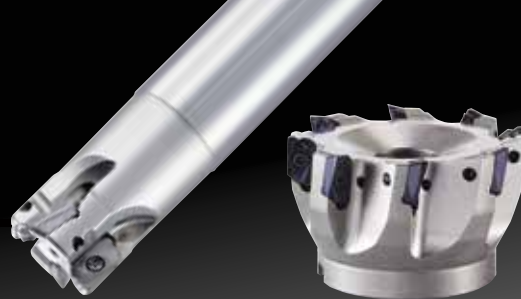


Phoenix PSE

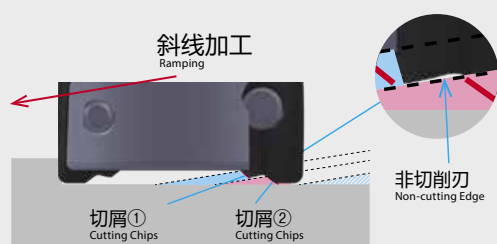
方肩铣刀系列
Shoulder Cutter Series

Phoenix Shoulder End mill



底部槽口的效果 Bottom notch

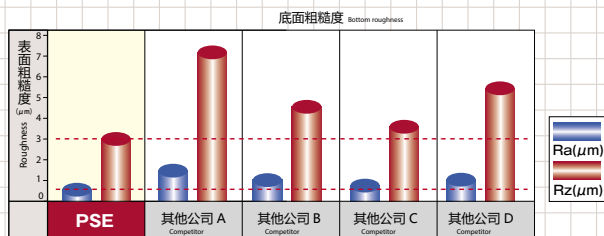
- 由于底部槽口，斜线加工或螺旋线加工时可将切屑分成两段。
The bottom notch breaks chips into 2 pieces when processing ramping and helical milling.
- 能抑制切屑堵塞·卷曲缠绕，可顺畅地进行加工。
Preventing chip jamming or wrapping and enabling smooth process.
- 槽口适用于 PSE11 R1.6 以下、PSE15 R2.5 以下。
The bottom notch is available in PSE11 R1.6 or less, and PSE15 R2.5 or less.



高精度刀片 High precision insert

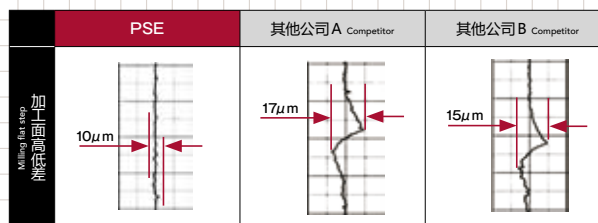
—底面粗糙度— Bottom roughness

工具: PSE11R032SS32-5S (ZDKT11T304SR-GM XP3035) 加工材料: S50C
Tool Work Material
切削条件: $V_c=180\text{m/min}$ $f_z=0.1\text{mm/t}$ $a_p=0.1\text{mm}$ $a_e=25.6\text{mm}$
Cutting Conditions
结果: $R_a: 0.5\mu\text{m}$ 以下 $R_z: 4\mu\text{m}$ 底面粗糙度可控制在 $4\mu\text{m}$ 以下。
Result: PSE showed an improvement at the bottom flat surface finish: $R_z 4\mu\text{m}$ and under.



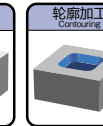
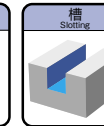
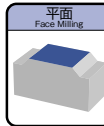
—侧面加工高低差异— Side Milling Offset

工具: PSE15R032SS32-3S (ZDKT150508SR-GM XP3035) 加工材料: S50C
Tool Work Material
切削条件: $V_c=180\text{m/min}$ $f_z=0.1\text{mm/t}$ $a_p=5\text{mm}$ $a_e=0.2\text{mm}$
Cutting Conditions
结果: 高低差距 $10\mu\text{m}$ (实际值) 及侧面加工高低差异上可发挥其性能。
Result: Showed improvement at side step machining as (measured) step as $10\mu\text{m}$



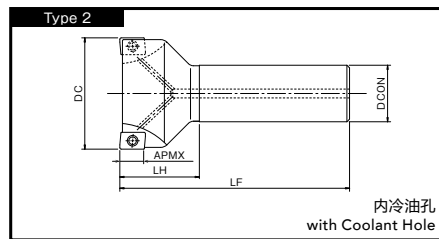
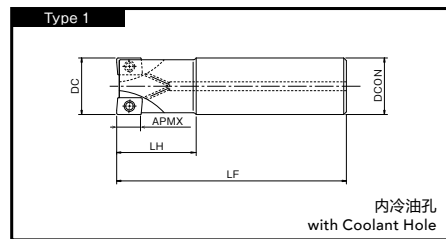
丰富的种类 Wide variety of inserts

断屑槽 Insert Breaker	NM	GL	SM	GM	GR	HR
用途 Application	铝合金·非铁金属加工 Aluminum alloy & Non-ferrous metal	低阻力加工 Low-resistance machining	耐热合金·难削材加工 Superalloy & Difficult-to-machine material	通用加工 Multi-purpose machining	断续加工·长悬长加工 Interrupted machining & Long overhang machining	高硬度材加工 High-hardened material



Specification

形状尺寸表 Specification



单位:mm Unit:mm

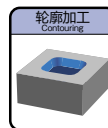
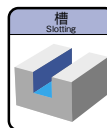
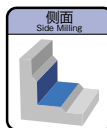
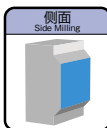
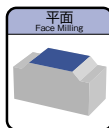
商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEPF	柄径 DCON	全长 LF	颈长 LH	APMX	重量 (kg)	适用刀片 Applicable Inserts	形状类型 Type
7801100	PSE11R016SS16-2S	16	2	16	90	25	10	0.12	①	1
7801121	PSE11R016SS16-2L	16	2	16	150	50	10	0.21		1
7801139	PSE11R017SS16-2L	★ 17	2	16	150	25	10	0.22		2
7801116	PSE11R018SS16-2S	★ 18	2	16	90	25	10	0.13		2
7801122	PSE11R018SS16-2L	★ 18	2	16	150	25	10	0.21		2
7801101	PSE11R020SS20-2S	20	2	20	100	30	10	0.21		1
7801115	PSE11R020SS20-3S	20	3	20	100	30	10	0.21		1
7801123	PSE11R020SS20-3L	20	3	20	160	60	10	0.34		1
7801140	PSE11R021SS20-3L	★ 21	3	20	160	30	10	0.35		2
7801117	PSE11R022SS20-3S	★ 22	3	20	110	30	10	0.24		2
7801124	PSE11R022SS20-3L	★ 22	3	20	160	30	10	0.35		2
7801102	PSE11R025SS25-3S	25	3	25	120	35	10	0.40		1
7801125	PSE11R025SS25-3L	25	3	25	170	70	10	0.57		1
7801104	PSE11R025SS25-4S	25	4	25	120	35	10	0.40		1
7801141	PSE11R026SS25-3L	★ 26	3	25	170	35	10	0.59		2
7801126	PSE11R028SS25-3L	★ 28	3	25	170	35	10	0.59		2
7801118	PSE11R028SS25-4S	★ 28	4	25	120	35	10	0.42		2
7801127	PSE11R030SS32-3L	30	3	32	190	90	10	1.01		1
7801119	PSE11R030SS32-4S	30	4	32	130	45	10	0.69		1
7801103	PSE11R032SS32-3S	32	3	32	130	45	10	0.73		1
7801128	PSE11R032SS32-3L	32	3	32	190	90	10	1.08		1
7801105	PSE11R032SS32-5S	32	5	32	125	40	10	0.70		1
7801142	PSE11R033SS32-3L	★ 33	3	32	190	35	10	1.09		2
7801129	PSE11R035SS32-3L	★ 35	3	32	190	35	10	1.11		2
7801120	PSE11R035SS32-5S	★ 35	5	32	130	35	10	0.75		2

★粗刃型 详细请参阅 p.89.
Reduced Shank Type See p.89 for details.

NEXT

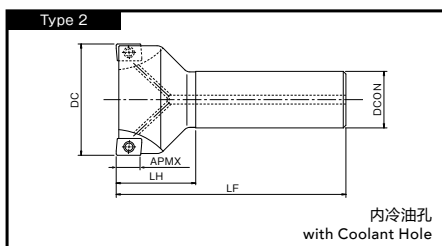
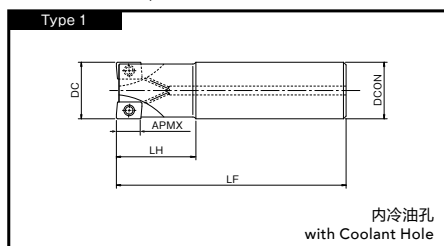
方肩铣刀 直柄型
Shoulder Cutter with Straight Shank

PSE SS



Specification

形状尺寸表 Specification

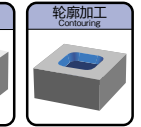
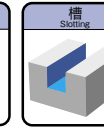
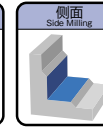
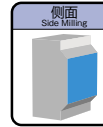
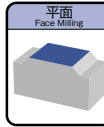
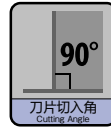


单位:mm Unit:mm

FROM

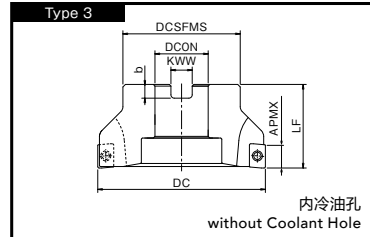
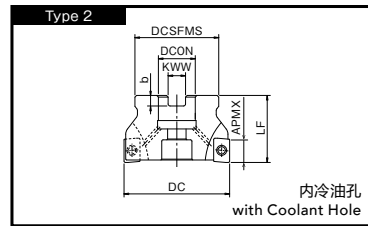
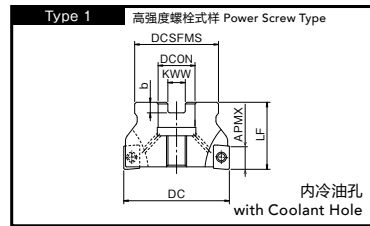
商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEPF	柄径 DCON	全长 LF	颈长 LH	APMX	重量 (kg)	适用刀片 Applicable Inserts	形状类型 Type
7801106	PSE15R025SS25-2S	25	2	25	120	35	14	0.38	②	1
7801133	PSE15R025SS25-2L	25	2	25	170	70	14	0.55		1
7801143	PSE15R026SS25-2L	★ 26	2	25	170	35	14	0.57		2
7801130	PSE15R028SS25-2S	★ 28	2	25	120	35	14	0.40		2
7801134	PSE15R028SS25-2L	★ 28	2	25	170	35	14	0.58		2
7801131	PSE15R030SS32-3S	30	3	32	130	45	14	0.67		1
7801135	PSE15R030SS32-3L	30	3	32	190	90	14	0.98		1
7801107	PSE15R032SS32-2S	32	2	32	130	45	14	0.70		1
7801111	PSE15R032SS32-3S	32	3	32	130	45	14	0.69		1
7801136	PSE15R032SS32-3L	32	3	32	190	90	14	1.04		1
7801144	PSE15R033SS32-3L	★ 33	3	32	190	45	14	1.07		2
7801132	PSE15R035SS32-3S	★ 35	3	32	130	35	14	0.72		2
7801137	PSE15R035SS32-3L	★ 35	3	32	190	45	14	1.08		2
7801108	PSE15R040SS32-3S	40	3	32	140	50	14	0.82		2
7801138	PSE15R040SS32-3L	40	3	32	190	45	14	1.11		2
7801112	PSE15R040SS32-4S	40	4	32	140	50	14	0.83		2
7801109	PSE15R050SS32-3S	50	3	32	130	45	14	0.88		2
7801113	PSE15R050SS32-5S	50	5	32	130	45	14	0.87		2
7801110	PSE15R063SS32-4S	63	4	32	130	45	14	1.04		2
7801114	PSE15R063SS32-6S	63	6	32	130	45	14	1.04		2

★粗刃型 详细请参阅 p.89.
Reduced Shank Type See p.89 for details.



Specification

■形状尺寸表 Specification

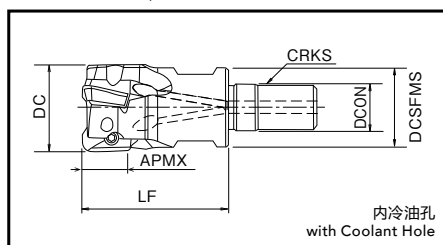


单位:mm Unit:mm

商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEFP	刀具高度 LF	刀盘径 DCSFMS	孔径 DCON	端面键槽 Key Slot		APMX	重量 (kg)	适用刀片 Applicable Inserts	形状类型 Type
							宽度 KWW	深度 b				
7801000	PSE11R040M16-4	40	4	40	38	16	8.4	5.6	10	0.21	①	1
7801004	PSE11R040M16-6	40	6	40	38	16	8.4	5.6	10	0.22		1
7801001	PSE11R050M22-5	50	5	40	45	22	10.4	6.3	10	0.30		1
7801005	PSE11R050M22-7	50	7	40	45	22	10.4	6.3	10	0.33		1
7801002	PSE11R063M22-6	63	6	40	50	22	10.4	6.3	10	0.50		2
7801006	PSE11R063M22-8	63	8	40	50	22	10.4	6.3	10	1.07		2
7801020	PSE11R080M25.4-7	80	7	50	60	25.4	9.5	6	10	1.05		2
7801003	PSE11R080M27-7	80	7	50	60	27	12.4	7	10	1.04		2
7801021	PSE11R080M25.4-10	80	10	50	60	25.4	9.5	6	10	1.04		2
7801007	PSE11R080M27-10	80	10	50	60	27	12.4	7	10	1.03		2
7801008	PSE15R040M16-3	40	3	40	38	16	8.4	5.6	14	0.19	②	1
7801014	PSE15R040M16-4	40	4	40	38	16	8.4	5.6	14	0.19		1
7801009	PSE15R050M22-3	50	3	40	45	22	10.4	6.3	14	0.30		1
7801015	PSE15R050M22-5	50	5	40	45	22	10.4	6.3	14	0.28		1
7801010	PSE15R063M22-4	63	4	40	50	22	10.4	6.3	14	0.47		2
7801016	PSE15R063M22-6	63	6	40	50	22	10.4	6.3	14	0.46		2
7801022	PSE15R080M25.4-5	80	5	50	60	25.4	9.5	6	14	1.00		2
7801011	PSE15R080M27-5	80	5	50	60	27	12.4	7	14	0.99		2
7801025	PSE15R080M25.4-8	80	8	50	60	25.4	9.5	6	14	1.01		2
7801017	PSE15R080M27-8	80	8	50	60	27	12.4	7	14	1.00		2
7801023	PSE15R100M31.7-7	100	7	50	70	31.75	12.7	8	14	1.45		3
7801012	PSE15R100M32-7	100	7	50	70	32	14.4	8	14	1.58		2
7801026	PSE15R100M31.7-10	100	10	50	70	31.75	12.7	8	14	1.50		3
7801018	PSE15R100M32-10	100	10	50	70	32	14.4	8	14	1.63		2
7801024	PSE15R125M38.1-8	125	8	63	90	38.1	15.9	10	14	3.13		3
7801027	PSE15R125M38.1-11	125	11	63	90	38.1	15.9	10	14	3.15		3

Specification

■形状尺寸表 Specification



PSE 螺纹安装型 Screw Fit Type

单位:mm Unit:mm

商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEP	装夹直径 DCON	螺纹尺寸 CRKS	扳手尺寸 Spanner Size	全长 LF	端面直径 DCSFMS	APMX	重量 (kg)	适用刀片 Applicable Inserts
7801600	PSE11R016SF8-2	16	2	8.5	M8	10	27	14.5	10	0.03	①
7801612	PSE11R017SF8-2	★ 17	2	8.5	M8	10	27	14.5	10	0.03	
7801613	PSE11R018SF8-2	★ 18	2	8.5	M8	10	27	14.5	10	0.03	
7801601	PSE11R020SF10-3	20	3	10.5	M10	14	33	18	10	0.06	
7801614	PSE11R021SF10-3	★ 21	3	10.5	M10	14	33	18	10	0.06	
7801615	PSE11R022SF10-3	★ 22	3	10.5	M10	14	33	18	10	0.06	
7801602	PSE11R025SF12-4	25	4	12.5	M12	17	35	23	10	0.10	
7801616	PSE11R026SF12-3	★ 26	3	12.5	M12	17	35	23	10	0.10	
7801603	PSE11R028SF12-4	★ 28	4	12.5	M12	17	35	23	10	0.11	
7801604	PSE11R032SF16-5	32	5	17	M16	22	40	28	10	0.19	
7801617	PSE11R033SF16-3	★ 33	3	17	M16	22	40	28	10	0.20	
7801605	PSE11R035SF16-5	★ 35	5	17	M16	22	40	28	10	0.20	
7801606	PSE11R040SF16-6	40	6	17	M16	22	40	28	10	0.22	②
7801607	PSE15R025SF12-2	25	2	12.5	M12	17	35	23	14	0.09	
7801618	PSE15R026SF12-2	★ 26	2	12.5	M12	17	35	23	14	0.10	
7801608	PSE15R028SF12-2	★ 28	2	12.5	M12	17	35	23	14	0.10	
7801609	PSE15R032SF16-3	32	3	17	M16	22	40	28	14	0.17	
7801619	PSE15R033SF16-3	★ 33	3	17	M16	22	40	28	14	0.18	
7801610	PSE15R035SF16-3	★ 35	3	17	M16	22	40	28	14	0.18	
7801611	PSE15R040SF16-4	40	4	17	M16	22	40	28	14	0.20	

刀具夹具, 刀柄请参考 P.190~192

See p.190-p.192 for shank holders.

PSE 粗刃型
Reduced Shank Type

粗刃型的刀具外径大于柄径, 使其在模具零件等的深壁加工、型腔加工中最为适合。

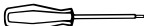
The outer diameter of the reduced shank type is larger than the shank diameter, making it highly effective in the processing of die and mold applications that require vertical wall milling or pocketing.

例
Example

Accessories

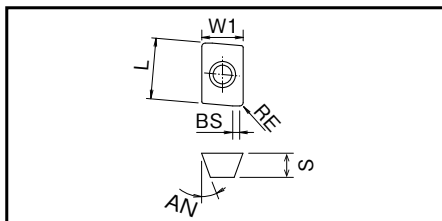
■ 零件 Accessories

	商品号 EDP No.	名称 Designation	适用刀片 Applicable Inserts		适用刀具 Applicable Cutters
 固定螺丝 Clamping Screw	7808107	FS25656P (Torx 8IP)	①	ZD*T11...	PSE SS/SF $\phi 16\sim 40$
	7808109	FS25673P (Torx 8IP)			PSE BORE $\phi 40\sim 80$
	7808115	FS35686P (Torx 15IP)	②	ZDKT15...	PSE SS/SF $\phi 25\sim 63$ PSE BORE $\phi 40\sim 125$
 高强度螺栓 Power Screw	7808150	PS0830 (M8×30)	①	ZD*T11...	PSE BORE $\phi 40$
			②	ZDKT15...	
	7808151	PS1031 (M10×31)	①	ZD*T11...	PSE BORE $\phi 50$
			②	ZDKT15...	

	商品号 EDP No.	名称 Designation	适用刀片 Applicable Inserts		适用刀具 Applicable Cutters
 扳手 Wrench	7808225	8IP-D (Torx 8IP)	①	ZD*T11...	PSE SS/SF $\phi 16\sim 40$ PSE BORE $\phi 40\sim 80$
	7808228	15IP-D (Torx 15IP)	②	ZDKT15...	PSE SS/SF $\phi 25\sim 63$ PSE BORE $\phi 40\sim 125$

扳手请另购。 The wrenches are sold separately from the cutters.

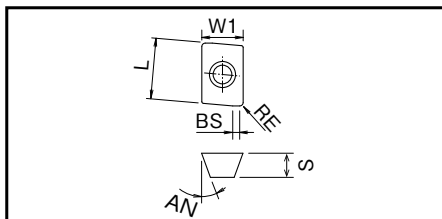
Inserts



■ 适用刀片 Inserts

名称 Designation	切削刃数 No. of Cutting Edges	刀片尺寸 Insert Size					硬质合金 Uncoated	
		L×W1	厚度 S	后角 AN	RE	副切 刃 BS	CK010	
①	ZDKT11T302FR-NM	2	11×6.8	3.8	15°	0.2	2.0	7811048
	ZDKT11T304FR-NM	2	11×6.8	3.8	15°	0.4	1.8	7811049
	ZDKT11T308FR-NM	2	11×6.8	3.8	15°	0.8	1.4	7811023
	ZDHT11T302FR-NM	2	11×6.8	3.5	15°	0.2	2.0	7811010
	ZDHT11T304FR-NM	2	11×6.8	3.5	15°	0.4	1.8	7811024
	ZDHT11T308FR-NM	2	11×6.8	3.5	15°	0.8	1.4	7811014
	ZDHT11T312FR-NM	2	11×6.8	3.5	15°	1.2	1.4	7811015
	ZDHT11T316FR-NM	2	11×6.8	3.5	15°	1.6	1.4	7811017
	ZDHT11T320FR-NM	2	11×6.8	3.5	15°	2.0	1.4	7811018
	ZDHT11T325FR-NM	2	11×6.8	3.5	15°	2.5	1.4	7811019
	ZDHT11T332FR-NM	2	11×6.8	3.5	15°	3.2	0.8	7811020
	ZDHT11T340FR-NM	2	11×6.8	3.5	15°	4.0	—	7811021
	ZDHT11T350FR-NM	2	11×6.8	3.5	15°	5.0	—	7811022
	ZDKT11T304SR-GL	2	11×6.8	3.8	15°	0.4	1.8	
	ZDKT11T308SR-GL	2	11×6.8	3.8	15°	0.8	1.4	
	ZDKT11T312SR-GL	2	11×6.8	3.8	15°	1.2	1.0	
	ZDKT11T320SR-GL	2	11×6.8	3.8	15°	2.0	2.1	
	ZDKT11T332SR-GL	2	11×6.8	3.8	15°	3.2	1.5	
	ZDKT11T304SR-GM	2	11×6.8	3.8	15°	0.4	1.8	
	ZDKT11T308SR-GM	2	11×6.8	3.8	15°	0.8	1.4	
	ZDKT11T312SR-GM	2	11×6.8	3.8	15°	1.2	1.0	
	ZDKT11T320SR-GM	2	11×6.8	3.8	15°	2.0	2.1	
	ZDKT11T325SR-GM	2	11×6.8	3.8	15°	2.5	1.6	
	ZDKT11T330SR-GM	2	11×6.8	3.8	15°	3.0	1.5	
	ZDKT11T340SR-GM	2	11×6.8	3.8	15°	4.0	—	
	ZDKT11T308SR-GR	2	11×6.8	3.8	15°	0.8	1.4	
	ZDKT11T308SR-HR	2	11×6.8	3.8	15°	0.8	1.4	
	ZDKT11T304ER-SM	2	11×6.8	3.8	15°	0.4	1.8	
	ZDKT11T308ER-SM	2	11×6.8	3.8	15°	0.8	1.4	
	ZDKT11T312ER-SM	2	11×6.8	3.8	15°	1.2	1.1	
	ZDKT11T316ER-SM	2	11×6.8	3.8	15°	1.6	0.8	
	ZDKT11T320ER-SM	2	11×6.8	3.8	15°	1.2	0.3	
	ZDKT11T325ER-SM	2	11×6.8	3.8	15°	2.5	—	
	ZDKT11T332ER-SM	2	11×6.8	3.8	15°	3.2	—	
	ZDKT11T340ER-SM	2	11×6.8	3.8	15°	4.0	—	

Inserts



FROM

■ 适用刀片 Inserts

名称 Designation		切削刃数 No. of Cutting Edges	刀片尺寸 Insert Size					硬质合金 Uncoated	
			L×W1	厚度 S	后角 AN	RE	副切削刃 BS		
								CK010	
②	ZDKT150508FR-NM	2	15×9.3	5.56	15°	0.8	1.6	7811046	
	ZDKT150508SR-GL	2	15×9.3	5.56	15°	0.8	1.6		
	ZDKT150508SR-GM	2	15×9.3	5.56	15°	0.8	1.6		
	ZDKT150512SR-GM	2	15×9.3	5.56	15°	1.2	1.2		
	ZDKT150516SR-GM	2	15×9.3	5.56	15°	1.6	0.8		
	ZDKT150520SR-GM	2	15×9.3	5.56	15°	2.0	2.1		
	ZDKT150530SR-GM	2	15×9.3	5.56	15°	3.0	1.9		
	ZDKT150540SR-GM	2	15×9.3	5.56	15°	4.0	1.1		
	ZDKT150550SR-GM	2	15×9.3	5.56	15°	5.0	0.7		
	ZDKT150508SR-GR	2	15×9.3	5.56	15°	0.8	1.6		
	ZDKT150508SR-HR	2	15×9.3	5.56	15°	0.8	1.6		
	ZDKT150508ER-SM	2	15×9.3	5.56	15°	0.8	1.6		

· 使用圆弧角 $R = R2$ 以上的刀片时，需要调整刀体的圆弧角部
如果有需要修正，请联系我们进行受注品对应。

· When using an insert with a corner radius of $R2$ or greater, the corner of the cutter body must be modified.
Please contact us for modification service if necessary.



单位:mm Unit:mm

	涂层种类 Grade of Coated Materials									
	XC3020	XP3025	XC3030	XP3035	XP2025	XP2040	XC1015	XC5035	XC5040	XP6015
	7827057	7828057	7825057	7814057	7826057	7813057				
	7827028	7828028	7825029	7814029	7826029	7813028	7812029			
				7814077		7813077				
				7814078		7813078				
				7814079		7813079				
				7814080		7813080				
				7814081		7813081				
				7814082		7813082				
	7827058	7828058	7825058	7814058		7813058	7812058			
										7824036
								7815056	7816056	

■加工材料推荐

Recommended Materials by Insert Type

◎第一推荐材料 Best

○第二推荐材料 Good

刀片材质 Insert Grades	断屑槽 Insert Breaker	切削油剂 Coolant	P	M	K	N	S	H
CK010	NM	有 Wet				◎		
XC3020	GL GM GR	无 Dry	◎		○			
XP3025	GL GM GR	有 Wet	◎		○			
XC3030	GL GM GR	无 Dry	◎		○			
XP3035	GL GM GR	无 Dry	◎	○	○			
		有 Wet						

刀片材质 Insert Grades	断屑槽 Insert Breaker	切削油剂 Coolant	P	M	K	N	S	H
XP2025	GL GM	有 Wet	○	◎			○	
XP2040	GL GM GR	无 Dry	○	○				○
		有 Wet	○	◎			○	
XC1015	GM GR	无 Dry			◎			
XC5035	SM	无 Dry		◎				
		有 Wet		○			○	
XC5040	SM	有 Wet		○			◎	
XP6015	HR	无 Dry	○		○			◎

NM: 铝合金用 GL: 轻切削用 GM: 中切削用 GR: 重切削用 HR: 高硬度钢用 SM: 耐热合金用

NM: Aluminum Alloy GL: Light Cutting GM: Middle Cutting GR: Heavy Cutting HR: High Hardened Steel SM: Heat Resistance Alloy

■切削条件基准表 Cutting Conditions

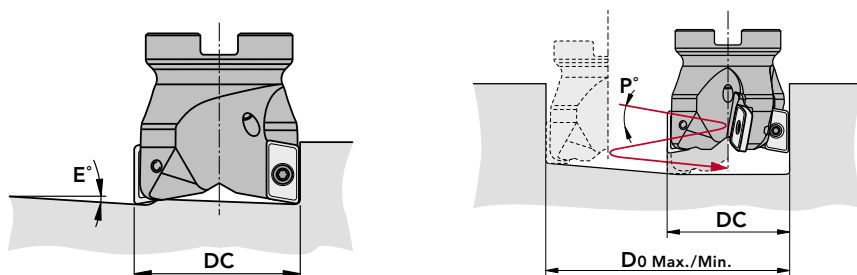
加工材料 Work Material		抗拉强度·硬度 Tensile Strength·Hardness	刀片尺寸 Insert Size							
			ZD*T11...				ZDKT15...			
			切削深度 ap:10mm 切削宽度 ae:0.2D		切削深度 ap:3mm 切削宽度 ae:1.0D		切削深度 ap:14mm 切削宽度 ae:0.2D		切削深度 ap:5mm 切削宽度 ae:1.0D	
			切削速度 Vc (m/min) Cutting Speed	每刃进给量 fz (mm/t) Feed per Tooth	切削速度 Vc (m/min) Cutting Speed	每刃进给量 fz (mm/t) Feed per Tooth	切削速度 Vc (m/min) Cutting Speed	每刃进给量 fz (mm/t) Feed per Tooth	切削速度 Vc (m/min) Cutting Speed	每刃进给量 fz (mm/t) Feed per Tooth
P	软钢、低碳素钢 Mild Steel, Carbon Steel (SS400, S10C)	~180HB	180 (100 ~ 250)	0.25 (0.2 ~ 0.5)	180 (100 ~ 250)	0.12 (0.05 ~ 0.2)	180 (100 ~ 250)	0.3 (0.2 ~ 0.6)	180 (100 ~ 250)	0.15 (0.05 ~ 0.25)
	碳素钢、合金钢 Carbon Steel, Alloy Steel (S50C, SCM440)	~280HB	180 (100 ~ 250)	0.2 (0.15 ~ 0.4)	180 (100 ~ 250)	0.11 (0.05 ~ 0.2)	180 (100 ~ 250)	0.25 (0.15 ~ 0.5)	180 (100 ~ 250)	0.12 (0.05 ~ 0.2)
	模具钢 Die Steel (SKD11, SKD61)	~280HB	150 (80 ~ 200)	0.2 (0.15 ~ 0.4)	150 (80 ~ 200)	0.1 (0.05 ~ 0.18)	150 (80 ~ 200)	0.25 (0.15 ~ 0.5)	150 (80 ~ 200)	0.12 (0.05 ~ 0.2)
M	不锈钢(干式) Stainless Steel (Dry) (SUS304, SUS420)	~250HB	150 (80 ~ 200)	0.18 (0.15 ~ 0.4)	150 (80 ~ 200)	0.1 (0.05 ~ 0.18)	150 (80 ~ 200)	0.2 (0.15 ~ 0.45)	150 (80 ~ 200)	0.12 (0.05 ~ 0.2)
	不锈钢(湿式) Stainless Steel (Wet) (SUS304, SUS420)	~250HB	80 (60 ~ 120)	0.18 (0.15 ~ 0.4)	80 (60 ~ 120)	0.1 (0.05 ~ 0.18)	80 (60 ~ 120)	0.2 (0.15 ~ 0.45)	80 (60 ~ 120)	0.12 (0.05 ~ 0.2)
K	铸铁 Cast Iron (FC250)	~350N/mm ²	180 (100 ~ 300)	0.25 (0.15 ~ 0.5)	180 (100 ~ 300)	0.12 (0.05 ~ 0.2)	180 (100 ~ 300)	0.3 (0.2 ~ 0.6)	180 (100 ~ 300)	0.15 (0.05 ~ 0.25)
	球墨铸铁 Ductile Cast Iron (FCD400)	~800N/mm ²	180 (100 ~ 250)	0.15 (0.1 ~ 0.4)	180 (100 ~ 250)	0.12 (0.05 ~ 0.2)	180 (100 ~ 250)	0.2 (0.15 ~ 0.5)	180 (100 ~ 250)	0.15 (0.05 ~ 0.25)
N	铝合金 Aluminum Alloy	~13%Si	300 (200 ~ 1,500)	0.3 (0.2 ~ 0.5)	300 (200 ~ 1,500)	0.15 (0.1 ~ 0.25)	300 (200 ~ 1,500)	0.35 (0.2 ~ 0.6)	300 (200 ~ 1,500)	0.18 (0.1 ~ 0.3)
S	超耐热合金(湿式) Superalloy (Wet) (Inconel 718)	—	35 (25 ~ 60)	0.15 (0.1 ~ 0.3)	35 (25 ~ 60)	0.1 (0.05 ~ 0.15)	35 (25 ~ 60)	0.2 (0.1 ~ 0.3)	35 (25 ~ 60)	0.12 (0.05 ~ 0.15)
	钛合金(湿式) Titanium Alloy (Wet) (Ti-6Al-4V)	—	40 (30 ~ 120)	0.18 (0.1 ~ 0.35)	40 (30 ~ 120)	0.1 (0.08 ~ 0.25)	40 (30 ~ 120)	0.22 (0.1 ~ 0.35)	40 (30 ~ 120)	0.12 (0.08 ~ 0.25)
H	预硬钢 Pre-hardened Steel (NAK80)	40~43HRC	100 (40 ~ 150)	0.18 (0.1 ~ 0.3)	90 (40 ~ 150)	0.1 (0.08 ~ 0.2)	100 (40 ~ 150)	0.22 (0.1 ~ 0.35)	90 (40 ~ 150)	0.12 (0.08 ~ 0.25)
	铸件用钢 Steel for Die Casting (DAC-MAGIC, DH31)	43~48HRC	80 (40 ~ 120)	0.12 (0.08 ~ 0.2)	70 (40 ~ 120)	0.08 (0.06 ~ 0.15)	80 (40 ~ 120)	0.15 (0.08 ~ 0.25)	70 (40 ~ 120)	0.1 (0.06 ~ 0.2)
	调质钢 Hardened Steel (SKD11)	50~55HRC	60 (40 ~ 90)	0.1 (0.05 ~ 0.2)	50 (40 ~ 90)	0.06 (0.05 ~ 0.1)	60 (40 ~ 90)	0.12 (0.05 ~ 0.2)	50 (40 ~ 90)	0.08 (0.05 ~ 0.12)

· 槽铣时推荐使用粗牙型。 · 上述条件表为短柄型的推荐参数。

· 上述数值是根据切削速度的标准数值, 请根据加工环境适当调整。

· Course pitch is recommended for Slotting. · Above recommended speed is for Short Shank Type.

· The above cutting conditions are to be used as general guidelines. Adjustments may be necessary depending on actual cutting condition.



Maximum Ramping (E) & Helical (P) Angle

■斜线加工·螺旋线加工时的最大倾斜角(E) Maximum Ramping (E) & Helical (P) Angle

刀片尺寸 Insert Size	ZD*T11...				ZDKT15...			
	倾斜角 Ramping Angle E°	螺旋线开孔 Helical Milling (mm)		螺旋角度 Helical Angle P°	倾斜角 Ramping Angle E°	螺旋线开孔 Helical Milling (mm)		螺旋角度 Helical Angle P°
		最小径 Do Min.	最大径 Do Max.			最小径 Do Min.	最大径 Do Max.	
16	10.8	18	29	9.5	—	—	—	—
17	9.8	22	31	7.0	—	—	—	—
18	9.8	22	33	7.0	—	—	—	—
20	9.8	30	37	7.0	—	—	—	—
21	8.5	32	39	4.5	—	—	—	—
22	7.5	34	41	4.5	—	—	—	—
25	7.5	40	47	4.5	9.5	37	48	7.5
26	6.8	42	49	4.2	8.3	38	50	6.0
28	6.3	46	53	3.9	8.3	39	54	5.6
30	5.5	50	57	3.4	7.4	43	58	5.3
32	4.8	53	61	3.2	6.8	47	62	5.0
33	4.5	56	63	3.0	6.3	49	64	4.2
35	3.2	60	67	2.5	5.9	53	68	3.8
40	2.9	72	77	2.2	5.1	63	78	3.2
50	2.2	93	98	1.7	2.5	86	98	2.5
63	1.8	118	123	1.5	2.5	111	124	1.5
80	1.4	152	157	1.0	2.0	147	158	1.3
100	—	—	—	—	1.5	190	198	1.1
125	—	—	—	—	0.9	240	248	0.9

Cutting Data

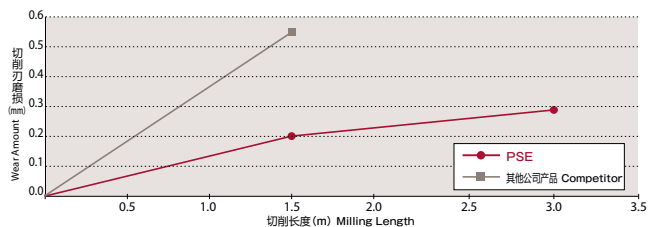
■加工数据 Cutting Data

Inconel 718 (45HRC) 的长寿命加工 Long tool life on Inconel 718

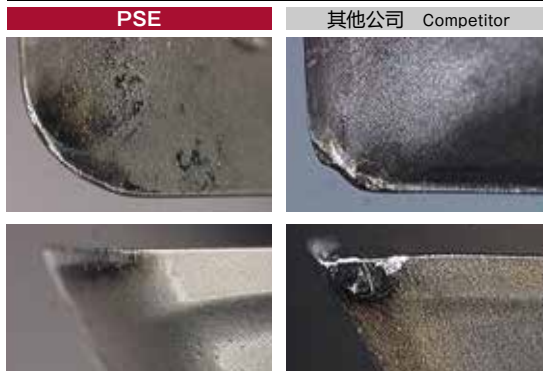
使用工具 Tool	PSE11R032SS32-5S ($\phi 32 \times 5$ 刀)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308ER-SM (XC5040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	Inconel 718 (45HRC)	
切削速度 Cutting Speed	30m/min (298min ⁻¹)	25m/min (248min ⁻¹)
进给速度 Feed	120mm/min (0.08mm/t)	80mm/min (0.08mm/t)
切削深度 Depth of Cut	a _p =1mm a _e =20mm	a _p =1mm a _e =20mm
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

与以往刀具相比，切削参数提高50%后仍可继续加工，耐久性提高2倍，且为正常磨损，仍可继续加工。

Our product was able to mill at conditions that were 50% higher than those for competitors' tools. It provided double the durability with normal wear and was able to continue milling.

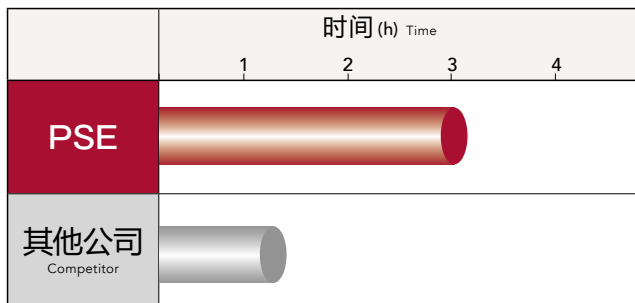


加工1.5m 后照片 After 1.5m of milling



NAK80 (40HRC) 的长寿命加工 Long tool life on NAK80 (40HRC)

使用工具 Tool	PSE11R020SS20-3S ($\phi 20 \times 3$ 刀)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308SR-GL (XP2040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	NAK80 (40HRC)	
切削速度 Cutting Speed	130m/min (2,070min ⁻¹)	
进给速度 Feed	1,400mm/min (0.23mm/t)	
切削深度 Depth of Cut	a _p =0.3mm a _e =10mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	立式加工中心 (BT50) Vertical Machining Center	

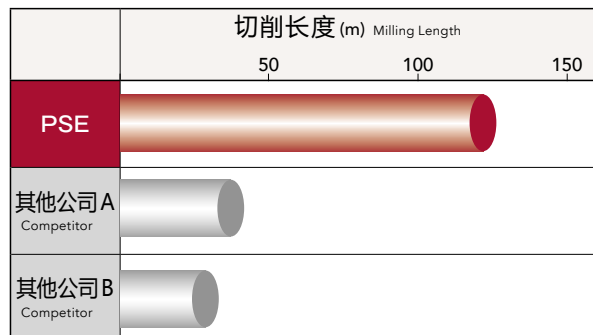


在相同的切削条件下，其他公司的产品已经发生崩损，但是PSE没有发生任何的崩损，仍可稳定加工，耐久性也约为2倍。

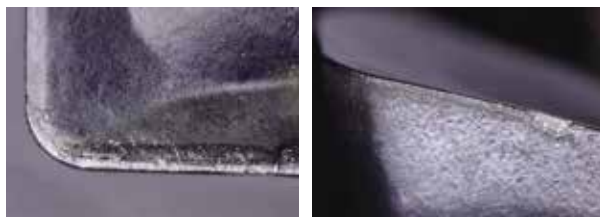
The competitor's tool chipped, but under the same conditions, the PSE did not exhibit any chipping, performed stably, and provided approximately double the durability.

粗加工的长寿命化 Long tool life in roughing

使用工具 Tool	PSE15R032SS32-3S ($\phi 32 \times 3$ 刃)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT150508SR-GM (XC3030)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	S50C	
切削速度 Cutting Speed	180m/min (1,790min ⁻¹)	
进给速度 Feed	1,000mm/min (0.2mm/t)	
切削深度 Depth of Cut	ap=3mm ae=25.2mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	卧式加工中心(BT50) Horizontal Machining Center	



PSE 加工128m后的照片 Photo after milling 128m



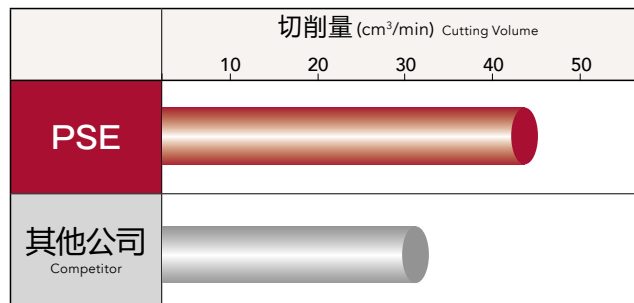
与其他公司产品相比，耐磨损性能更强。

抑制磨损，可大幅提高使用寿命。

In comparison to the competitors, the PSE (XC3030) has much great wear resistance, which leads to longer tool life.

机械零部件的正面加工 Face milling of machine parts

使用工具 Tool	PSE15R100M31.7-10 ($\phi 100 \times 10$ 刃)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT150508SR-GM (XP2040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	SUS304	
切削速度 Cutting Speed	150m/min (478min ⁻¹)	
进给速度 Feed	720mm/min (0.15mm/t)	500mm/min (0.15mm/t)
切削深度 Depth of Cut	ap=1mm ae=60mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	卧式加工中心(BT40) Horizontal Machining Center	
切削量 Cutting Volume	43.2cm ³ /min	30cm ³ /min



断续加工等孔较多的正面加工情况下，可以得到比其他公司产品1.4倍的效率。而且能进一步抑制发热，与其他公司产品相比，可抑制工件变形，改善对后序加工的影响。

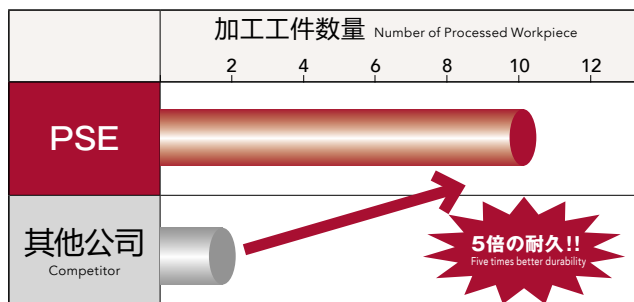
This process consisted of intermittent face milling a surface with multiple holes, and our product was able to mill with 1.4 times the efficiency of the competitor's tool. Moreover, it inhibited the generation of heat, reducing the distortion of the workpiece as well as the effects passed on to the subsequent process.

Cutting Data

■加工数据 Cutting Data

喷嘴的槽加工 Groove milling of a nozzle piece

使用工具 Tool	PSE11R020SS20-3S ($\phi 20 \times 3$ 刃)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308ER-SM (XC5040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	SUS630	
切削速度 Cutting Speed	160m/min (2,548min ⁻¹)	
进给速度 Feed	510mm/min (0.07mm/t)	
切削深度 Depth of Cut	ap=2mm ae=20mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	复合加工机 Compound Machine	

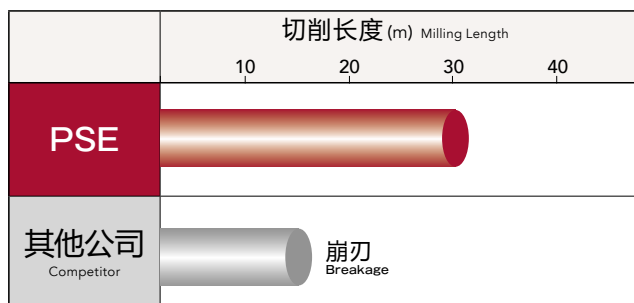


不锈钢的槽加工案例。其他公司的产品由于切屑堵塞，过早发生崩刃而无法加工。而PSE切屑由于排出稳定，可加工10个工件，性能非常好。

This process consists of groove milling in stainless steel. The competitor's tool caused the chips to jam, resulting in premature breakage of the tool. The PSE, in contrast, evacuated chips in a stable manner and could mill 10 workpieces, a significant improvement.

容器长寿命加工 Long life milling of a chamber

使用工具 Tool	PSE15R080M25.4-8 ($\phi 80 \times 8$ 刃)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT150508SR-GM (XP2040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	SUS304	
切削速度 Cutting Speed	180m/min (717min ⁻¹)	
进给速度 Feed	700mm/min (0.12mm/t)	
切削深度 Depth of Cut	ap=1mm ae=60mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	卧式加工中心(BT50) Horizontal Machining Center	



不锈钢干式加工案例。型腔开口部的正面加工，在相同条件下，传统的工具过早崩刃，不可继续加工，而PSE可得到2倍以上的耐久性。

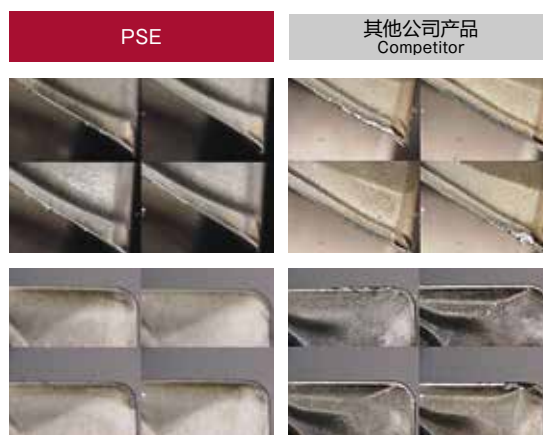
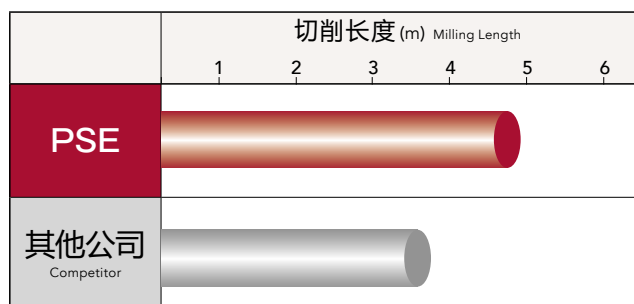
This process consisted of dry milling in stainless steel. A competitor's tool and the PSE were compared in face milling the surface of a chamber opening under identical conditions. The competitor's tool broke prematurely, and was not able to continue. However, the PSE was able to attain more than double the durability.

飞机零部件粗加工 Rough milling of aircraft parts

使用工具 Tool	PSE11R025SS25-4S ($\phi 25 \times 4$ 刀)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308ER-SM(XC5040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	β -Titanium alloy	
切削速度 Cutting Speed	40m/min (510min ⁻¹)	
每刃进给量 Feed per Tooth	160mm/min (0.08mm/t)	
切削深度 Depth of Cut	ap=5mm ae=10mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	卧式加工中心(BT40) Horizontal Machining Center	

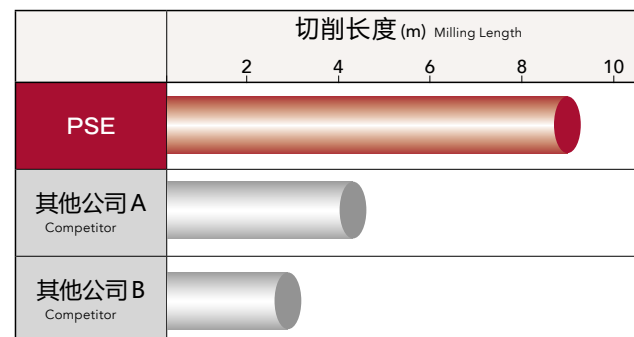
飞机零部件的粗加工案例，在同等条件下的加工比较。其他公司产品发生崩刃，但是PSE为正常磨损，为其他公司产品耐久性的1.5倍。

A competitor's product and the PSE were compared in the rough milling of aircraft parts under identical conditions. The competitor's product chipped, but the PSE wore normally and attained 1.5 times the durability.



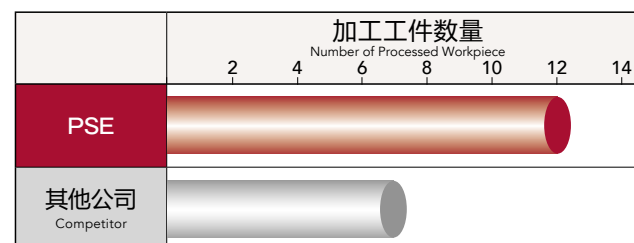
社内测试 DH31S (48HRC) Internal test DH31S (48HRC)

使用工具 Tool	PSE11R032SS32-3S ($\phi 32 \times 3$ 刀)	其他公司 A、B Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308SR-HR (XP6015)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	DH31S (48HRC)	
切削速度 Cutting Speed	50m/min (497min ⁻¹)	
进给速度 Feed	150mm/min (0.1mm/t)	
切削深度 Depth of Cut	ap=5mm ae=1mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	立式加工中心(BT40) Vertical Machining Center	



熔覆部的稳定加工 Stable machining of padding

使用工具 Tool	PSE15R032SS32-3S ($\phi 32 \times 3$ 刀)	其他公司 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308SR-HR (XP6015)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	熔覆部 (56HRC) Padding	
切削速度 Cutting Speed	30m/min (300min ⁻¹)	
进给速度 Feed	110mm/min (0.12mm/t)	
切削深度 Depth of Cut	ap=11mm ae=5~20mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	立式加工中心(BT50) Vertical Machining Center	



其他公司的刀片大多易磨损，寿命不稳定。

PSE(XP6015)的寿命稳定，约可提高1.5倍的寿命。

The competitor tool exhibited frequent insert breakage, which is an indicator for instability. OSG's PSE (XP6015), on the other hand, demonstrated consistent performance with 1.7 times the durability versus the competition.