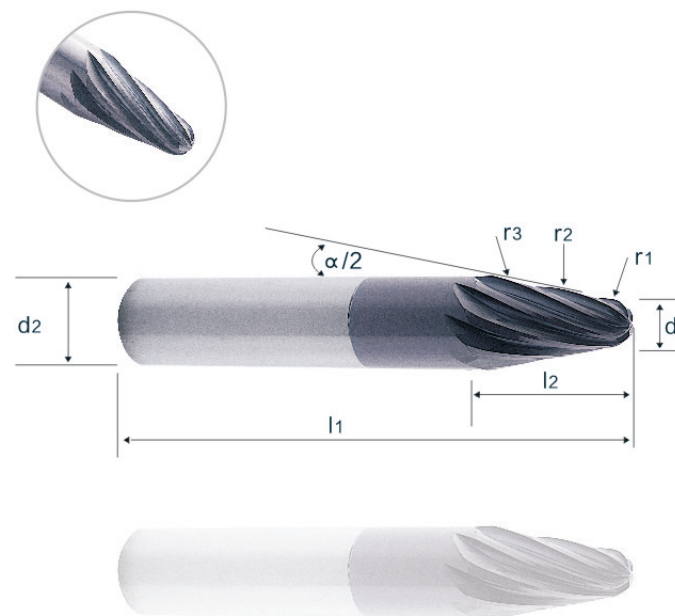
尺寸 Dimension		Size (mm)			订货号 Type No.
D	d	L1	L	LN	
7.5	8	76	114	60	LZ075087611460
7.6	8	76	114	60	LZ076087611460
7.7	8	76	114	60	LZ077087611460
7.8	8	76	114	60	LZ078087611460
7.9	8	76	114	60	LZ079087611460
8.0	8	76	114	68	LZ080087611468
8.1	10	95	142	68	LZ081109514268
8.2	10	95	142	68	LZ082109514268
8.3	10	95	142	68	LZ083109514268
8.4	10	95	142	68	LZ084109514268
8.5	10	95	142	68	LZ085109514268
8.6	10	95	142	68	LZ086109514268
8.7	10	95	142	68	LZ087109514268
8.8	10	95	142	68	LZ088109514268
8.9	10	95	142	68	LZ089109514268
9.0	10	95	142	76	LZ090109514276
9.1	10	95	142	76	LZ091109514276
9.2	10	95	142	76	LZ092109514276
9.3	10	95	142	76	LZ093109514276
9.4	10	95	142	76	LZ094109514276
9.5	10	95	142	76	LZ095109514276
9.6	10	95	142	76	LZ096109514276
9.7	10	95	142	76	LZ097109514276
9.8	10	95	142	76	LZ098109514276
9.9	10	95	142	76	LZ099109514276
10.0	10	114	142	76	LZ1001011414276
10.1	12	114	114	90	LZ1011211411490
10.2	12	114	114	90	LZ1021211411490
10.3	12	114	114	90	LZ1031211411490
10.4	12	114	114	90	LZ1041211411490
10.5	12	114	114	90	LZ1051211411490

高精模具及航空零部件解决方案

Solution of High Precision Die and Aviation Parts



d1	$\alpha/2$	d2 h5	尺寸 Dimension						订货号 Type No.
			l1	l2	r1	r2	r3	z	
4	30°	16	108	14.5	2	750	3	4	LZ04A30161084F
4	30°	16	108	14.5	2	750	3	6	LZ04A30161086F
6	20°	16	108	18.5	3	1000	5	4	LZ06A20161084F
6	20°	16	108	18.5	3	1000	5	8	LZ06A20161088F
8	10°	16	108	28.5	4	1000	5	4	LZ08A10161084F
8	10°	16	108	28.5	4	1000	5	8	LZ08A10161088F
8	6°	16	123	44.0	4	1000	5	4	LZ08A06161234F
8	6°	16	123	44.0	4	1000	5	8	LZ08A06161238F



材料 Material	INCO718 & Titanium
工具 Tool	硬质合金锥度球头铣刀 Cemented carbide taper ball end milling cutter
尺寸 Size	R3*A20*16*108*8F
切割速度 Cutting Speed Vc(m/min)	110
每分钟转数 RPM	1750
进给Feed fz(mm/tooth)	0.1
Ap(mm)	35
加工寿命 Processing Life	350



医疗零部件解决方案 Medical Parts Solution



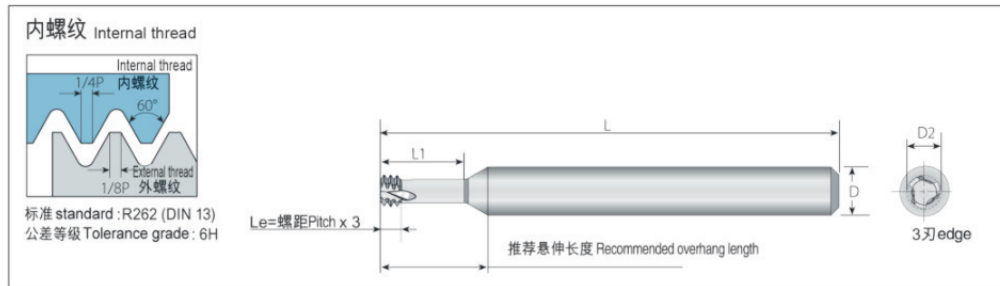
材料 Material 钛合金 Titanium alloy
 工具 Tool 硬质合金螺纹铣刀
 Carbide Thread milling cutter
 尺寸 Size K55-08035C12T A55-0.6
 切割速度 Cutting Speed Vc(m/min) 50
 每分钟转数 RPM 4500
 进料速度 Feed Rate Vf(mm/min) 225
 进给Feed fz(mm/tooth) 0.015
 通孔/盲孔 through/blind holes 通孔 for through holes
 Ap(mm) 8
 加工寿命 Processing Life 10300holes

螺距 Pitch	规格 Specification					订货号 Type No.
	D1	D	d	Lt	L	
0.30	1.5	2.8	6	3.9	50	LZ01502803050
0.35	1.8	3.9	6	6.2	50	LZ01803903550
0.40	2.5	5.9	6	10.0	60	LZ02505904060
0.50	2.9	5.9	6	9.0	60	LZ02905905060
0.60	3.8	5.9	6	6.9	60	LZ03805906060
0.40	3.2	5.9	6	8.0	60	LZ03205904060
0.50	2.9	5.9	6	9.0	60	LZ02905905060



Millipro

IOS公制螺纹 IOS metric thread

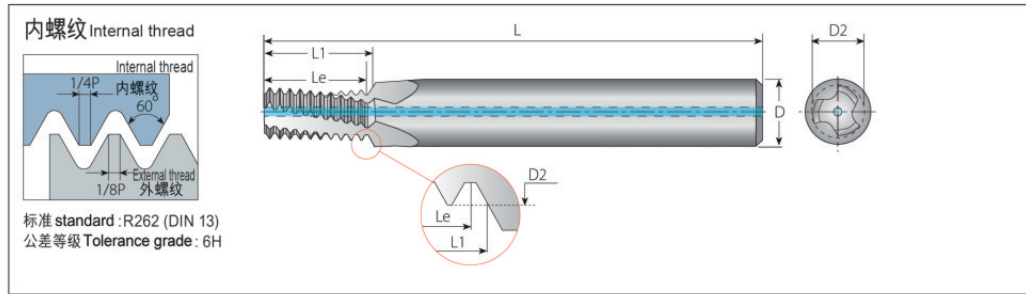


Millipro 小型螺纹铣刀

Small threaded milling cutter

2 × Do (L1 ≤ 2 × 螺纹直径 Thread diameter)

螺纹 Thread		螺距 Pitch	订货号 Type No.	尺寸规格 Size specification				槽数 Slot number	齿数 Tooth number	底孔直径* Bottom hole diameter*
M粗牙 M coarse teeth	细牙 Fine teeth	mm	内螺纹 Internal thread	D	D2	L	L1	Z	Zt	mm
M0.8 × 0.2		0.2	LZ0080020450	4	0.57	50	1.8	3	3	0.65
M0.9 × 0.225		0.225	LZ009002250450	4	0.64	50	2.0	3	3	0.70
M1 × 0.25		0.25	LZ01000250450	4	0.71	50	2.2	3	3	0.75
M1.2 × 0.25		0.25	LZ01200250450	4	0.91	50	2.6	3	3	0.95
M1.4 × 0.3		0.3	LZ0140030450	4	1.06	50	3.0	3	3	1.10
M1.6 × 0.35		0.35	LZ01600350450	4	1.20	50	3.4	3	3	1.25
M1.8 × 0.35		0.35	LZ01800350450	4	1.40	50	3.8	3	3	1.45
M2 × 0.4		0.4	LZ020040660	6	1.55	60	4.2	3	3	1.60
M2.2 × 0.45		0.45	LZ02200450660	6	1.65	60	4.6	3	3	1.75
M2.5 × 0.45		0.45	LZ02500450660	6	1.95	60	5.2	3	3	2.05
M3 × 0.5	M3.5-M16 × 0.5	0.5	LZ030050660	6	2.40	60	6.2	4	4	2.5
M3.5 × 0.6		0.6	LZ0350060660	6	2.75	60	7.3	4	4	2.9
M4 × 0.7		0.7	LZ040070660	6	3.15	60	8.3	4	4	3.3
M5 × 0.8		0.8	LZ050080660	6	4.05	60	10.4	4	4	4.2
M6 × 1.0	M8-M40 × 1.0	1.0	LZ060100660	6	4.80	60	12.5	5	5	5.0
M8 × 1.25		1.25	LZ0801250860	8	6.50	60	16.6	5	5	6.8
M10 × 1.5	M12-M48 × 1.5	1.5	LZ0100151060	10	8.20	60	20.8	5	5	8.5
M12 × 1.75		1.75	LZ01201751060	10	9.90	60	25.0	5	5	10.3
M14 × 2.0		2.0	LZ014021260	12	10.95	60	29.0	5	5	12.0
M16 × 2.0		2.0	LZ016021260	12	11.90	60	33.0	6	6	14.0
M18 × 2.5		2.5	LZ01802514100	14	13.95	100	37.0	6	6	15.5
M20 × 2.5		2.5	LZ02002516100	16	15.90	100	41.3	6	6	17.5



螺纹槽内冷螺纹铣刀

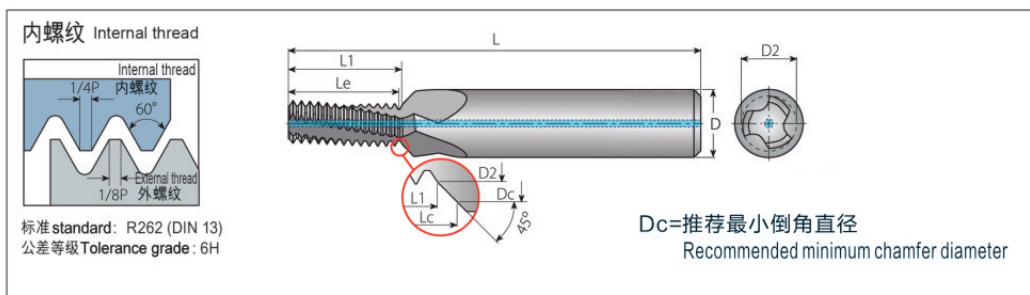
Thread Groove Internal Cold Thread Milling Cutter

$2 \times D_o (L1 \leq 2 \times \text{螺纹直径 Thread diameter})$

螺纹 Thread		螺距 Pitch	订货号 Type No.	尺寸规格 Size specification					槽数 Slot number	齿数 Tooth number	底孔直径* Bottom hole diameter*
M粗牙 M coarse teeth	细牙 Fine teeth	mm	内螺纹 Internal thread	D	D2	L	Le	L1	Z	Zt	mm
M3×0.5	M3.5-M16×0.5	0.5	LZ040240550	4	2.4	50	6	6.2	3	12	2.5
	M4×0.5	0.5	LZ040320550	4	3.2	50	8	8.2	3	16	3.5
	M5×0.5	0.5	LZ060420550	6	4.2	50	10	10.2	3	20	4.5
M4×0.7	M4×0.7	0.7	LZ0403150750	4	3.15	50	8.4	8.7	3	12	3.3
	M6×0.75	0.75	LZ060507560	6	5	60	12	12.4	3	16	5.3
M5×0.8		0.8	LZ040390850	4	3.9	50	10.4	10.8	3	13	4.2
M6×1.0	M8-M40×1.0	1.0	LZ060481060	6	4.8	60	12	12.5	3	12	5
	M8×1.0	1.0	LZ080671060	8	6.7	60	16	16.5	3	16	7
	M10×1.0	1.0	LZ100871075	10	8.7	75	20	20.5	3	20	9
	M12×1.0	1.0	LZ121071075	12	10.7	75	24	24.5	4	24	11
M8×1.25	M8×1.25	1.25	LZ080612560	8	6.5	60	16.2	16.9	3	13	6.8
	M10×1.25	1.25	LZ1008512575	10	8.5	75	20	20.6	3	16	8.8
M10×1.5	M12-M48×1.5	1.5	LZ100821575	10	8.2	75	19.5	20.2	3	13	8.5
	M12×1.5	1.5	LZ100991575	10	9.9	75	24	24.7	4	16	10.5
	M14×1.5	1.5	LZ121191575	12	11.9	75	28.5	29.2	4	19	12.5
	M16×1.5	1.5	LZ141391585	14	13.9	85	31.5	32.2	4	21	14.5
M12×1.75		1.75	LZ1009917575	10	9.9	75	24.5	25.4	4	14	10.2
M14×2.0	M17-M80×2.0	2.0	LZ121162075	12	11.6	75	28	29	4	14	12
M16×2.0	M17-M80×2.0	2.0	LZ161362085	14	13.6	85	32	33	4	16	14
M18×2.5		2.5	LZ1614825100	16	14.8	100	35	36.2	4	14	15.5
M20×2.5		2.5	LZ1817125100	18	17.1	100	40	41.2	4	16	17.5
M24×3.0		3.0	LZ2019930100	20	19.9	100	48	49.5	4	16	21

螺纹冷却 Thread cooling

IOS公制螺纹 IOS metric thread



螺旋槽内冷带倒角螺纹铣刀-C(HCC)

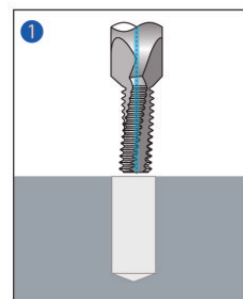
Spiral groove internal cold belt chamfered thread milling cutter-C(HCC)

$2 \times D_o (L1 \leq 2 \times \text{螺纹直径 Thread diameter})$

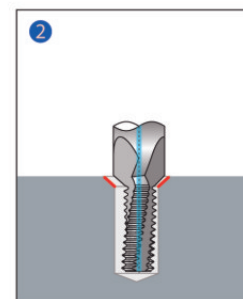
螺纹 Thread		螺距 Pitch	订货号 Type No.	尺寸规格 Size specification							槽数 Slot number	齿数 Tooth number	底孔直径* Bottom hole diameter*
M粗牙 M coarse teeth	细牙 Fine teeth	mm	内螺纹 Internal thread	D	D2	Dc	L	Le	L1	Lc	Z	Zt	mm
M6 × 1.0	M8-M40 × 1.0	1.0	LZ080480160	8	4.8	6.3	60	12.0	12.5	13.3	3	12	5.0
	M10 × 1.0	1.0	LZ120870175	12	8.7	10.3	75	20.0	20.5	21.3	3	20	9.0
	M12 × 1.0	1.0	LZ141070175	14	10.7	12.3	85	24.0	24.5	25.3	4	24	11.0
M8 × 1.25		1.25	LZ10065012575	10	6.5	8.3	75	16.3	16.9	17.8	3	13	6.8
M10 × 1.5	M12-M48 × 1.5	1.5	LZ1208201575	12	8.2	10.3	75	19.5	20.3	21.3	3	13	8.5
	M12 × 1.5	1.5	LZ1409901585	14	9.9	12.3	85	24.0	24.8	26	4	16	10.5
	M14 × 1.5	1.5	LZ1611901585	16	11.9	14.3	85	28.5	29.3	30.5	4	19	12.5
	M16 × 1.5	1.5	LZ18139015100	18	13.9	16.3	100	31.5	32.3	33.5	4	21	14.5
M12 × 1.75		1.75	LZ14099017585	14	9.9	12.3	85	24.5	25.4	26.6	4	14	10.2

螺旋槽内冷带倒角螺纹铣刀-C(HCC)加工过程

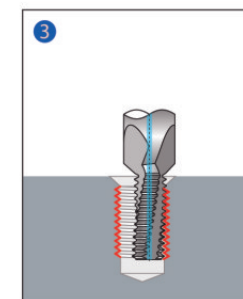
Machining process of spiral groove internal cold belt chamfered thread milling cutter-C(HCC)



定位 Location



加工倒角 Chamfering



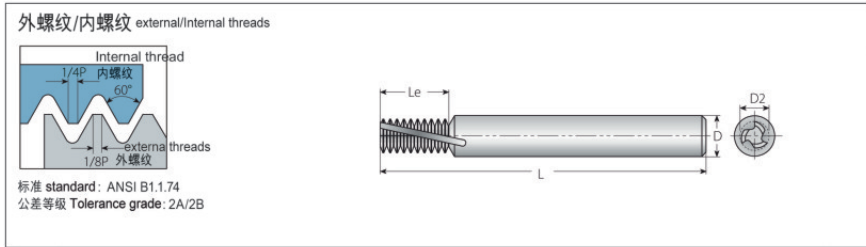
螺纹铣削 Thread milling



美制UN

Us made UN

螺旋槽
spiral groove



螺旋槽-外部的

Spiral groove - external

$2 \times Do (L1 \leq 2 \times \text{螺纹直径 Thread diameter})$

螺纹 Thread		螺距 Pitch	订货号 Type No.	尺寸规格 Size specification				槽数 Slot number	齿数 Tooth number
UNC	UNF	tpi	内螺纹 Internal thread	D	D2	L	Le	Z	Zt
No.8-32		32	LZ0403932031150	4	3.9	50	8.7	3	11
	No.12-28	28	LZ0403928031350	4	3.9	50	11.8	3	13
No.12-24		24	LZ0403924031150	4	3.9	50	11.6	3	11
1/4"×20		20	LZ0403920031050	4	3.9	50	12.7	3	10
5/16"×18		18	LZ0605918031250	6	5.9	50	16.9	3	12
3/8"×16		16	LZ0807916031260	8	7.9	60	19.1	3	12
9/16"×12		12	LZ1211912041475	12	11.9	75	29.6	4	14

螺旋槽-内槽

Spiral groove-inner groove

$2 \times Do (L1 \leq 2 \times \text{螺纹直径 Thread diameter})$

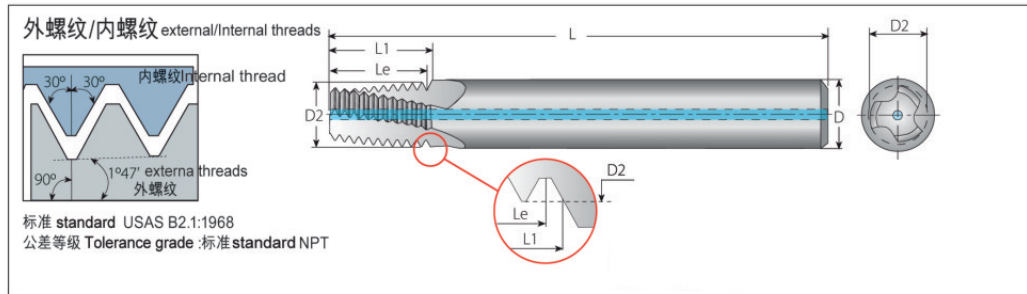
螺纹 Thread		螺距 Pitch	订货号 Type No.	尺寸规格 Size specification				槽数 Slot number	齿数 Tooth number	底孔直径* Bottom hole diameter*	
UNC	UNF	UNEF	内螺纹 Internal thread	D	D2	L	Le	Z	Zt	mm	
	No.8-36		36	LZ0403036031250	4	3.0	50	8.5	3	12	3.5
	No.10-32		32	LZ0403332031450	4	3.3	50	11.1	3	14	4.0
	No.12-28, 1/4"×28	7/16", 1/2"×28	28	LZ0403828031350	4	3.8	50	11.8	3	13	4.6
	1/4"×28	7/16", 1/2"×28	28	LZ0604628031450	6	4.6	50	12.7	3	14	5.5
		7/16", 1/2"×28	28	LZ1009228042575	10	9.2	75	22.7	4	25	10.2
No.10-24	5/16", 3/8"×24	9/16"-11/16"×24	24	LZ0402924031050	4	2.9	50	10.6	3	10	3.8
No.12-24	5/16", 3/8"×24	9/16"-11/16"×24	24	LZ0403524031150	4	3.5	50	11.6	3	11	4.5
	5/16", 3/8"×24	9/16"-11/16"×24	24	LZ0605724031550	6	5.7	50	15.9	3	15	6.8
	3/8"×24	9/16"-11/16"×24	24	LZ0807424031860	8	7.4	60	19.1	3	18	8.5
		9/16"-11/16"×24	24	LZ1211924042775	12	11.9	75	28.6	4	27	13.2
1/4"×20	7/16", 1/2"×20	3/4"-1"×20	20	LZ0403920031050	4	3.9	50	12.7	3	10	5.2
	7/16", 1/2"×20	3/4"-1"×20	20	LZ1008520041875	10	8.5	75	22.9	4	18	9.8
	1/2"×20	3/4"-1"×20	20	LZ1009920042075	10	9.9	75	25.4	4	20	11.5
		3/4"-1"×20	20	LZ1615920053085	16	15.9	85	38.1	5	30	17.8
5/16"×18	9/16", 5/8"×18	11/16"-1 11/16"×18	18	LZ0605218031250	6	5.2	50	16.9	3	12	6.5
	9/16", 5/8"×18	11/16"-1 11/16"×18	18	LZ1211318042175	12	11.3	75	29.6	4	21	12.8
	5/8"×18	11/16"-1 11/16"×18	18	LZ1211918042375	12	11.9	75	32.5	4	23	14.5
3/8"×16	3/4"×16		16	LZ0806716031260	8	6.7	60	19.1	3	12	8.0
	3/4"×16		16	LZ1615916042485	16	15.9	85	38.1	4	24	17.5
7/16"×14	7/8"×14		14	LZ0807614041360	8	7.6	60	23.6	4	13	9.3
	7/8"×14		14	LZ20187140424100	20	18.7	100	44.4	4	24	20.5
1/2"×13			13	LZ1008913041375	10	8.9	75	25.4	4	13	10.8
9/16"×12	1"-1 1/2"×12		12	LZ1210312041475	12	10.3	75	29.6	4	14	12.3
	1"-1 1/2"×12		12	LZ20199120524100	20	19.9	100	50.8	5	24	23.5
5/8"×11			11	LZ1211011041475	12	11.0	75	32.3	4	14	13.5
3/4"×10			10	LZ1613510051585	16	13.5	85	38.1	5	15	16.5
7/8"×9			9	LZ1615209041685	16	15.2	85	45.2	4	16	19.5
1"×8			8	LZ20170080416100	20	17.0	100	50.8	4	16	22.0

螺纹冷却

Thread cooling

美制 NPT

US MADE NPT



螺旋槽带冷却通孔

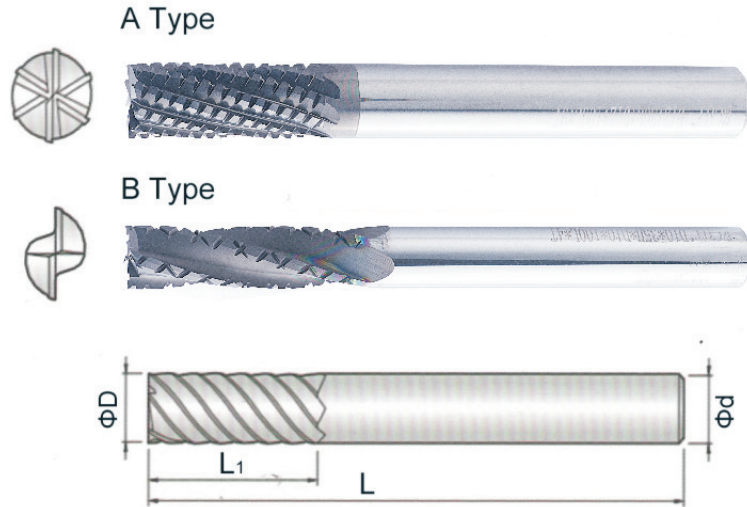
Spiral groove with cooling through hole

螺纹 Thread	螺距 Pitch	订货号 Type No.	尺寸规格 Size specification					槽数 Slot number	齿数 Tooth number	底孔直径* Bottom hole diameter*
			D	D2	L	Le	L1			
标准型 Standard form	tpi	内螺纹 Internal thread	D	D2	L	Le	L1	Z	Zt	mm
1/16" × 27	27	LZ060592760	6	5.9	60	9.4	9.9	3	10	6.3
1/8" × 27	27	LZ0807652760	8	7.65	60	9.4	9.9	3	10	8.5
1/4" × 18	18	LZ100991875	10	9.9	75	14.1	14.8	3	10	11.1
3/8" × 18	18	LZ1211151875	12	11.15	75	14.1	14.8	4	10	14.5
1/2", 3/4" × 14	14	LZ1614251485	16	14.25	85	18.1	19.0	4	10	17.7, 23
1, "1 1/4", 1 1/2", 2" × 11.5	11.5	LZ20196115100	20	19.6	100	22.1	23.2	4	10	29, 37.7, 44, 56
2 1/2", 3" × 8	8	LZ2019608100	20	19.6	100	31.7	33.3	4	10	66.5, 82.1



石墨碳纤维/玻璃纤维 Graphite Carbon Fiber/Glass Fiber

复合材料铣刀 Composite material milling cutter



尺寸 Dimension				订货号 A Type No.
D	L1	L	d	
4	16	60	4	LZA041660
5	20	60	6	LZA052060
6	20	70	6	LZA062070
8	25	80	8	LZA082580
10	27	80	10	LZA102780
12	30	80	12	LZA123080

尺寸 Dimension				订货号 B Type No.
D	L1	L	d	
4	16	60	4	LZB041660
5	20	60	6	LZB052060
6	20	70	6	LZB062070
8	25	80	8	LZB082580
10	27	80	10	LZB102780
12	30	80	12	LZB123080

用于碳纤维增强塑料、玻璃纤维增强塑料、玻璃/碳纤维、石墨、有色金属和非金属材料的路由器。

各种复合材料的粗加工性能优异

A型有许多底边，并为开槽进行了优化。

B型有两个下边缘，在垂直、水平加工方面性能优异。

采用高硬度涂层，具有优异的耐磨性。

通过低摩擦金刚石涂层技术，将堆积边缘最小化。

Router for CFRP, GFRP, glass/carbon fiber, graphite, noferrous and no-metallic material.

Outstanding performance in roughing of various composite materials

A type has many bottom edges and optimized for slotting.

B type has two bottom edges and excellent performance in vertical, horizontal machining

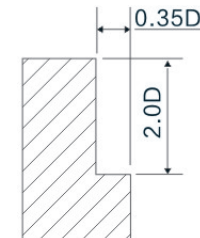
Excellent wear resistance by applying high hardness coating layer.

Minimize built up edge by low friction diamond coating technology.

RPM:rev/min FEED:mm/min Vc:m/min Fz:mm/rev

Material		CFRP			Material		GFRP		
Diameter	RPM	FEED	Vc		Diameter	RPM	FEED	Vc	
4mm	15900	1400	200		4mm	7900	700	100	
5mm	12700	1900	200		5mm	6300	950	100	
6mm	10600	2200	200		6mm	5300	1000	100	
8mm	7960	2600	200		8mm	3900	1300	100	
10mm	6360	3000	200		10mm	3100	1500	100	
12mm	5300	3300	200		12mm	2600	1600	100	

Depet of cut

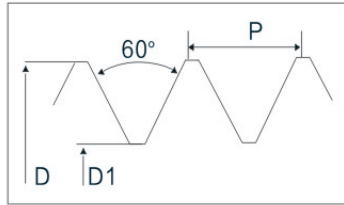


螺纹技术对照表

Thread Technology Control Table



ISO米制螺纹 Metric thread



ISO米制粗牙螺纹 Metric coarse thread

米制粗牙Metric coarse teeth (M)		
公称直径 Nominal diameter ΦD	牙距 Pitch of tooth	钻头直径 Drill diameter
2	0.4	1.6
2.2	0.45	1.75
2.3	0.4	1.9
2.5	0.45	2.05
2.6	0.45	2.1
3	0.5	2.5
3.5	0.6	2.9
4	0.7	3.3
4.5	0.75	3.7
5	0.8	4.2
6	1	5
7	1	6
8	1.25	6.8
9	1.25	7.8
10	1.5	8.5
11	1.5	9.5
12	1.75	10.2
14	2	12
16	2	14
18	2.5	15.5
20	2.5	17.5
22	2.5	19.5
24	3	21
27	3	24
30	3.5	26.5
33	3.5	29.5
36	4	32
39	4	35
42	4.5	37.5
45	4.5	40.5
48	5	43
52	5	47
56	5.5	50.5
60	5.5	54.5
64	6	58
68	6	62

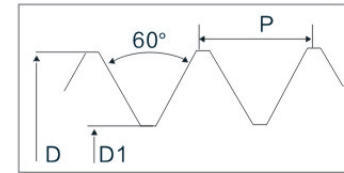
ISO米制细牙螺纹 Metric Fine Teeth Thread

米制细牙Metric fine teeth (M)		
公称直径 Nominal diameter ΦD	牙距 Pitch of tooth	钻头直径 Drill diameter
2.5	0.35	2.15
3	0.35	2.65
3.5	0.35	3.15
4	0.5	3.5
4.5	0.5	4
5	0.5	4.5
6	0.75	5.2
7	0.75	6.2
8	0.75	7.2
8	1	7
9	1	8
10	0.75	9.2
10	1	9
10	1.25	8.8
11	1	10
12	1	11
12	1.25	10.8
12	1.5	10.5
14	1	13
14	1.25	12.8
14	1.5	12.5
15	1	14
15	1.5	13.5
16	1	15
16	1.5	14.5
17	1	16
17	1.5	15.5
18	1.5	16.5
18	2	16
20	1	19
20	1.5	18.5
20	2	18
22	1	21
22	1.5	20.5
22	2	20
24	1	23
24	1.5	22.5
24	2	22
24	1	23
25	1.5	23.5

ISO米制细牙螺纹 Metric Fine Teeth Thread

米制细牙Metric fine teeth (M)		
公称直径 Nominal diameter ΦD	牙距 Pitch of tooth	钻头直径 Drill diameter
26	1.5	24.5
27	1	26
27	1.5	25.5
27	2	25
28	1.5	26.5
28	2	26
30	2	29
30	1.5	28.5
30	2	28
32	1.5	30.5
32	2	30
33	1.5	31.5
33	2	31
33	3	30
35	1.5	33.5
36	1.5	34.5
36	2	34
36	3	33
38	1.5	36.5
39	1.5	37.5
39	2	37
39	3	36
40	1.5	38.5
40	2	38
40	3	37
42	1.5	40.5
42	2	40
42	3	39
45	1.5	43.5
45	2	43
45	3	42
48	1.5	46.5
48	2	46
48	3	45
50	1.5	48.5
50	2	48
50	3	47
52	1.5	50.5
52	2	50
52	3	49

挤压丝锥底孔 Bottom hole of extruded tap



ISO米制螺纹 Metric thread

粗牙牙距 Coarse pitch		
丝锥规格 Tap specifications	牙距 Pitch of tooth	钻头直径 Drill diameter
M2	0.4	1.8
M2.5	0.45	2.3
M3	0.5	2.8
M3.5	0.6	3.25
M4	0.7	3.7
M4.5	0.75	4.15
M5	0.8	4.6
M6	1	5.55
M7	1	6.55
M8	1.25	7.5
M10	1.5	9.3
M11	1.5	10.3
M12	1.75	11.2
M14	2	13.1
M16	2	15.1
M18	2.5	16.9
M20	2.5	18.9

UNC TAPS		
丝锥规格 Tap specifications	牙距 Pitch of tooth	钻头直径 Drill diameter
N0.1	64	1.7
N0.2	56	2
N0.3	48	2.3
N0.4	40	2.6
N0.5	40	2.9
N0.6	32	3.2
N0.8	32	3.8
N0.10	24	4.4
N0.12	24	5
1/4"	20	5.8
5/16"	18	7.3
3/8"	16	8.8
7/16"	14	10.3
1/2"	13	11.9

惠氏管螺纹 Wyeth tube thread		
丝锥规格 Tap specifications	牙距 Pitch of tooth	钻头直径 Drill diameter
G 1/8"	28	9.25
G 1/4"	19	12.5
G 3/8"	19	16
G 1/2"	14	20
G 3/4"	14	25.5
G 1"	11	32

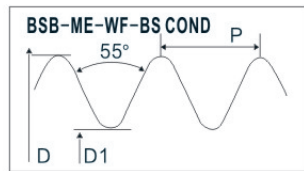
ISO米制螺纹 Metric thread

细牙牙距 Fine pitch		
丝锥规格 Tap specifications	牙距 Pitch of tooth	钻头直径 Drill diameter
M3	0.35	2.85
M4	0.5	3.8
M5	0.5	4.8
M6	0.75	5.65
M8	1	7.55
M10	1	9.55
M10	1.25	9.45
M12	1	11.55
M12	1.25	11.45
M12	1.5	11.3
M14	1.25	13.45
M14	1.5	13.3
M16	1.5	15.3
M18	1.5	17.3
M20	1.5	19.3
M18	2.5	16.9
M20	2.5	18.9

UNC TAPS		
丝锥规格 Tap specifications	牙距 Pitch of tooth	钻头直径 Drill diameter
N0.1	72	1.7
N0.2	64	2
N0.3	56	2.3
N0.4	48	2.6
N0.5	44	2.9
N0.6	40	3.2
N0.8	36	3.9
N0.10	32	4.5
N0.12	28	5.1
1/4"	28	6
5/16"	24	7.5
3/8"	24	9.1
7/16"	20	10.6
1/2"	20	12.1

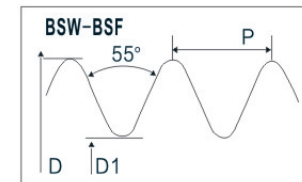
英制螺纹 Inch thread

BSB		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/4"	26	5.3
5/16"	26	6.9
3/8"	26	8.4
7/16"	26	10
1/2"	26	11.5
9/16"	26	13.1
5/8"	26	14.7
11/16"	26	16.5
3/4"	26	17.8
7/8"	26	21
1"	26	24.2
1.1/8"	26	27.5
1.1/4"	26	30.5
1.3/8"	26	33.7
1.1/2"	26	36.9
2	26	49.6



BS COND.		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/2"	18	11.5
5/8"	18	14.2
3/4"	16	17.5
7/8"	16	20.6
1"	16	23.8
1.1/4"	16	30.1
1.1/2"	14	36.1
2	14	48.8

ME		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/8"	40	2.55
5/32"	40	3.3
3/16"	40	4
7/32"	40	4.8
1/4"	40	5.5
9/32"	32	6.1
5/16"	32	7
3/8"	32	8.6
7/16"	26	10.5
1/2"	26	12.1



英制惠氏螺纹 British wyeth thread

BSW		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/16"	60	1.2
3/32"	48	1.9
1/8"	40	2.55
5/32"	32	3.2
3/16"	24	3.7
7/32"	24	4.5
1/4"	20	5.1
9/32"	20	5.8
5/16"	18	6.5
3/8"	16	7.9
7/16"	14	9.3
1/2"	12	10.5
9/16"	12	12.1
5/8"	11	13.5
11/16"	11	15.1
3/4"	10	16.3
7/8"	9	19.3
15/16"	9	20.6
1"	8	22
1.1/8"	7	24.75
1.1/4"	7	28
1.3/8"	6	30.5
1.1/2"	6	33.5
1.5/8"	5	36
1.3/4"	5	39
1.7/8"	4 1/2	41.3
2"	4 1/2	44.5

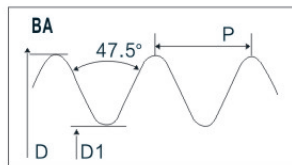
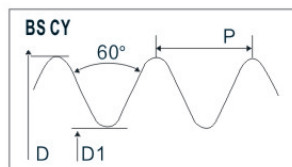
英制细牙螺纹 English fine teeth thread

BSF		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
3/16"	32	4
7/32"	28	4.6
1/4"	26	5.3
9/32"	26	6
5/16"	22	6.8
3/8"	20	8.3
7/16"	18	9.7
1/2"	16	11.1
9/16"	16	12.7
5/8"	14	14
11/16"	14	15.5
3/4"	12	16.75
7/8"	11	19.75
15/16"	11	21.5
1"	10	22.75
1.1/8"	9	25.5
1.1/4"	9	28.5
1.3/8"	8	31.5
1.1/2"	8	34.5
1.5/8"	8	37.7
1.3/4"	7	41
1.7/8"	7	43.7
2"	7	47

惠氏非标 Wyeth nonstandard		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/4"	24/28/32	5.3, 5.4, 5.5
5/16"	24/40	6.75, 7.3
3/8"	24/40	8.4, 8.9
7/16"	20/24/40	9.8, 10, 10.5
1/2"	20/24/40	11.5, 11.9, 12
9/16"	20	13.1

惠氏非标 Wyeth nonstandard		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
5/8"	20	14.5
11/16"	20	16.2
3/4"	14/20	17.1, 17.8
7/8"	14/16/20	20.2, 20.6, 21
1	12/20	23, 24

BA			
尺寸 size	直径 diameter	TPI	钻头直径 Drill diameter in mm
0	0.2362	25.4	5.1
1	0.2087	28.2	4.5
2	0.1850	31.4	4
3	0.1614	34.8	3.4
4	0.1417	38.5	3
5	0.1260	43	2.65
6	0.1102	47.9	2.3
7	0.0984	52.9	2.05
8	0.0866	59.1	1.8
9	0.0748	65.1	1.55
10	0.0669	72.6	1.4
11	0.0591	81.9	1.2
12	0.0512	90.9	1.05



BS CY		
尺寸 size	TPI	钻头直径 Drill diameter in mm
1/8"	40	2.65
5/32"	32	3.3
3/16"	32	4.1
7/32"	26	4.8
1/4"	26	5.6
5/16"	26	7.2
3/8"	26	8.7
7/16"	26	10.3
1/2"	26	11.9
9/16"	26	13.5
5/8"	26	15
3/4"	26	18.2
1"	24	24.5

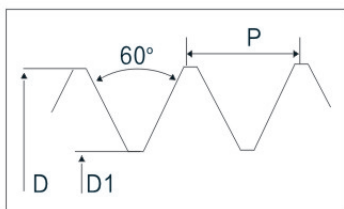
螺纹技术对照表

Thread Technology Control Table



美标螺纹 American Standard thread

统一粗牙螺纹 Uniform coarse thread



UNC		
公称直径 Nominal diameter ΦD	Pitch	钻头直径 Drill diameter in mm
#1	64	1.55
#2	56	1.8
#3	48	2.1
#4	40	2.3
#5	40	2.6
#6	32	2.9
#8	32	3.5
#10	24	3.9
#12	24	4.5
1/4"	20	5.2
5/16"	18	6.6
3/8"	16	8
7/16"	14	9.4

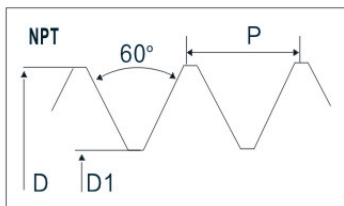
UNC		
公称直径 Nominal diameter ΦD	Pitch	钻头直径 Drill diameter in mm
1/2"	13	10.9
9/16"	12	12.3
5/8"	11	13.6
3/4"	10	16.6
7/8"	9	19.5
1"	8	22.3
1.1/8"	7	25
1.1/4"	7	28.3
1.3/8"	6	30.8
1.1/2"	6	34
1.3/4"	5	39.5
2"	4.5	45.3

统一细牙螺纹 Uniform fine thread

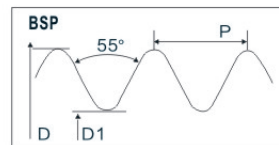
UNF		
公称直径 Nominal diameter ΦD	Pitch	钻头直径 Drill diameter in mm
#0	80	1.25
#1	72	1.55
#2	64	1.85
#3	56	2.1
#4	48	2.4
#5	44	2.7
#6	40	2.9
#8	36	3.5
#10	32	4.1
#12	28	4.6
1/4"	28	5.5
5/16"	24	6.9
3/8"	24	8.5

UNF		
公称直径 Nominal diameter ΦD	Pitch	钻头直径 Drill diameter in mm
7/16"	20	9.9
1/2"	20	11.5
9/16"	18	12.9
5/8"	18	14.5
3/4"	16	17.5
7/8"	14	20.5
1"	12	23.3
1.1/8"	12	26.5
1.1/4"	12	29.6
1.3/8"	12	32.8
1.1/2"	12	36
2"	12	48.6

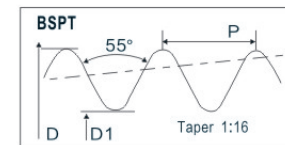
管螺纹 Pipe thread



公称直径 Nominal diameter ΦD	NPT			NPS
	TPI	铰孔后攻丝 Reaming back tapping	不铰孔攻丝 Unreamed tapping	钻头直径 Drill diameter in mm
1/16"	27	5.94	6.15	6.35
1/8"	27	8.33	8.43	8.75
1/4"	18	10.72	11.13	11.13
3/8"	18	14.27	14.68	14.68
1/2"	14	17.48	17.86	18.26
3/4"	14	22.63	23.01	23.42
1"	11.5	28.58	28.98	29.36
1.1/4"	11.5	37.31	37.69	38.1
1.1/2"	11.5	43.26	43.66	44.45
2"	11.5	55.17	55.58	56.36
2.1/2"	8	65.48	66.27	67.46



BSP		
公称直径 Nominal diameter ΦD	TPI	钻头直径 Drill diameter in mm
1/8"	28	8.8
1/4"	19	11.8
3/8"	19	15.3
1/2"	14	19
5/8"	14	21
3/4"	14	24.5
7/8"	14	28.3
1"	11	30.8
1.1/4"	11	39.5
1.1/2"	11	45
1.3/4"	11	51
2"	11	57



BSPT			
公称直径 Nominal diameter ΦD	TPI	铰孔后攻丝 Reaming back tapping	不铰孔攻丝 Unreamed tapping
1/16"	28	6.1	6.2
1/8"	28	8.1	8.2
1/4"	19	10.7	11
3/8"	19	14.2	14.5
1/2"	14	17.6	18
3/4"	14	23	23.5
1"	11	29	29.5
1.1/4"	11	37.5	38
1.1/2"	11	43.5	44
2"	11	54.9	55.5