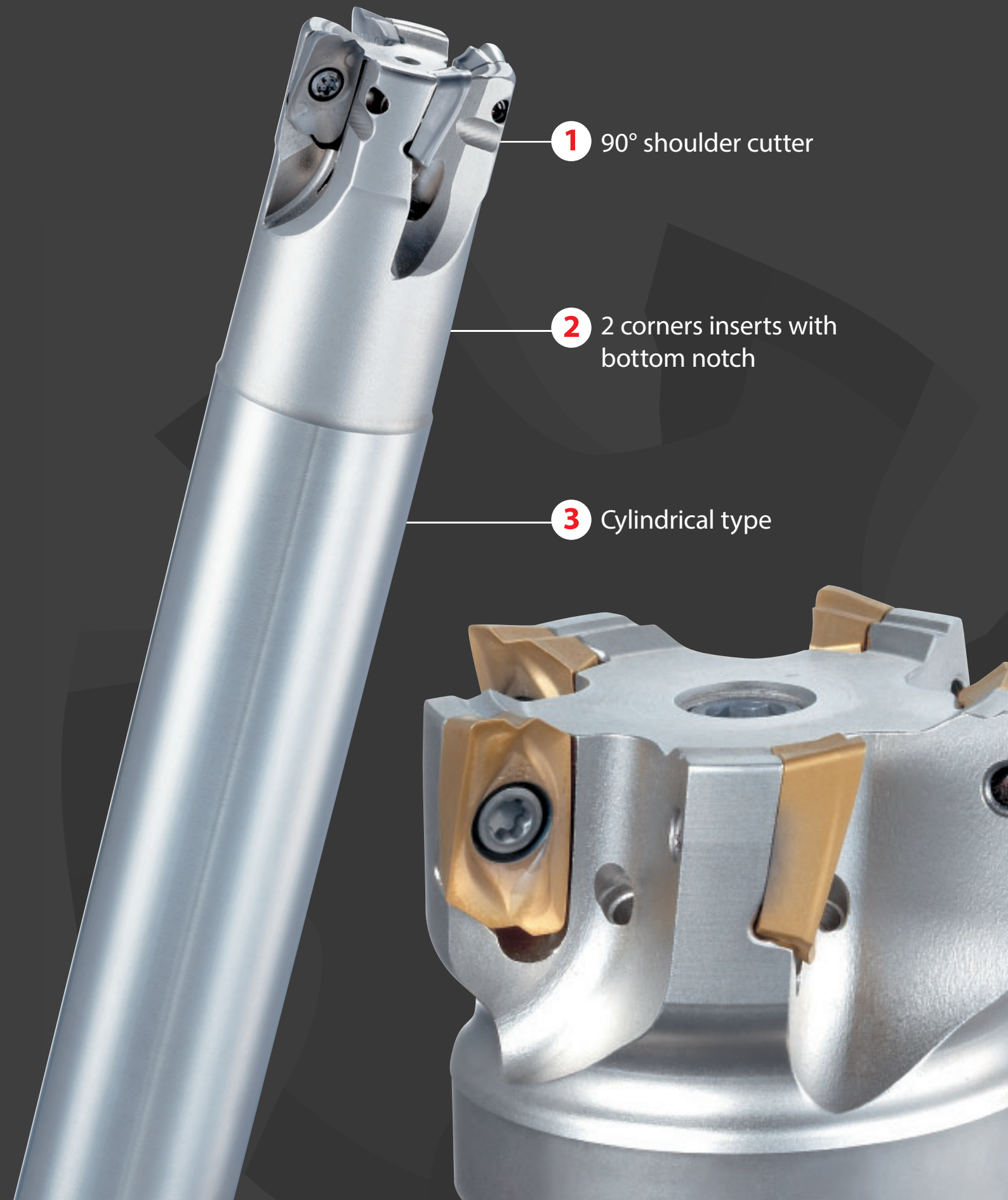
Shoulder & roughing end mill series

PSE • PSEL

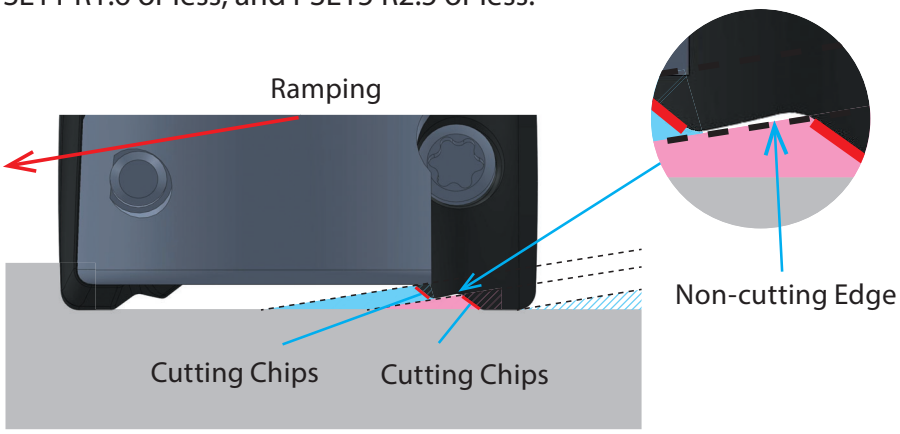
Volume 2

KEY FEATURES: PHOENIX PSE



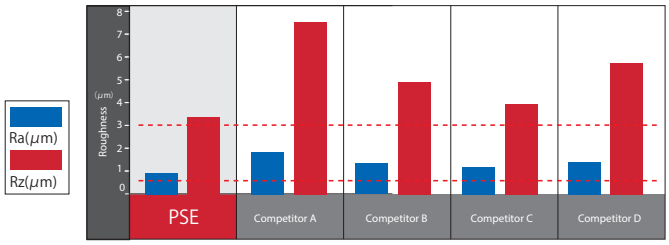
Bottom notch

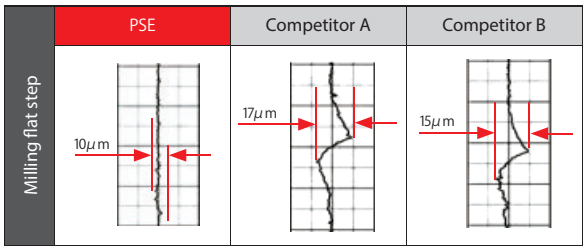
- The bottom notch breaks chips into 2 pieces when processing ramping and helical milling.
- Preventing chip jamming or wrapping and enabling smooth process.
- The bottom notch is available in PSE11 R1.6 or less, and PSE15 R2.5 or less.



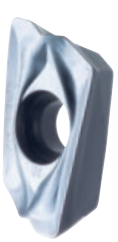
High precision insert

	Bottom roughness	Side Milling offset
Tool	PSE11R032SS32-5S	PSE15R032SS32-3S
Insert Grade	ZDKT11T304SR-GM XP3035	ZDKT150508SR-GM XP3035
Work Material	S50C	
Cutting Conditions	Vc=180m/min fz=0,1mm/t ap=0,1mm ae=25,6mm	Vc=180m/min fz=0,1mm/t ap=5mm ae=0,2mm
Result	PSE showed an improvement at the bottom flat surface finish Rz 4µm and under.	Showed improvement at side step machining as (measured) step as 10 µm





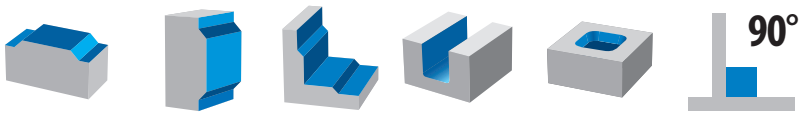
Wide variety of inserts

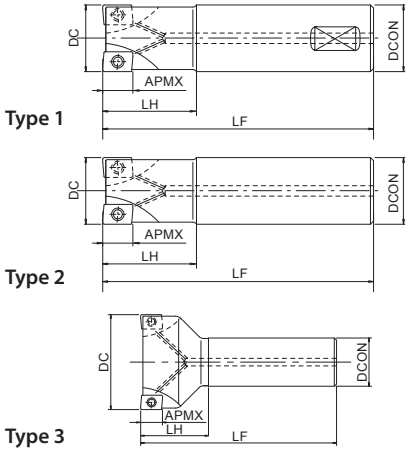
Insert Breaker	NM	GL	SM	GM	GR	HR
Rake Angle	30°	25°	15°	15°	7°	3°
Application	Aluminum alloy & Non-ferrous metal	Low-resistance machining	Superalloy & Difficult-to-machine material	Multi-purpose machining	Interrupted machining & Long overhang machining	High-hardened material
						

PSE WS / PSE SS NEW SIZES

Milling | Indexable | 90 degrees

- 90° shoulder cutter
- 2 corners inserts with bottom notch
- Cylindrical type, with internal coolant
- 10 - 63 mm





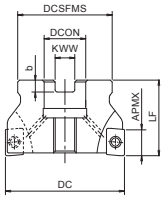
EDP	Designation	ZEFP	DC	LF	LH	APMX	DCON	Applicable inserts type	Type
NEW 7803810	PSE07R010SS10-2S	2	10	50	12	6	10	ZDT07	2
NEW 7803811	PSE07R012SS12-3S	3	12	50	12	6	12	ZDT07	2
NEW 7803813	PSE07R016SS16-3S	3	16	90	25	6	16	ZDT07	2
NEW 7803814	PSE07R016SS16-4S	4	16	90	25	6	16	ZDT07	2
NEW 7803817	PSE07R020SS20-4S	4	20	100	30	6	20	ZDT07	2
NEW 7803820	PSE07R025SS25-5S	5	25	120	35	6	25	ZDT07	2
47801100	PSE11R016WS16-2S	2	16	75	25	10	16	ZDT11	1
7801100	PSE11R016SS16-2S	2	16	90	25	10	16	ZDT11	2
7801121	PSE11R016SS16-2L	2	16	150	50	10	16	ZDT11	2
7801116	PSE11R018SS16-2S	2	18	90	25	10	16	ZDT11	3
7801122	PSE11R018SS16-2L	2	18	150	25	10	16	ZDT11	3
47801115	PSE11R020WS20-3S	3	20	80	25	10	20	ZDT11	1
7801101	PSE11R020SS20-2S	2	20	100	30	10	20	ZDT11	2
7801115	PSE11R020SS20-3S	3	20	100	30	10	20	ZDT11	2
7801123	PSE11R020SS20-3L	3	20	160	60	10	20	ZDT11	2
7801117	PSE11R022SS20-3S	3	22	110	30	10	20	ZDT11	3
7801124	PSE11R022SS20-3L	3	22	160	30	10	20	ZDT11	3
47801104	PSE11R025WS25-4S	4	25	90	35	10	25	ZDT11	1
7801102	PSE11R025SS25-3S	3	25	120	35	10	25	ZDT11	2
7801104	PSE11R025SS25-4S	4	25	120	35	10	25	ZDT11	2
7801125	PSE11R025SS25-3L	3	25	170	70	10	25	ZDT11	2
7801118	PSE11R028SS25-4S	4	28	120	35	10	25	ZDT11	3
7801126	PSE11R028SS25-3L	3	28	170	35	10	25	ZDT11	3
7801119	PSE11R030SS32-4S	4	30	130	45	10	32	ZDT11	2
7801127	PSE11R030SS32-3L	3	30	190	90	10	32	ZDT11	2
47801105	PSE11R032WS32-5S	5	32	105	40	10	32	ZDT11	1
7801105	PSE11R032SS32-5S	5	32	125	40	10	32	ZDT11	2
7801103	PSE11R032SS32-3S	3	32	130	45	10	32	ZDT11	2
7801128	PSE11R032SS32-3L	3	32	190	90	10	32	ZDT11	2
7801120	PSE11R035SS32-5S	5	35	130	35	10	32	ZDT11	3
7801129	PSE11R035SS32-3L	3	35	190	35	10	32	ZDT11	3
47801106	PSE15R025WS25-2S	2	25	100	32	14	25	ZDT15	1
7801106	PSE15R025SS25-2S	2	25	120	35	14	25	ZDT15	2
7801133	PSE15R025SS25-2L	2	25	170	70	14	25	ZDT15	2
7801130	PSE15R028SS25-2S	2	28	120	35	14	25	ZDT15	3
7801134	PSE15R028SS25-2L	2	28	170	35	14	25	ZDT15	3
7801131	PSE15R030SS32-3S	3	30	130	45	14	32	ZDT15	2
7801135	PSE15R030SS32-3L	3	30	190	90	14	32	ZDT15	2
47801111	PSE15R032WS32-3S	3	32	125	40	14	32	ZDT15	1
7801107	PSE15R032SS32-2S	2	32	130	45	14	32	ZDT15	2
7801111	PSE15R032SS32-3S	3	32	130	45	14	32	ZDT15	2
7801136	PSE15R032SS32-3L	3	32	190	90	14	32	ZDT15	2
7801132	PSE15R035SS32-3S	3	35	130	35	14	32	ZDT15	3
7801137	PSE15R035SS32-3L	3	35	190	45	14	32	ZDT15	3
7801108	PSE15R040SS32-3S	3	40	140	50	14	32	ZDT15	3
7801112	PSE15R040SS32-4S	4	40	140	50	14	32	ZDT15	3
7801138	PSE15R040SS32-3L	3	40	190	45	14	32	ZDT15	3
7801109	PSE15R050SS32-3S	3	50	130	45	14	32	ZDT15	3
7801113	PSE15R050SS32-5S	5	50	130	45	14	32	ZDT15	3
7801110	PSE15R063SS32-4S	4	63	130	45	14	32	ZDT15	3
7801114	PSE15R063SS32-6S	6	63	130	45	14	32	ZDT15	3

Accessories and spare parts

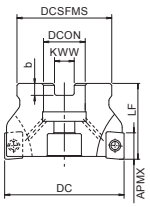
Applicable cutter DC	EDP	Designation	Specification
PSE SS/SF 10 - 12 (ZDKT07)	7808098	FS18634P (Torx 6IP)	Clamping screw
PSE SS 16 - 26 (ZDKT07)	7808099	FS18637P (Torx 6IP)	Clamping screw
PSE SF 16 - 32 (ZDKT07)	7808099	FS18637P (Torx 6IP)	Clamping screw
PSE SS 10 - 26 (ZDKT07)	7808223	6IP-D (Torx 6IP)	Wrench
PSE SF 10 - 32 (ZDKT07)	7808223	6IP-D (Torx 6IP)	Wrench
16 - 40 (ZD-T11)	7808107	FS25656P (Torx 8IP)	Clamping screw
16 - 40 (ZD-T11)	7808225	8IP-D (Torx 8IP)	Wrench
25 - 63 (ZDKT15)	7808115	FS35686P (Torx 15IP)	Clamping screw
25 - 63 (ZDKT15)	7808228	15IP-D (Torx 15IP)	Wrench

PSE BORE

Milling | Indexable | 90 degrees

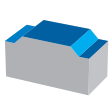


Type 1

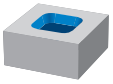
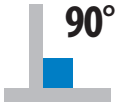


Type 2

- 90° shoulder cutter
- 2 corners inserts with bottom notch
- Bore type
- 40 - 100 mm





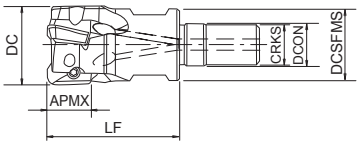
EDP	Designation	ZEFP	DC	LF	APMX	DCON	DCSFMS	KWW	b	Applicable inserts type	Type
7801000	PSE11R040M16-4	4	40	40	10	16	38	8,4	5,6	ZDT11	1
7801004	PSE11R040M16-6	6	40	40	10	16	38	8,4	5,6	ZDT11	1
7801001	PSE11R050M22-5	5	50	40	10	22	45	10,4	6,3	ZDT11	1
7801005	PSE11R050M22-7	7	50	40	10	22	45	10,4	6,3	ZDT11	1
7801002	PSE11R063M22-6	6	63	40	10	22	50	10,4	6,3	ZDT11	2
7801006	PSE11R063M22-8	8	63	40	10	22	50	10,4	6,3	ZDT11	2
7801003	PSE11R080M27-7	7	80	50	10	27	60	12,4	7	ZDT11	2
7801007	PSE11R080M27-10	10	80	50	10	27	60	12,4	7	ZDT11	2
7801008	PSE15R040M16-3	3	40	40	14	16	38	8,4	5,6	ZDT15	1
7801014	PSE15R040M16-4	4	40	40	14	16	38	8,4	5,6	ZDT15	1
7801009	PSE15R050M22-3	3	50	40	14	22	45	10,4	6,3	ZDT15	1
7801015	PSE15R050M22-5	5	50	40	14	22	45	10,4	6,3	ZDT15	1
7801010	PSE15R063M22-4	4	63	40	14	22	50	10,4	6,3	ZDT15	2
7801016	PSE15R063M22-6	6	63	40	14	22	50	10,4	6,3	ZDT15	2
7801011	PSE15R080M27-5	5	80	50	14	27	60	12,4	7	ZDT15	2
7801017	PSE15R080M27-8	8	80	50	14	27	60	12,4	7	ZDT15	2
7801012	PSE15R100M32-7	7	100	50	14	32	70	14,4	8	ZDT15	2
7801018	PSE15R100M32-10	10	100	50	14	32	70	14,4	8	ZDT15	2

Accessories and spare parts

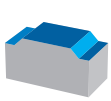
Applicable cutter DC	EDP	Designation	Specification
40	7808150	PS0830 (M8x30)	Power screw
50	7808151	PS1031 (M10x31)	Power screw
40 - 80 (ZD-T11)	7808109	FS25673P (Torx 8IP)	Clamping screw
40 - 80 (ZD-T11)	7808225	8IP-D (Torx 8IP)	Wrench
40 - 125 (ZDKT15)	7808115	FS35686P (Torx 15IP)	Clamping screw
40 - 125 (ZDKT15)	7808228	15IP-D (Torx 15IP)	Wrench

PSE SCREW FIT NEW SIZES

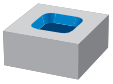
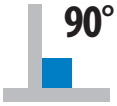
Milling | Indexable | 90 degrees



- 90° shoulder cutter
- 2 corners inserts with bottom notch
- Screw fit type
- 10 - 40 mm





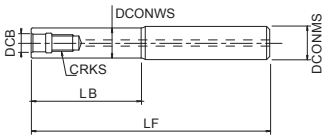
EDP	Designation	ZEFP	DC	APMX	DCON	DCSFMS	LF	CRKS	Wrench size	Applicable inserts type	Applicable shank
NEW 7803822	PSE07R010SF6-2	2	10	6	6,5	9	26	6	7	ZD…T07…	①
NEW 7803823	PSE07R012SF6-3	3	12	6	6,5	11	26	6	7	ZD…T07…	②
NEW 7803824	PSE07R016SF8-4	4	16	6	8,5	15	27	8	10	ZD…T07…	③
NEW 7803825	PSE07R020SF10-4	4	20	6	10,5	18	33	10	14	ZD…T07…	④
NEW 7803826	PSE07R025SF12-5	5	25	6	12,5	23	35	12	17	ZD…T07…	⑤
NEW 7803827	PSE07R032SF16-6	6	32	6	17	17	35	16	22	ZD…T07…	⑥
7801600	PSE11R016SF8-2	2	16	10	8,5	14,5	27	8	10	ZD…T11…	③
7801601	PSE11R020SF10-3	3	20	10	10,5	18	33	10	14	ZD…T11…	④
7801602	PSE11R025SF12-4	4	25	10	12,5	23	35	12	17	ZD…T11…	⑤
7801603	PSE11R028SF12-4	4	28	10	12,5	23	35	12	17	ZD…T11…	⑤
7801604	PSE11R032SF16-5	5	32	10	17	28	40	16	22	ZD…T11…	⑥
7801605	PSE11R035SF16-5	5	35	10	17	28	40	16	22	ZD…T11…	⑥
7801606	PSE11R040SF16-6	6	40	10	17	28	40	16	22	ZD…T11…	⑥
7801607	PSE15R025SF12-2	2	25	14	12,5	23	35	12	17	ZD…T15…	⑤
7801608	PSE15R028SF12-2	2	28	14	12,5	23	35	12	17	ZD…T15…	⑤
7801609	PSE15R032SF16-3	3	32	14	17	28	40	16	22	ZD…T15…	⑥
7801610	PSE15R035SF16-3	3	35	14	17	28	40	16	22	ZD…T15…	⑥
7801611	PSE15R040SF16-4	4	40	14	17	28	40	16	22	ZD…T15…	⑥

Accessories and spare parts

Applicable cutter DC	EDP	Designation	Specification
PSE SS/SF 10 - 12 (ZDKT07)	7808098	FS18634P (Torx 6IP)	Clamping screw
PSE SS 16 - 26 (ZDKT07)	7808099	FS18637P (Torx 6IP)	Clamping screw
PSE SF 16 - 32 (ZDKT07)	7808099	FS18637P (Torx 6IP)	Clamping screw
PSE SS 10 - 26 (ZDKT07)	7808223	6IP-D (Torx 6IP)	Wrench
PSE SF 10 - 32 (ZDKT07)	7808223	6IP-D (Torx 6IP)	Wrench
16 - 40 (ZD-T11)	7808107	FS25656P (Torx 8IP)	Clamping screw
16 - 40 (ZD-T11)	7808225	8IP-D (Torx 8IP)	Wrench
25 - 40 (ZDKT15)	7808115	FS35686P (Torx 15IP)	Clamping screw
25 - 40 (ZDKT15)	7808228	15IP-D (Torx 15IP)	Wrench

OP-SFA

Milling | Indexable

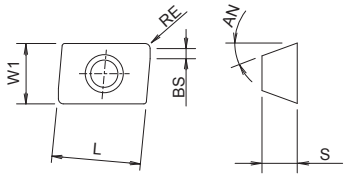


- Arbor for Screw fit type

	EDP	Designation	LF	LB	DCON	DCONWS	DCB	CRKS	Specification
①	7801904	SF-M06SS10-4	104	4	10	9	6,5	6	Steel
②	7801905	SF-M06SS12-10	104	10	12	11	6,5	6	Steel
③	7801900	SF-M08SS16-15	95	15	16	14,5	8,5	8	Steel
④	7801901	SF-M10SS20-20	120	20	20	18	10,5	10	Steel
⑤	7801902	SF-M12SS25-35	135	35	25	23	12,5	12	Steel
⑥	7801903	SF-M16SS32-35	155	35	32	28	17	16	Steel
①	7801918	SF-M06SS10-24CS	124	24	10	9	6,5	6	Carbide
②	7801919	SF-M06SS12-34CS	134	34	12	11	6,5	6	Carbide
③	7801910	SF-M08SS16-55CS	115	55	16	14,5	8,5	8	Carbide
③	7801911	SF-M08SS16-85CS	145	85	16	14,5	8,5	8	Carbide
④	7801912	SF-M10SS20-70CS	140	70	20	18	10,5	10	Carbide
④	7801913	SF-M10SS20-110CS	180	110	20	18	10,5	10	Carbide
⑤	7801914	SF-M12SS25-90CS	170	90	25	23	12,5	12	Carbide
⑤	7801915	SF-M12SS25-140CS	220	140	25	23	12,5	12	Carbide
⑥	7801916	SF-M16SS32-120CS	220	120	32	28	17	16	Carbide
⑥	7801917	SF-M16SS32-190CS	290	190	32	28	17	16	Carbide

PSE INSERTS NEW SIZES

Milling | Indexable | Inserts

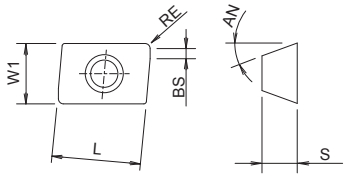


- 90° shoulder cutter
- 2 corners inserts with bottom notch

	EDP	Designation	S	W1	L	AN	RE	BS	APMX	Grade	P		M		K		N		S		H	
											dry		dry		GG	GGG	dry		dry		dry	
NEW	7811112	ZDKT070302FR-NM	2,54	4	8,2	15	0,2	1,1		CK010								◉				
NEW	7811113	ZDKT070304FR-NM	2,54	4	8,2	15	0,4	0,9		CK010								◉				
NEW	7825127	ZDKT070304SR-GL	2,54	4	8,2	15	0,4	0,9		XC3030	◉				○	○						
NEW	7825129	ZDKT070308SR-GL	2,54	4	8,2	15	0,8	0,5		XC3030	◉				○	○						
NEW	7825128	ZDKT070304SR-GM	2,54	4	8,2	15	0,4	0,9		XC3030	◉				○	○						
NEW	7825130	ZDKT070308SR-GM	2,54	4	8,2	15	0,8	0,5		XC3030	◉				○	○						
NEW	7814123	ZDKT070304SR-GL	2,54	4	8,2	15	0,4	0,9		XP3035	◉	◉	○	○	○	○						
NEW	7814125	ZDKT070308SR-GL	2,54	4	8,2	15	0,8	0,5		XP3035	◉	◉	○	○	○	○						
NEW	7814124	ZDKT070304SR-GM	2,54	4	8,2	15	0,4	0,9		XP3035	◉	◉	○	○	○	○						
NEW	7814126	ZDKT070308SR-GM	2,54	4	8,2	15	0,8	0,5		XP3035	◉	◉	○	○	○	○						
NEW	7826121	ZDKT070304SR-GL	2,54	4	8,2	15	0,4	0,9		XP2025		○		◉						○		
NEW	7826122	ZDKT070308SR-GL	2,54	4	8,2	15	0,8	0,5		XP2025		○		◉						○		
NEW	7813117	ZDKT070304SR-GL	2,54	4	8,2	15	0,4	0,9		XP2040	○	○	○	◉						○	○	
NEW	7813119	ZDKT070308SR-GL	2,54	4	8,2	15	0,8	0,5		XP2040	○	○	○	◉						○	○	
NEW	7813116	ZDKT070302SR-GM	2,54	4	8,2	15	0,2	1,1		XP2040	○	○	○	◉						○	○	
NEW	7813118	ZDKT070304SR-GM	2,54	4	8,2	15	0,4	0,9		XP2040	○	○	○	◉						○	○	
NEW	7813120	ZDKT070308SR-GM	2,54	4	8,2	15	0,8	0,5		XP2040	○	○	○	◉						○	○	
NEW	7812114	ZDKT070304SR-GM	2,54	4	8,2	15	0,4	0,9		XC1015					◉	◉						
NEW	7812115	ZDKT070308SR-GM	2,54	4	8,2	15	0,8	0,5		XC1015					◉	◉						
	7814026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XP3035	◉	◉	○	○	○	○						
	7814025	ZDKT11T304SR-GM	3,8	6,8	11	15	0,4	1,8	10	XP3035	◉	◉	○	○	○	○						
	7814032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XP3035	◉	◉	○	○	○	○						
	7814053	ZDKT11T312SR-GM	3,8	6,8	11	15	1,2	1	10	XP3035	◉	◉	○	○	○	○						
	7814038	ZDKT11T320SR-GM	3,8	6,8	11	15	2	2,1	10	XP3035	◉	◉	○	○	○	○						
	7814054	ZDKT11T330SR-GM	3,8	6,8	11	15	3	1,5	10	XP3035	◉	◉	○	○	○	○						
	7814055	ZDKT11T340SR-GM	3,8	6,8	11	15	4	-	10	XP3035	◉	◉	○	○	○	○						
	7814033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XP3035	◉	◉	○	○	○	○						
	7825026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XP3030	◉				○	○						
	7825025	ZDKT11T304SR-GM	3,8	6,8	11	15	0,4	1,8	10	XP3030	◉				○	○						
	7825032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XP3030	◉				○	○						
	7825033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XP3030	◉				○	○						
	7828026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XP3025		◉			○	○						
	7828032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XP3025		◉			○	○						
	7828033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XP3025		◉			○	○						
	7813026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XP2040	○	○	○	◉						○	◉	
	7813025	ZDKT11T304SR-GM	3,8	6,8	11	15	0,4	1,8	10	XP2040	○	○	○	◉						○	◉	
	7813032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XP2040	○	○	○	◉						○	◉	
	7813033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XP2040	○	○	○	◉						○	◉	
	7826026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XP2025		○		◉						○		
	7826025	ZDKT11T304SR-GM	3,8	6,8	11	15	0,4	1,8	10	XP2025		○		◉						○		
	7826032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XP2025		○		◉						○		
	7815031	ZDKT11T308ER-SM	3,8	6,8	11	15	0,8	1,4	10	XC5035			◉	○						○	○	
	7815027	ZDKT11T316ER-SM	3,8	6,8	11	15	1,6	0,8	10	XC5035			◉	○						○	○	
	7816034	ZDKT11T304ER-SM	3,8	6,8	11	15	0,4	1,8	10	XC5040				○						◉		
	7816031	ZDKT11T308ER-SM	3,8	6,8	11	15	0,8	1,4	10	XC5040				○						◉		
	7816027	ZDKT11T316ER-SM	3,8	6,8	11	15	1,6	0,8	10	XC5040				○						◉		
	7827026	ZDKT11T308SR-GL	3,8	6,8	11	15	0,8	1,4	10	XC3020	◉				○	○						
	7827032	ZDKT11T308SR-GM	3,8	6,8	11	15	0,8	1,4	10	XC3020	◉				○	○						
	7827033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XC3020	◉				○	○						
	7812025	ZDKT11T304SR-GM	3,8	6,8	11	15	0,4	1,8	10	XC1015					◉	◉						
	7812033	ZDKT11T308SR-GR	3,8	6,8	11	15	0,8	1,4	10	XC1015					◉	◉						
	7824035	ZDKT11T308SR-HR	3,8	6,8	11	15	0,8	1,4	10	XP6015	○				○	○					◉	
	7811048	ZDKT11T302FR-NM	3,8	6,8	11	15	0,2	2	10	CK010								◉				
	7811049	ZDKT11T304FR-NM	3,8	6,8	11	15	0,4	1,8	10	CK010								◉				
	7811024	ZDHT11T304FR-NM	3,5	6,8	11	15	0,4	1,8	10	CK010								◉				
	7811023	ZDKT11T308FR-NM	3,8	6,8	11	15	0,8	1,4	10	CK010								◉				
	7814057	ZDKT150508SR-GL	5,56	9,3	15	15	0,8	1,6	14	XP3035	◉	◉	○	○	○	○						
	7814029	ZDKT150508SR-GM	5,56	9,3	15	15	0,8	1,6	14	XP3035	◉	◉	○	○	○	○						
	7814077	ZDKT150512SR-GM	5,56	9,3	15	15	1,2	1,2	14	XP3035	◉	◉	○	○	○	○						
	7814078	ZDKT150516SR-GM	5,56	9,3	15	15	1,6	0,8	14	XP3035	◉	◉	○	○	○	○						
	7814079	ZDKT150520SR-GM	5,56	9,3	15	15	2	2,1	14	XP3035	◉	◉	○	○	○	○						

PSE INSERTS NEW SIZES

Milling | Indexable | Inserts



- 90° shoulder cutter
- 2 corners inserts with bottom notch

EDP	Designation	S	W1	L	AN	RE	BS	APMX	Grade	P		M		K		N		S		H	
										dry		dry		GG	GGG	dry		dry		dry	
7814080	ZDKT150530SR-GM	5,56	9,3	15	15	3	1,9	14	XP3035	◉	◉	◎	◎	◎	◎						
7814081	ZDKT150540SR-GM	5,56	9,3	15	15	4	1,1	14	XP3035	◉	◉	◎	◎	◎	◎						
7814082	ZDKT150550SR-GM	5,56	9,3	15	15	5	0,7	14	XP3035	◉	◉	◎	◎	◎	◎						
7814058	ZDKT150508SR-GR	5,56	9,3	15	15	0,8	1,6	14	XP3035	◉	◉	◎	◎	◎	◎						
7825057	ZDKT150508SR-GL	5,56	9,3	15	15	0,8	1,6	14	XP3030	◉				◎	◎						
7825029	ZDKT150508SR-GM	5,56	9,3	15	15	0,8	1,6	14	XP3030	◉				◎	◎						
7825058	ZDKT150508SR-GR	5,56	9,3	15	15	0,8	1,6	14	XP3030	◉				◎	◎						
7813057	ZDKT150508SR-GL	5,56	9,3	15	15	0,8	1,6	14	XP2040	◎	◎	◎	◉						◎	◉	
7813028	ZDKT150508SR-GM	5,56	9,3	15	15	0,8	1,6	14	XP2040	◎	◎	◎	◉						◎	◉	
7813058	ZDKT150508SR-GR	5,56	9,3	15	15	0,8	1,6	14	XP2040	◎	◎	◎	◉						◎	◉	
7826057	ZDKT150508SR-GL	5,56	9,3	15	15	0,8	1,6	14	XP2025		◎		◉						◎		
7826029	ZDKT150508SR-GM	5,56	9,3	15	15	0,8	1,6	14	XP2025		◎		◉						◎		
7815056	ZDKT150508ER-SM	5,56	9,3	15	15	0,8	1,6	14	XC5035			◉	◎						◎	◎	
7816056	ZDKT150508ER-SM	5,56	9,3	15	15	0,8	1,6	14	XC5040				◎						◉		
7812029	ZDKT150508SR-GM	5,56	9,3	15	15	0,8	1,6	14	XC1015					◉	◉						
7812058	ZDKT150508SR-GR	5,56	9,3	15	15	0,8	1,6	14	XC1015					◉	◉						
7824036	ZDKT150508SR-HR	5,56	9,3	15	15	0,8	1,6	14	XP6015	◎				◎	◎					◉	
7811046	ZDKT150508FR-NM	5,56	9,3	15	15	0,8	1,6	14	CK010								◉				

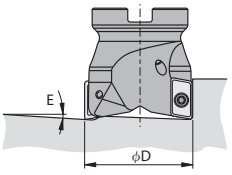
PSE

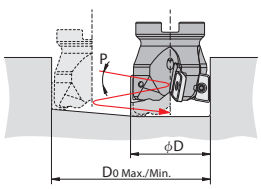
90° shoulder cutter

	Work Material	Tensile Strength / Hardness	Insert Size												Grade
			ZDKT07...				ZD-T11...				ZDKT15...				
			ap:6mm	ae:0,15D	ap:0,8mm	ae:1,0D	ap:10mm	ae:0,2D	ap:3mm	ae:1,0D	ap:14mm	ae:0,2D	ap:5mm	ae:1,0D	
			Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	
P	Mild Steel-Carbon Steel (SS400-S10C)	~180HB	180 (100~ 250)	0,1 (0,04~0,12)	180 (100~250)	0,08 (0,04~0,1)	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)	XP3035
P	Carbon Steel-Alloy Steel (S50C-SCM440)	~280HB	180 (100~ 250)	0,07 (0,04~0,1)	180 (100~250)	0,08 (0,04~0,1)	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)	XP3035
P	Die Steel (SKD11-SKD61)	~280HB	140 (80~180)	0,07 (0,04~0,1)	140 (80~180)	0,07 (0,04~0,1)	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)	XP3035
M	Stainless Steel (Dry) (SUS304-SUS420)	~250HB	140 (80~180)	0,06 (0,04~0,08)	140 (80~180)	0,05 (0,04~0,08)	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)	XC5035
M	Stainless Steel (Coolant) (SUS304-SUS420)	~250HB	80 (60~100)	0,06 (0,04~0,08)	80 (60~100)	0,05 (0,04~0,08)	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)	XP2040
K	Cast Iron (FC250)	~350N/mm²	180 (100~300)	0,1 (0,04~0,12)	180 (100~300)	0,1 (0,04~0,12)	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)	XC1015
K	Ductile Cast Iron (FCD400)	~800N/mm²	180 (100~300)	0,07 (0,04~0,1)	180 (100~300)	0,06 (0,04~0,08)	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)	XC1015
N	Aluminium Alloys	~13%Si	300 (200~1,500)	0,15 (0,04~0,3)	300 (200~1,500)	0,12 (0,04~0,2)	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)	CK010
S	Heat Resistant Alloys (Wet) (Inconel 718)	–	35 (25~60)	0,07 (0,04~0,1)	35 (25~60)	0,06 (0,04~0,08)	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)	XC5040
S	Titanium Alloy (Wet) (Ti-6Al-4V)	–	45 (35~70)	0,07 (0,04~0,1)	45 (35~70)	0,07 (0,04~0,1)	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)	XC5040
H	Pre-hardened Steel (NAK80)	40~43HRC	100 (40~150)	0,08 (0,04~0,12)	100 (40~150)	0,06 (0,04~0,08)	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)	XP6015
H	Steel for Die Casting (DAC55-DH31)	43~48HRC	80 (40~100)	0,06 (0,03~0,08)	80 (40~100)	0,06 (0,03~0,08)	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)	XP6015
H	Hardened Steel (SKD11)	50~55HRC	60 (40~70)	0,06 (0,03~0,08)	60 (40~70)	0,06 (0,03~0,08)	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)	XP6015

Maximum Ramping Angle (E) & Helical Angle (P)

Insert Size	ZDKT07...				ZD-T11...				ZDKT15...			
D	Ramping Angle E°	Helical Milling (mm)		Helical Angle P°	Ramping Angle E°	Helical Milling (mm)		Helical Angle P°	Ramping Angle E°	Helical Milling (mm)		Helical Angle P°
		D Min.	D Max.			D Min.	D Max.			D Min.	D Max.	
10	6	14	19	4,5	-	-	-	-	-	-	-	-
12	4,5	17	23	2,2	-	-	-	-	-	-	-	-
16	2,8	25	31	1,1	10,8	18	29	9,8	-	-	-	-
17	2,6	27	33	1	9,8	22	31	7,0	-	-	-	-
18	-	-	-	-	9,8	22	33	7,0	-	-	-	-
20	2,1	33	39	0,8	9,8	30	37	7,0	-	-	-	-
21	2	35	41	0,7	8,5	32	39	4,5	-	-	-	-
22	-	-	-	-	7,5	34	41	4,5	-	-	-	-
25	1,6	43	49	0,5	7,5	40	47	4,5	9,5	37	48	7,5
26	1,5	45	51	0,5	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	1,1	57	63	0,4	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





PSE

For sliding heads lathes

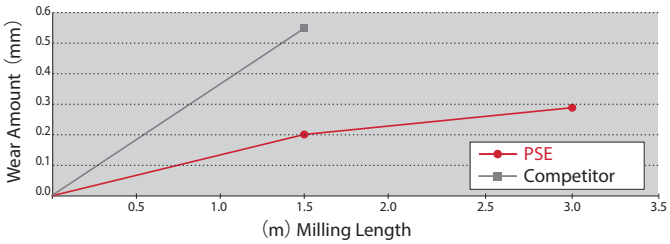
Work Material		Tensile Strength / Hardness	Insert Size			
			ZDKT07...			
			ap:2mm ae:0,7D		ap:0,5mm ae:1,0D	
			Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)
P	Mild Steel-Carbon Steel (SS400-S10C)	~180HB	60 (40~ 80)	0,07 (0,03~0,1)	60 (40~ 80)	0,04 (0,02~0,06)
	Carbon Steel-Alloy Steel (S50C-SCM440)	~280HB	60 (40~ 80)	0,07 (0,03~0,1)	60 (40~ 80)	0,04 (0,02~0,06)
	Die Steel (SKD11-SKD61)	~280HB	60 (40~ 80)	0,07 (0,03~0,1)	60 (40~ 80)	0,04 (0,02~0,06)
M	Stainless Steel (Dry) (SUS304-SUS420)	~250HB	50 (40~ 70)	0,07 (0,03~0,1)	50 (40~ 70)	0,04 (0,02~0,05)
	Stainless Steel (Coolant) (SUS304-SUS420)	~250HB	40 (20~ 60)	0,05 (0,03~0,06)	40 (20~ 60)	0,04 (0,02~0,05)
K	Cast Iron (FC250)	~350N/mm²	60 (40~80)	0,07 (0,03~0,1)	60 (40~80)	0,05 (0,02~0,08)
	Ductile Cast Iron (FCD400)	~800N/mm²	60 (40~80)	0,07 (0,03~0,1)	60 (40~80)	0,05 (0,02~0,08)
N	Aluminium Alloys	~13%Si	190 (80~300)	0,08 (0,03~0,12)	190 (80~300)	0,07 (0,03~0,1)
S	Heat Resistant Alloys (Wet) (Inconel 718)	–	35 (20~50)	0,05 (0,03~0,06)	35 (20~50)	0,04 (0,02~0,05)
	Titanium Alloy (Wet) (Ti-6Al-4V)	–	40 (20~60)	0,05 (0,03~0,06)	40 (20~60)	0,04 (0,02~0,05)
H	Pre-hardened Steel (NAK80)	40~43HRC	50 (40~70)	0,07 (0,03~0,1)	50 (40~70)	0,04 (0,02~0,05)
	Steel for Die Casting (DAC55-DH31)	43~48HRC	40 (30~50)	0,05 (0,03~0,08)	40 (30~50)	0,04 (0,03~0,06)
	Hardened Steel (SKD11)	50~55HRC	40 (30~50)	0,05 (0,03~0,08)	40 (30~50)	0,04 (0,03~0,06)

The above cutting conditions are to be used as general guidelines.
Adjustements ma be necessary depending on actual cutting condition

Long tool life on Inconel 718

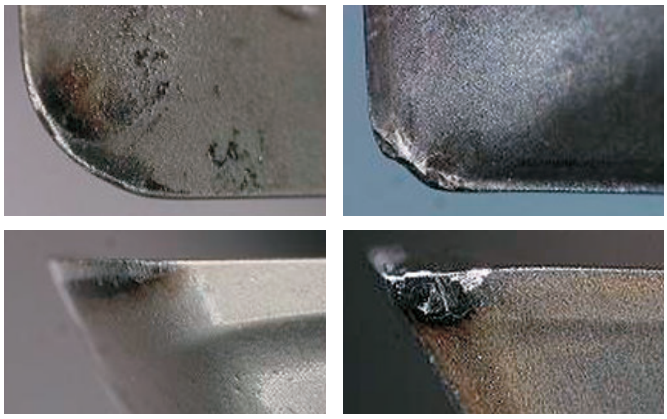
Tool	PSE11R032SS32-5S (Ø32x5)	Competitor
Insert Grade	SPMT070305SR-GM (XC3020)	Coated carbide insert
Work Material	Inconel 718 (45HRC)	
Cutting Speed	30m/min (298min^{-1})	25m/min (248min^{-1})
Feed	120mm/min (0,08mm/t)	80mm/min (0,08mm/t)
Depth of Cut	ap=1mm ae=20mm	ap=1mm ae=20mm
Coolant	Water-Soluble	
Machine	Vertical Machining Center	

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.



After 1.5m of milling

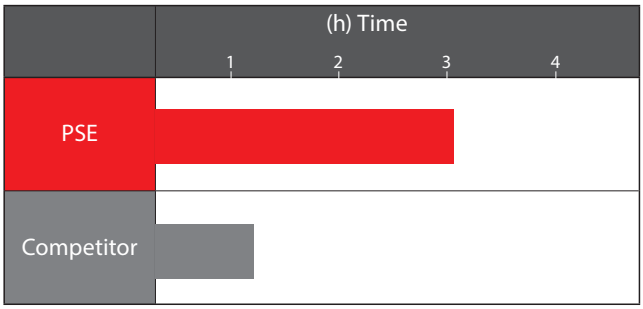
PSE	Competitor



Long tool life on NAK80 (40HRC)

Tool	PSE11R020SS20-3S (Ø20x3)	Competitor
Insert Grade	ZDKT11T308SR-GL (XP2040)	Coated carbide insert
Work Material	NAK80 (40HRC)	
Cutting Speed	130m/min (2.070min^{-1})	
Feed	1.400mm/min (0,23mm/t)	
Depth of Cut	ap=0,3mm ae=10mm	
Coolant	Air Blow	
Machine	Vertical Machining Center	

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.



Rough milling of die-casting dies

Tool	PHC09R050M22-5 (Ø50x5)	Competitor
Insert Grade	SDMT09T308SR-GM (XP2040)	Coated carbide insert
Work Material	SKD61 (48 HRC)	
Cutting Speed	80m/min (510min^{-1})	110m/min (700min^{-1})
Feed	1.360mm/min (0.53mm/t)	800mm/min (0.28mm/t)
Depth of Cut	ap=0.5mm ae=25mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center	

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

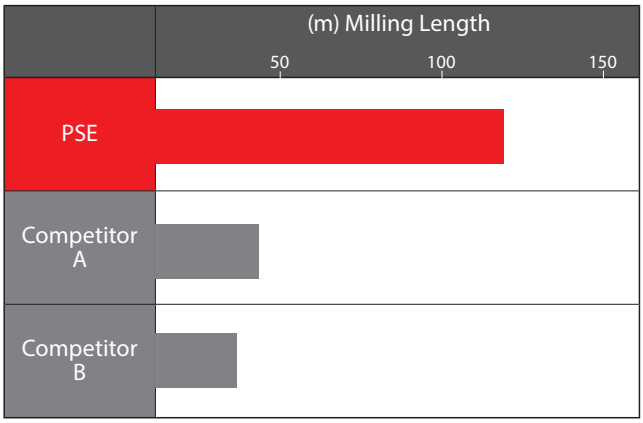
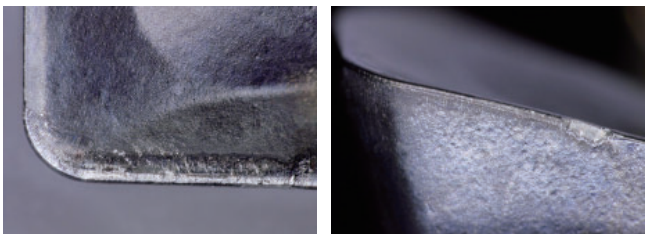


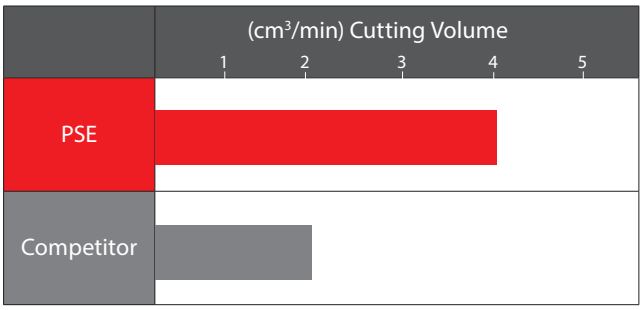
Photo after milling 128m



Face milling of machine parts

Tool	PHC12R050M22-4 (Ø50x4)	Competitor
Insert Grade	ZDKT150508SR-GM (XP2040)	Coated carbide insert
Work Material	SUS304	
Cutting Speed	150m/min (478min^{-1})	
Feed	720mm/min (0,15mm/t)	500mm/min (0,15mm/t)
Depth of Cut	ap=1mm ae=60mm	
Coolant	Water-Soluble	
Machine	Horizontal Machining Center (BT40) Horizontal Machining Center	
Cutting Volume	43.2cm^3/min	30cm^3/min

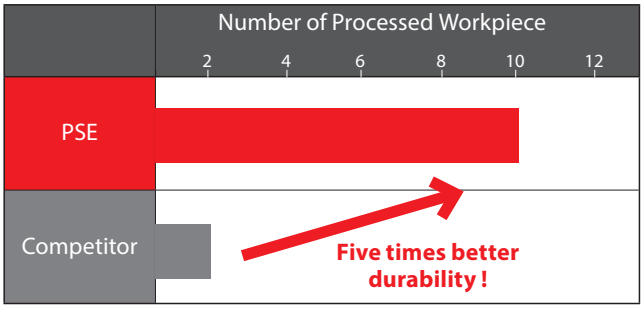
This process consisted of intermittent face milling a surface with multiple holes, and our product was able to mill with 1.4 times the efficiency of the competitor's tool. Moreover, it inhibited the generation of heat, reducing the distortion of the workpiece as well as the effects passed on to the subsequent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



Groove milling of a nozzle piece

Tool	PSE11R020SS20-3S (Ø20x3)	Competitor
Insert Grade	ZDKT11T308ER-SM (XC5040)	Coated carbide insert
Work Material	SUS630	
Cutting Speed	160 m/min (2.548 min^{-1})	
Feed	510 mm/min (0,07 mm/t)	
Depth of Cut	ap=2mm ae=20mm	
Coolant	Water-Soluble	
Machine	Compound Machine	

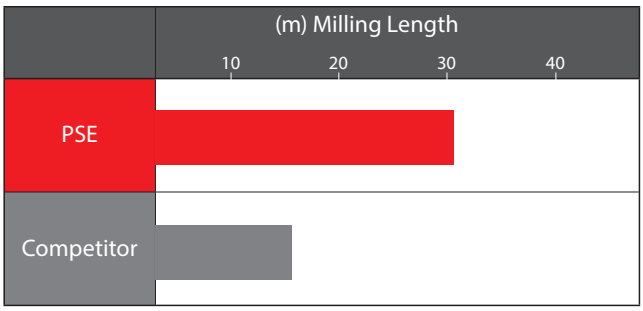
This process consists of groove milling in stainless steel. The competitor's tool caused the chips to jam, resulting in premature breakage of the tool. The PSE, in contrast, evacuated chips in a stable manner and could mill 10 workpieces, a significant improvement.



Long life milling of a chamber

Tool	PSE15R080M25.4-8 (Ø80x8)	Competitor
Insert Grade	ZDKT150508SR-GM (XP2040)	Coated carbide insert
Work Material	SUS304	
Cutting Speed	180 m/min (717 min^{-1})	
Feed	700 mm/min (0,12 mm/t)	
Depth of Cut	ap=1 mm ae=60 mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center	

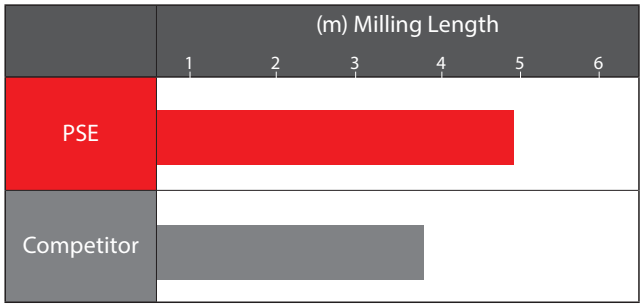
This process consisted of dry milling in stainless steel. A competitor's tool and the PSE were compared in face milling the surface of a chamber opening under identical conditions. The competitor's tool broke prematurely, and was not able to continue. However, the PSE was able to attain more than double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

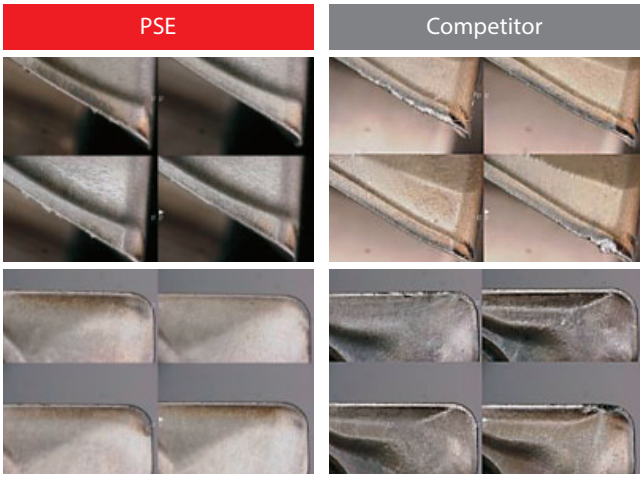


Rough milling of aircraft parts

Tool	PSE11R025SS25-4S (Ø25x4)	Competitor
Insert Grade	ZDKT11T308ER-SM(XC5040)	Coated carbide insert
Work Material	Titanium alloy	
Cutting Speed	40 m/min (510 min^{-1})	
Feed per Tooth	160 mm/min (0,08 mm/t)	
Depth of Cut	ap=5 mm ae=10 mm	
Coolant	Water-Soluble	
Machine	Horizontal machining center	

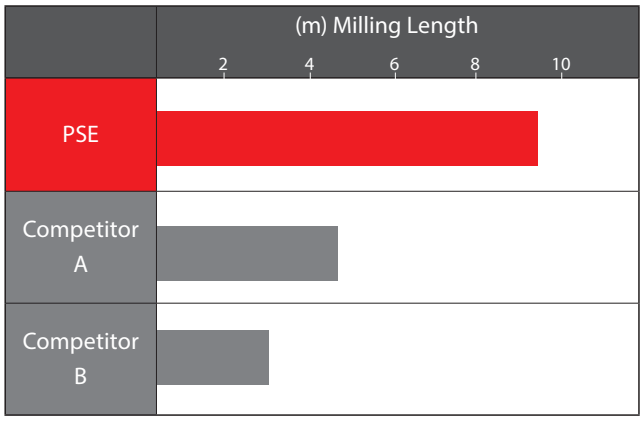
A competitor's product and the PSE were compared in the rough milling of aircraft parts under identical conditions. The competitor's product chipped, but the PSE wore normally and attained 1.5 times the durability.





Internal test DH31S (48HRC)

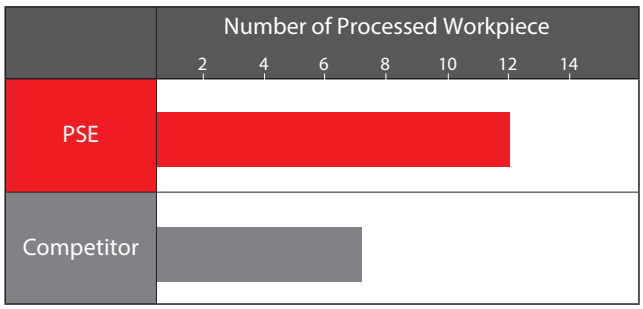
Tool	PSE11R032SS32-3S (Ø32x3)	Competitor
Insert Grade	ZDKT11T308SR-HR (XP6015)	Coated carbide insert
Work Material	DH31S (48HRC)	
Cutting Speed	50 m/min (497 min^{-1})	
Feed per Tooth	150 mm/min (0,1 mm/t)	
Depth of Cut	ap=5 mm ae=1 mm	
Coolant	Air Blow	
Machine	Vertical machining center	



Stable machining of padding

Tool	PSE15R032SS32-3S (Ø32x3)	Competitor
Insert Grade	ZDKT11T308SR-HR (XP6015)	Coated carbide insert
Work Material	Padding (56HRC)	
Cutting Speed	30 m/min (497 min^{-1})	
Feed per Tooth	110 mm/min (0,12 mm/t)	
Depth of Cut	ap=11 mm ae= 5~20 mm	
Coolant	Air Blow	
Machine	Vertical machining center	

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.

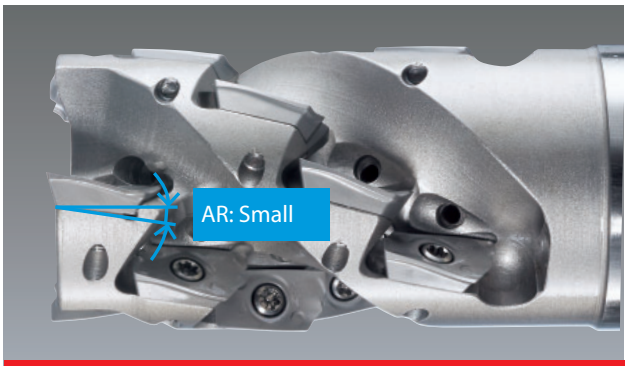


KEY FEATURES: PHOENIX PSEL

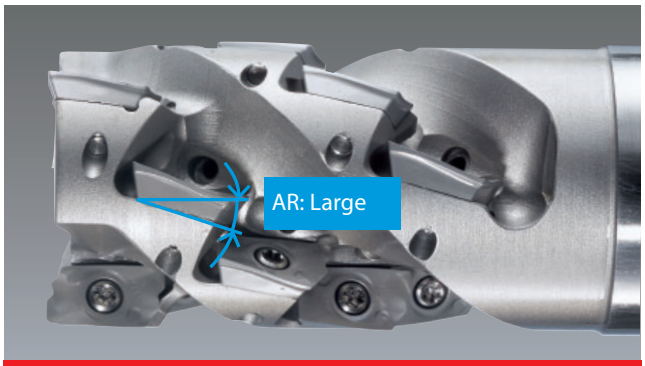
1. 90° shoulder cutter with long neck of cut
2. 2 corners inserts with bottom notch
3. Cylindrical type

Optimized insert arrangement

Variable axial rake angle (AR) suppress vibration which enables low-resistance machining.



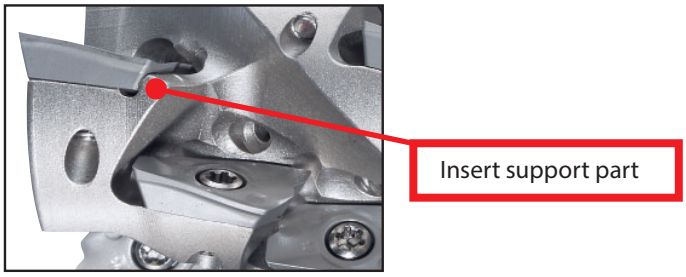
1st step: for high chipping resistance



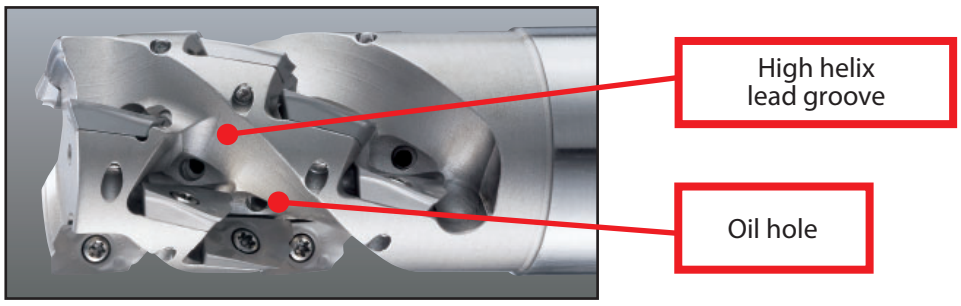
2nd and subsequent steps: for high sharpness

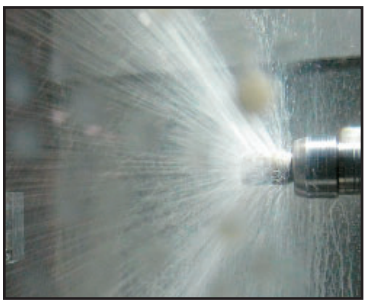
Securely clamped inserts at the tip

Avoids sudden chipping and enables stable machining



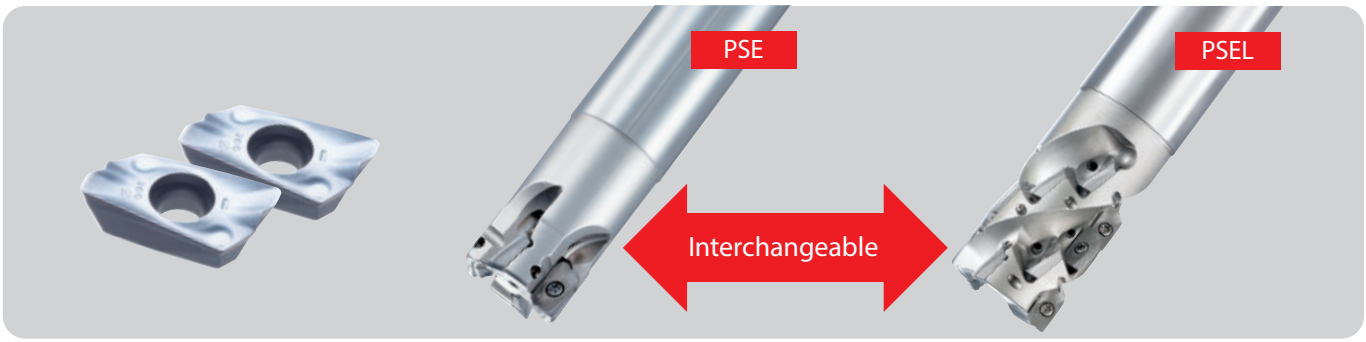
A special lead groove and oil hole for every insert seat enable excellent chip ejection





Enables to simplify tool management, as inserts for PSEL are interchangeable with those for PSE.

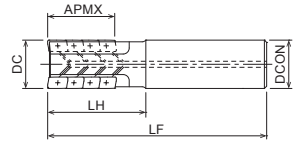
A wide variety of inserts cover the various types of machining



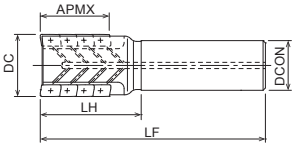
PSEL SS

Milling | Indexable | 90 degrees

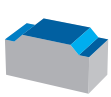
Type 1



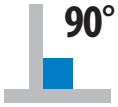
Type 2



- 90° shoulder cutter with long length of cut
- 2 corners inserts with bottom notch
- Cylindrical type, with internal coolant
- 25 - 50 mm







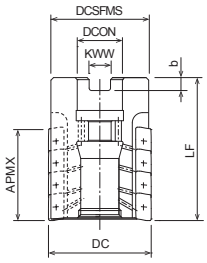
EDP	Designation	ZEFP	DC	LF	LH	APMX	DCON	Inserts per flute	Inserts total	Applicable inserts type	Type
7802900	PSEL11R025SS25-2-27	2	25	125	50	27	25	3	6	ZDT11	1
7802901	PSEL11R032SS32-2-37	2	32	140	60	37	32	4	8	ZDT11	1
7802902	PSEL11R032SS32-3-45	3	32	140	60	45,5	32	5	15	ZDT11	1
7802903	PSEL11R040SS42-3-37	3	40	140	60	37	42	4	12	ZDT11	1
7802904	PSEL11R040SS42-4-45	4	40	140	60	45,5	42	5	20	ZDT11	1
7802905	PSEL15R040SS42-2-38	2	40	140	60	38	42	3	6	ZDT15	1
7802906	PSEL15R050SS42-3-50	3	50	144	64	50,5	42	4	12	ZDT15	2

Accessories and spare parts

Applicable cutter DC	EDP	Designation	Specification
25 (ZD-T11)	7808107	FS25656P (Torx 8IP)	Clamping screw
25 (ZD-T11)	7808225	8IP-D (Torx 8IP)	Wrench
32 - 40 (ZD-T11)	7808109	FS25673P (Torx 8IP)	Clamping screw
32 - 40 (ZD-T11)	7808225	8IP-D (Torx 8IP)	Wrench
40 - 50 (ZDKT15)	7808115	FS35686P (Torx 15IP)	Clamping screw
40 - 50 (ZDKT15)	7808228	15IP-D (Torx 15IP)	Wrench

PSEL BORE

Milling | Indexable | 90 degrees



- 90° shoulder cutter with long length of cut
- 2 corners inserts with bottom notch
- Bore type
- 50 - 80 mm

EDP	Designation	ZEFP	DC	LF	APMX	DCON	DCSFMS	KWW	b	Inserts per flute	Inserts total	Applicable inserts type
7802850	PSEL15R050M22-3-50	3	50	74	50,5	22	45	10,4	6,3	4	12	ZDKT150
7802851	PSEL15R063M27-3-50	3	63	74	50,5	27	60	12,4	7	4	12	ZDKT150
7802852	PSEL15R080M32-4-63	4	80	88	63	32	76	14,4	8	5	20	ZDKT150

Accessories and spare parts

Applicable cutter DC	EDP	Designation	Specification
50 - 80 (ZDKT15)	7808115	FS35686P (Torx 15IP)	Clamping screw
50 - 80 (ZDKT15)	7808228	15IP-D (Torx 15IP)	Wrench
50	7808132	OCB-M20-08	Coolant cap bolt
63	7808133	OCB-M24-10	Coolant cap bolt
80	7808134	OCB-M30-14	Coolant cap bolt

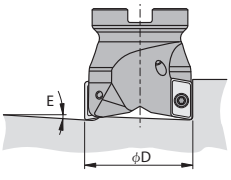
PSEL

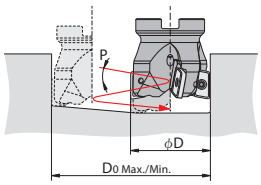
90° shoulder cutter

Work Material		Tensile Strength / Hardness	Insert Size				Grade
			ZD-T11...		ZDKT15...		
			Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	
P	Mild Steel-Carbon Steel (SS400-S10C)	~180HB	160 (100~ 200)	0,25 (0,2 ~ 0,4)	160 (100~ 200)	0,3 (0,2 ~ 0,4)	XP3035
	Carbon Steel-Alloy Steel (S50C-SCM440)	~280HB	150 (100 ~ 200)	0,2 (0,15 ~ 0,3)	150 (100~ 200)	0,25 (0,15 ~ 0,3)	XP3035
	Die Steel (SKD11-SKD61)	~280HB	130 (80 ~ 180)	0,2 (0,15 ~ 0,3)	130 (80 ~ 180)	0,25 (0,15 ~ 0,3)	XP3035
M	Stainless Steel (Dry) (SUS304-SUS420)	~250HB	150 (100 ~ 200)	0,12 (0,1 ~ 0,3)	150 (100 ~ 200)	0,15 (0,1 ~ 0,3)	XC5035
	Stainless Steel (Coolant) (SUS304-SUS420)	~250HB	80 (60 ~ 120)	0,12 (0,1 ~ 0,3)	80 (60 ~ 120)	0,15 (0,1 ~ 0,3)	XP2040
K	Cast Iron (FC250)	~350N/mm²	160 (100 ~ 300)	0,2 (0,2 ~ 0,35)	160 (100 ~ 300)	0,25 (0,2 ~ 0,35)	XC1015
	Ductile Cast Iron (FCD400)	~800N/mm²	160 (100 ~ 250)	0,15 (0,2 ~ 0,3)	160 (100 ~ 250)	0,2 (0,2 ~ 0,3)	XC1015
N	Aluminium Alloys	~13%Si	300 (200 ~ 1.000)	0,25 (0,1 ~ 0,4)	300 (200 ~ 1.000)	0,3 (0,1 ~ 0,4)	CK010
S	Heat Resistant Alloys (Wet) (Inconel 718)	–	35 (25 ~ 60)	0,15 (0,1 ~ 0,3)	35 (25 ~ 60)	0,18 (0,1 ~ 0,3)	XC5040
	Titanium Alloy (Wet) (Ti-6Al-4V)	–	40 (30 ~ 120)	0,15 (0,1 ~ 0,3)	40 (30 ~ 120)	0,18 (0,1 ~ 0,3)	XC5040
H	Pre-hardened Steel (NAK80)	40~43HRC	100 (40 ~ 150)	0,15 (0,1 ~ 0,3)	100 (40 ~ 150)	0,18 (0,1 ~ 0,3)	XP6015
	Steel for Die Casting (DAC55-DH31)	43~48HRC	60 (40 ~ 120)	0,12 (0,05 ~ 0,2)	60 (40 ~ 120)	0,15 (0,05 ~ 0,2)	XP6015

Maximum Ramping Angle (E) & Helical Angle (P)

Insert Size	ZD-T11...				ZDKT15...			
D	Ramping Angle E°	Helical Milling (mm)		Helical Angle P°	Ramping Angle E°	Helical Milling (mm)		Helical Angle P°
		D Min.	D Max.			D Min.	D Max.	
16	10,8	18	29	9,8	-	-	-	-
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

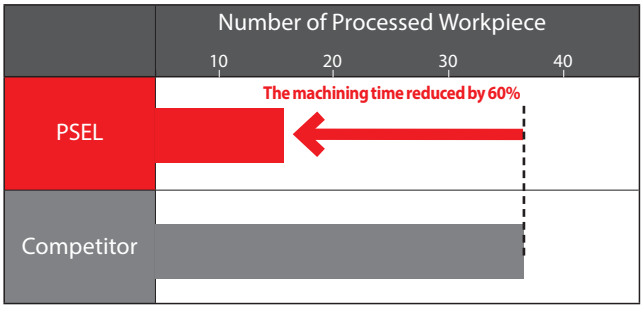


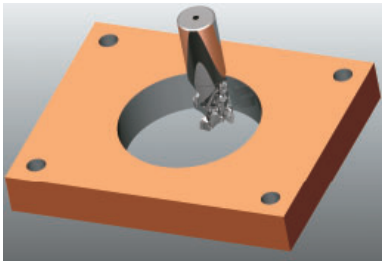


Side milling of the internal circumference of FCD450 machine parts with casting surface

Tool	PSEL11R032SS32-3-45 (Ø32x3)	Competitor (Ø32x2)
Insert Grade	ZDKT11T308SR-GR (XP3035)	Coated carbide insert
Work Material	FCD450	
Cutting Speed	100m/min (995min^{-1})	80m/min (795min^{-1})
Feed	600mm/min (0,2mm/t)	240mm/min (0,15mm/t)
Depth of Cut	ap=33mm ae=5mm	
Coolant	Water-Soluble	
Overhang Length	200 mm	
Machine	Vertical Machining Center	

The machining time was reduced by 60% compared with the competitor's product. The sound was low with the stable machining. Its wear after machining 30 workpieces was minimal, and sudden chipping, which was occurred by the competitor's product, was unlikely to happen.

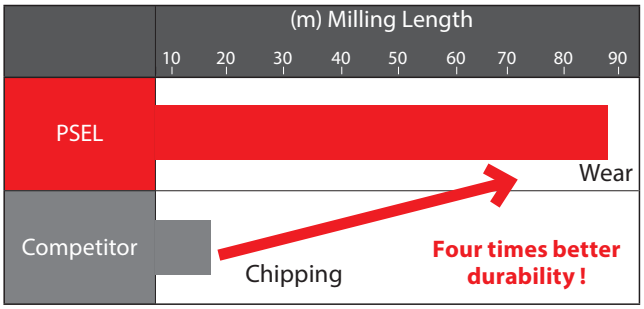


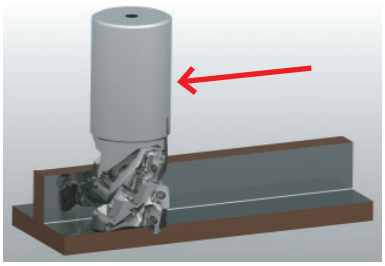


Side milling of pre-hardened steel machine parts

Tool	PSEL11R040SS42-3-37 (Ø40x3)	Competitor
Insert Grade	ZDKT11T308SR-GR (XP2040)	Coated carbide insert
Work Material	NAK80 (45HRC)	
Cutting Speed	150 m/min (1.200 min^{-1})	
Feed	450 mm/min (0,13 mm/t)	240 mm/min (0,1 mm/t)
Depth of Cut	ap=25 mm ae=5 mm	
Coolant	Water-Soluble	
Overhang Length	180 mm	
Machine	Horizontal Machining Center	

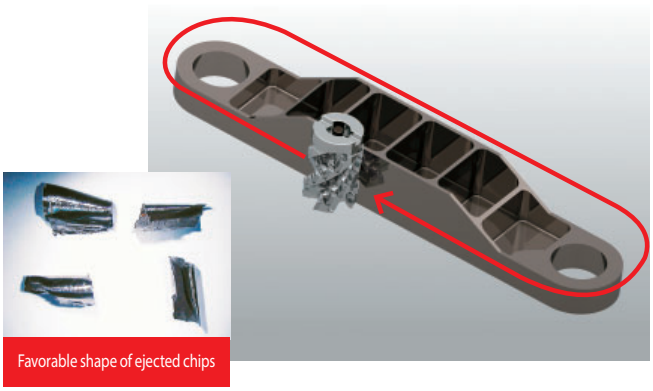
The machining time was reduced by 47% (PSEL: 10min. 8sec. per workpiece; the competitor's product: 19 min. per workpiece). Furthermore, the tool life became approximately 4 times, and sudden chipping, which was occurred by the competitor's product, was unlikely to happen.





Side milling of the outer circumference of titanium alloy aircraft parts

Tool	PSEL15R063M27-3-50 (Ø63x3)	Competitor (Ø63x4)
Insert Grade	ZDKT150508ER-SM (XC5040)	Coated carbide insert
Work Material	Ti-6Al-4V (35HRC)	
Cutting Speed	50 m/min (250 min^{-1})	
Feed	150 mm/min (0,2 mm/t)	150 mm/min (0,15 mm/t)
Depth of Cut	ap=21~45 mm ae= 7,5~25 mm	
Coolant	Water-Soluble	
Overhang Length	300 mm	
Machine	Horizontal Machining Center	



The PSEL achieved 3 times longer tool life (3 workpieces and welding wear after 276 mins) than the competitor tool (1 workpiece and chipping after 92 mins). Moreover, the PSEL was able to maintain consistent chip shape and minimize the risk of sudden chipping.

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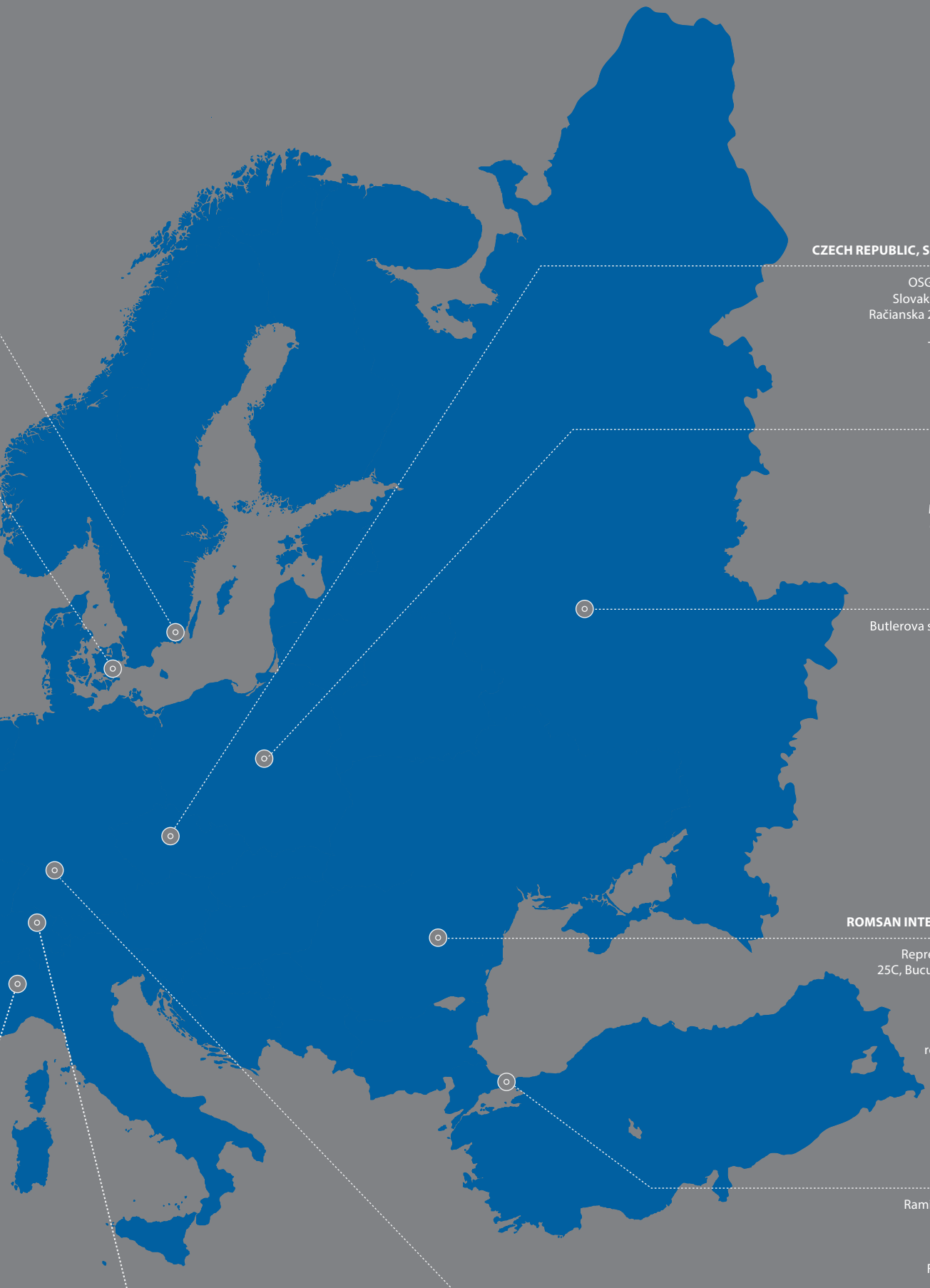

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