

SHOULDER PUNCHES

—LAPPING—

Type	Shank diameter D Tolerance	M H	Catalog No.		The tip shape can be selected from Tip shape A~G in the figure below.
			Type	Tip length	
—Lapping— RoHS	D _{m5}	Equivalent to SKD11 60 ~ 63HRC SKH51 61 ~ 64HRC Powdered high-speed steel 64 ~ 67HRC	L-SP	S L X Tip length (B) X>L>S	
			L-SH		
			L-PH		
	D ^{+0.005} ₀	AL-SP			
		AL-SH			
		AL-PH			

Tip shape	Tip shape	Tip shape	Tip shape	Tip shape
A	D	R	E	G
$P \geq W$ $K = \sqrt{P^2 + W^2}$	$P \geq W$ $K = \sqrt{P^2 + W^2}$	$P \geq W$ $0.15 \leq R < \frac{W}{2}$ $K = \sqrt{(P-2R)^2 + (W-2R)^2} + 2R$	$P > W$	$P > W$

Type	Tip shape	Tip length	0.001 mm increments										B	H					
			L		D R E G		R												
			min.	max.	P-Kmax.	P-Wmin.													
(D _{m5})	S	3	40	50	60	70	80	90	100	1.000	2.990			8	5				
		4	40	50	60	70	80	90	100	1.000	3.990	3.970	1.000	7					
		5	40	50	60	70	80	90	100	2.000	4.990	4.970	1.200	8					
		6	40	50	60	70	80	90	100	2.000	5.990	5.970	1.500	9					
		8	(40)	50	60	70	80	90	100	3.000	7.990	7.970	2.000	11					
		10	(40)	50	60	70	80	90	100	3.000	9.990	9.970	2.500	13					
		13	(40)	50	60	70	80	90	100	6.000	12.990	12.970	3.000	16					
		16	(40)	50	60	70	80	90	100	10.000	15.990	15.970	4.000	19					
		20	(40)	50	60	70	80	90	100	13.000	19.990	19.970	5.000	23					
		25	(40)	50	60	70	80	90	100	18.000	24.990	24.970	6.000	28					
		L-SP L-SH L-PH	A D R E G	L	3	50	60	70	80	90	100	1.000	2.990			13	5		
					4	50	60	70	80	90	100	1.000	3.990	3.970	2.000		7		
					5	50	60	70	80	90	100	2.000	4.990	4.970	2.000		8		
					6	50	60	70	80	90	100	2.000	5.990	5.970	2.000		9		
					8	50	60	70	80	90	100	3.000	7.990	7.970	2.500		11		
10	50				60	70	80	90	100	3.000	9.990	9.970	2.500	13					
13	50				60	70	80	90	100	6.000	12.990	12.970	3.000	16					
16	60				70	80	90	100	10.000	15.990	15.970	4.000	19						
20	60				70	80	90	100	13.000	19.990	19.970	5.000	23						
25	60				70	80	90	100	18.000	24.990	24.970	6.000	28						
AL-SP AL-SH AL-PH	A D R E G				X	3	50	60	70	80	90	100	1.200	2.990				19	5
						4	50	60	70	80	90	100	1.200	3.990	3.970		2.000		7
						5	60	70	80	90	100	2.000	4.990	4.970	3.500		8		
						6	60	70	80	90	100	2.000	5.990	5.970	3.500		9		
						8	60	70	80	90	100	3.000	7.990	7.970	5.000		11		
		10	60	70		80	90	100	3.000	9.990	9.970	5.000	13						
		13	60	70		80	90	100	6.000	12.990	12.970	5.000	16						
		16	70	80		90	100	10.000	15.990			19							
		20	70	80		90	100	13.000	19.990			23							
		25	70	80		90	100	18.000	24.990			28							

Ⓜ: P>D-0.03...ℓ=0 If P>D-0.03 for a round punch, D₀^{-0.01} (press-in lead) is not included.
 ⓂⓂⓂⓂⓂ: P·K>D-0.05...ℓ=0 If P·K>D-0.05 for a shaped punch, D₀^{-0.01} (press-in lead) is not included.
 Ⓜ(40)→B=8 If full length is (40), tip length is 8 mm in all cases.

Order	Catalog No.	L	P	W	R (Ⓜ only)
	L-SHAS 10	70	P9.500		
	AL-PHDL 13	80	P10.500	W7.340	

Days to Ship **Quotation**

Alterations	Catalog No.	L(LC·LCT·LMT)	P(PC)	W(WC)	R	(BC·HC·TC, etc.)
	AL-SPAS 10	LC72	PC2.800			BC8

Alteration	Code	(A)	D R E G	1Code
Alterations to tip	PC WC	Tip dimension change PC ≥ P _{min.} WC ≥ P _{min.} ≥ 0.800 0.001 mm increments P(PC) Bmax. 0.500 ~ 0.799 10 0.800 ~ 0.999 13 1.000 ~ 1.999 20 2.000 ~ 3.999 35 4.000 ~ 4.999 45 5.000 ~ 5.999 50 6.000 ~ 6.999 60	Tip dimension change PC WC ≥ P _{min.} ≥ 0.800 0.001 mm increments P(PC)·W(WC) Bmax. 0.800 ~ 1.499 8 1.500 ~ 1.999 13 2.000 ~ 3.499 19 3.500 ~ 4.999 25 5.000 ~ 6.999 30	Quotation
	BC	Tip length change 2 ≤ BC ≤ Bmax. 0.1 mm increments Full length L must be at least 25 mm longer than tip length BC.	Tip length change 2 ≤ BC ≤ Bmax. 0.1 mm increments Full length L must be at least 30 mm longer than tip length BC.	
	PRC	Rounding of tip side edge 0.3 ≤ PRC ≤ 1 0.1 mm increments PRC ≤ (P-0.2)/2 Cannot be combined with PCC-GC.		
	PCC	Chamfering to tip side edge 0.3 ≤ PCC ≤ 1 0.1 mm increments PCC ≤ (P-0.2)/2 Cannot be combined with PRC-GC.		
	GC	20° ≤ GC < 90° 1° increments Tip length B ≥ 1+2 f = P/2 × tan(90° - GC°) Tip edges are rounded. Cannot be used for P < 1.0. Cannot be combined with LKC·LKZ·LCT·LMT·PRC·PCC.		
	Alterations to full length	LC	Full length change 25+B(BC) ≤ LC < L 0.1 mm increments If difference between full length and tip length is 25 mm or less, tip length is adjusted to (Full length-25 mm). (If combined with LKC·LKZ, 0.01 mm increments can be selected.)	
LCT		Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes (Ⓜ) are the same as for LC.	TKC Head thickness tolerance change T +0.3 → +0.02 0 0	LC Full length tolerance change L +0.3 → +0.1 0 0
LMT		Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes (Ⓜ) are the same as for LC.	TKM Head thickness tolerance change T +0.3 → 0 0 -0.02	LC Full length tolerance change L +0.3 → +0.1 0 0

Price **Quotation**

Alteration	Code	(A)	D R E G	1Code
Alterations to full length	LKC	Full length tolerance change L +0.3 → +0.05 0 0		
	LKZ	Full length tolerance change L +0.3 → +0.01 0 0		
Alterations to head	KC	Addition of single key flat to head Key flat position change 1° increments		
	WKC	Addition of double key flats in parallel Double key flats in parallel Can be combined with KC.		
	KFC	Double key flats at 0° and a selected angle 1° increments Cannot be combined with KC-WKC.		
	NKC	No key flat		
	HC	Head diameter change D ≤ HC < H 0.1 mm increments		
	TC	Head thickness change 2 ≤ TC < 5 0.1 mm increments (If combined with TKC·TKM·LCT·LMT, 0.01 mm increments can be selected.) Full length L is shortened by (5-TC). If combined with LC·LCT·LMT, full length remains as specified.		
Alterations to shank	TKC	Head thickness tolerance change T +0.3 → +0.02 0 0		
	TKM	Head thickness tolerance change T +0.3 → 0 0 -0.02		
	TCC	Chamfering of head This improves the strength of the punch head. Ⓜ P.1097 0.1 mm increments 0.5 ≤ TCC ≤ (H-D)/2 If H ≤ 5, then TCC is 0.5.		
	RC	Head thickness is machined to a tolerance of -0.04~0 relative to the retainer surface. Cannot be used for D ₀ ^{+0.005} types.		
Alterations to shank	SKK	Single key flat on shank D3 ~ 6 P ≤ D-1.2 W ≤ D-1.2 (Machining width 0.5) D8 ~ P ≤ D-2.2 W ≤ D-2.2 (Machining width 1) Cannot be combined with KC-WKC-KFC.		
	NDC	No press-in lead ℓ ≥ 3 → ℓ = 0		